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Financial Aid and Social Mobility: Evidence from Colombia's Ser Pilo Paga
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ABSTRACT

The paper studies the impact of financial aid on long-term educational attainment and labor market outcomes in Colombia. In 2014, the government launched a large-scale and generous student loan program called "Ser Pilo Paga." It offered full tuition coverage to students admitted to one of 33 government-certified high-quality universities known for superior test scores, graduation rates, and per-student spending. Notably, completing a bachelor's degree converted the loan into a grant. To qualify, students must score in the top 10% of the standardized high school exit exam and have below-median household wealth. Using RD and DD methodologies, we use nationwide administrative microdata linking all high school test takers, postsecondary attendees, and formal workers to estimate impacts up to eight years after high school. Financial aid improves college enrollment, quality, and attainment, particularly in STEM-related fields. The earnings gains are substantial, growing, and driven partly by high-quality universities improving students' skills, as demonstrated by their performance on Colombia's college graduation exam. A welfare analysis using the MVPF yields over $4.8 per dollar of government spending. Lastly, the program narrowed socioeconomic gaps in college attainment, skill development, and earnings among academically similar students without adversely affecting non-recipients, thereby promoting equity and efficiency.

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1 Introduction

How can governments enhance upward mobility? While many policymakers and scholars view higher education as a pathway out of poverty (Goldin and Katz, 2008; Oreopoulos and Petronijevic, 2013), evidence that colleges, particularly top-tier institutions, serve as engines of upward mobility is lacking. For instance, research conducted in the United States and Chile suggests that students with a low socioeconomic status (SES) face challenges accessing top-tier colleges (Chetty et al., 2023, 2020; Hoxby and Avery, 2013) and may not consistently experience the expected benefits (Zimmerman, 2019). Given that low-SES students may be too financially constrained to afford college and costly top-tier institutions, governments worldwide invest heavily in financial aid programs. However, evidence on whether such aid effectively improves their long-term educational and labor market outcomes is both limited and inconclusive (Dynarski et al., 2023; Nguyen et al., 2019).

This paper studies the impact of financial aid on social mobility in Colombia, an upper-middle-income country characterized by substantial income inequality and a pronounced wage premium for higher education (Ferreyra et al., 2017). We leverage Colombia's substantial reforms in its financial aid system, designed to enhance upward mobility by improving college access and quality for low-SES students. In 2014, the national government introduced the "Ser Pilo Paga" (SPP) program, a generous student loan initiative translating to "hard work pays off." This program offered full tuition coverage for 10,000 high school graduates annually, provided they enrolled in one of Colombia's 33 government-certified "high-quality" universities (HQ colleges), known for their higher test scores, graduation rates, and per-student spending compared to other institutions. To be eligible for SPP, students had to score in the top 10% on the national standardized high school exit exam and belong to the lower half of the wealth distribution. Notably, participants who completed their bachelor's degree had their loans forgiven, converting them into grants.

We use extensive administrative data linking all high school test takers, postsecondary attendees, and formal workers throughout the country, encompassing information from 2012 (two years preceding the reform) through 2022. This comprehensive dataset enables us to investigate the immediate and long-term effects on various outcomes such as college enrollment, college quality, college completion, employment, and earnings for both individuals who received the aid and those who did not, on a nationwide scale.[1]

To identify impacts on program recipients, we use two complementary regression discontinuity (RD) designs. In one, we compare outcomes for students who meet the poverty requirement but have test scores close to the minimum eligibility threshold. In the other, we compare students who meet the test score requirement but are near the poverty cutoff for eligibility. These discontinuities pertain to distinct groups. The first group comprises high school graduates with low SES (bottom wealth tertile) and test scores near the 90th percentile. The second group consists of middle-class students (near the 53rd wealth percentile) scoring within the top 5% on the exam. Interestingly, we find that the impact of financial aid on college graduation and earnings is large for both groups, implying substantial benefits from expanding financial aid across the distribution of student SES and ability.

We find that financial aid significantly improves college enrollment, college quality, and college completion. Low-SES students just above the test score cutoff experience a ten percentage point (p.p.) increase in college attendance, a 12% improvement over low-SES students just below the test score cutoff (the control group). Aid eligibility also raises the chance of attending HQ colleges by 44 p.p. (240%) compared to the control group, most of whom end up attending low-quality (LQ) institutions. Importantly, we show that HQ colleges are more effective in imparting skills and offering high-paying job prospects, as measured by "value added." Additionally, financial aid eligibility increases the odds of low-SES high achievers attaining a bachelor's degree by 16 p.p. (39%) at the test score cutoff and by 15 p.p. (27%) at the poverty cutoff. Notably, over two-thirds of the rise in bachelor's attainment occurs in STEM-related fields, known for substantial wage returns (Hastings et al., 2013; Kirkeboen et al., 2016; Riehl et al., 2018). Similar effects are observed for students near the poverty cutoff. These findings underscore that binding credit constraints lead to distorted educational choices and college sorting primarily based on the ability to pay and demonstrate that government interventions can effectively remove these barriers.

Financial aid recipients also experience substantial improvements in the labor market. The program led to a significant increase in formal monthly earnings eight years after high school completion, ranging from 26% to 36% of the mean earnings of the control group, depending on the complier population. These earnings gains more than offset the temporary earnings losses experienced by students during their

[1]Notably, our extensive nationwide data enables us to circumvent concerns about biases arising from out-of-state migration, a common issue in U.S. studies (Foote and Stange, 2022).

time in college. Moreover, these earnings gains grow over time, consistent with prior research showing that the returns to college quality rise with labor market experience (MacLeod et al., 2017; Zimmerman, 2014). Targeted students also achieve earnings gains surpassing the average returns of the HQ institutions they attended, as measured by "value added," in alignment with earlier research highlighting the benefits of selective, high-quality education for disadvantaged students (Bleemer, 2021a,b; Bleemer and Mehta, 2022).

Interestingly, the positive impact on earnings is not solely attributed to the signaling advantages of an HQ college degree. These institutions also contribute to students' skill enhancement. We can document this improvement in skill because Colombia has a mandatory and widely recognized standardized college graduation exam. This allows us to compare skill development during college and estimate impacts on human capital—a rare opportunity in other contexts. We find that recipients just above the test score threshold score 8% of a standard deviation higher in Colombia's college graduation exam, a 17% increase compared to the control group.

Calculating the ratio of recipients' willingness to pay by the net cost to the government, we estimate the marginal value of public funds (MVPF) at 4.8 based on the poverty threshold and 5.6 based on the test score threshold. This indicates that the policy yields over $4.8 of benefits per dollar of net government spending. Importantly, this estimate considers the program's impact on increasing government educational expenditure by encouraging students to pursue more expensive degrees. An MVPF of 4.8 or higher positions the SPP program well above the median of estimated MVPFs for other grant aid programs discussed in Hendren and Sprung-Keyser (2020) and Angrist et al. (2021), showcasing its effectiveness in improving social welfare.

Our results also illustrate that financial aid can promote both equity and efficiency. While assessing these broader effects of financial aid is challenging in the United States because it has been gradually phased in (Dynarski and Scott-Clayton, 2013), Colombia's substantial and unprecedented aid expansion enables us to make progress on these questions. We examine the equity impact of broadening financial assistance by comparing outcomes for low-SES and high-SES students before and after the policy's implementation. We find that the expansion of financial aid effectively narrows the socioeconomic gap in college attainment, skill development, and earnings among students who were academically similar in high school.

For assessing efficiency, we conducted a comparison between students who were eligible for financial aid and those who were not, employing a difference-in-difference

(DD) approach. Our analysis indicates that there were no negative consequences observed for students ineligible for aid. Elite colleges effectively managed the increased demand by promptly expanding their incoming cohorts, increasing them by an average of approximately 50%.[2] Despite concerns regarding potential compromises in educational quality or the value of degrees (Blair and Smetters, 2021; MacLeod and Urquiola, 2015; Urquiola, 2020), our findings indicate that this unprecedented expansion of elite college capacity did not lead to any adverse effects on degree completion, learning outcomes, or earnings for more privileged students. Instead, our results suggest that there were positive spillover effects resulting from the policy, indicating an overall improvement in efficiency.[3]

Our study contributes to three key literatures. First, we add to the existing body of evidence on the impacts of financial aid on long-term educational attainment and earnings, metrics strongly linked to economic mobility. With numerous financial aid programs in the United States and globally, the central challenge lies in designing policies that effectively enhance recipients' long-term outcomes (Dynarski et al., 2023; Nguyen et al., 2019). Current evidence indicates that some U.S. programs contribute to students' long-term success (Angrist et al., 2021; Bettinger, 2015; Bettinger et al., 2019; Black et al., forthcoming; Castleman and Long, 2016; Denning et al., 2019), while others fall short (Barr et al., 2021; Cohodes and Goodman, 2014; Eng and Matsudaira, 2021; Gurantz, 2022; Marx and Turner, 2018). Similarly, evidence from outside the United States is limited and mixed (Bucarey et al., 2020; Card and Solis, 2022; Chu and Cuffe, 2021; Gurgand et al., 2023).

We contribute to this literature by demonstrating that financial aid policies can effectively enhance low-SES students' college attainment and earnings while promoting equity. This achievement results from a strategic approach that directs students toward higher-quality colleges and programs, supported by various measures of "value added." This finding highlights the centrality of institutional quality and the importance of designing policies that induce students to attend better institutions (Dynarski et al., 2023; Hoxby and Avery, 2013). A key insight from our study is that improving educational quality is facilitated by three factors: the ability of

[2] Notably, HQ private colleges in Colombia exhibit supply flexibility, relying primarily on student tuition rather than endowments or government funding. Additionally, housing constraints were not an issue since students typically lived off-campus.

[3] However, caution should be taken when extrapolating these findings to policies that aim to improve low-SES students' access to selective colleges through changes in admission practices, such as implementing "need affirmative" action policies. This is especially crucial if such policies could potentially compromise class quality as assessed by test scores.

policymakers and students to observe institutional quality, the substantial influence of academic credentials (test scores) on college admissions, and the capacity of low-SES students to attain scores that meet the requirements for admission to top-tier colleges. Consequently, programs implemented in settings where it is challenging to gauge institutional quality or where admission criteria create barriers for low-SES students to access high-quality institutions (as shown in Chetty et al., 2023, 2020) may face heightened challenges in significantly improving upward mobility and promoting equity.

A second literature focuses on the returns of college quality on education and labor market outcomes. While attending or graduating from a higher-quality college can result in increased earnings (Bleemer, 2021b; Canaan and Mouganie, 2018; Hoekstra, 2009; Mountjoy and Hickman, 2021; Smith et al., 2020; Zimmerman, 2014), the effect of elite colleges on later-life outcomes is mixed. Some studies find that elite colleges improve earnings (Anelli, 2020; Jia and Li, 2021), while others show no mean impacts (Chetty et al., 2023; Dale and Krueger, 2014, 2002; Ge et al., 2022; Zimmerman, 2019). Furthermore, to the extent that there *is* an earnings advantage, it seems to be driven by signaling (Barrera-Osorio and Bayona-Rodríguez, 2019; Sekhri, 2020) and networking (Michelman et al., 2021) rather than improved human capital.[4] We contribute to this literature by showing positive causal returns to both college quality and elite colleges. Moreover, using system-wide learning metrics, we show that the earnings advantage is tied to improved human capital as these colleges equip students with more knowledge and skills.

Lastly, we contribute to the literature concerning government policies to foster upward mobility. Researchers increasingly employ big data to offer descriptive analyses of social mobility in both developed and developing nations (Acciari et al., 2022; Bratberg et al., 2017; Britto et al., 2022; Chetty et al., 2014; Connolly et al., 2019; Deutscher and Mazumder, 2020; Heidrich, 2017; Helsø, 2021). However, there is little causal evidence regarding public policies' impact on long-run earnings. Education is often hailed as a solution to enhance economic mobility, and policies bolstering early childhood education have been demonstrated to elevate children's long-term earnings (Bailey et al., 2021; Chetty et al., 2011; Fredriksson et al., 2012; Jackson et al., 2015). Yet, emerging research suggests that the quality of education in later stages might wield

[4] Exceptionally, Saavedra (2009) finds that marginal admission to an elite university leads to more learning, but his study relies on college exit exams that were optional at the time, raising concerns about potential bias stemming from self-selection into taking the exam.

an even greater influence on long-term outcomes (Hoxby, 2021), leaving open the question of which policy levers policymakers can use to enhance educational quality during the "age of opportunity." We contribute to this literature by providing causal evidence of a large-scale education policy aimed at improving economic mobility through colleges, demonstrating that facilitating high schoolers' ability to afford high-quality education enhances their earnings in adulthood.

2 Higher Education in Colombia and The SPP Program

Colombia has around 300 higher education institutions, including professional technical institutions, technological institutions, technological schools, university institutions, and universities. For simplicity, we refer to all these institutions collectively as "colleges." Colombian colleges offer two- or three-year programs classified as "technical and technological" and four- or five-year programs known as "professional," akin to associate and bachelor's degree programs in the United States.[5]

Programs and colleges in Colombia vary in terms of selectivity, quality, and tuition fees. Unlike in the United States, undergraduate admissions in Colombia primarily rely on students' performance in the national standardized high school exit exam, known as SABER 11. This exam assesses knowledge in subjects like mathematics, physics, chemistry, biology, language, philosophy, social science, and English. Almost 90% of high school seniors take this exam, regardless of their intention to apply to college. When applying to colleges, students indicate their preferred college-major combination, and admissions are decentralized and occur twice a year due to the different academic calendars followed by high schools. Around 85% of students begin college in the spring term, while the remaining 15%, primarily from elite private high schools, start in the fall.

Since 2010, a distinctive aspect of the Colombian higher education system is the mandatory standardized exam for undergraduate students upon graduation (Law 1324/2009). This exam provides insights into the educational value added by individual colleges, a practice not widely adopted in other countries (OECD, 2016). For bachelor's degree seekers who have completed at least 75% of their academic credits, the exam is SABER PRO. Prior to 2016, students pursuing associate

[5] Universities and university institutions can offer either bachelor's or associate's programs, while the other college types only offer associate's programs. Some researchers use the term "short-cycle programs" to refer to the two- or three-year "technical and technological" programs.

degrees took SABER PRO, while after 2016, they took a separate exam called SABER T&T. These exams evaluate generic competencies such as writing, critical reading, quantitative reasoning, English, and citizenship, as well as program-specific skills. Students achieving the highest scores in the program-specific component receive academic distinctions (Busso et al., 2022).

To recruit students, all programs and colleges in Colombia must meet the Ministry of Education's "Qualified Registry" standards and renew this status every seven years. Additionally, colleges have the option to undergo a peer review proceess to obtain "High-Quality Accreditation" (HQA). HQA aims to foster continuous self-evaluation, self-regulation, and improvement of institutions and programs (OECD, 2016).[6] Programs offered by colleges with HQA automatically receive HQA, while colleges without HQA can still have individual programs that achieve HQA. However, by 2014, shows that only 9% of programs and 12% of colleges achieved HQA (OECD, 2016). Among the 43 colleges with HQA, 33 were universities, while the remaining 10 were non-university institutions. For convenience, we refer to these 33 universities with HQA as HQ colleges, while all other colleges are referred to as LQ colleges.

Table A.1 reports key descriptive statistics for different college types. Among the 33 HQ colleges, 12 are public, and 21 are private. Students enrolled in HQ colleges exhibit meaningfully higher entry and exit test scores in comparison to those attending LQ colleges. Furthermore, HQ colleges demonstrate superior graduation rates and a higher percentage of faculty members with a Ph.D. However, this comes at a higher expense: HQ colleges are about twice as costly as LQ institutions, even though public colleges offer discounted fees due to substantial government subsidies.

Colombia's student loan and grant programs have lagged behind those of other OECD countries (OECD, 2016), and private colleges offer limited financial aid. This creates significant challenges for low-income students pursuing higher education, as financial resources play a crucial role in accessing higher education in Colombia (Riehl et al., 2018). High-achieving students with financial means can afford HQ private colleges, while entrance to competitive and affordable HQ public colleges is limited to a small exceptional minority. Consequently, most low-income students either attend LQ colleges or encounter barriers accessing higher education altogether (Ferreyra et al., 2017). This sorting based on financial capacity results in misallocation of talent and socioeconomic segregation within higher education, where educational

[6] HQA is granted by the National Accreditation Council, composed of members from the academic and scientific community, and lasts for three to ten years, requiring re-accreditation thereafter.

opportunities and future prospects are heavily influenced by financial circumstances. This perpetuates inequality and hampers social mobility.

The SPP Financial Aid Program

On October 1, 2014, the Colombian government announced "Ser Pilo Paga," a merit-based financial aid program aimed at low-SES students. SPP was a publicly funded student loan program that fully covered the tuition fees for four- or five-year bachelor's dgree programs at any of Colombia's 33 HQ colleges. The government directly paid the tuition fees for each SPP beneficiary to their chosen university. Additionally, beneficiaries received a modest stipend every six months, equivalent to one monthly minimum wage or about US$40 per month. If the student relocated to a different metropolitan area to attend college, the stipend increased to four minimum wages. Crucially, SPP included an incentive component where the loan was automatically forgiven upon graduation.

SPP combines merit- and need-based criteria for eligibility. To quality for SPP, applicants must meet three conditions. Firstly, they need to achieve a score above a specified cutoff in the SABER 11 exam taken in the fall term of their high school graduation year. For the first cohort of SPP recipients, this required scoring at least 310 out of 500, which placed them among the top 9.5% of test scores in 2014 (Figure I, Panel A). Secondly, applicants must come from economically disadvantaged households, as determined by the government's SISBEN proxy-means testing instrument. The applicant's SISBEN wealth index must fall below a cutoff that varies by geographic location: 57.21 in the 14 main metropolitan areas; 56.32 in other urban areas; and 40.75 in rural areas (Figure I, Panel B).[7] Approximately 52.8% of test takers are eligible based on their SISBEN score, indicating both possession of a SISBEN score and a score below the applicable cutoff. Thus, SPP places greater emphasis on merit rather than financial need. Thirdly, applicants must receive admission to an HQ university; SPP does not impact the college admissions process for aid beneficiaries.

Students with greater financial resources tend to achieve higher scores on standardized exams compared to their peers with fewer financial means. Figure A.1

[7] SISBEN is a means-tested survey that assigns households a score ranging from 0 to 100, representing their relative wealth based on factors like housing quality, possession of durable goods, access to public utilities, and human capital indicators. SPP's SISBEN cutoffs align with the eligibility criteria of other social programs, such as the conditional cash transfer program "Familias en Acción" and humanitarian aid for victims of Colombia's armed conflict.

illustrates the distribution of SABER 11 test scores for students eligible for financial aid based on need and those who are not eligible, showcasing lower performance among the former group. Among merit-eligible students, 71.4% do not meet the financial need criterion, while 28.6% are eligible due to financial need. Conversely, among need-eligible students, approximately 15,000 students, which translates to about one in twenty, also meet the test score requirement, compared to one in seven for need-*in*eligible students.

Importantly, the announcement of SPP came as a surprise nearly two months after students had taken the SABER 11 exam (Londoño-Vélez et al., 2020). Eligibility for SPP was determined based on test scores received before the application deadlines of most colleges. This prevented students from manipulating their scores or wealth index to become eligible for SPP, supporting our assumption of quasi-random assignment near the eligibility cutoffs, which we validate in Section 4.1. The program benefited approximately 40,000 students between 2014 and 2018. Additionally, a widespread government advertising campaign contributed to SPP becoming one of Colombia's most popular social programs.

3 Data

We use administrative data from six main sources:

1. The population of SABER 11 test takers from the *Instituto Colombiano para el Fomento de la Educación Superior* (ICFES), the institution in charge of standardized testing in Colombia. These data contain test scores and sociodemographic information (e.g., socioeconomic status, parental education, sex) and cover the fall semesters of 2012, 2013, and 2014, capturing both pre- and post-expansion of financial aid.

2. The universe of households from DNP's *Sistema de Identificación de Potenciales Beneficiarios de Programas Sociales* (SISBEN) from 2012 to 2014.

3. The population of program beneficiaries from SPP from ICETEX, the institution that manages all student loans and grant aid for postbaccalaureate programs. These data allow us to identify program beneficiaries, quantify the program's cost, and observe dropouts' loan repayment behavior.

Together, these three sources allow us to identify the eligible population and program recipients. The following three sources enable us to measure key outcomes of interest:

4. The Ministry of Education's *Sistema Nacional de Información de la Educación Superior* (SNIES) tracks students in the postsecondary education system and provides student-by-semester level information on enrollment status, institution and type of program attended (e.g., associate, bachelor's, graduate), field of study, academic performance (credits and courses passed), persistence, and degree completion. We have SNIES microdata from 2013 to 2020. We complement this dataset with information from institutional financial accounts and balance sheets reported by colleges to Colombia's Ministry of Education, providing institution-by-year reports on educational expenditures per full-time student.

5. The population of college graduation test takers from ICFES. It includes information from SABER PRO from 2013 to 2021 and SABER T&T from 2016 to 2021. Since 2016, SABER PRO is offered annually while SABER T&T is offered each semester, specifically for students in associate degree programs. Both exams consist of five generic competency tests (writing, critical reading, quantitative reasoning, English, and citizenship competencies) and field-specific components related to the students' majors (e.g., economics, biology). The scores obtained in the five generic modules were summed and standardized to have a mean of zero and standard deviation of one for students taking the test in 2016. The test scores are comparable between 2013 and 2021.

6. Social security records from Colombia's Ministry of Health and Social Protection's *Planilla Integrada de Liquidación de Aportes* (PILA). It provides a comprehensive record of individual-by-month contributions to healthcare, pension funds, and workers' compensations. It includes detailed information on payroll, earnings, days worked, and employer characteristics (e.g., firm size, sector, location) for all formal workers in Colombia. However, it does not capture earnings for informal workers; the implications for our analysis are discussed in Section 4.5 The dataset covers April, August, and December from 2013 to 2022.

Out of the 574,259 individuals who took the SABER 11 exam in August 2014, we exclude approximately 11,000 individuals (2% of test takers) who had previous college experience before retaking the exam. Our main analysis focuses on the remaining sample of 563,027 individuals. Among these individuals, 297,279 (52.8%) qualify for SPP based on their SISBEN score, while 53,636 (9.5%) qualify for SPP based on their SABER 11 score.

4 Impacts on Recipients

4.1 RD Design and Validity

To estimate the causal effects of financial aid on recipients, we utilize an RD design by leveraging the SABER 11 and SISBEN cutoffs. While applicants must meet both need- and merit-based criteria and obtain admission to an HQ university to receive SPP, we focus solely on eligibility determined by test scores and households' poverty index to avoid potential biases caused by students expecting financial aid and influencing their college application decisions.

This multidimensional RD setting allows us to identify two types of compliers: (1) need-eligible students near the test score cutoff and (2) merit-eligible students near the need cutoff (Figure A.2). However, to simplify our analysis, we report separate estimates by collapsing the discontinuity into a single dimension for each student. This is achieved by measuring the distance of SABER 11 (SISBEN) scores from the eligibility cutoff, based on their SISBEN- (SABER 11-) eligibility status. We adopt this univariate approach instead of calculating a weighted average of the two RD effects because the two discontinuities pertain to different student populations who, as we will demonstrate, are impacted differently by financial aid.

Indeed, Table A.2 shows that the RD design, employing the *test score* as the running variable, compares students who score around the 90th percentile of the test score distribution. These students generally have a lower SES, with control group students at the 31st percentile of Colombia's wealth distribution. In contrast, the RD design using the *wealth index* as the running variable compares students around the 53rd percentile of Colombia's wealth distribution. These students demonstrate higher SES, with smaller families, more educated parents, attendance at private full-day high schools, and urban residences. Moreover, this group performs exceptionally well on the exam, with the control group scoring above the 95th percentile. Considering the higher SES and academic performance of the latter population, they are likely to encounter fewer financial constraints and have a higher chance of attending an HQ college without financial aid. Consequently, we can anticipate that the impact of financial aid on college attendance and quality may be more pronounced for the former population than for the latter.

Our primary RD analysis focuses on students who took the high school exit exam in the fall semester of 2014. This cohort provides the highest internal validity as they were informed about the financial aid program and the strict eligibility cutoffs *after* completing the SABER 11 exam in 2014, mitigating concerns about non-random sorting based on test scores. In contrast, students in subsequent years may react to the prospect of future aid by putting in more effort during standardized exams, as shown by Laajaj et al. (2022) and Bernal and Penney (2019). Additionally, younger cohorts have more time to request an evaluation from local authorities for inclusion in SISBEN, which could introduce non-random sorting based on the need criterion.

We use a data-driven approach to select the optimal bandwidth using package 'rdrobust' (Cattaneo et al., 2014). Notwithstanding, Appendix B shows that the estimated RD coefficient and 95% confidence intervals are stable across smaller and larger bandwidth choices for all of our main outcomes of interest. Moreover, our analysis provides support for our identifying assumption of no manipulation of SABER 11 or SISBEN for fall 2014 test takers. The histograms in Figure I indicate no apparent manipulation of these variables. Furthermore, we conduct a formal test for manipulation using the local polynomial density estimator proposed by Cattaneo et al. (2018, 2020). The resulting robust-corrected p-values are 0.823 when using SABER 11 as the running variable, R_i, and 0.413 when using SISBEN as the running variable (Figure A.3). These results confirm that there is no statistical evidence of systematic manipulation of the running variable. Additionally, Table A.2 shows that we cannot reject the joint null hypothesis of balance in covariates around the two discontinuities.[8]

Figure A.4 presents the likelihood of receiving SPP based on the SABER 11 score (for SISBEN-eligible individuals) in Panel A, and the SISBEN score (for SABER 11-eligible individuals) in Panel B. The eligibility criteria were stringent, resulting in only a few individuals below the cutoffs receiving SPP. However, the program had a high take-up rate, with 58.3% of individuals eligible by merit and 64.5% of individuals eligible by need receiving SPP. The higher take-up rate at the need cutoff is consistent with the complier population, which has higher SES and test scores, being more

[8] When using SABER 11 as the running variable, we cannot reject the null hypothesis of no statistical difference for all but three of the 40 baseline characteristics. Similarly, when using SISBEN as the running variable, we cannot reject the null hypothesis for 28 of the 40 baseline characteristics. There is less balance at the SISBEN cutoff since, as mentioned in footnote 7, it coincides with those used by other social programs.

likely to apply and receive admission from an HQ university. Nevertheless, there is incomplete take-up due to reasons such as students not applying or being admitted to an HQ university that semester, or not applying to the SPP program.

4.2 Impacts on College Attendance and Quality

We begin by examining the impact of financial aid on college attendance within six years after high school. Figure II compares need-eligible students above and below the test score cutoff. Test scores predict college attendance. For instance, Panel A shows that a student scoring 40 points above the cutoff (98th percentile) has over 50 p.p. higher enrollment compared to a student scoring 40 points below (71st percentile). Financial aid eligibility increases immediate postsecondary enrollment by 28.7 p.p., from 41.4% among control students to 70.1%, a 69.5% increase.[9] Panel B shows that the proportion of control students attending college has risen from 41.4% to 77.3% over time. As a result, Panel C, which plots the reduced-form RD coefficient and 95% confidence intervals, shows an overall enrollment effect of around ten p.p. three years after high school. The effect remains stable and persistent, with a coefficient of 9.6 p.p. (or 12.4%) six years after high school completion (Table I).

Financial aid substantially improves the quality of the institutions that students select for higher education. Figure III displays the distribution of college attendance between HQ and LQ colleges. Approximately three-quarters of control group students choose LQ institutions. However, financial aid redirects students away from these colleges and towards HQ colleges. Consequently, six years after high school, marginally-eligible students are 43.6 p.p. (241%) more likely to have attended an HQ college. Thus, financial aid has a lasting effect on college quality by steering students away from no college or low-quality education and guiding them towards high-quality educational opportunities. Subsequent sections will provide further evidence of the "value added" of HQ colleges in terms of skill development and job placement, leading to improved educational and labor market outcomes.

Two key pieces of evidence support the claim that credit market imperfections hindered investments in human capital. Firstly, Figure A.5 shows that financial aid has a stronger impact on enrolling in HQ colleges for the poorest students compared

[9] Using data from SPADIES to trace students along the postsecondary pipeline, Londoño-Vélez et al. (2020) estimate a 32 p.p. increase in immediate enrollment. By contrast, we estimate a 28.7 p.p. increase because control students are more likely to attend SENA, Colombia's largest college for vocational training, which is included in our SNIES data but excluded in SPADIES.

to their less economically disadvantaged counterparts. Secondly, there is a significant difference in the effect on college attendance and quality between students close to the SABER 11 cutoff and those near the SISBEN cutoff (with higher SES and test scores). Despite the latter group already being more likely to attend college and doing so at an HQ institution, financial aid eligibility further increases their attendance at any college by 4.9 p.p. (5.8%) and to HQ colleges by 35.7 p.p. or 99% (Figures A.6 and A.7 and Table I).

Financial aid recipients strongly favor *private* HQ colleges, with eligibility leading to a 47 p.p. increase in attendance at these institutions for both the test score and need cutoffs (Table I and Figure A.8). The impact of financial aid on college choice varies between the two groups of compliers. Near the test score cutoff, there is a larger shift away from no college and LQ colleges. Conversely, near the need cutoff, where students have higher test scores and SES, there is a greater shift away from HQ *public* colleges, where they were twice as likely to attend compared to students near the test score cutoff.

Financial aid also influences program duration of college programs attended. At the test score cutoff, attendance at four- or five-year programs increases by 21.2 p.p. (37.6%), while attendance at two- or three-year programs decreases by 12.1 p.p. (56.3%). For students at the need cutoff, who have higher test scores and SES, the likelihood of attending four- or five-year programs is already higher. However, financial aid further encourages them to pursue longer programs, resulting in a 14.5 p.p. increase (Figures A.9 and A.10 and Table I).

4.3 Impacts on College Attainment

We now turn our attention to the influence of financial aid on degree attainment, addressing concerns that while it may broaden college attendance, it may not lead to higher graduation rates, especially if low-SES high-achievers face challenges that lead them to drop out of college.

Figure IV examines the probability of obtaining a bachelor's degree within seven years after high school, using the SABER PRO college graduation exam as a proxy. Panel A illustrates the strong association between test scores and degree attainment. Students who are need-eligible and score 40 points above the cutoff (98th percentile) are 28 p.p. more likely to earn a bachelor's degree compared to students just below the cutoff (90th percentile), and nearly 44 p.p. more likely compared to those scoring 40 points below the cutoff (71st percentile). Moreover, financial aid eligibility increases the likelihood of attaining a bachelor's degree by 15.6 p.p., representing a 38.8% increase relative to the control group (Table II).[10] The instrumental variable (IV) estimate, obtained by scaling the reduced-form coefficient by the take-up rate (58.3%), indicates that financial aid raises bachelor's degree attainment by 26.8 p.p. or 66.5% relative to the control group (Table III).

Panel B of Figure IV offers a placebo test by comparing need-eligible students who took the high school exit exam in the fall semesters of 2012 and 2013, before the expansion of financial aid (shown in black). These students have an equal likelihood of earning a bachelor's degree compared to those from 2014 (shown in red) if they score below the test score cutoff. Additionally, their probability of earning a bachelor's degree remains constant at the threshold. The RD coefficient is almost zero and statistically insignificant with the p-value is 0.841. These results provide further evidence that financial aid plays a causal role in increasing degree attainment.

In addition, the figure sheds light on the equity implications of expanding financial aid by comparing the series against need-*in*eligible students. These "high-SES" students do not qualify for SPP because either they lack a SISBEN score or their score exceeds SPP's cutoff. Reflecting their higher SES, these students are approximately ten p.p. more likely to earn a bachelor's degree compared to need-eligible students prior to the aid rollout (shown in gray). This disparity persists across all ranges of test scores. The expansion of financial aid does not affect need-*in*eligible students (shown in blue), while significantly enhancing outcomes for low-SES students. As a result, aid eligibility eliminates the SES gap in attainment among equally-achieving students.

Interestingly, despite financial aid having a greater impact on college *access* more for students near the test score cutoff (with lower performance and lower SES) compared to students near the need cutoff (with higher performance and higher SES), the effect on college *attainment* is remarkably similar. This reflects the fact that students with higher test scores and SES are less likely to drop out from college (Figure A.11). For this group, the reduced-form RD estimate indicates a 14.5 p.p. increase in degree attainment and the IV estimate is 22.5 p.p. (Tables II and III, and Figure A.12).

More than half of the increase in bachelor's degree attainment is concentrated in STEM fields (science, technology, engineering, mathematics, and medicine). This outcome is not ex-ante obvious since the program covered tuition for all majors, allowing students the freedom to choose their field of study. At the

[10] The effect remains consistent across different bandwidth choices (Figure B.7).

test score cutoff, the probability of earning a STEM degree increased by 8.8 p.p. (64.3%). Including STEM-related majors like Architecture, Business, Economics, and Psychology (referred to as "STEM-Plus" in Table II), the effect increases to 12.4 p.p. (41.2%), or over four-fifths of the attainment gains. Additionally, there is a 3.1 p.p. (60.8%) increase in the likelihood of earning a degree in social sciences and humanities, and a 1.5 p.p. (327.5%) increase in the likelihood of earning an art degree.[11] Near the need cutoff, where students perform better academically and come from higher socioeconomic backgrounds, the likelihood of earning a STEM degree is nearly double and 70% of the increase in bachelor's degree attainment is observed in the STEM-Plus fields. Crucially, STEM and STEM-related fields have the highest labor market returns in our data.

Financial aid significantly boosts degree attainment from HQ colleges, with the reduced-form and IV coefficients at 32.2 p.p. (330%) and 55.2 p.p. (566%), respectively. This effect holds across all test score ranges, including top 2% scores (Figure A.13). The increase is mainly driven by HQ *private* colleges, where the probability of earning a degree rises by 34.3 p.p. (1094%) at the test score cutoff and 39.0 p.p. (534%) at the need cutoff, with a slight opting out from HQ *public* colleges (Table II and Figure A.14). Conversely, financial aid decreases graduation from LQ colleges by 16.1 p.p. (-53.0%) and from short-cycle programs by 10.1 p.p. (-54.8%) as recipients shift away from these institutions and programs. However, there is an overall increase in the likelihood of earning *any* degree, with a 6.2 p.p. (10.6%) increase at the test score cutoff and a 7.7 p.p. (11.6%) increase at the need cutoff (Table II).

Table IV shows the impact of financial aid on additional educational outcomes. For example, by expanding college attendance, persistence, and program duration, the total number of years students attended an undergraduate program increased by 0.51 to 0.76 years, or 13.2% to 22.8%, depending on the complier population. Despite this, financial aid reduces the time to graduation by 0.13 to 0.19 years (2.4% to 3.6%), partially due to students choosing *private* HQ colleges, which offer shorter bachelor's degree programs (Table A.1). Furthermore, financial aid enhances the likelihood of pursuing graduate studies. While graduate education is rare in our data (only 0.8% of control students at the test score cutoff attend graduate studies within six years of completing high school), financial aid eligibility increases this likelihood by 0.5 p.p.

[11] Some LQ colleges do not report students' field of study, leading to a reduction in the likelihood of earning a bachelor's degree with a missing field of study (Column 14 of Table II).

(61.6%). For merit-eligible students at the need cutoff, who have higher test scores and higher SES, this increase is three times larger at 1.6 p.p. (106%).

4.4 Impacts on Learning Performance

Having shown financial aid's impact on college attendance and quality, we now examine its effect on students' learning as measured by Colombia's college graduation exam. We analyze the five generic competency tests taken by all students in all majors, which are comparable to the SABER 11 exam. These scores are commonly used by the Colombian government and researchers to assess college learning outcomes.[12] We specifically focus on bachelor's program students and their SABER PRO scores, as the standardized testing institution, ICFES, advises against comparing scores from SABER PRO and SABER T&T.

We begin by analyzing the impacts of financial aid on exam scores taken within five years of high school completion, which aligns with the timing for the majority of SPP recipients and the average student in Colombia. Figure V plots college test scores as a function of the distance to the SABER 11 cutoff for need-eligible students. Notably, *high school* scores strongly correlate with *college* scores. Financial aid eligibility further improves learning performance, with a reduced-form RD coefficient of 9.6% of a standard deviation (22.7% compared to the control group) and an IV estimate of 11.9% of a standard deviation (28.2% compared to the control group).[13]

Panel B provides a placebo check and highlights the equity implications of expanding financial aid. Before the implementation of SPP, there is an SES gap in learning performance in college. Despite equal performance in high school, high-SES students outperform low-SES students (shown in gray and black, respectively), with a gap of at least 5% of a standard deviation just below the test score cutoff. Moreover, this gap persists across the entire test score distribution and widens for the top 5% of high school test scores. Section 4.7 will demonstrate that the SES gap in college "value added" explains the disparity in learning performance. However, the expansion of financial aid improves low-SES students' test scores, eliminating the

[12] Our focus on the generic component means that teaching to the test is not a concern because students compete for an academic distinction based on the program-specific component.

[13] Control students take longer to access college, leading to a delayed completion of the college exit exam. Figure A.15 includes all exams taken within seven years of high school completion. The reduced form estimate shows a significant and economically meaningful 12.4% improvement, while the IV estimate indicates a 17% improvement. These effects hold consistently across different RD bandwidth choices (Figures B.12 and B.13).

learning performance gap between low- and high-SES students (shown in red and blue, respectively).

Merit-eligible students near the need cutoff, who have higher test scores and higher SES, achieve significantly higher scores on the college exit exam. The control group scores almost twice as high as the control group below the test score cutoff (Table III). Despite their already high performance, financial aid appears to further improve their test scores. The IV coefficient is 5.9% of a standard deviation for exams taken within five years. Similarly, Panel B of Figures A.16 and A.17 shows that aid-eligible students outperform comparable students before the expansion of financial aid, indicating greater learning during college. However, the estimates at this particular margin have lower precision due to the smaller sample size, and we cannot reject the null hypothesis of no effect.

The college graduation exam is typically taken by graduating students, which means we lack test scores for those who dropped out before completing their degree. However, financial aid contributed to increased college attainment by promoting completion among potentially at-risk students. As a result, students taking the exam above SPP's cutoff differ from those below the cutoff in observable characteristics. Joint significance tests around the eligibility cutoffs using all baseline characteristics reject the null, supporting this conclusion (Table A.3). For example, need-eligible test takers above the test score cutoff are more likely to have attended a public, rural high school. If these encouraged students perform worse on the college graduation exam, the RD approach underestimates student learning, an issue we revisit in Section 4.7.[14]

4.5 Impacts on Labor Market Outcomes

Having shown that financial improves long-term educational outcomes, we now analyze the effects of financial aid on early-career labor market outcomes. We start by examining the effects on formal monthly earnings, measured in multiples of Colombia's monthly minimum wage for full-time workers. Individuals who are not formally employed receive zero formal earnings. Panel A of Figure VI displays these earnings eight years after high school, plotted against the distance to the test score cutoff for need-eligible students. The graph illustrates a strong correlation between test scores and formal earnings: a need-eligible student scoring in the top 2% of test

[14] However, the direction of the bias is less clear at the need cutoff due to some existing covariate imbalance, as shown in Table A.2 and discussed in footnote 8.

scores earns double the amount of a student scoring in the 71st percentile. Financial aid eligibility further increases earnings by 20.6% of a monthly minimum wage, or US$46.62 more per month, which corresponds to a 20.9% rise compared to the control group mean. The IV estimate indicates an increase of US$79.90 more per month, or 35.7%. Notably, this effect does not solely stem from increased formal employment, which we describe below, as the IV coefficient on log earnings is also positive, substantial, and statistically significant (Table III).

Panel B of Figure VI examines the dynamics of financial aid's impact on formal earnings. It shows that earnings generally decline while students are more likely to be in college, but there is a marginal increase in earnings six years after high school (the reduced-form coefficient is 3.9% of the minimum wage with a p-value of 0.058). However, the earnings gap between aid-eligible and aid-ineligible students widens seven years after high school, with aid-eligible students experiencing significantly higher earnings. This gain surpasses the temporary earnings reduction observed earlier. The earnings gap continues to grow in the eighth year, aligning with findings from MacLeod et al. (2017) and Zimmerman (2014), which suggest that the return to attending more selective and prestigious colleges increases with experience. Section 4.7 will demonstrate how financial aid boosts earnings by encouraging students to attend colleges and programs that offer a substantial earnings premium.

Our findings from Section 4.4 suggest that the earnings gains partly result from enhanced skills, not solely from signaling effects. Additionally, based on a simple cross-sectional analysis using pre-reform data, we observe that a one standard deviation increase in the college graduation test score is associated with an earnings boost of 45.7% of the monthly minimum wage eight years after high school for students who took the exam within five years from high school. Consequently, an improvement of 11.9% of a standard deviation in the college graduation exam would imply recipients earning 5.4% more of the monthly minimum wage. Comparing this to the actual IV estimate of 35.4%, 15.4% of the observed impact on earnings would be associated with better skills (this estimate should be taken with a grain of salt; it is not causally identified).

In Figure VII, we conduct a placebo test and examine the equity implications of expanding financial aid. We compare outcomes for low-SES and high-SES students before and after the implementation of SPP. Prior to the policy, high-SES students (shown in gray) had higher earnings than low-SES students (shown in black) across the test score distribution, particularly in the top decile. However, the aid expansion narrowed the earnings gap between low- and high-SES students (shown in red and blue, respectively).[15] In Section 4.7, we will analyze the earnings gap and show that it can be attributed to the SES gap in college "value added." High-SES students tend to access colleges with higher "value added," whereas low-SES students do not. Financial aid plays a crucial role in leveling the opportunity to access quality education and reducing the earnings gap.

Financial aid also improved recipients' formal employment rates in a country where one in five individuals aged 15 to 24 are unemployed, according to SEDLAC (CEDLAS and The World Bank). Initially, in the first four years after high school, aid eligibility reduces formal employment due to enrollment in college (Figure A.19). However, as time progresses, aid recipients complete their degrees and enter the labor force. The RD coefficient becomes non-significant six years after high school, consistent with equal college attendance likelihood for aid-eligible and aid-ineligible students (Figure A.20). However, seven and eight years after high school, barely-eligible students have higher employment rates than barely-ineligible students. Indeed, Table III shows that financial aid increases formal employment eight years after high school by 6.9 p.p. (11.6%).

Compared to need-eligible students near the test score cutoff, merit-eligible students near the need cutoff, who have higher test scores and higher SES, earn higher salaries. However, financial aid also has a positive impact on this group, with beneficiaries experiencing an increase in formal earnings of 34.2% of a minimum wage eight years after high school, statistically indistinguishable from the effect for the former group of compliers (Table III).[16] The earnings gain for this population is driven by improvements in daily wages, with no discernible effect on employment. The coefficient on log earnings is approximately twice as large compared to those near the test score cutoff.[17]

Our focus on formal labor market outcomes means that individuals engaged in

[15] For this outcome, we restrict the comparison group to the 2013 cohort because the COVID-19 pandemic impacts the earnings of the 2012 cohort eight years after high school in 2020. However, Figure A.18 shows the results using both the 2012 and 2013 cohorts as the comparison group.

[16] Merit-eligible students near the need cutoff experience a temporary employment decrease in the four years after high school, but this effect diminishes and becomes statistically insignificant thereafter (Figure A.21). In contrast, earnings gains increase over time (Figure A.22).

[17] Additionally, financial aid eligibility reduces the time it takes to secure the first formal job after college graduation by 11.6% to 13.3% (Table V). It also has a minor positive influence on the number of days worked and the probability of employment in Colombia's 13 largest cities, where most HQ colleges are located. However, there is no significant impact on firm size or sector, except for a higher likelihood of working in information and communication jobs (Tables A.4 and A.5).

informal work are recorded as having zero formal earnings, potentially leading us to overestimate the effect if the control group is more likely to work informally. However, several factors mitigate this concern. Firstly, informality is less common in our study population, as both treated and control groups have achieved some level of college education. The informality rate for workers with more than 13 years of education is only 7.9% (CEDLAS and The World Bank), and a high percentage of control students at the test score (77%) and need (85%) cutoffs have at least 13 years of education (Table I). Secondly, our study sample is highly-achieving students, and test scores are negatively correlated with informality. Thirdly, even among formally-employed individuals, financial aid still had a significant and substantial increase in earnings.

We expect the earnings effect to further increase in the coming years for several reasons. Firstly, many graduate students have zero formal earnings during their studies, but often earn high salaries upon graduation. As financial aid has increased the likelihood of pursuing graduate studies, we anticipate that the earnings effect will rise once program recipients complete their graduate degrees, given the high returns associated with graduate education. Secondly, graduates with STEM majors typically earn higher salaries and experience steeper earnings growth in Colombia (Bayona and Sanchez, 2023). Thirdly, as we mentioned earlier, the return to attending more selective and prestigious colleges tends to increase with experience (MacLeod et al., 2017; Zimmerman, 2014).

4.6 Outcome Heterogeneity by Baseline Characteristics

In Appendix C, we investigate the heterogeneous treatment effects of financial aid on students' educational and labor market outcomes. Financial aid consistently leads to positive and significant gains across all baseline characteristics. Notably, the largest impacts are observed among students from disadvantaged high schools with low test scores and limited transitions to HQ colleges. Furthermore, financial aid disproportionately benefits female students in terms of college graduation from HQ colleges. However, females often choose fields with lower returns, such as social sciences and humanities, leading to similar earnings gains compared to males. Lastly, first-generation college students benefit from financial aid to the same extent as students with college-educated parents.

4.7 Mechanisms

In this section, our objective is to assess the extent to which the educational and labor market gains caused by financial aid can be attributed to the colleges and programs attended by aid recipients. Following a similar approach as Melguizo et al. (2017) and Riehl et al. (2018), we examine various dimensions of colleges' and programs' "value added" by considering graduation rates, skill development, and labor market outcomes. We analyze these dimensions separately, as different college-program combinations may excel in specific outcomes. For example, some college-program combinations may be more effective in graduating students from their programs, while others may teach more skills, and yet others may add most to students' earnings.

We exploit the fact that Colombian students apply to specific college-program combinations when seeking higher education. These combinations have varying levels of selectivity and primarily consider students' SABER 11 test scores. This variation allows us to estimate the contributions of individual college-program pairs to students' outcomes. Appendix D provides more detailed information on our empirical approach; here, we summarize the main steps. We utilize data from students who took the SABER 11 exam in the fall semesters of 2012 and 2013, before the implementation of the SPP policy, to estimate the "value added" of college-program combinations. We regress each outcome on the college-program fixed effects and control for baseline ability, sociodemographic characteristics, student selection across programs, and peer cohort qualities using the following specification:

$$y_{i,t} = \alpha + \delta_{j(i,t)p(i,t)} + \mathbf{X_i}'\Gamma + \epsilon_{i,t} \tag{1}$$

where $y_{i,t}$ is the outcome y for individual i taking the SABER 11 exam in semester t, $\delta_{j(i,t)p(i,t)}$ are the college-program fixed effects based on the first college and program attended, $\mathbf{X}$ is a vector of baseline covariates, and $\epsilon_{i,t}$ is a student-specific error term.[18] The vector $\mathbf{X}$ includes relevant student sociodemographic information related to these outcomes of interest and capturing students' selection across colleges and programs. In particular, we first control for a student's SABER 11 score using a third-degree polynomial. Following Melguizo et al. (2017), we also include the

[18] Our focus is on measuring the following five student outcomes $y_{i,t}$ observed seven or eight years after high school completion: (1) attainment of any degree, approximated using SABER PRO or SABER T&T exams, (2) attainment of a bachelor's degree, approximated using the SABER PRO exam, (3) SABER PRO test score, (4) formal employment status, and (5) formal monthly earnings, expressed as multiples of the monthly minimum wage.

leave-one-out mean SABER 11 score in the entering college and program cohort. Because colleges select students based mainly on their SABER 11 scores, these two measures enable controlling for a big part of the selection into colleges and programs. Additionally, we use a rich vector of baseline sociodemographic covariates correlated with the outcomes of interest and influencing students' selection across programs.[19] By controlling for these factors, we aim to isolate the contributions of colleges and programs independent of student and peer characteristics.

Appendix D provides detailed information on the estimated patterns and robustness checks; here, we briefly summarize the key findings. $\hat{\delta}_{jp}$ varies widely across different college types, and their ranking changes depending on the outcome of interest and the inclusion of baseline covariates, particularly students' SABER 11 test score. Without controlling for $\mathbf{X}$, a naive model ranks HQ *private* colleges as having the highest graduation "value added" (Table D.1). However, these institutions attract students with exceptionally high ability and privileged socioeconomic backgrounds. Once we account for these observable differences, LQ colleges demonstrate the highest graduation "value added," while HQ *public* colleges show the lowest. In terms of teaching knowledge and skills, HQ colleges excel, with HQ *private* institutions displaying the highest "value added" in this aspect. HQ *private* colleges also outperform other types in providing higher-paying job opportunities, while HQ *public* colleges have the lowest earnings "value added" compared to all other college types.[20]

Using the estimated college-program fixed effects, we assess the impact of financial aid on the "value added" of the attended colleges and programs, treating the $\hat{\delta}_{jp}$s as outcome variables in the RD design. Then, we compare the RD coefficients for each outcome with the RD coefficients on the estimated graduation, learning, and earnings "value added" of the corresponding college-programs.

The results are presented in Table VI. Column (1) examines the impact of financial aid eligibility on the likelihood of obtaining any college degree for students who have accessed college. For need-eligible students near the test score cutoff, the

[19] Specifically, we include student demographics (sex, ethnic minority, third-degree polynomials of age, and an indicator for the exam year), household characteristics (size, socioeconomic stratum, parental educational attainment, SISBEN score, and third-degree polynomials of distance to the college), and time-invariant high school characteristics (private indicator, calendar dummies, urban indicator). Additionally, we include leave-one-out mean socioeconomic stratum, parental education, and SABER 11 test scores at the high school-cohort level, as well as leave-one-out mean socioeconomic stratum, parental education, and SISBEN score at the college-program-cohort level.

[20] Riehl et al. (2018) also find that Colombia's top public institutions are better in teaching skills than in job placement, while top private schools do relatively better on earning. They posit that students at top private colleges may benefit more from peer and alumni networks in the labor market.

effect on attainment is half the magnitude of the effect reported in Column (1) of Table II, which does not condition on enrollment. This suggests that about half of the increase in college attainment can be attributed to the enrollment expansion facilitated by financial aid. The remaining portion of the attainment gain may be influenced by two factors: the effect of the policy on colleges and programs with different graduation "value added," and the impact of the loan forgiveness policy that encourages graduation.[21]

Column (2) examines the RD coefficient on the college-program graduation "value added" (Figure D.3). Since financial aid directs students to programs in HQ colleges, which are typically more demanding than the counterfactual programs they would have attended, the improved degree attainment cannot be explained by financial aid altering the graduation "value added" of the colleges and programs attended by recipients. Instead, it is likely that the significant incentives for graduation provided by the policy itself are the primary driving force behind the increase in attainment. This is particularly true for merit-eligible students near the need cutoff, who tend to have higher test scores and higher SES. For this group, Panel B indicates that the gains in attainment are primarily attributed to the program's graduation incentives, while access to college and the "value added" of the college-program combination play a minimal role.

Columns (3) and (4) analyze bachelor's degree attainment (Figure D.4). For need-eligible students near the test score cutoff, more than half of the increase in bachelor's degree attainment can be attributed to the expanded access to these programs facilitated by financial aid. Around one-sixth of the graduation effect is associated with the college-program "value added," and the remainder is likely driven by the graduation incentives provided by the policy. A similar pattern is observed for merit-eligible students near the need cutoff, who generally have higher test scores and higher SES. However, the impact of financial aid on the "value added" plays a more significant role for these students, since they tend to switch from HQ *public* to *private* colleges, which typically have higher graduation "value added."

Columns (5) and (6) examine learning performance for students who took the SABER PRO exam within seven years of completing high school. Students with higher test scores and more advantaged socioeconomic backgrounds tend to enroll

[21] SPP may have also expanded graduation because the stipend reduces the opportunity cost of attending college. Notwithstanding, this stipend is tiny compared to the sizable debt they must repay if they drop out of college.

in colleges and programs that offer greater knowledge and skill acquisition (Figure D.5). However, Column (6) shows that the policy shifted students towards colleges and programs that provide improved knowledge and skills. The effect is particularly notable for students near the test score cutoff, who were more likely to attend the less productive LQ colleges in terms of imparting knowledge and skills. However, the actual learning effect is smaller than the predicted effect size due to a selection effect; the policy motivated some students to graduate who might have otherwise dropped out. These students, as Table A.3 showed, differ in observable characteristics.

Finally, we examine the effects on early-career labor market outcomes. For this analysis, we do not condition on college enrollment or graduation; instead, we compare college-program "value added" to students without college experience. Columns (7) and (8) of Table VI delve into formal employment eight years after high school, while Columns (9) and (10) focus on formal earnings. Students with higher test scores and more advantaged socioeconomic backgrounds tend to enroll in colleges and programs that offer better job opportunities (Figure D.6). The policy's effect on the employment "value-added" of the attended college and program is profound, completely closing the SES gap in college "value added." Furthermore, the observed employment effects closely mirror the impact on "value added," with overlapping confidence intervals. This finding suggests that the employment gains are influenced by the policy's role in steering students toward more productive colleges that enhance their employment prospects.

Similarly, before the reform, students' SES strongly correlated with earnings "value added," which, as pointed out by Riehl et al. (2018), was also more correlated with colleges' tuition levels. Moreover, better test scores did not improve earnings "value added" for low-SES students (Figure D.7), likely due to their inability to afford access to top private colleges, which do better on earning. However, after the reform, test scores enable these students to access these colleges. Consequently, financial aid plays a crucial role in leveling the opportunity to access colleges that do better on earnings. According to Table VI, the effect on expected earnings, based on "value added," is about half of the observed impact on actual earnings. Notably, targeted students experience treatment effects from HQ universities that exceed the average returns to those universities, suggesting that recipients benefit more from high-quality education.

5 Impacts on Nonrecipients

This section evaluates the overall effects of financial aid by considering its impact on all high school test takers, regardless of their socioeconomic status or academic performance.

College admissions in Colombia heavily rely on test scores, and the SPP program specifically targets low-SES students in the top decile. This targeting may result in the displacement of high-SES students and those scoring below the top decile, who are considered *ineligible* for SPP. To address this, we analyze the outcomes of approximately 1.7 million students who took the high school graduation exam in the fall of 2012, 2013, and 2014, spanning the period before and after the expansion of financial aid in Colombia. We employ a DD approach, comparing outcomes across the distribution of SABER 11 scores separately for low- and high-SES students—based on their eligibility status according to the SISBEN wealth index—using the following ordinary least squares (OLS) regression:

$$y_{idt} = \alpha + \gamma_t + \delta_d + \sum_{k=6, k \neq \{1,5\}}^{10} \beta_k \cdot 1(d = k) \times 1(t = 2014) + \epsilon_{idt} \quad (2)$$

where y_{idt} is the outcome for individual i taking SABER 11 in year t and scoring in decile d, γ_t are the year fixed effects, δ_d are the SABER 11 decile fixed effects (with deciles 1 through 5, unlikely admitted by HQ colleges, being the omitted category), and ϵ_{idt} is the individual-specific error term. The β_ks are the coefficients of interest and represent the difference in outcomes before and after the financial aid expansion for aid-eligible and aid-ineligible students. Since students scoring in the top decile of test scores are eligible for financial aid, β_{10} for low-SES students captures the direct effect of the policy. By contrast, β_{10} for high-SES students, and β_6 through β_9, capture the "spillover" effects for different groups. The identifying assumption of this DD specification is that the trends between the two groups would be similar in the absence of the policy. The absence of pre-trends using the 2013 as the placebo group supports this assumption (Figure A.23).

Figure VIII plots the β_k coefficients and 95% confidence intervals from Specification (2) for college attendance outcomes. The markers in red and blue distinguish between low- and high-SES students, respectively. Panels A to D focus on immediate college enrollment right after high school, presenting effects separately for various college types. Panel E examines overall college enrollment within six years after high school completion. The DD results are consistent with the RD analysis: financial aid expanded attendance at HQ *private* colleges for low-SES high-achievers (Panel B), slightly reduced it at HQ *public* colleges (Panel C), and significantly reduced it at LQ colleges (Panel D). Consequently, the policy increased any college attendance for these students (Panel E).[22]

Importantly, the DD analysis reveals that the expansion of financial aid did not lead to the displacement of nonrecipients from college opportunities or impact their college quality. As aid recipients chose HQ colleges over LQ ones, LQ colleges filled their vacancies with less qualified applicants, thereby enhancing college enrollment for students below the top decile of the SABER 11 test. Moreover, high-SES students, who were ineligible for SPP, were not displaced from HQ institutions.[23] This outcome can be attributed to the oversubscription of HQ *public* colleges, which could admit other high-achieving applicants into the vacant seats. Additionally, HQ *private* colleges, driven by tuition, increased available seats by about 50% while maintaining fees (Figures A.26 and A.27). Consequently, the educational quality, as indicated by college-program "value added," remained unaffected for students ineligible for aid (Figure A.28).

Critics of expanding elite education often raise concerns about potential downsides like compromised educational quality and diminished degree value. To address these concerns, we evaluate the policy's impact on nonrecipients' bachelor's degree attainment, skill development, and labor market results. Figure IX indicates limited effects on nonrecipients' bachelor's degree attainment from HQ private colleges. Figure X reveals no detrimental impact nonrecipients' skill acquisition; in fact, high-SES students with top scores seem to have enhanced learning. Similarly, Figure XI dismisses negative impacts on labor market outcomes; instead, there appears to be an improvement in their earnings.[24] These findings suggest that expanding elite education did not adversely affect high-SES, high-achieving students who typically attend such esteemed institutions.

[22] Additionally, the DD results reveal that the earnings gains for low-SES students are particularly pronounced for the top 5% of test scores, who experienced larger gains in college-program "value added," compared to the subsequent 5% (Figures A.24 and A.25).

[23] Figure VIII suggests that high-SES students scoring in the top decile also reassessed their choices and were less likely to attend LQ colleges after the policy announcement, indicating potential gaps in their baseline knowledge about college quality, as Dynarski et al. (2021) found in the U.S.

[24] In Figure XI, the comparison group is based only on the 2013 cohort because the COVID-19 pandemic in 2020 affected the 2012 cohort's earnings eight years after high school.

Rather than causing adverse effects, the policy seems to have created positive spillover impacts on nonrecipients. This outcome is likely attributed to changes in peer compositions driven by the policy. As low-SES high-achievers increased their demand for HQ private colleges, these institutions enrolled more high-achieving students, leading to a nearly 5% enhancement in the average quality of entering students (Figure A.26). This shift may have triggered a positive peer effect for high-SES students, who were exposed to more capable peers and potentially experienced their own academic improvements. Additionally, the benefits of studying alongside a more socioeconomically diverse student group could also play a role (Londoño-Vélez, 2022).[25]

Additionally, Figures IX, X, and XI illustrate that learning and earnings for low-SES students in the ninth decile of SABER 11 remained largely steady or slightly improved, even without changes in college quality or "value added." The average student quality did not decline at LQ colleges because number of SPP recipients is relatively small compared to the student body at these institutions (Figure A.26). Instead, it seems that the students who took the place of SPP recipients at LQ colleges exhibited enhanced learning performance. This, combined with their improved college access, may have ultimately led to higher earnings.

To summarize, there are no evident negative impacts from the policy. In fact, it appears to have generated positive spillover effects, enhancing outcomes for all students in the cohort. This highlights how financial aid contributed to increased equity and efficiency across the board.

6 Cost-Benefit Analysis

To evaluate the potential cost-effectiveness of financial aid, we conduct a prospective cost-benefit analysis using the concept of the MVPF. This analysis compares the program's impact on projected lifetime earnings to the overall program costs, specifically focusing on the ratio of program benefits among beneficiaries to the net costs incurred by the government (Hendren and Sprung-Keyser, 2020).

Projecting Lifetime Earnings. To project the earnings impacts of the SPP program

[25] Other possible reasons for the positive spillover effects on nonrecipients include the potential capital and labor responses of HQ private colleges, such as increasing per-student expenditures or the number of teaching instructors, which could have provided added support to nonrecipients. Nonetheless, we do not find significant changes in per-student spending (Figure A.29) or instructor numbers (Figure A.30).

throughout the lifecycle, we make several assumptions. Firstly, we assume an average age of 18 one year after graduating high school, based on the average age of taking the SABER 11 exam of 17 (Table A.2). Secondly, we assume a retirement age of 60, consistent Colombia's current retirement age (57 for women and 62 for men). Thirdly, we estimate the lifecycle earnings profile of those affected by the policy using population average trajectory based on the 2019 *Gran Encuesta Integrada de Hogares* (GEIH), Colombia's main employment and earnings survey.[26] Fourthly, we use the RD-IV estimates one to eight years after high school from Table VII, treating censored observations as zeros and combining temporary earnings losses with estimated earnings gains starting in year six.[27] As in Hendren and Sprung-Keyser (2020), we project the eight-year percentage earnings gain forward throughout the lifecycle to obtain the earnings impacts for the rest of individuals' lives. This projection assumes a constant percentage earnings impact over time, starting from eight years after high school. This is a conservative assumption for reasons discussed in Section 4.5. Fifthly, we convert monthly earnings to annual earnings by multiplying by 12 and adjust for inflation using the consumer price index. Finally, we discount all earnings gains by 3% back to the time of initial expenditure. Overall, Column (2) of Table VII shows that financial aid is expected to increase discounted lifetime earnings by 110,283,598 pesos (US$27,222) for each treated student at the test score cutoff and 82,790,624 pesos (US$20,436) at the need cutoff.

Estimating Direct and Indirect Costs. We follow the methodology used by Angrist et al. (2021) to calculate direct and indirect cost measures. We calculate total government expenditure on the SPP program over eight years using ICETEX data. This expenditure measure, denoted as D_i, includes average educational expenses per full-time student transferred to the institution and the stipend provided to the recipient. In the case of private colleges, the average educational expenses per full-time student correspond to the tuition fee transferred by the government. However, public institutions' average educational expenses per full-time student exceed the tuition fee due to government subsidies, resulting in discounted tuition fees (Table A.1). Hence, we incorporate the actual average educational expenses per full-time

[26] We drop individuals who are inactive in the labor force, outside municipal cores (*cabeceras municipales*), aged younger than 18, aged older than 60, or without a high school diploma.

[27] The estimates earnings gains and losses using SABER 11 as the running variable are statistically significant. However, when using SISBEN as the running variable, we take a conservative approach by assuming no negative earnings impact in years 1 and 2 after high school, and no positive earnings impact in years 5 and 6 as these estimates are not statistically significant at the 10% level (Table VII).

student for students enrolled in public institutions based on ICETEX data. In the IV model, we employ D_i on the left-hand side to represent direct government spending on the SPP program. As nonrecipients of the SPP program do not receive any aid, the program's effect on D_i in Column (3) of Table VII reflects the average government expenditure on treated students.

However, it is essential to consider that students who do not receive assistance from the SPP program still generate costs for the government when they attend public colleges. To incorporate this cost, we calculate the total cost of attendance for the government (COA_i) for all students who enroll in any undergraduate program within six years after completing high school, utilizing data from SNIES. Unlike D_i, COA_i takes into account the government's spending on *non*recipients who pursue associate and bachelor's degree programs at public institutions.[28,29] (For students who attend private institutions without SPP support, we assume that their tuition fees cover the entire educational expenses, resulting in no additional cost to the government.) As a result, Column (4) of Table VII showcases the additional educational expenditure incurred by the government due to the SPP program. The program increased per-student educational expenditure, not only due to its direct costs but also by influencing the duration of college enrollment and motivating recipients to pursue degrees at more expensive institutions, as we demonstrated earlier. We discount D_i and COA_i back to year one at an annual rate of 3%.

The statistics in Table VII show the difference between direct costs (D_i) and indirect costs (COA_i) of financial aid. At the test score cutoff, D_i is 78,335,884 pesos (US$19,336), while it rises to 86,192,140 pesos (US$21,275) at the need cutoff. This increase is due to students at the latter cutoff being more likely to attend college, and when they do, they often choose more expensive institutions. When considering the total costs of attendance (COA_i) for both recipients and nonrecipients, the marginal increase in educational spending decreases to 51,083,113 pesos (US$12,609) at the test score cutoff and 47,786,944 pesos (US$11,796) at the need cutoff. Once again,

[28] We use data on educational expenditures per full-time student from ICETEX for HQ public colleges; for LQ public colleges, we use per-full time student expenditure data from financial accounts and balance sheets reported by the colleges to Colombia's Ministry of Education. For institutions that do not disclose information on average educational expenses, such as SENA, we rely on the average educational expenses of full-time students enrolled in the same degree type (associate or bachelor's), institution type (private or public), and institutional quality (high or low).

[29] This calculation of the cost of attendance does not include expenses for books, supplies, housing, transportation, or variations in the marginal cost of educating different types of students with varying levels of academic support.

the difference between COA_i and D_i reflects the fact that nonrecipients opt for public colleges, incurring additional costs for the government as captured in COA_i.

The MVPF. In our analysis, the observed earnings gains after taxes and transfers represent the willingness to pay for individuals who change their behavior due to the SPP program. The discounted lifetime earnings gains are US$27,222 at the test score cutoff and US$20,436 at the need cutoff. Assuming a tax and transfer rate of 19%, similar to previous studies (Angrist et al., 2021; Hendren and Sprung-Keyser, 2020), the total willingness to pay is calculated by summing the post-tax and post-transfer earnings gains with the value of the transfer (D_i) for individuals who do not change their behavior. Table VII shows a willingness to pay of 167,665,598 pesos (US$41,386) at the test score cutoff and 153,252,546 pesos (US$37,828) at the need cutoff.

Assuming a 19% tax rate on incremental earnings reduces the government's program costs by the same amount as the reduction in total willingness to pay. Based on Table VII, the direct costs of financial aid (D_i) are 57,382,000 pesos (US$14,164) at the test score cutoff and 70,461,922 pesos (US$17,393) at the need cutofff. This implies an MVPF of 2.92 (SABER 11) and 2.17 (SISBEN), indicating that each dollar of public spending on the SPP program generates $2.92 and $2.17 of private benefits, respectively. When considering the impact on marginal educational spending (COA_i), the MVPF roughly doubles to 5.56 (SABER 11) and 4.78 (SISBEN). The SPP program exhibits higher MVPFs compared to other cost-effective financial aid programs targeting college-bound high school students, as discussed in Hendren and Sprung-Keyser (2020) and Angrist et al. (2021).[30]

However, these cost-benefit comparisons may underestimate the program's true value due to several reasons. Firstly, they overlook non-pecuniary benefits of education, like improved health, marriage prospects, and reduced public spending on healthcare and criminal justice. Secondly, they do not account for future economic returns from the program's impact on post-bachelor's degree education, increasing returns to STEM-related degrees, and increasing returns to degrees from selective universities. Lastly, they ignore potential spillover effects on nonrecipients, such as expanded college attendance and higher earnings, as suggested earlier.

[30] For instance, SPP surpasses the MVPF of Nebraska's STBF program (1.75), Michigan's HAIL Scholarship (1.30), the Wisconsin Scholars Grant program (1.43), Georgia's HOPE Scholarship (4.0), Ohio's Pell Grants (2.49), Pell Grants to adults (2.18), Tennessee's HOPE Scholarship (1.86), and Kalamazoo's Promise program (1.93).

7 Conclusions

This paper examined the long-term effects of expanding financial aid through a large-scale program targeting low-SES high achievers in Colombia. Using comprehensive administrative data and RD and DD approaches, we found that financial aid increased human capital accumulation and enhanced early-career outcomes. Furthermore, it reduced socioeconomic disparities in college attainment, skill development, and earnings among equally-achieving students. Importantly, the benefits of financial aid do not come at the expense of nonrecipients, promoting equity and efficiency.

Future research could delve into several additional aspects. Firstly, exploring how financial aid shapes labor market outcomes by influencing students' social and professional networks, job search behavior, aspirations, and outlook on the future would yield valuable insights. Secondly, understanding the returns to high-quality education on measures beyond the labor market like life satisfaction, health, civic engagement, crime, marriage, fertility, and spousal quality could shed light on its broader socioeconomic effects and financial aid's potential to impact these key outcomes. Thirdly, assessing the consequences of the SPP program's increasing merit-selectivity over time, limiting eligibility to students scoring within the top 2% by 2018, would offer valuable insights into equity and efficiency considerations for optimizing financial aid policy design. Lastly, comparing the MVPF of the SPP program with a policy subsidizing the supply of public universities, given the policy changes in 2022, will provide essential information for evaluating potential government policies and assessing where public spending could have the biggest "bang for the buck."

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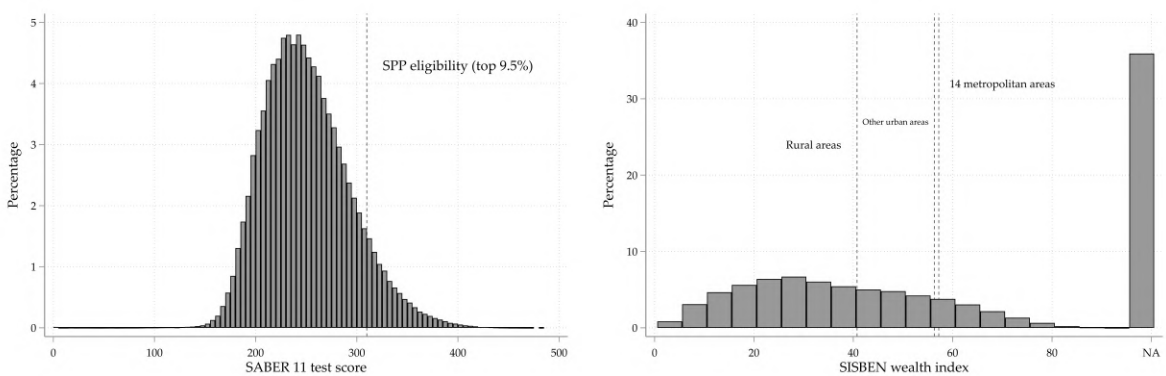
Figures and Tables

Figure I: SPP Eligibility Conditions

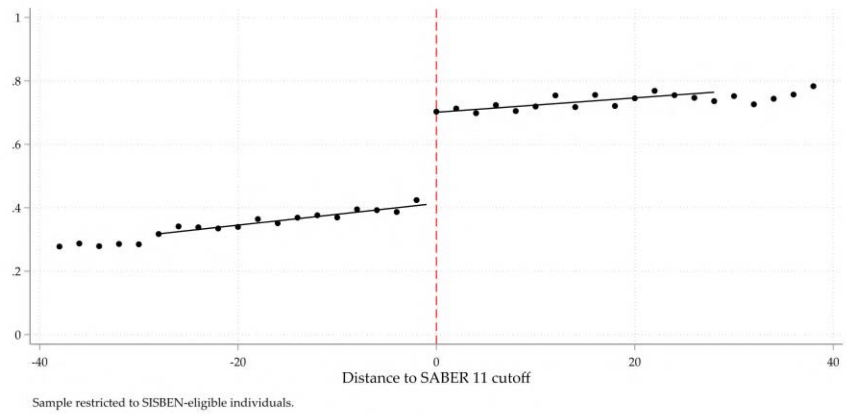
(a) Merit: SABER 11 test score $\geq 310/500$ (b) Need: SISBEN wealth index $<$ threshold



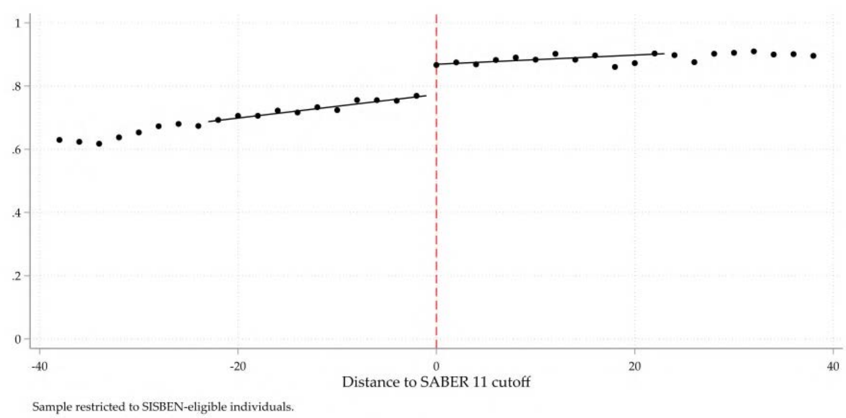
Notes: The SPP financial aid program has specific eligibility criteria based on SABER 11 test scores and the SISBEN poverty index. Panel A shows the distribution of SABER 11 test scores, with the red vertical line representing the SPP eligibility cutoff (top 9.5%). Panel B displays the distribution of the SISBEN poverty index, with the red vertical line representing the eligibility threshold (bottom 52.8%). Notably, one-third of test takers are labeled as "N/A" in Panel B as they are not included in SISBEN. Figure A.1 plots the distribution of SABER 11 test scores separately for SPP-eligible and SPP-ineligible students based on their SISBEN score, and shows that need-eligible students tend to perform worse on SABER 11.
Sources: Authors' calculations based on SABER 11 (ICFES) and SISBEN (DNP).

Figure II: The Effect of Financial Aid on College Access (Merit Cutoff)

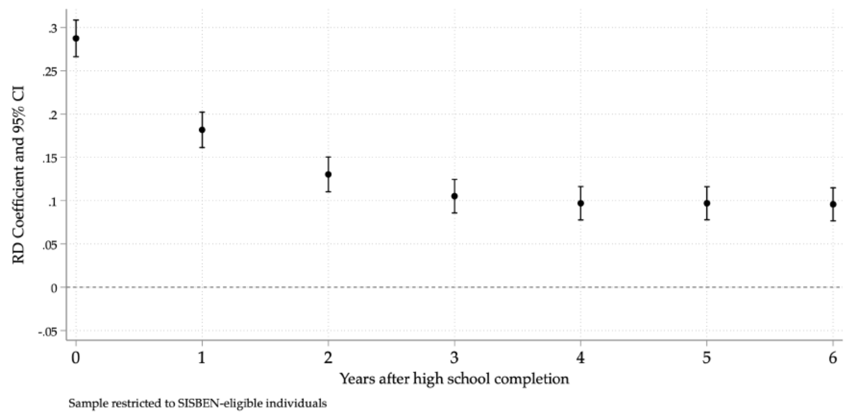
(a) Probability of Accessing College Immediately After High School



(b) Probability of Ever Accessing College



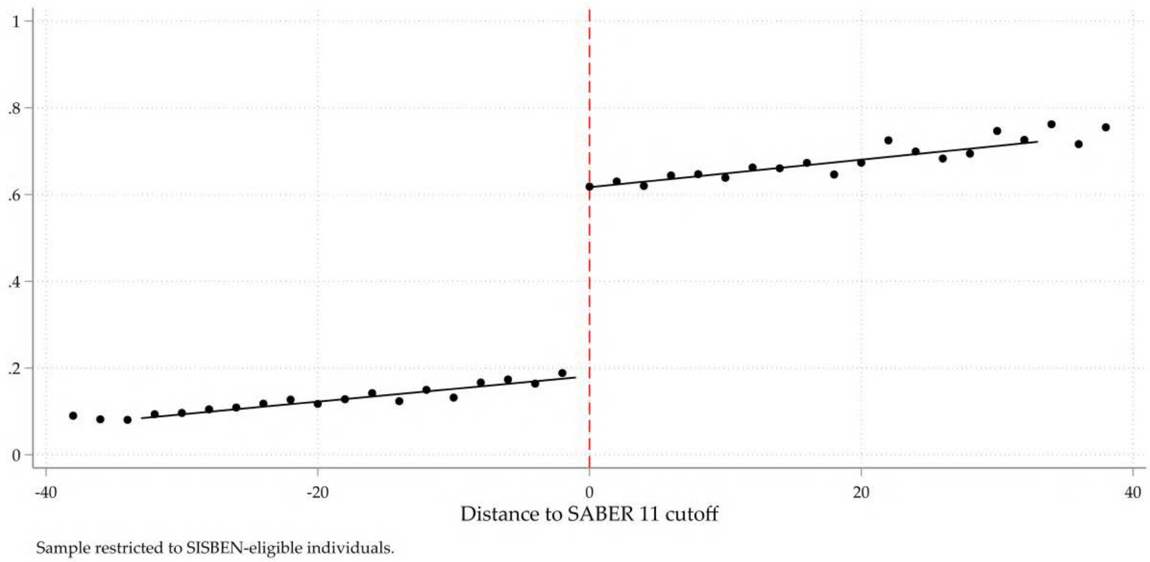
(c) The Effect of Financial Aid on College Access Stabilizes at 10 p.p.



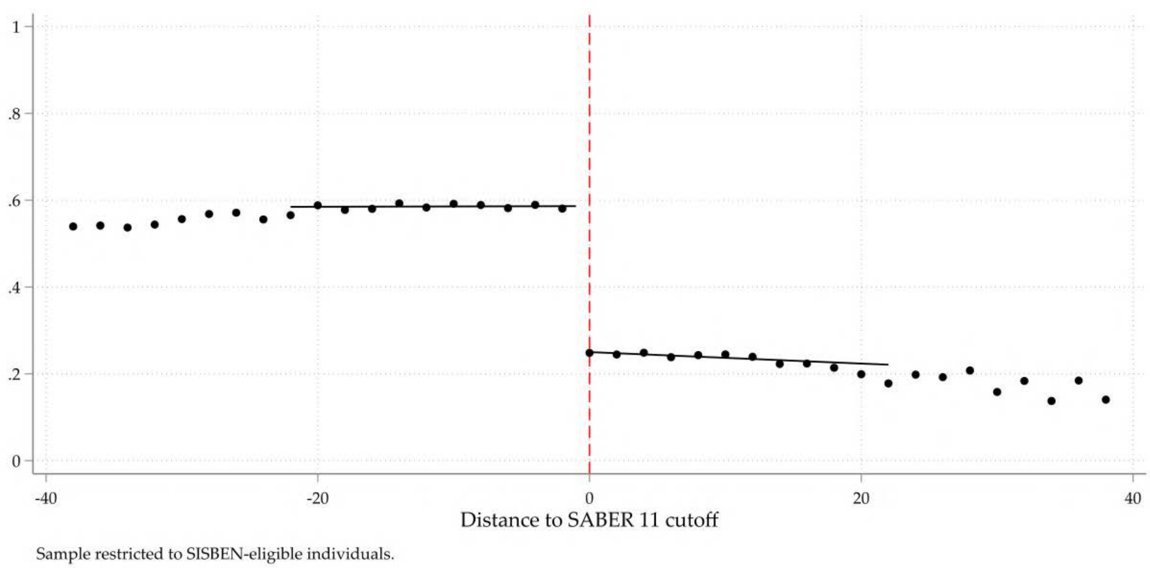
Notes: Panels A and B display the probability of attending college within zero and six years after high school completion for need-eligible students, respectively, based on the distance to the test score cutoff. Panel C shows the RD coefficients over time. Similar patterns are observed in Figure A.6, which uses SISBEN as the running variable. Table I provides the reduced-form estimates for these effects.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure III: The Effect of Financial Aid on College Quality (Merit Cutoff)

(a) Probability of Ever Accessing an HQ College



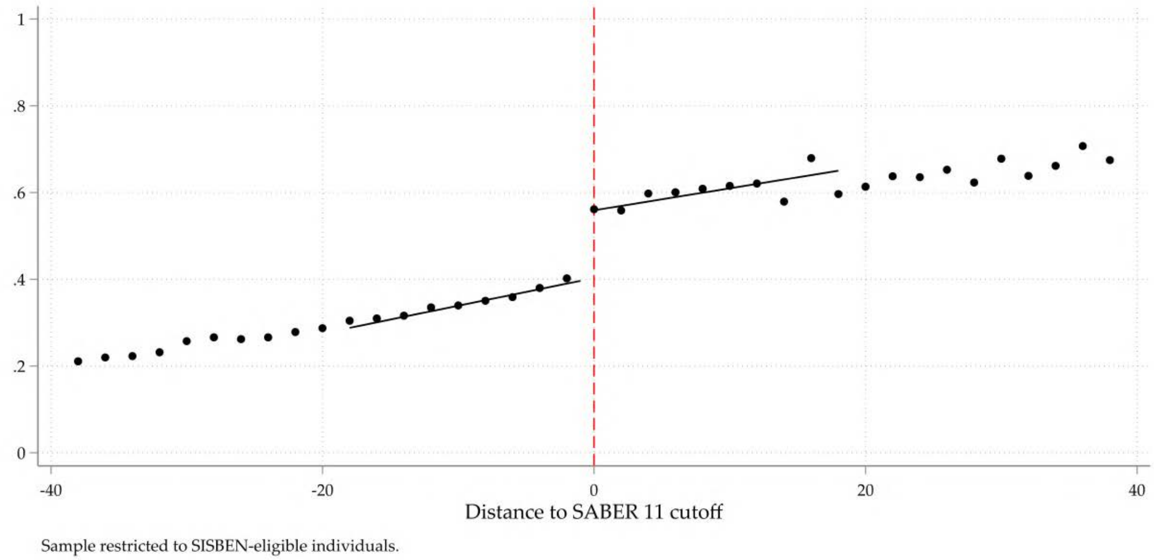
(b) Probability of Ever Accessing an LQ College



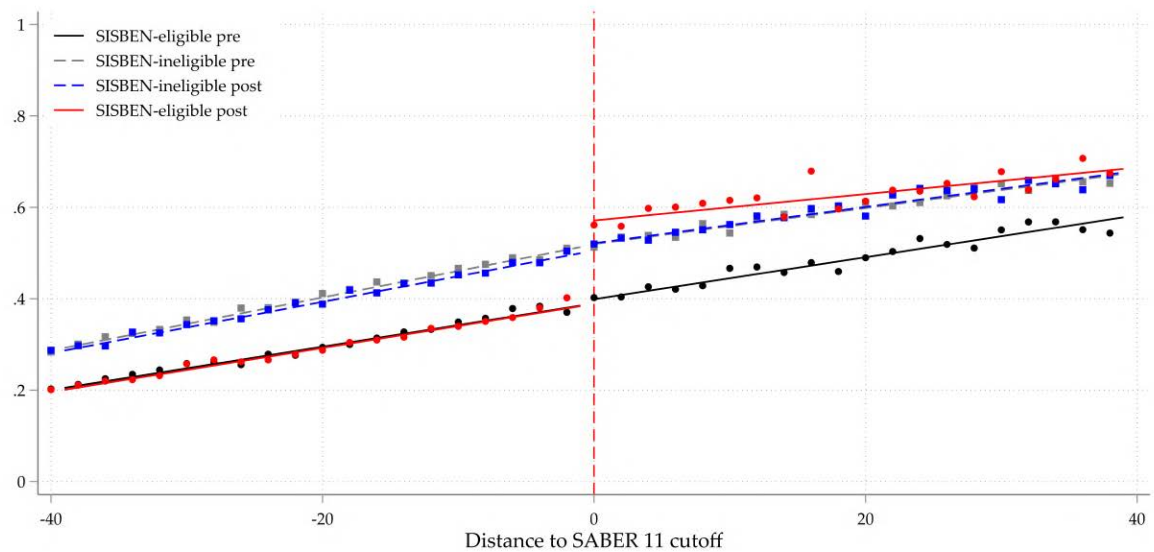
Notes: This figure decomposes the enrollment effect shown in Panel B of Figure II by college quality, where an HQ college is one of the 33 institutions with high-quality status by October 2014. The RD coefficient over time is plotted in Figure A.9, providing a further breakdown of the results by college quality and program duration. Similar patterns can be observed in Figure Figures A.7 and A.10, which utilize SISBEN as the running variable. Table I presents the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure IV: The Effect of Financial Aid on Obtaining a Bachelor's Degree

(a) Merit Cutoff



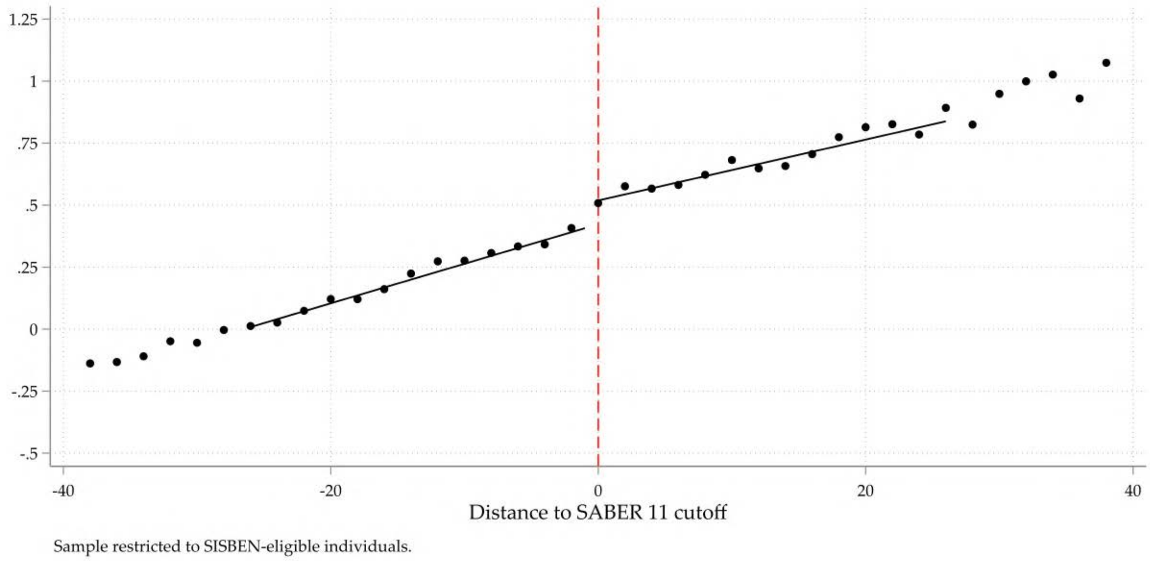
(b) Placebo and Impacts on Equity



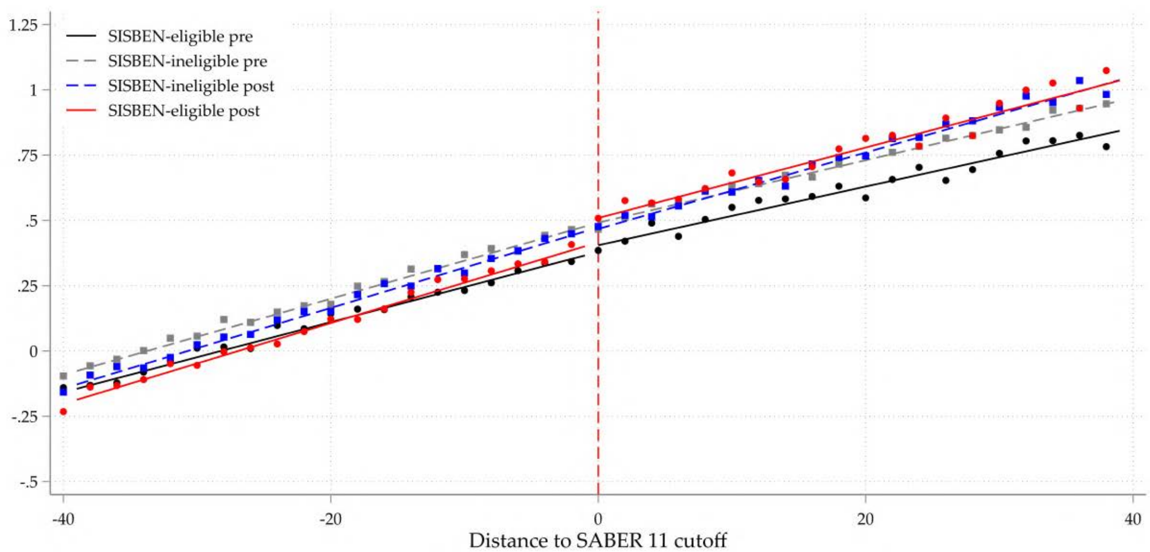
Notes: The figures illustrate the probability of obtaining a bachelor's degree, as measured by taking the SABER PRO exam, within seven years of high school completion, based on the distance to the test score cutoff. The results are summarized in Table II. In Panel B, the series from Panel A (highlighted in red) is compared with a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-*in*eligible students are displayed in gray and blue, respectively. These include students without a SISBEN score or whose score exceeds the SPP cutoff. The figures reveal a 10-p.p. disparity in bachelor's degree attainment among students with similar high school test scores. While the expansion of financial aid had no impact on SISBEN-*in*eligible students, it effectively eliminated the socioeconomic gap in bachelor's degree attainment.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure V: The Effect of Financial Aid on College Graduation Test Scores

(a) Merit Cutoff



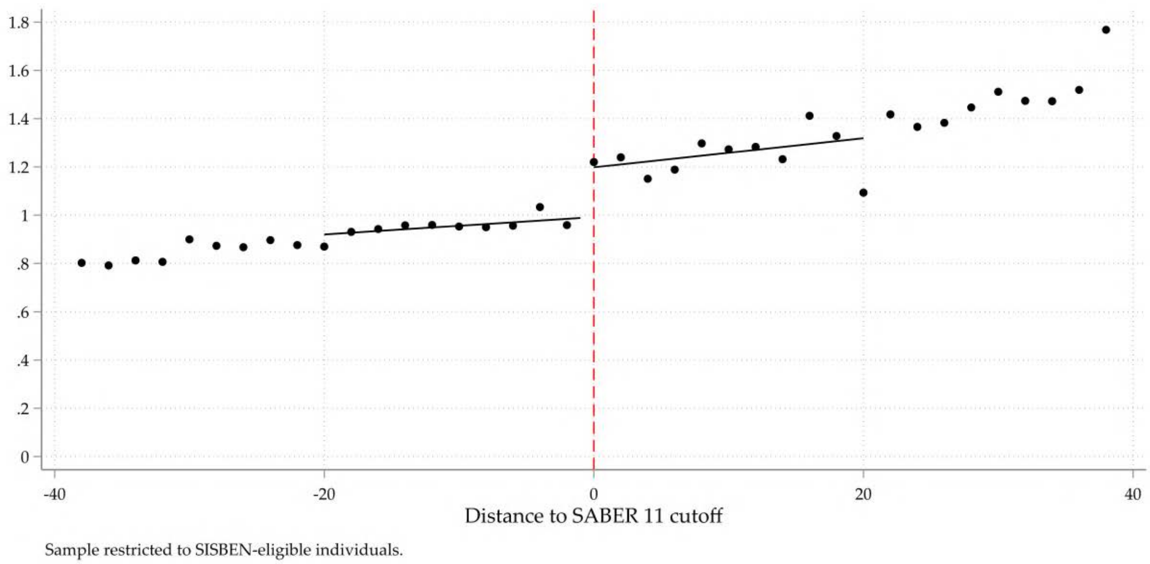
(b) Placebo and Impacts on Equity



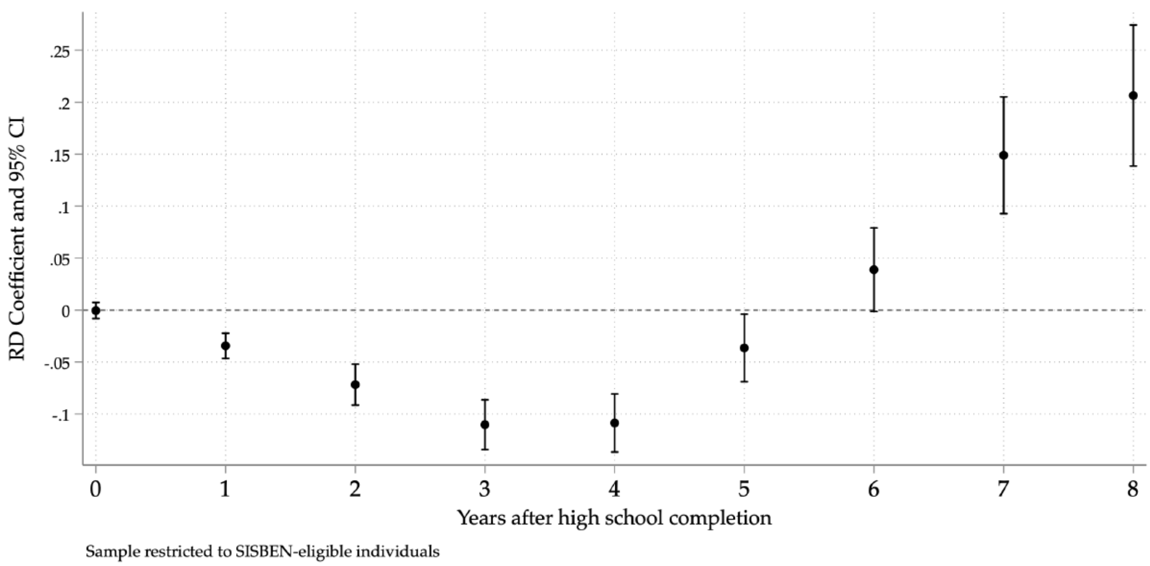
Notes: The figures illustrate the impact of financial aid eligibility on students' performance in Colombia's college graduation exam, SABER PRO, within five years of completing high school, based on their proximity to the test score cutoff. Panel A focuses on SISBEN-eligible students, with the reduced-form estimate provided in Table IV. Panel B compares the series from Panel A (depicted in red) with a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (shown in black). Pre- and post-policy outcomes for SISBEN-*in*eligible students are also displayed in gray and blue, respectively. An SES gap in learning performance emerges in college among students who achieved similar results in high school. This gap is attributed to differences in college "value added" based on SES (Figure D.5). The expansion of financial aid successfully eliminated the SES gap in learning, improving equity.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure VI: The Effect of Financial Aid on Formal Earnings (Merit Cutoff)

(a) Eight Years After High School Completion

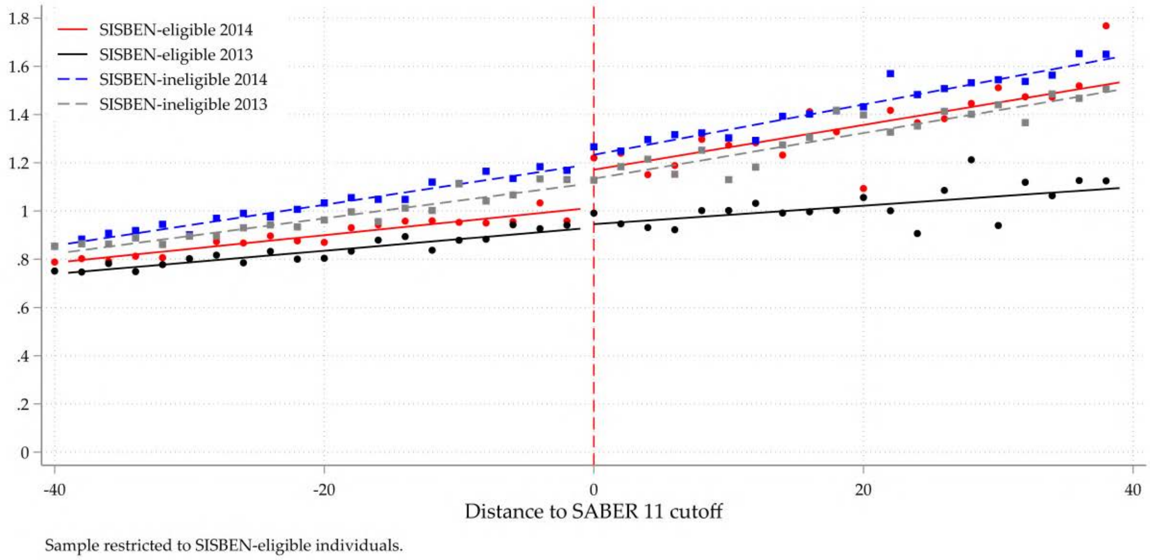


(b) The Dynamics of the Earnings Effect



Notes: The figures depict the impact of financial aid eligibility on formal monthly earnings, expressed as multiples of the monthly minimim wage, for need-eligible students. Individuals without formal employment are assigned zeros earnings. Panel A compares individuals' formal earnings eight years after high school completion based on their proximity to the test score cutoff, with the reduced-form estimates reported in Table V. Panel B, displaying the RD coefficient over time, demonstrates that the effects are positive and increasing after the fourth year. Similarly, Figure A.22 exhibits comparable effects using SISBEN as the running variable.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

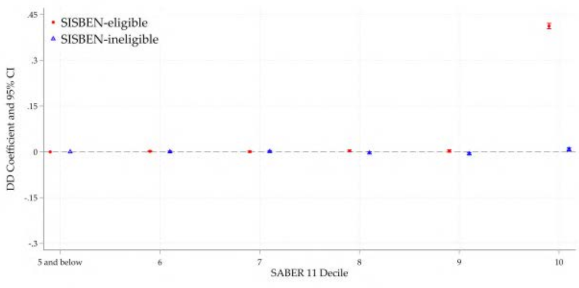
Figure VII: Financial Aid Eligibility Narrows the SES Gap in Formal Earnings



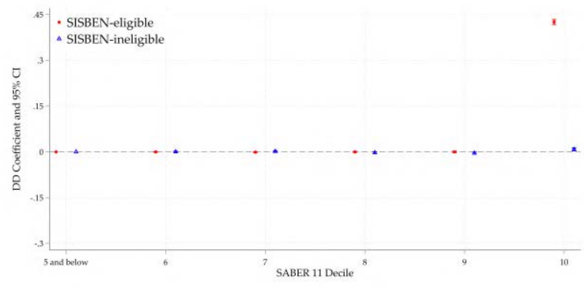
Notes: This figure examines the equity implications of expanding financial aid by comparing formal monthly earnings for different groups of students. Earnings are presented in multiples of the monthly minimum wage, with zeros representing individuals without formal employment. The figure compares the series from Panel A of Figure VI (depicted in red) with a placebo series of SISBEN-eligible students from 2013, which predates the expansion of financial aid (shown in black). Pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively. It reveals an earnings gap based on socioeconomic status among students with similar achievements, which widens as test scores increase. This gap can be attributed to the socioeconomic gap in college "value added" (Figure D.7). The expansion of financial aid has reduced the socioeconomic gap in earnings, leading to greater equity.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure VIII: Financial Aid Did Not Displace Nonrecipients From College

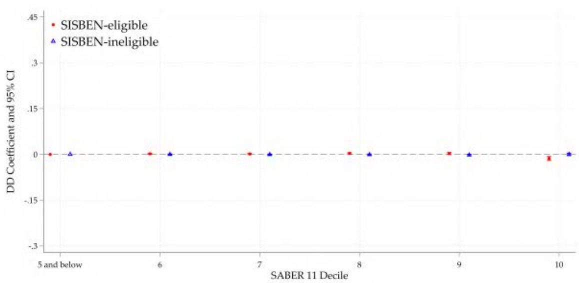
(a) HQ Colleges



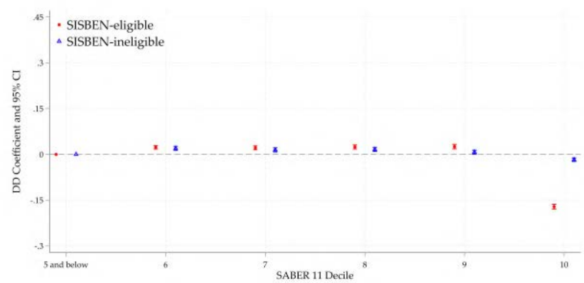
(b) HQ Private Colleges



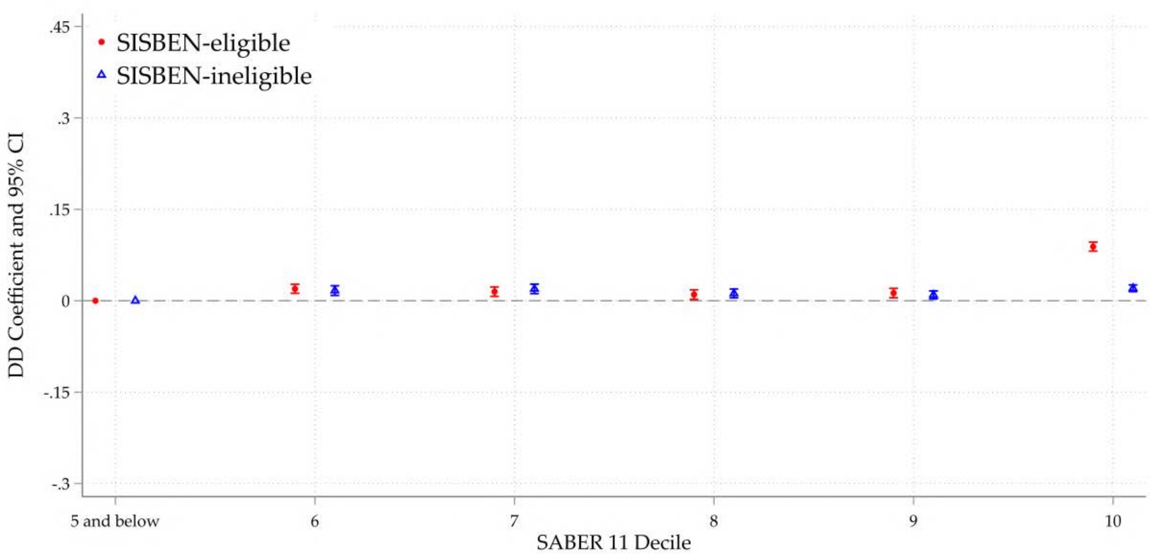
(c) HQ Public Colleges



(d) LQ Colleges



(e) Any College Within Six Years from High School

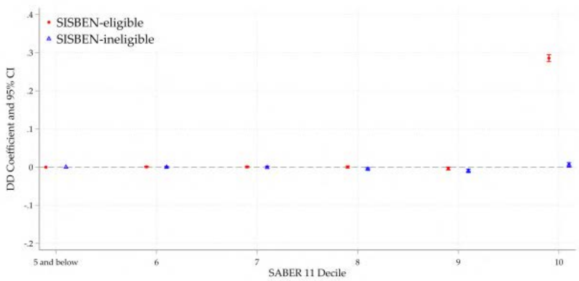


Notes: This figure displays the β_k coefficients and 95% confidence intervals from Specification (2), indicating the effect of financial aid expansion on nonrecipients' college access and quality. The red and blue markers represent the low-SES and high-SES students, respectively. Each panel corresponds to a different outcome: immediate access to HQ colleges (A), HQ *private* colleges (B), HQ *public* colleges (C), LQ colleges (D), and *any* college within six years after high school (E). Financial aid did not displace nonrecipients from HQ colleges. Instead, HQ private colleges expanded their capacity, while LQ colleges admitted lower-performing applicants to fill the vacant seats. This led to an overall improvement in college access for the entire cohort. Moreover, Figure A.28 shows that college "value added" remained unchanged for nonrecipients. Additionally, Figure A.23 provides a placebo check using the 2013 cohort.

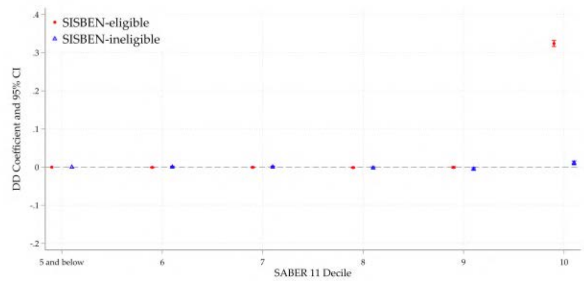
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure IX: Financial Aid Does Not Affect Nonrecipients' Bachelor's Attainment

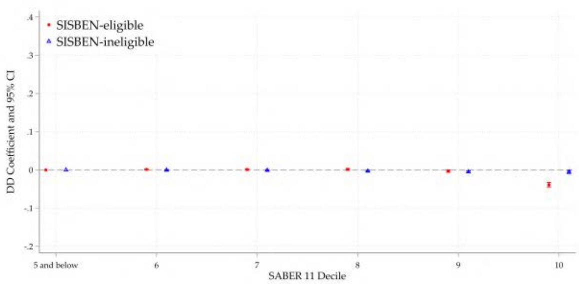
(a) HQ Colleges



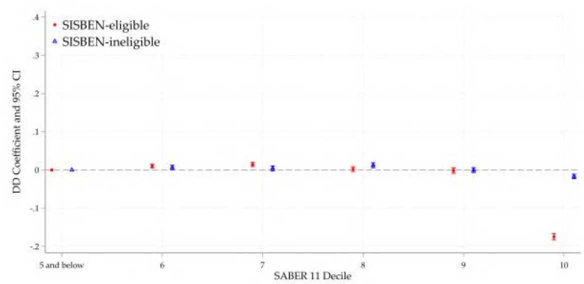
(b) HQ Private Colleges



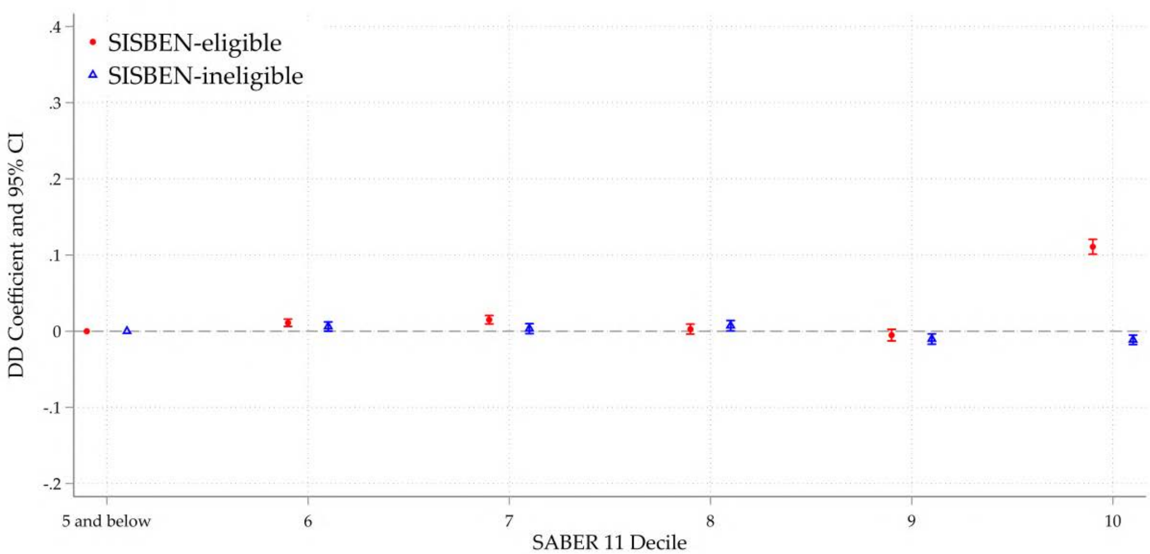
(c) HQ Public Colleges



(d) LQ Colleges

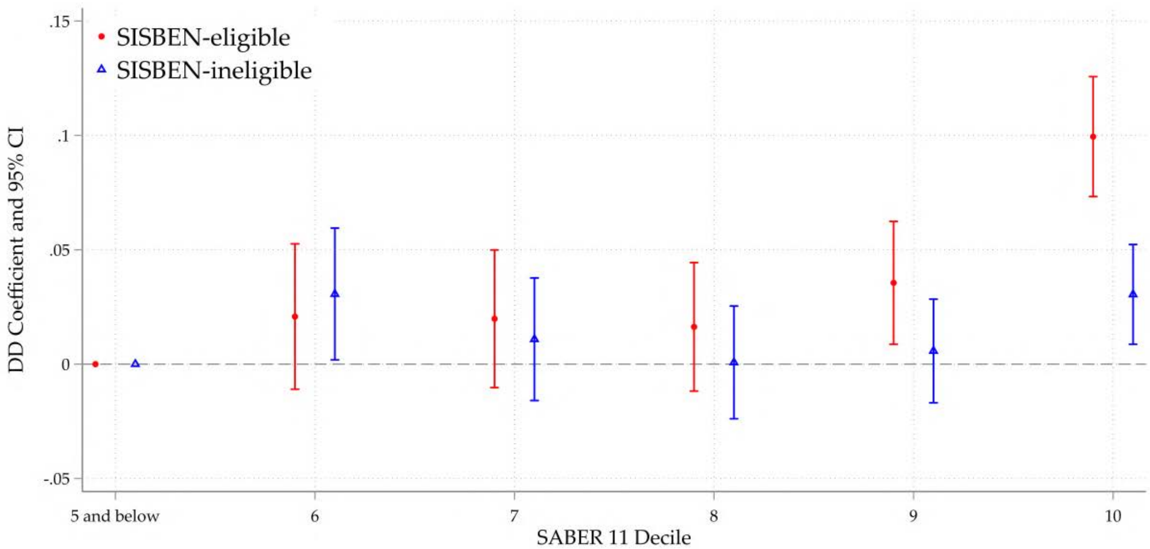


(e) Any College



Notes: This figure plots the β_k coefficients and 95% confidence intervals from Specification (2), which depict the impact of financial aid expansion on nonrecipients' bachelor's degree attainment, as measured by completing SABER PRO within seven years after high school completion. Each panel represents bachelor's attainment from different college types: HQ colleges (A), HQ *private* colleges (B), HQ *public* colleges (C), LQ colleges (D), and any college (E). The results indicate that financial aid expansion did not affect nonrecipients' likelihood of earning a bachelor's degree from an HQ college. Additionally, Figure A.23 provides a placebo check using the 2013 cohort.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

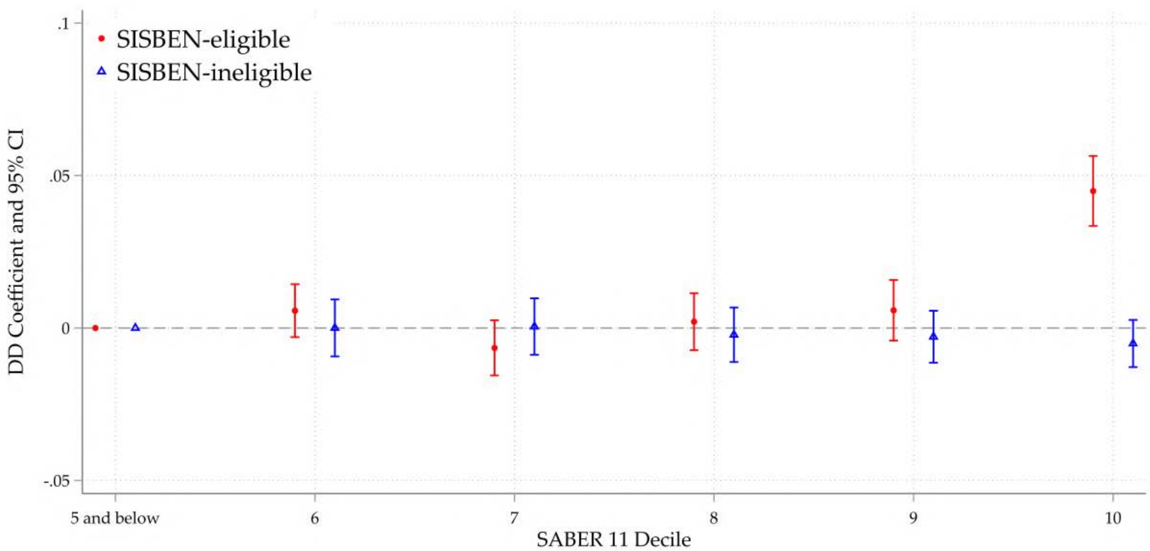
Figure X: Financial Aid Slightly Improves Nonrecipients' Learning



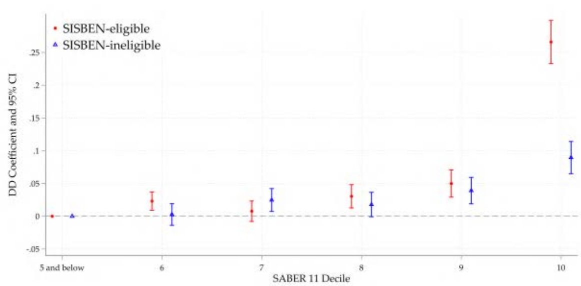
Notes: This figure plots the β_k coefficients and 95% confidence intervals from Specification (2), which represent the effect of financial aid expansion on nonrecipients' performance in Colombia's college graduation exam, SABER PRO. The exam is usually taken within five years after high school completion. Financial aid expansion did not hinder nonrecipients' learning performance. Interestingly, there was an improvement in test scores for high-SES students in the top SABER 11 decile (blue markers), indicating positive effects from attending college with higher-achieving peers (Figure A.26). This improvement cannot be attributed to changes in college learning "value added" (Figure A.28). Furthermore, low-SES students in the ninth decile (red markers also experienced an enhancement in test scores, suggesting an increase in overall efficiency. Additionally, Figure A.23 provides a placebo check using the 2013 cohort.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure XI: Financial Aid Improves Nonrecipients' Formal Labor Market Outcomes

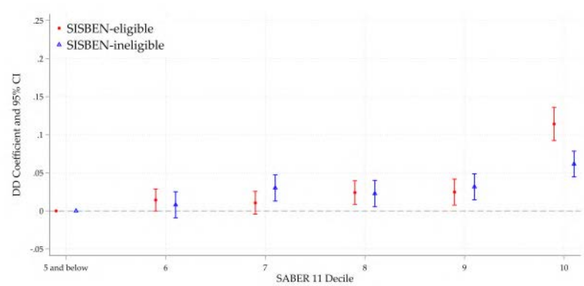
(a) Employment



(b) Earnings



(c) Log Earnings



Notes: This figure plots the β_k coefficients and 95% confidence intervals from Specification (2), representing the impact of financial aid expansion on nonrecipients' formal labor market outcomes eight years after high school completion. The outcome is employment in Panel A, earnings (measured in multiples of the monthly minimum wage and including zeros) in Panel B, and log earnings in Panel C. The comparison group is based on the 2013 cohort since the COVID-19 pandemic in 2020 affected the 2012 cohort's earnings eight years after high school. The results show that financial aid expansion did not devalue degrees from HQ colleges. Interestingly, there was an improvement in earnings for high-SES students in the top decile (blue markers) and a slight earnings gain for low-SES students in the ninth decile (red markers). Again, these improvements cannot be attributed to changes in college "value added" (Figure A.28). Instead, the earnings gain is consistent with nonrecipients having greater college access (Figure VIII) and acquiring more knowledge (Figure X).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Table I: Reduced-Form Estimates on Enrollment Over Time by Type of College and Program

	Enrollment within zero years from high school completion									Enrollment within six years from high school completion								
	Any	High-quality college			Low-quality college			Program duration		Any	High-quality college			Low-quality college			Program duration	
	college	Any	Private	Public	Any	Private	Public	Two years	Four years	college	Any	Private	Public	Any	Private	Public	Two years	Four years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
***Panel A**: SABER 11 is the running variable*																		
Reduced form	0.287	0.469	0.470	-0.003	-0.180	-0.065	-0.117	-0.063	0.345	0.096	0.436	0.472	-0.038	-0.336	-0.120	-0.217	-0.121	0.212
	(0.011)	(0.009)	(0.009)	(0.006)	(0.009)	(0.006)	(0.007)	(0.006)	(0.012)	(0.010)	(0.009)	(0.010)	(0.008)	(0.012)	(0.008)	(0.010)	(0.009)	(0.012)
Mean control	0.414	0.096	0.028	0.071	0.317	0.106	0.213	0.112	0.307	0.773	0.181	0.044	0.140	0.586	0.200	0.390	0.215	0.562
Observations	297,279																	
BW loc. poly.	28.48	30.60	26.86	25.30	27.12	30.22	32.74	25.92	21.08	23.33	33.15	23.71	26.19	22.18	26.74	26.99	22.92	20.29
Effect obs. control	29,368	32,363	25,871	24,714	27,607	32,363	35,547	24,714	18,948	21,963	37,647	21,963	25,871	20,459	25,871	25,871	20,459	17,966
Effect obs. Treat	11,214	11,576	10,754	10,576	11,002	11,576	11,880	10,576	9,489	10,107	12,061	10,107	10,754	9,815	8,796	10,754	9,815	9,317
***Panel B:** SISBEN is the running variable*																		
Reduced form	0.226	0.418	0.473	-0.053	-0.185	-0.077	-0.109	-0.060	0.286	0.049	0.357	0.468	-0.114	-0.302	-0.125	-0.177	-0.096	0.145
	(0.021)	(0.019)	(0.015)	(0.015)	(0.018)	(0.011)	(0.016)	(0.010)	(0.021)	(0.016)	(0.020)	(0.018)	(0.017)	(0.021)	(0.015)	(0.017)	(0.012)	(0.019)
Mean control	0.535	0.241	0.074	0.167	0.292	0.113	0.181	0.094	0.442	0.851	0.360	0.097	0.264	0.490	0.198	0.291	0.150	0.701
Observations	22,552																	
BW loc. poly.	11.24	12.84	14.83	12.56	10.31	11.81	9.60	12.18	11.78	9.33	12.02	10.82	11.85	9.80	10.34	11.04	13.13	9.90
Effect obs. control	4,674	5,164	5,712	5,096	4,351	4,894	4,085	4,990	4,885	4,005	4,961	4,523	4,904	4,166	4,360	4,602	5,257	4,198
Effect obs. Treat	4,797	5,368	6,072	5,272	4,412	5,029	4,124	5,173	5,019	4,012	5,118	4,627	5,047	4,199	5,234	4,721	5,484	4,238

Notes: This table presents the reduced-form effect of financial aid eligibility on postsecondary enrollment within zero (Columns 1–9) and six years (Columns 10–18) from high school completion using an RD design. The dependent variable is enrollment by college type (e.g., HQ, LQ) and program duration (two or three years versus four or five years). Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students. The reduced-form coefficient in Column (1) of Panel A suggests that, for need-eligible individuals, financial aid eligibility raises immediate postsecondary enrollment by 28.7 p.p. or 69.5% relative to a control mean of 41.4%. Conventional local linear RD estimates and standard errors in parentheses are estimated with package rdrobust (Cattaneo et al., 2014).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Table II: Reduced-Form Estimates on Degree Attainment by Type of College and Program

	Any Degree	Two Year Degree	Four Year Degree											
			Any college	High-quality college			Low-quality college			Field of study				
				Any	Private	Public	Any	Private	Public	STEM	STEM Plus	Arts	S.S.H.	N.A.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
***Panel A:** SABER 11 is the running variable*														
Reduced form	0.062	-0.101	0.156	0.322	0.343	-0.016	-0.161	-0.066	-0.080	0.088	0.124	0.015	0.031	-0.017
	(0.012)	(0.009)	(0.014)	(0.011)	(0.009)	(0.006)	(0.009)	(0.006)	(0.007)	(0.009)	(0.014)	(0.003)	(0.006)	(0.005)
Mean control	0.584	0.184	0.403	0.098	0.031	0.063	0.304	0.109	0.147	0.137	0.301	0.005	0.051	0.048
Observations								297,279						
BW loc. poly.	22.71	22.97	18.78	19.46	26.35	20.86	30.67	30.89	25.41	24.64	17.53	27.34	27.55	24.60
Effect obs. control	20,459	20,459	15,683	16,562	25,871	17,966	32,363	32,363	24,714	23,070	14,367	27,607	27,607	23,070
Effect obs. Treat	9,815	9,815	8,796	8,987	10,754	9,317	11,576	11,576	10,576	10,299	8,464	11,002	11,002	10,299
***Panel B:** SISBEN is the running variable*														
Reduced form	0.077	-0.060	0.145	0.327	0.390	-0.065	-0.179	-0.081	-0.081	0.063	0.101	0.017	0.051	-0.015
	(0.023)	(0.015)	(0.020)	(0.019)	(0.017)	(0.014)	(0.017)	(0.012)	(0.013)	(0.019)	(0.023)	(0.007)	(0.015)	(0.009)
Mean control	0.661	0.111	0.546	0.238	0.073	0.167	0.306	0.124	0.136	0.237	0.409	0.015	0.071	0.045
Observations								22,552						
BW loc. poly.	8.72	7.42	12.43	13.74	12.65	12.20	12.00	11.33	11.79	12.37	10.72	11.41	8.43	10.52
Effect obs. control	3,738	3,199	5,053	5,417	5,118	4,995	4,953	4,698	4,888	5,036	4,480	4,723	3,615	4,424
Effect obs. Treat	3,761	3,162	5,234	5,689	5,303	5,179	5,108	4,830	5,025	5,220	4,582	4,852	3,603	4,496

Notes: This table presents the reduced-form effect of financial aid eligibility on the likelihood of earning a degree (proxied by college exit exam test-taking) within seven years from high school completion using an RD design. Following U.S. Department of Homeland Security, STEM fields include Engineering, Biological and Biomedical Sciences, Mathematics and Statistics, Physical Sciences, and Medicine. STEM-Plus adds Agriculture and Related Sciences; Natural Resources Conservation; Architecture; Education; Military Science; Psychology; Accounting, Business, and Economics; and Health Professions and Related Programs. Arts includes Plastic and Visual Arts; Music; Advertising; Design. Social Sciences and Humanities include Anthropology; Geography and History; Sociology and SocialWork; Philosophy and Theology; Literature; Library Science; Social Communication and Journalism; Sports and Physical Education; Law; Political Science and International Relations. S.S.H. refers to social sciences and humanities. N.A. refers to missing field of study (all of which come from LQ colleges). See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SABER PRO (ICFES), and SABER T&T (ICFES).

Table III: Instrumental Variables Estimates for Educational and Labor Market Outcomes

	Enrollment within six years from high school					Degree attainment					College exit test score if exam taken within...		Formal work	Formal earnings (includes zeros)		
	Any college	High-quality college		Program duration		Any degree	Two-year degree	Four-year degree			Five years	Seven years		in constant pesos	in monthly min. wages	in natural logarithm
		Any	Private	Two Years	Four Years			Any college	High-quality college: Any	High-quality college: Private						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
***Panel A:** SABER 11 is the running variable*																
IV	0.164	0.752	0.810	-0.208	0.363	0.106	-0.173	0.268	0.552	0.590	0.119	0.076	0.069	323,762.40	0.354	0.122
	(0.016)	(0.012)	(0.011)	(0.015)	(0.020)	(0.021)	(0.015)	(0.023)	(0.016)	(0.012)	(0.026)	(0.025)	(0.020)	(53,815.60)	(0.059)	(0.033)
First stage	0.583	0.580	0.583	0.583	0.584	0.583	0.583	0.584	0.584	0.582	0.804	0.732	0.582	0.583	0.583	0.623
	(0.009)	(0.008)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)	(0.011)	(0.011)	(0.009)	(0.009)	(0.009)	(0.011)
Mean control	0.773	0.181	0.044	0.215	0.562	0.584	0.184	0.403	0.098	0.031	0.423	0.448	0.598	905,908.90	0.992	14.056
Observations						297,279					23,059	41,429		297,279		146,252
BW loc. poly.	23.335	33.150	23.706	22.922	20.293	22.714	22.966	18.781	19.459	26.351	26.531	24.865	24.880	20.919	20.910	26.903
Effect obs. control	21,963	37,647	21,963	20,459	17,966	20,459	20,459	15,683	16,562	25,871	4,491	7,350	23,070	17,966	17,966	15,351
Effect obs. Treat	10,107	12,061	10,107	9,815	9,317	9,815	9,815	8,796	8,987	10,754	4,576	6,186	10,299	9,317	9,317	6,943
***Panel B:** SISBEN is the running variable*																
IV	0.081	0.553	0.731	-0.146	0.227	0.124	-0.100	0.225	0.500	0.604	0.059	0.044	0.005	311,081.00	0.342	0.209
	(0.026)	(0.032)	(0.026)	(0.024)	(0.031)	(0.038)	(0.022)	(0.038)	(0.033)	(0.029)	(0.046)	(0.047)	(0.038)	(116,697.40)	(0.128)	(0.059)
First stage	0.634	0.634	0.634	0.633	0.635	0.634	0.634	0.635	0.635	0.633	0.801	0.740	0.634	0.635	0.635	0.671
	(0.018)	(0.018)	(0.018)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.019)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Mean control	0.849	0.359	0.096	0.147	0.702	0.659	0.114	0.546	0.239	0.069	0.809	0.842	0.669	1,208,255.00	1.324	14.187
Observations						22,552					9,047	13,694		22,552		14,975
BW loc. poly.	8.305	8.428	8.278	7.792	8.604	8.135	8.075	8.663	8.589	7.361	12.116	10.209	8.278	8.483	8.480	11.142
Effect obs. control	3,560	3,613	3,552	3,337	3,686	3,481	3,466	3,721	3,682	3,180	1,572	2,386	3,552	3,640	3,640	3,113
Effect obs. Treat	3,544	3,598	3,527	3,331	3,688	3,475	3,450	3,720	3,681	3,137	2,376	2,851	3,527	3,630	3,630	3,257

Notes: This table presents the instrumental variables estimates of the effect of financial aid on educational and labor market outcomes realized up to eight years after high school completion using an RD design. The outcomes in Columns (6)–(10) are measured within seven years from high school completion, while the outcomes in Columns (13)–(16) are measured exactly eight years after high school completion. See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), SABER T&T (ICFES), and PILA (MinSalud).

Table IV: Reduced-Form Estimates on Other Educational Outcomes

	Years of undergrad. study	Time to bachelor's degree attainment					Any graduate study	College exit test score if exam taken within…	
		Any college	High quality college			Low quality college			
			Any	Private	Public			Five years	Seven years
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
***Panel A:** SABER 11 is the running variable*									
Reduced form	0.758	-0.125	-0.220	0.115	-0.154	0.070	0.005	0.096	0.056
	(0.063)	(0.038)	(0.074)	(0.123)	(0.104)	(0.073)	(0.002)	(0.021)	(0.019)
Mean control	3.319	5.213	5.277	4.920	5.467	5.193	0.008	0.423	0.448
Observations	297,279	22,476	8,800	6,484	2,316	13,676	297,279	23,059	41,429
BW loc. poly.	18.96	25.41	24.19	18.40	26.70	23.02	29.91	26.53	24.86
Effect obs. control	15,683	3,986	824	227	573	2,830	30,526	4,491	7,350
Effect obs. Treat	8,796	5,342	4,425	3,305	572	759	11,339	4,576	6,186
***Panel B:** SISBEN is the running variable*									
Reduced form	0.507	-0.190	-0.234	0.024	-0.080	-0.001	0.016	0.057	0.033
	(0.113)	(0.062)	(0.081)	(0.114)	(0.126)	(0.116)	(0.007)	(0.040)	(0.035)
Mean control	3.836	5.234	5.253	4.934	5.406	5.226	0.016	0.804	0.843
Observations	22,552	10,691	8,253	6,309	1,944	2,438	22,552	9,047	13,694
BW loc. poly.	7.94	9.17	9.04	8.75	9.61	14.05	9.37	9.89	10.03
Effect obs. control	3,421	1,365	641	254	408	991	4,011	1,320	2,359
Effect obs. Treat	3,385	2,227	1,959	1,605	318	408	4,024	1,969	2,804

Notes: This table presents the reduced-form estimates of the effect of financial aid on educational outcomes using an RD design. Column (1) reports the effects on the total years in undergraduate studies and assigns zeros for people who do not attend any undergraduate program within six years from high school. Columns (2)–(6) report effects on the number of years to obtain a bachelor's degree (proxied by taking the SABER PRO exam within seven years from high school), restricting the sample to students who attend college immediately after high school. Column (7) reports the effects on the likelihood of attending any graduate program within six years from high school. Finally, Columns (8) and (9) report effects on the SABER PRO test score for exams taken within five and seven years from high school completion, respectively. See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Table V: Reduced-Form Estimates on Early-Career Labor Market Outcomes

	Formal work	Formal earnings (includes zeros)			Time to first formal job
		in constant pesos	in monthly min. wages	in natural logarithm	
	(1)	(2)	(3)	(4)	(5)
Panel A: *SABER 11 is the running variable*					
Reduced form	0.040	188,897.30	0.206	0.076	-0.496
	(0.012)	(31,591.41)	(0.035)	(0.021)	(0.119)
Mean control	0.598	905,908.90	0.992	14.056	3.744
Observations	297,279	297,279	146,252	146,252	31,463
BW loc. poly.	24.88	20.92	20.91	26.90	34.44
Effect obs. control	23,070	17,966	17,966	15,351	6,744
Effect obs. Treat	10,299	9,317	9,317	6,943	3,165
Panel B: *SISBEN is the running variable*					
Reduced form	0.008	194,399.70	0.213	0.235	-0.382
	(0.023)	(72,732.85)	(0.080)	(0.055)	(0.233)
Mean control	0.668	1,214,661.00	1.331	14.109	3.296
Observations	22,552	22,552	22,552	14,975	5,483
BW loc. poly.	9.20	8.93	8.93	5.58	9.62
Effect obs. control	3,954	3,811	3,811	1,639	738
Effect obs. Treat	3,973	3,841	3,841	1,639	1,191

Notes: This table presents the reduced-form estimates of the effect of financial aid on early-career labor market outcomes using an RD design. The outcomes in Columns (1)–(4) are measured eight years after high school completion. Earnings are reported in December 2021 pesos. Converting COP to USD at the market exchange rate on December 31, 2021, the reduced form coefficient in Column (2) of Panel A is US$46.63 and the control mean is US$223.61 including zeros and US$373.79 excluding zeros. Column (5) reports the effects on the time to first formal job, measured in periods of four months since graduation according to SNIES. See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and PILA (MinSalud).

Table VI: Financial Aid's Impact on Educational and Labor Market Outcomes and College-Program "Value Added"

	College attainment				College exit test score		Formal labor market outcomes			
	Any degree		Four-year degree				Employment		Earnings	
	Outcome	VA	Outcome	VA	Outcome	VA	Outcome	VA	Outcome	VA
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: *SABER 11 is the running variable*										
Reduced form	0.032	-0.010	0.062	0.009	0.054	0.108	0.044	0.025	0.223	0.137
	(0.013)	(0.004)	(0.016)	(0.004)	(0.019)	(0.007)	(0.013)	(0.003)	(0.036)	(0.011)
Observations	130,376	130,376	68,416	68,416	35,493	35,374	284,782	284,782	284,782	284,782
Panel B: *SISBEN is the running variable*										
Reduced form	0.079	0.002	0.082	0.021	0.021	0.064	-0.004	0.017	0.226	0.146
	(0.026)	(0.007)	(0.023)	(0.006)	(0.033)	(0.011)	(0.025)	(0.006)	(0.083)	(0.024)
Observations	19,471	19,471	17,605	17,605	12,488	12,466	21,219	21,219	21,219	21,219

Notes: This table compares the reduced-form estimates on educational and early-career labor market outcomes and those predicted by college-program "value added" using an RD design. The outcomes are measured within seven years from high school completion in Columns (1) through (6) and eight years after high school completion in Columns (7) through (10). The dependent variable is the outcome of interest in odd columns and the associated college-program "value added" in even columns. Formal earnings in Columns (9) and (10) are measured in multiples of the monthly minimum wage and have zeros for individuals not formally employed. See Appendix D and the notes under Table I for other details.

Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), SABER T&T (ICFES), and PILA (MinSalud).

Table VII: Discounted Lifetime Benefits and Costs of Financial Aid and the MVPF

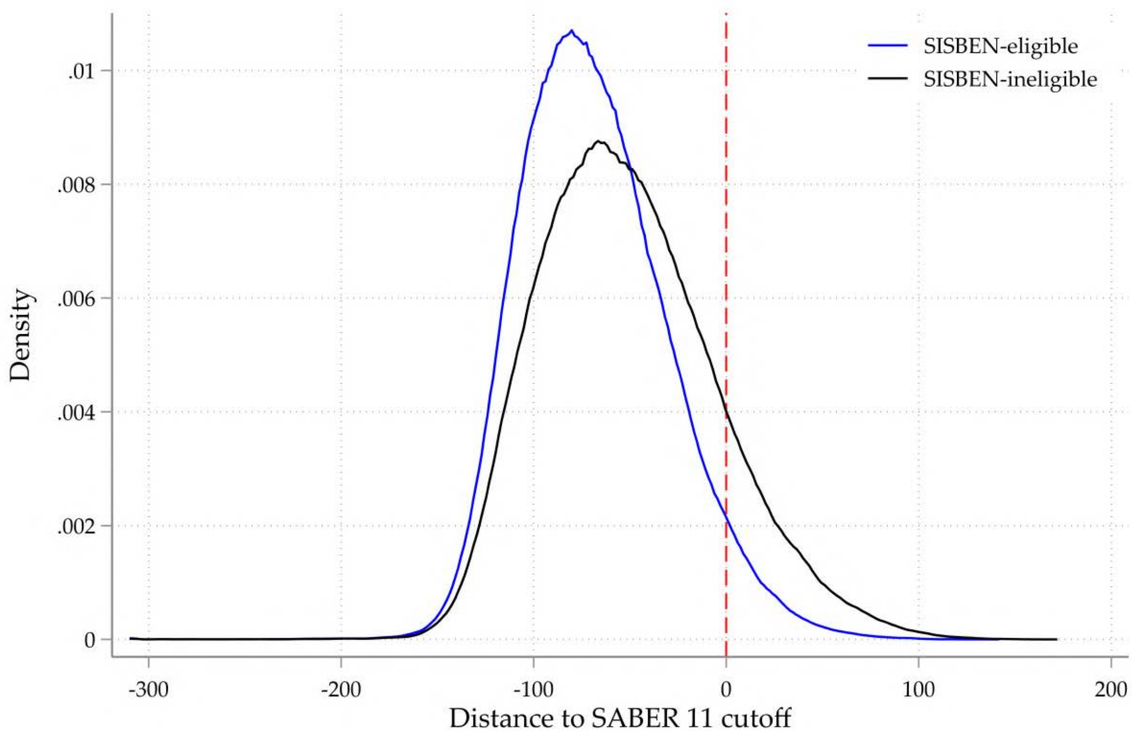
Years after high school completion	Annual earnings: Mean control (1)	Annual earnings: RD-IV estimate (2)	D: Mean control (3)	D: RD-IV estimate (4)	COA: Mean control (5)	COA: RD-IV estimate (6)
Panel A: *SABER 11 is the running variable*						
1	824,191	-586,135	0	18,245,360	5,244,523	12,645,545
2	1,954,522	-1,225,576	0	16,759,246	4,915,485	11,606,497
3	2,860,744	-1,935,274	0	17,021,608	5,121,074	11,538,549
4	3,560,159	-1,956,422	0	16,564,866	4,896,173	11,312,535
5	4,625,874	-673,952	0	12,050,541	4,301,969	7,494,951
6	5,753,196	743,385	0	2,124,008	3,159,448	-833,290
7	8,113,900	2,820,266	0	91,675		
8	10,870,907	3,885,149	0	0		
Lifetime		110,283,598		78,335,884		51,083,113
WTP / Costs		167,665,598		57,382,000		30,129,230
MVPF				2.92		5.56
Panel B: *SISBEN is the running variable*						
1	573,210	-275,993†	101,793.70	19,762,078	7,181,810	11,847,911
2	1,495,811	-424,379†	123,586.60	18,557,160	6,576,327	11,134,620
3	2,380,560	-1,120,974	89,005.48	18,829,610	6,619,477	11,433,690
4	2,929,795	-1,187,153	127,393.90	18,137,244	6,734,639	10,689,724
5	4,388,284	665,341†	104,272.60	13,313,946	5,808,413	6,936,964
6	6,640,765	1,141,438†	43,930.00	2,128,963	4,117,933	-1,848,626
7	10,683,776	3,074,324	14,223.06	406,543		
8	14,499,060	3,732,972	-	74,207		
Lifetime		82,790,624		86,192,140		47,786,944
WTP / Costs		153,252,546		70,461,922		32,056,726
MVPF				2.17		4.78

Notes: This table presents the instrumental variables estimates of the effect of financial aid on annual earnings, D_i, and COA_i, as described in the main text, one to eight years following high school graduation using an RD design. Lifetime earnings and costs are discounted back to year one at a rate of 3%. Willingness to pay and costs assume that incremental earnings are subject to a 19% tax rate. Columns (1), (3), and (5) present the average outcomes for the control group. In Column (3) of Panel A, D_i is zero because no student received SPP without meeting the SABER 11 requirement. Conversely, in Panel B, it is positive but relatively small because a few students received SPP without meeting the SISBEN condition. † denotes not statistically significant at the 10% level. See the main text and the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SPP (ICETEX), institutional financial accounts and balance sheets (MEN), and PILA (MinSalud).

Online Appendix

Appendix A Additional Figures and Tables

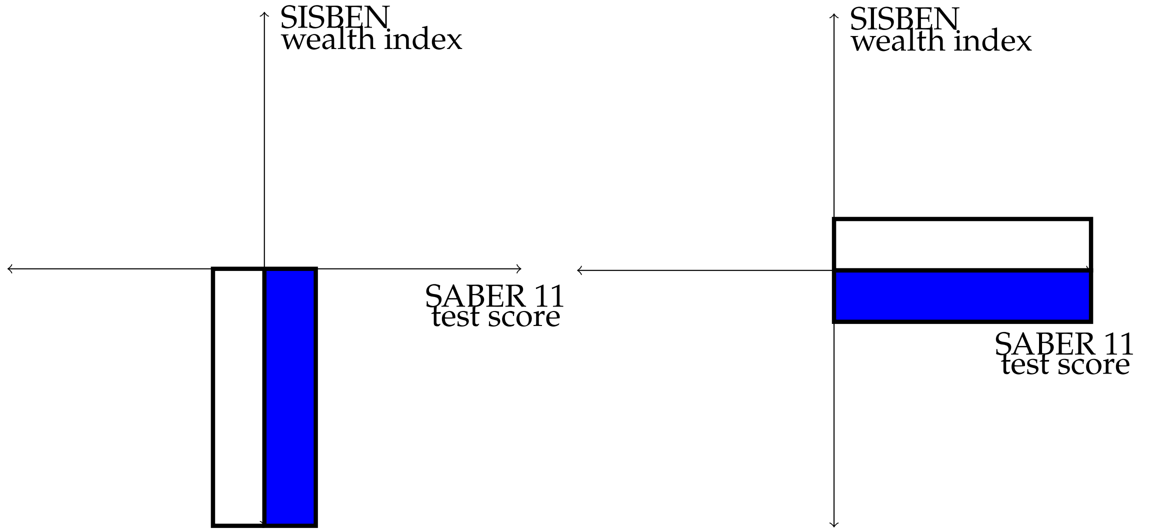
Figure A.1: The Distribution of SABER 11 Test Scores for SISBEN-Eligible and SISBEN-Ineligible Students



Notes: The figure plots the distribution of SABER 11 test scores separately for students who are need-eligible and need-ineligible for the SPP financial aid program based on their SISBEN score. The red dashed line marks SPP's SABER 11 test score cutoff.
Sources: Authors' calculations based on SABER 11 (ICFES) and SISBEN (DNP).

Figure A.2: Illustration of the Two Types of Compliers

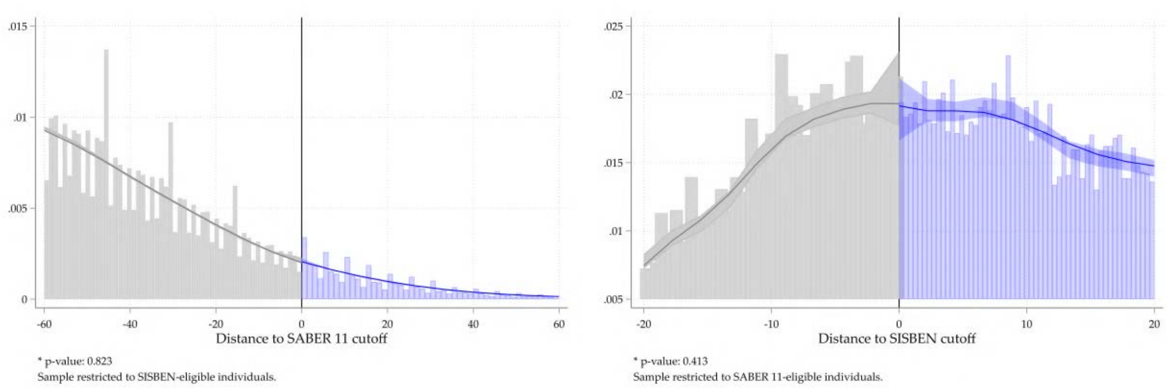
(a) SABER 11 as the running variable (b) SISBEN as the running variable



Notes: This figure depicts the two types of compliers in the SPP financial aid program. Panel A compares need-eligible students who are barely merit-eligible (blue) and merit-ineligible (white). Panel B compares merit-eligible students who are barely need-eligible (blue) and need-ineligible (white).

Figure A.3: Manipulation Testing based on Density Discontinuity

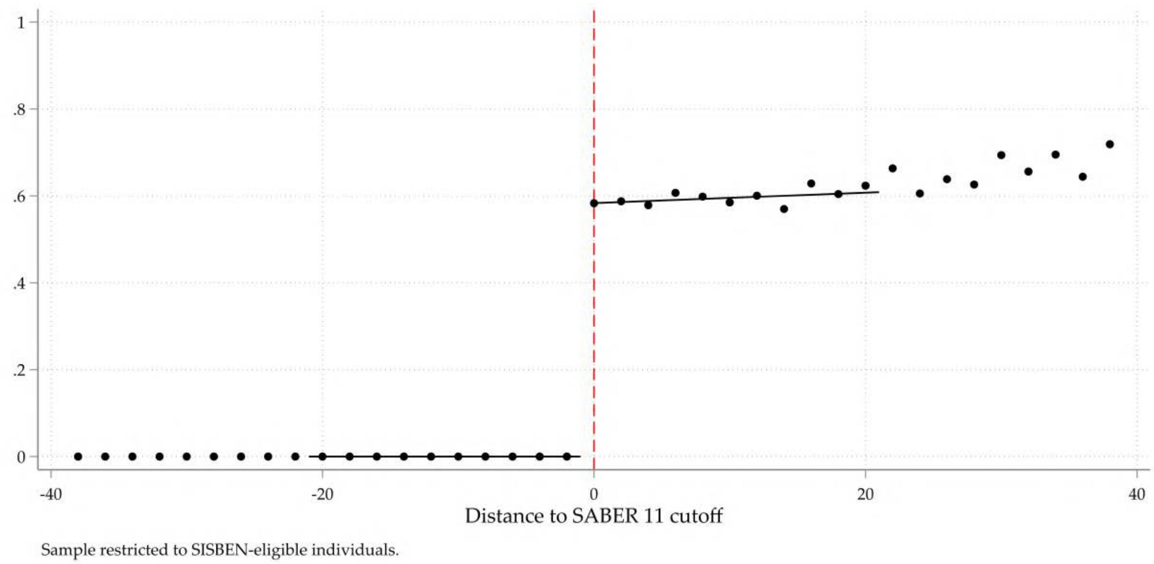
(a) SABER 11 as the running variable (b) SISBEN as the running variable



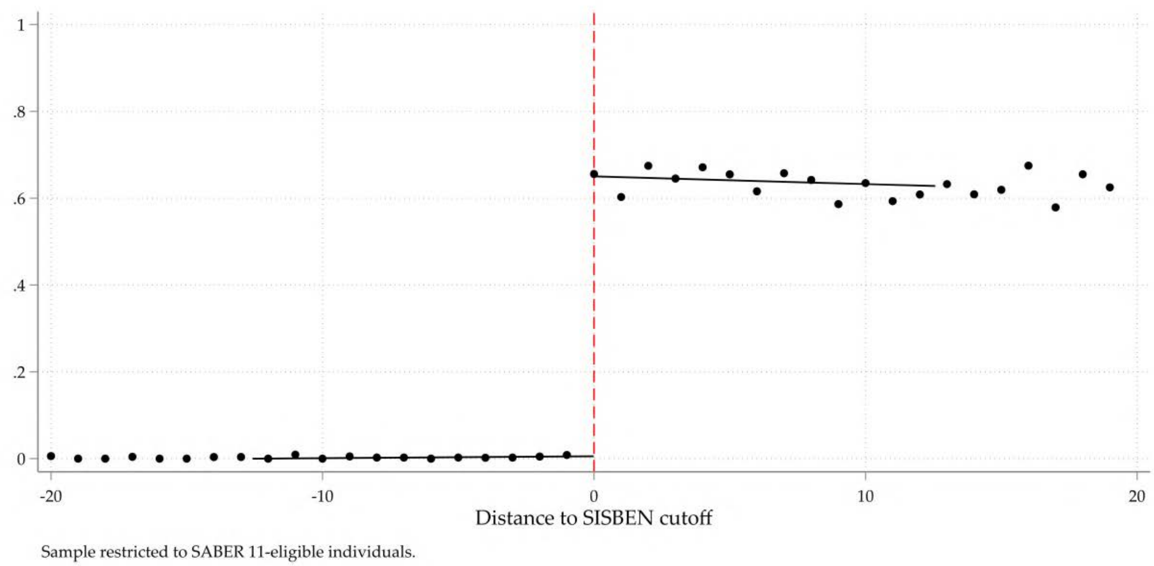
Notes: This figure tests for manipulation of the running variable based on density discontinuity. All results are estimated with package rddensity (Cattaneo et al., 2018) using an unrestricted model and a triangular kernel function, and employ the jackknife standard errors estimator. Panel A restricts the sample to SISBEN-eligible individuals. Panel B restricts the sample to SABER 11-eligible individuals. The p-values suggest we cannot statistically detect manipulation in either variable.
Sources: Authors' calculations based on SABER 11 (ICFES) and SISBEN (DNP).

Figure A.4: Discontinuity in the Probability of Receiving SPP Financial Aid

(a) Merit-Based Eligibility

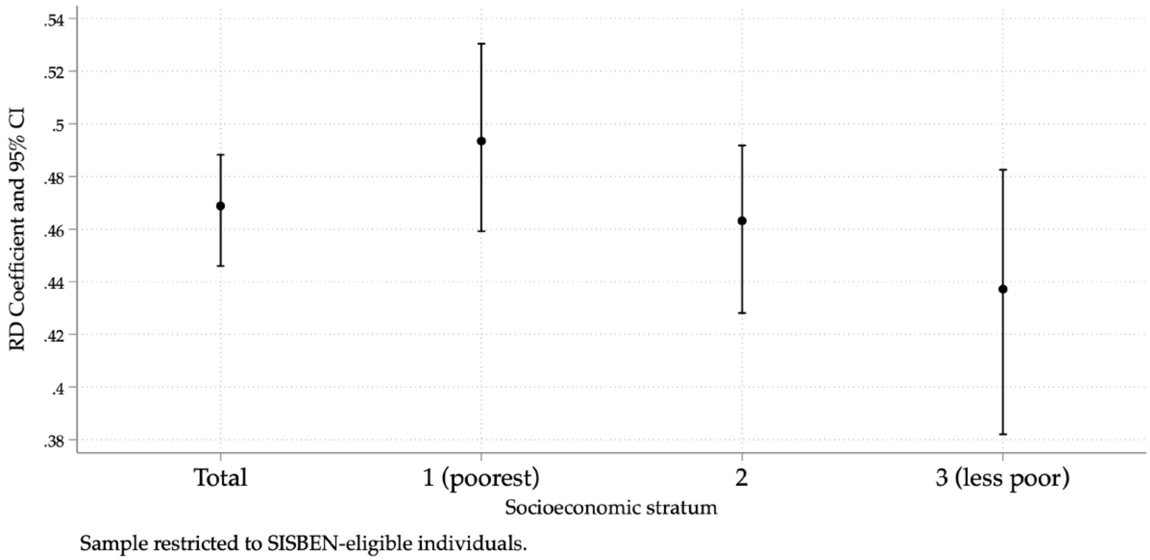


(b) Need-Based Eligibility



Notes: The figures plot the take-up rate, that is, the probability of receiving SPP financial aid program as a function of the distance to the SABER 11 (Panel A) and SISBEN (Panel B) eligibility cutoffs, restricting the sample to need- and merit-eligible students, respectively. The probability of being a SPP recipient increases from 0% to 58.3% using SABER 11 as the running variable (Panel A) and from 0% to 64.5% using SISBEN as the running variable (Panel B). Sample average within bin. The line is plotted for the optimal bandwidth (Cattaneo et al., 2014).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and ICETEX.

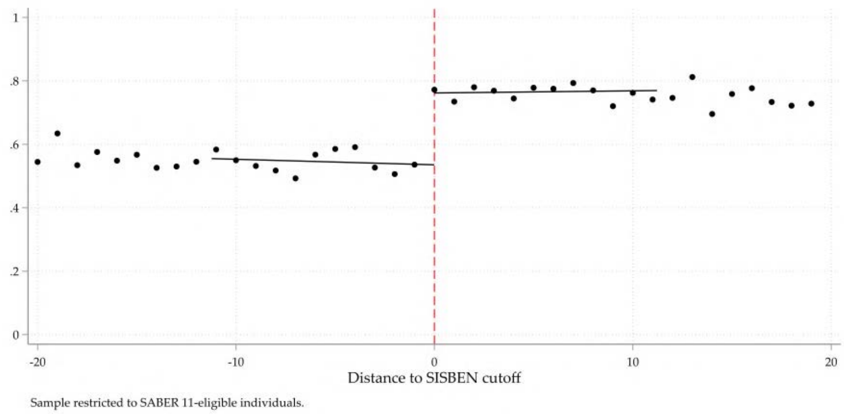
Figure A.5: The Effect of Financial Aid on HQ College Access by SES (Merit Cutoff)



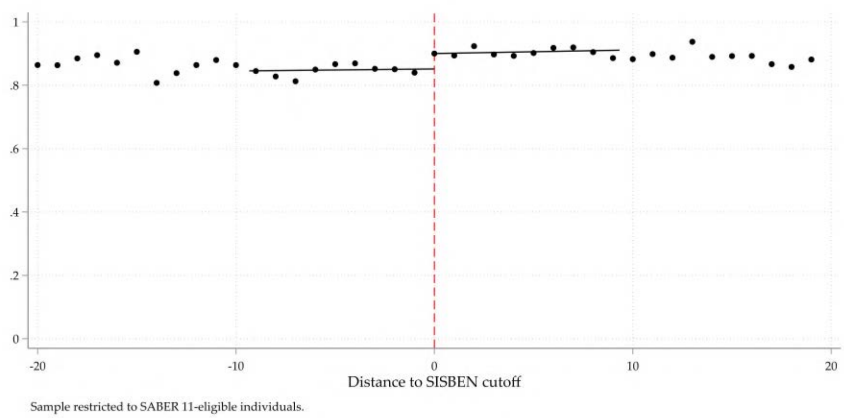
Notes: This figure compares the reduced-form RD coefficient and 95% confidence intervals by socioeconomic status. The running variable is the SABER 11 test score, and the outcome is the likelihood of accessing an HQ college immediately after high school. The sample is restricted to SISBEN-eligible individuals. The term "socioeconomic stratum" refers to Colombia's socioeconomic stratification system (*estratos*), which categorizes households based on their affluence using neighborhood and dwelling characteristics. Stratum 1 corresponds to the poorest households. More than 99% of SISBEN-eligible individuals belong to strata 1, 2, and 3.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.6: The Effect of Financial Aid on College Access (Need Cutoff)

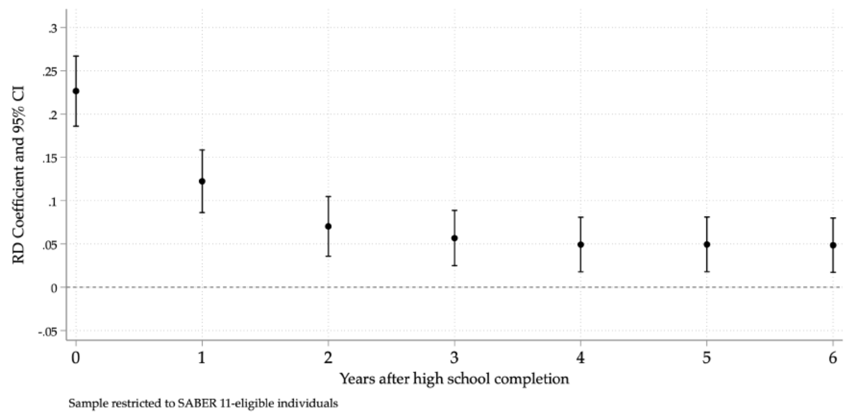
(a) Any Enrollment Zero Years After High School



(b) Any Enrollment Six Years After High School



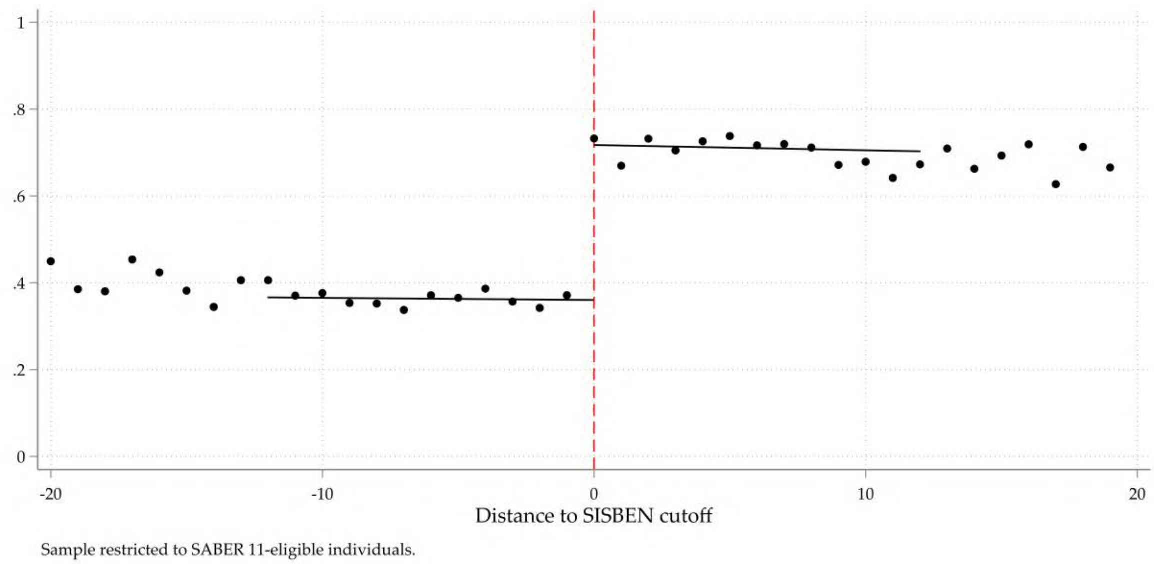
(c) The Enrollment Effect Stabilizes Around 5 p.p.



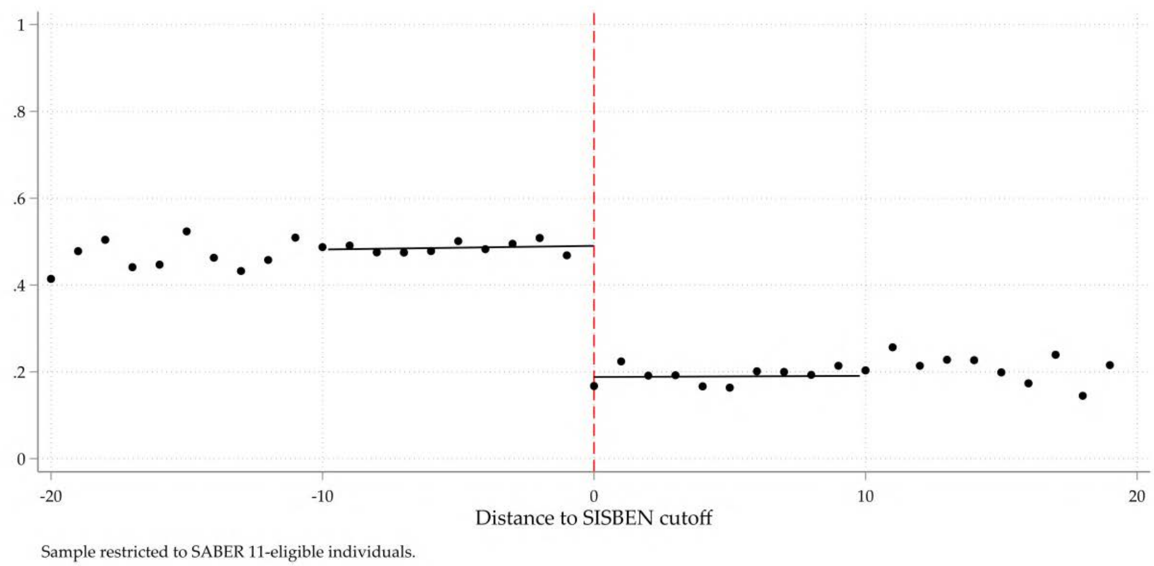
Notes: Panels A and B plot the probability of ever attending college within zero and six years after high school completion, respectively, as a function of the distance to the need cutoff (for merit-eligible students). Panel C plots the RD coefficients over time. Figure II shows similar effects using SISBEN as the running variable. Table I reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.7: The Effect of Financial Aid on College Quality (Need Cutoff)

(a) High-Quality College



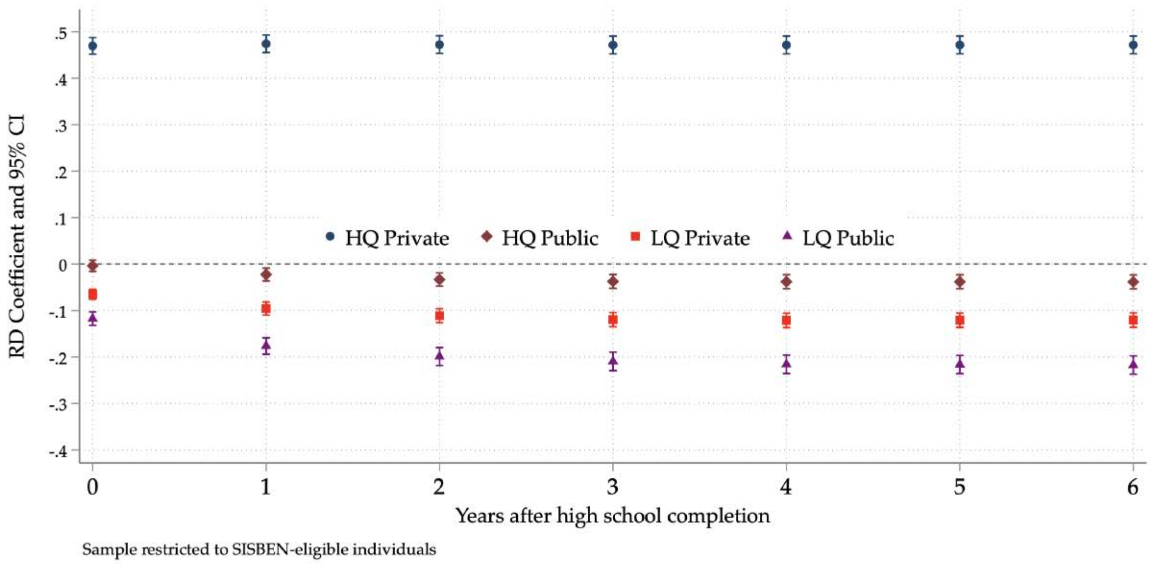
(b) Low-Quality College



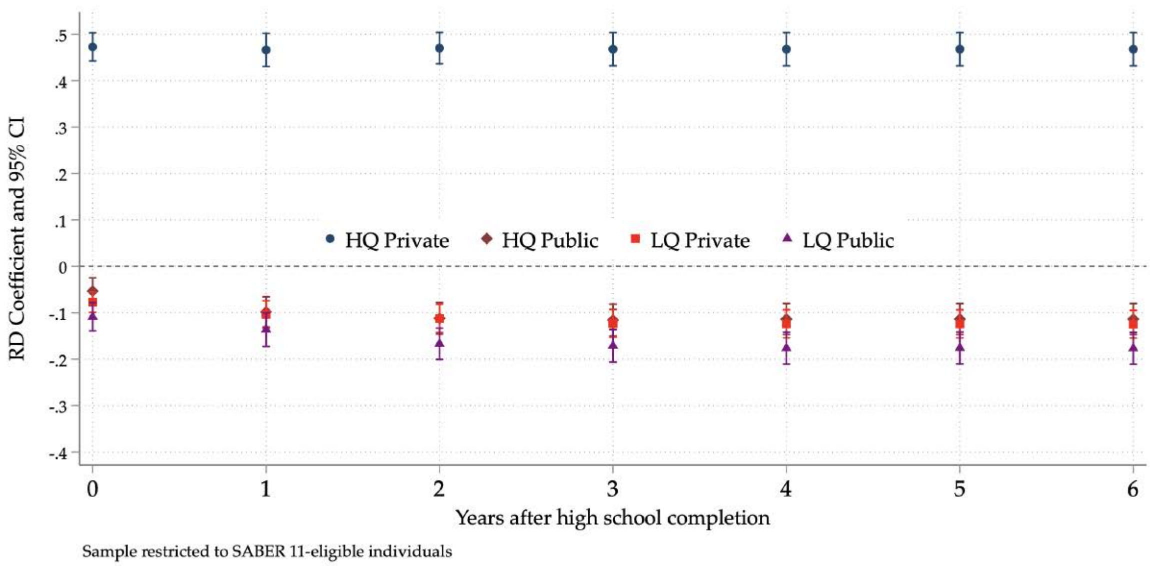
Notes: The figures decompose the enrollment effect six years after high school by college quality based on the need discontinuity (for merit-eligible students). Panels A and B plot the probability of ever attending a high- and low-quality college, respectively. Figure A.10 plots the RD coefficient over time. Table I reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.8: Enrollment by College Type: High- vs. Low-Quality and Private vs. Public

(a) Merit Cutoff



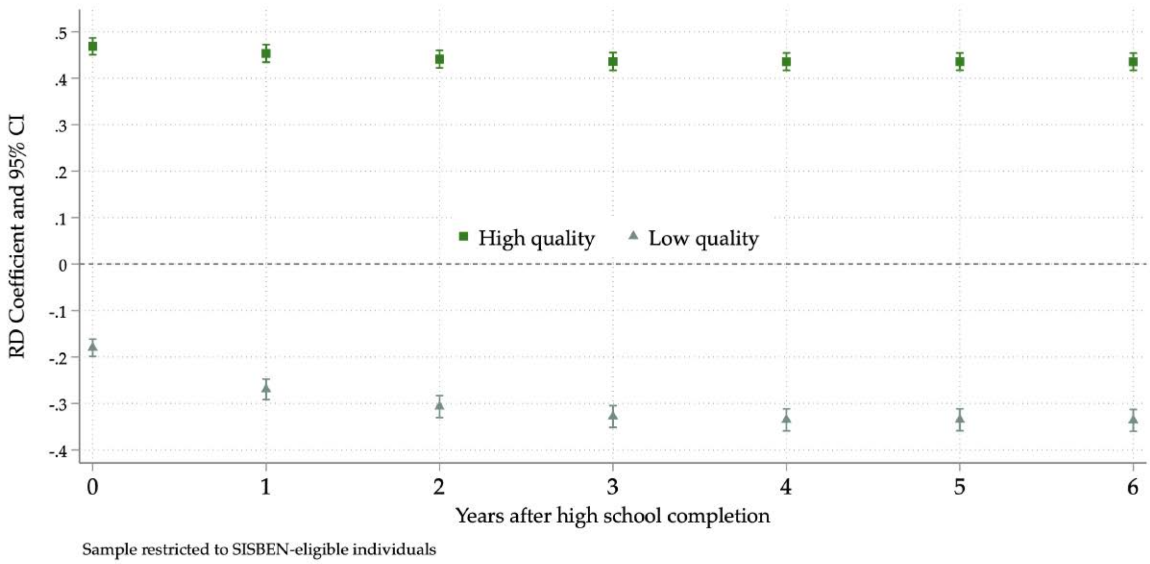
(b) Need Cutoff



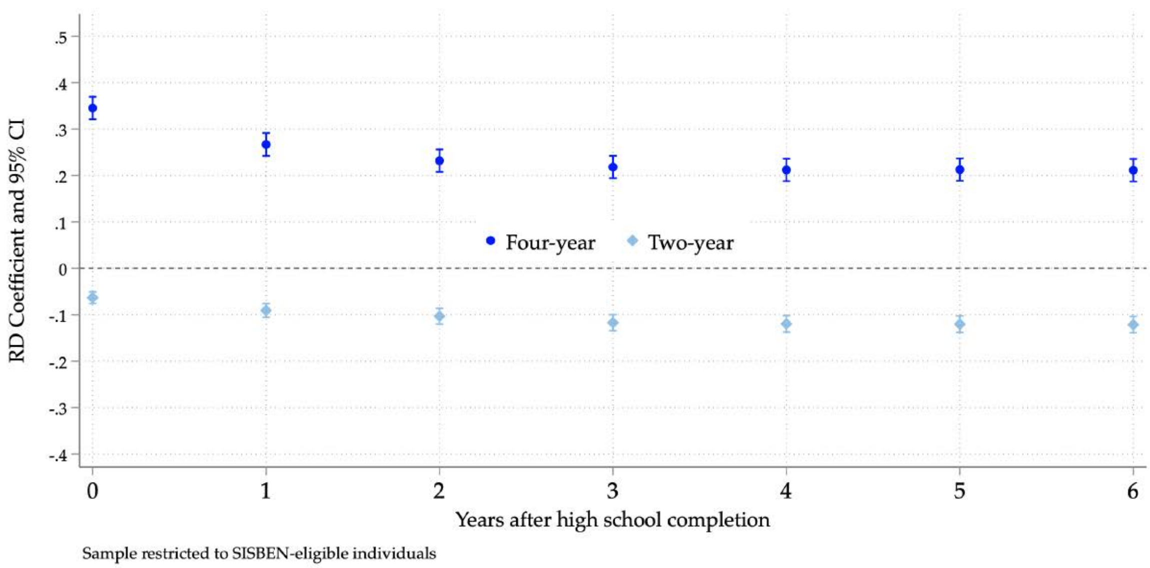
Notes: The figures decompose the enrollment effects over time by college quality and whether the institution is public or private. Panel A plots the RD coefficient based on the test score discontinuity (for need-eligible students), while Panel B plots the RD coefficient based on the need discontinuity (for merit-eligible students). Table I reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.9: Enrollment by College Quality and Program Duration (Merit Cutoff)

(a) High- versus Low-Quality College



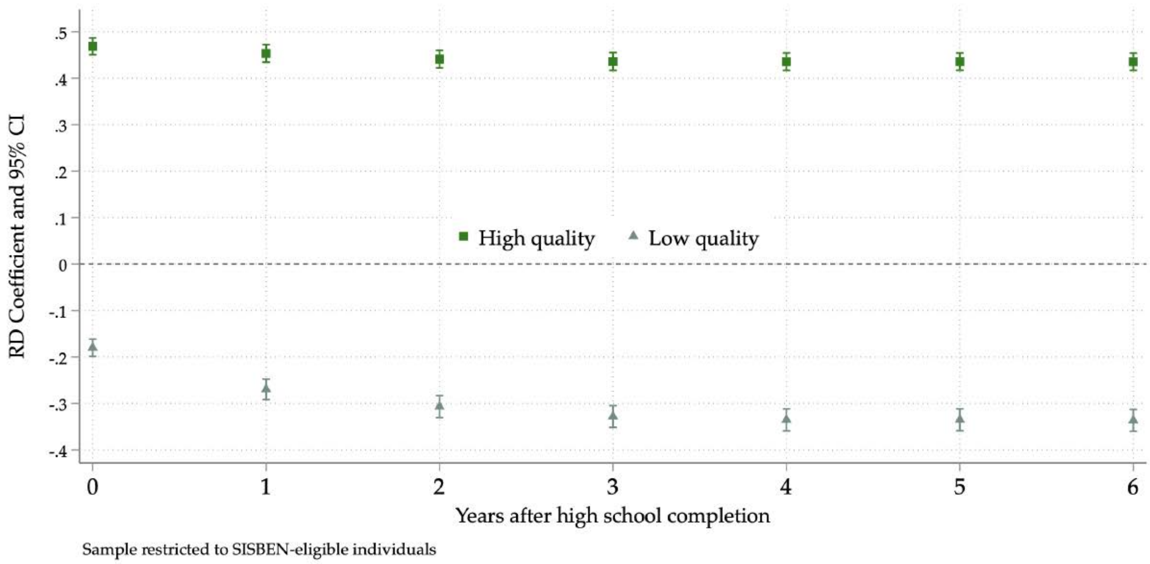
(b) Four- (or five-)year program versus two- (or three-)year program



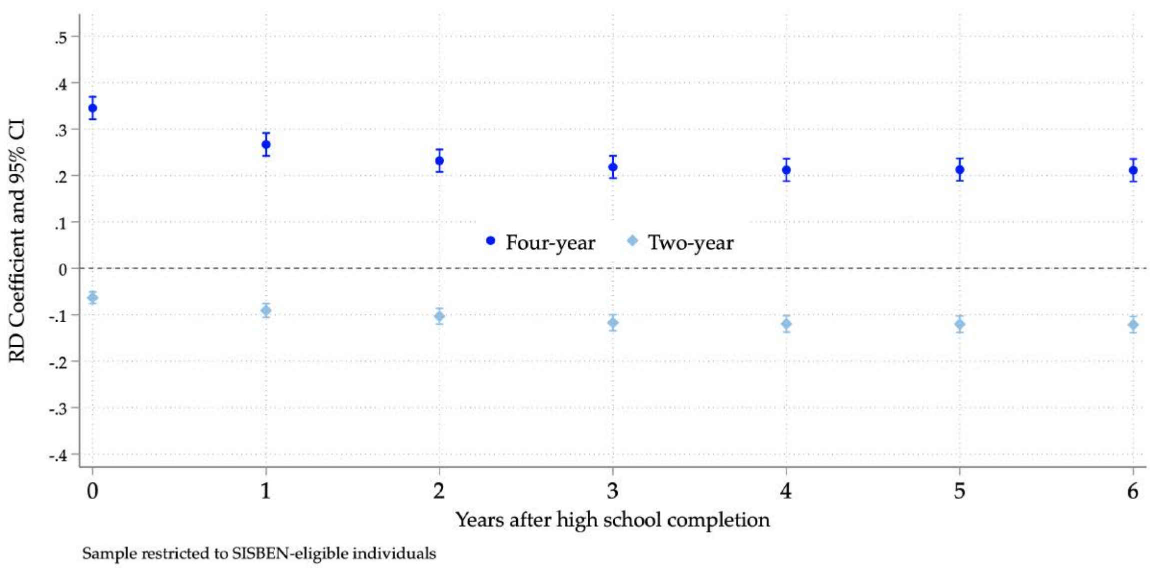
Notes: The figures decompose the enrollment effects over time from Figure II by college quality and program duration based on the test score discontinuity (for need-eligible students). Panel A plots the RD coefficient on the probability of ever attending a high- or low-quality college. Panel B plots the RD coefficients on the probability of ever attend a four- (or five-)year program or a two- (or three-)year program. Figure A.10 shows similar effects using SISBEN as the running variable. Table I reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.10: Enrollment by College Quality and Program Duration (Need Cutoff)

(a) High- versus Low-Quality College



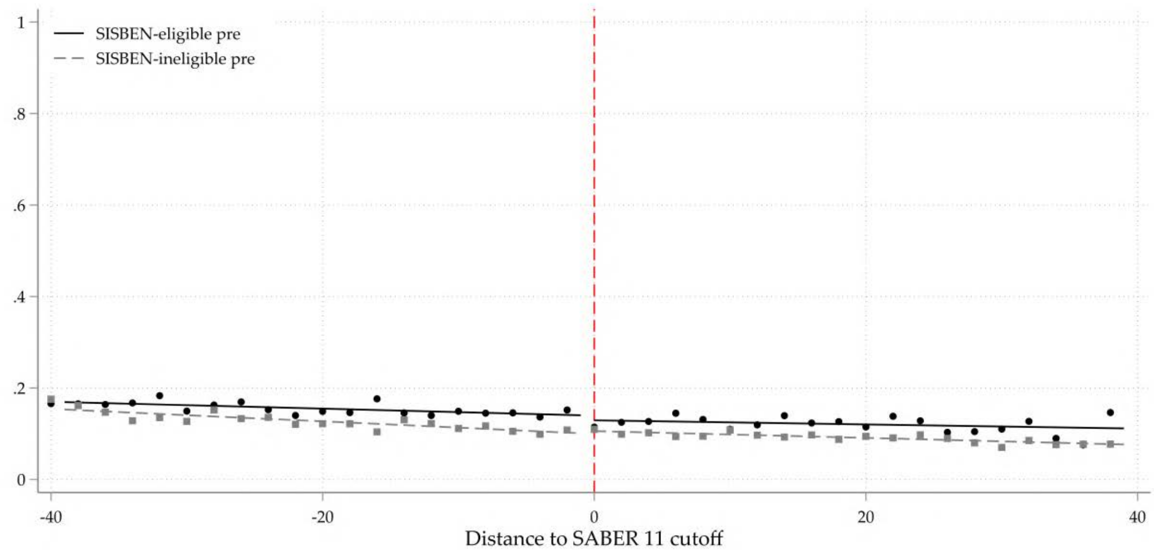
(b) Four- (or five-)year program versus two- (or three-)year program



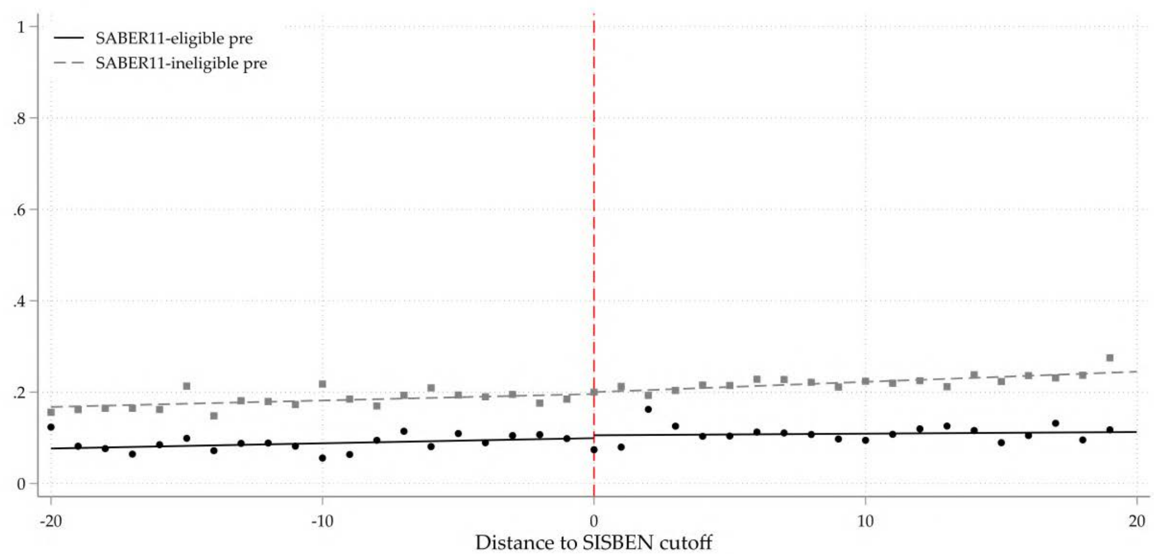
Notes: The figures decompose the enrollment effects over time from Figure A.6 by college quality and program duration based on the need discontinuity (for merit-eligible students). Panel A plots the RD coefficient on the probability of ever attending a high- or low-quality college. Panel B plots the RD coefficients on the probability of ever attend a four- (or five-)year program or a two- (or three-)year program. Figure A.9 shows similar effects using SABER 11 as the running variable. Table I reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.11: The Likelihood of Dropping Out from a Bachelor's Program

(a) Merit Cutoff



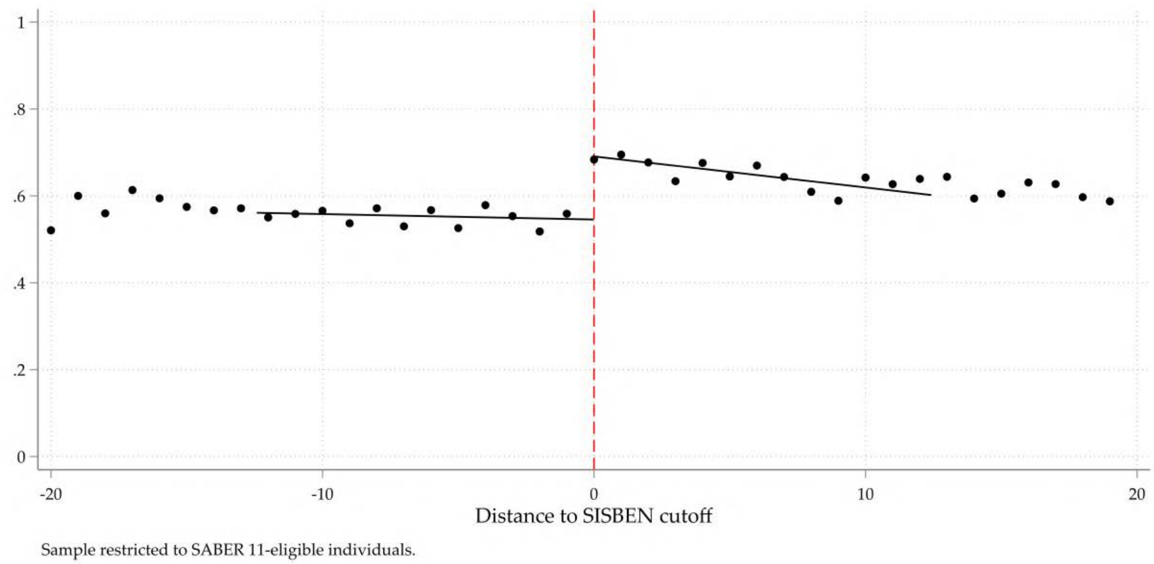
(b) Need Cutofff



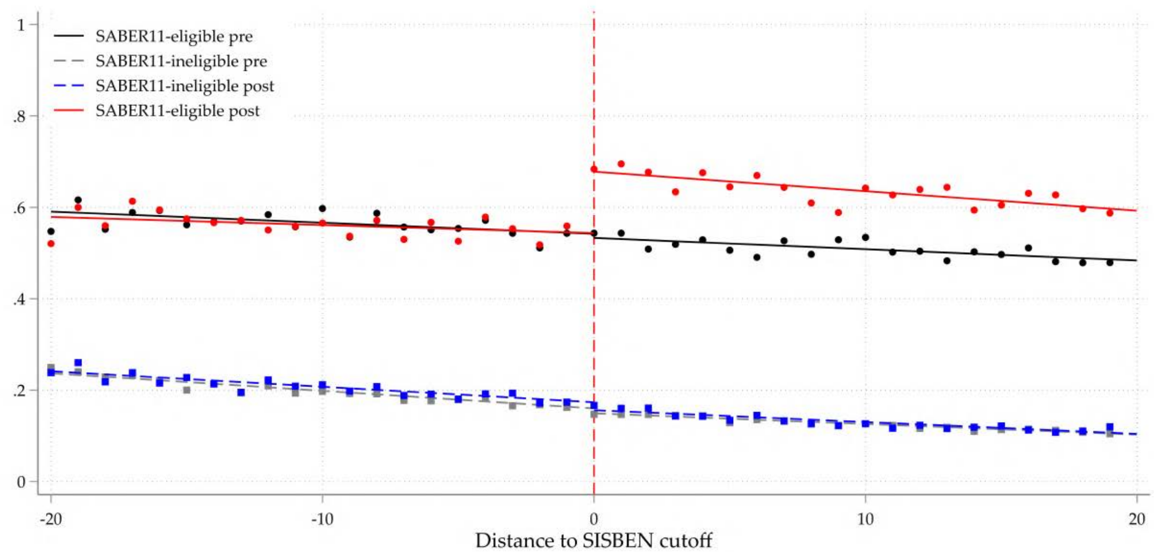
Notes: The figures plot the likelihood of dropping out of a bachelor's program as a function of the distance to the test score and need cutoffs in Panels A and B, respectively. The sample is restricted to individuals who took SABER 11 in the fall of 2012 or 2013 (i.e., before the expansion of financial aid) and accessed a bachelor's program immediately after high school. The figures compare the outcome for aid-eligible and -ineligible students in black and gray, respectively.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure A.12: Bachelor's Degree Earned Within Seven Years from High School

(a) Need Cutoff



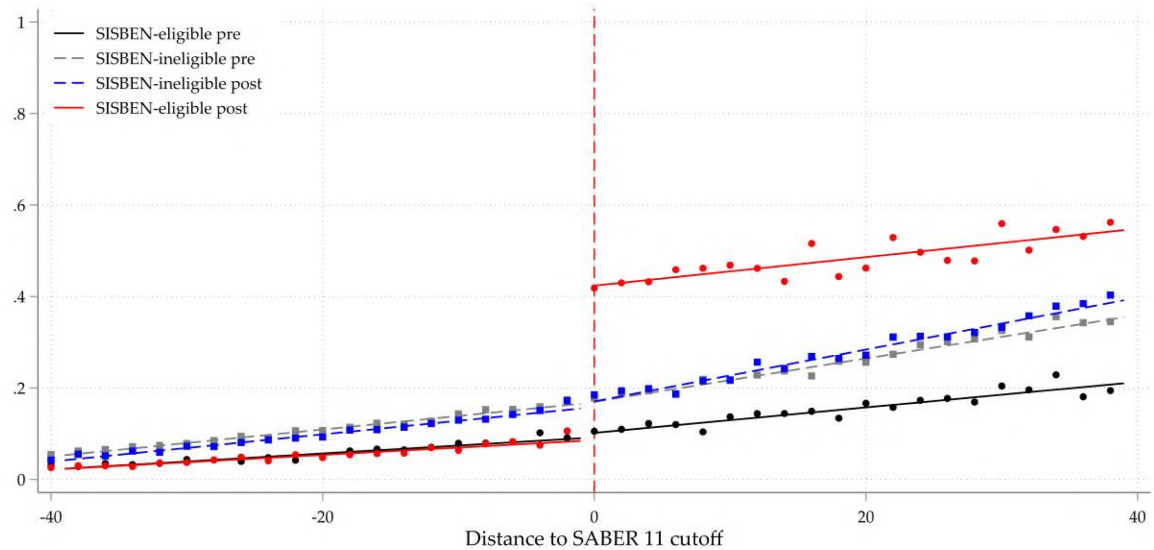
(b) Placebo



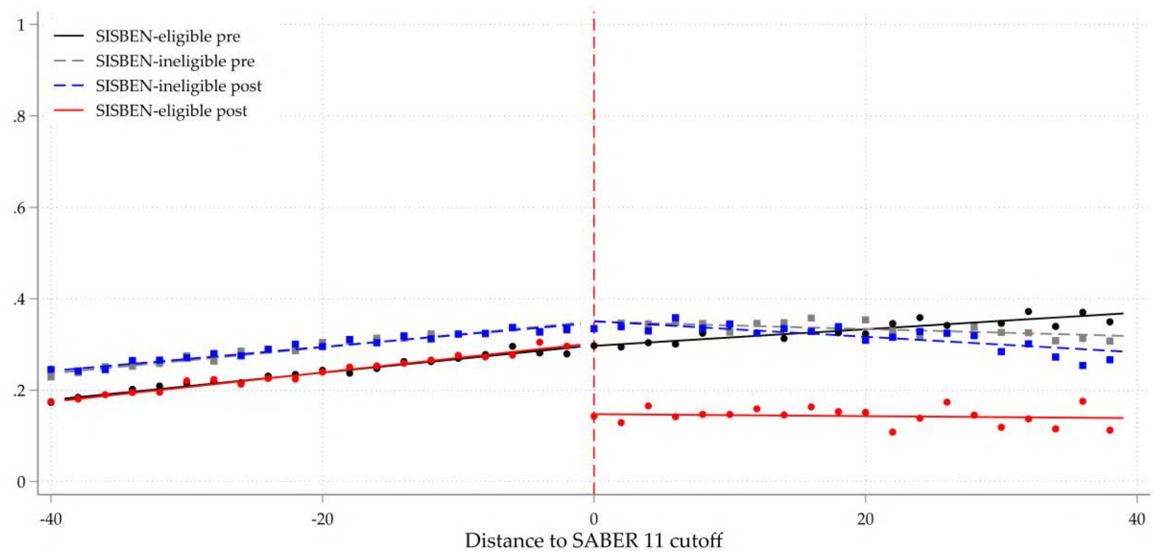
Notes: The figures plot the likelihood of earning a bachelor's degree (proxied by taking the SABER PRO exam) within seven years from high school completion as a function of the distance to the need cutoff. Panel A restricts the sample to merit-eligible students (Table II reports the reduced-form estimate). Panel B compares that series (in red) with a placebo series of SABER 11-eligible students from 2012 and 2013 (in black), and SABER 11-ineligible students before and after the program (in gray and blue, respectively).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure A.13: Bachelor's Degree Attainment by College Quality (Merit Cutoff)

(a) High Quality



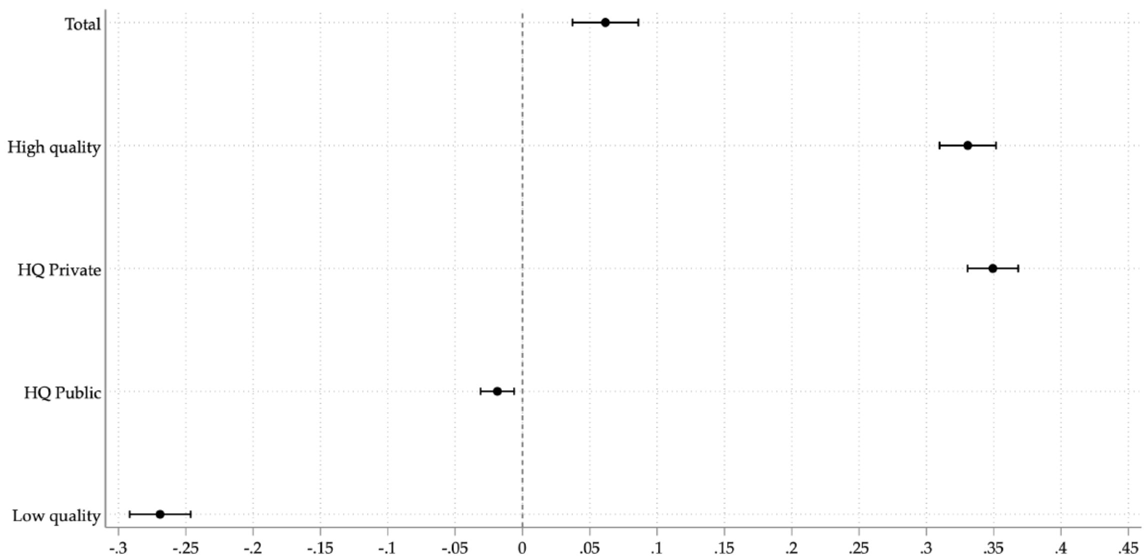
(b) Low Quality



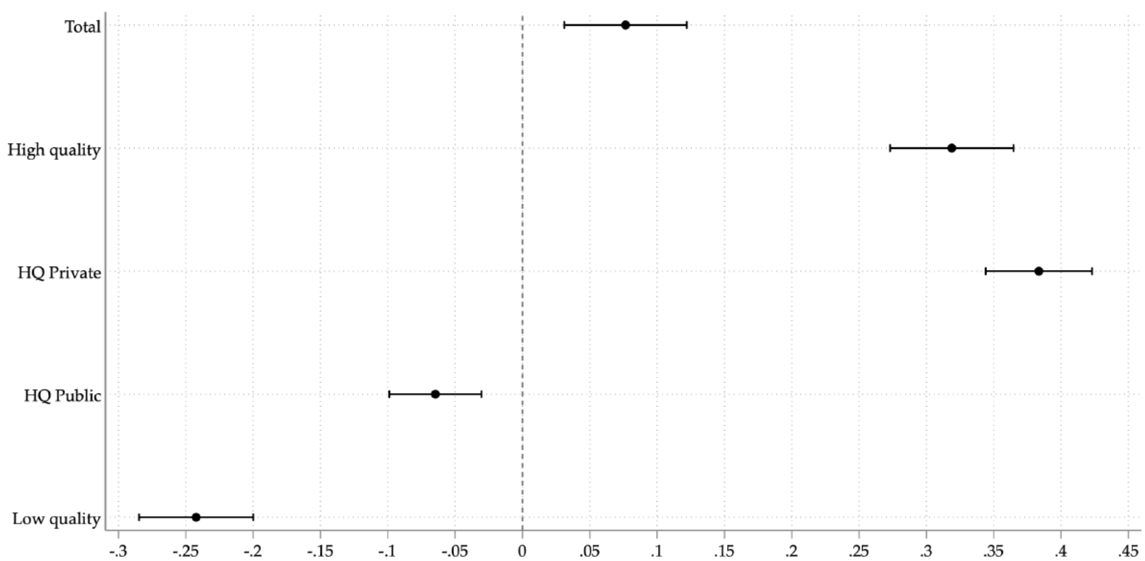
Notes: The figures decompose bachelor's degree attainment (proxied by taking the SABER PRO exam) by high- and low-quality colleges in Panels A and B, respectively. The figures show the equity implications of expanding financial aid by comparing need-eligible students from 2014 (in red) and three placebo series: SISBEN-eligible and SISBEN-ineligible students from 2012 and 2013, before the SPP program (in black and gray, respectively) and SISBEN-ineligible students in 2014 (in blue). SISBEN-ineligible students are those whose SISBEN score is above SPP's eligibility cutoff and those without a SISBEN score. Table II reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure A.14: The Increase in Any Degree Attainment is Driven by HQ Private Colleges

(a) Merit Cutoff



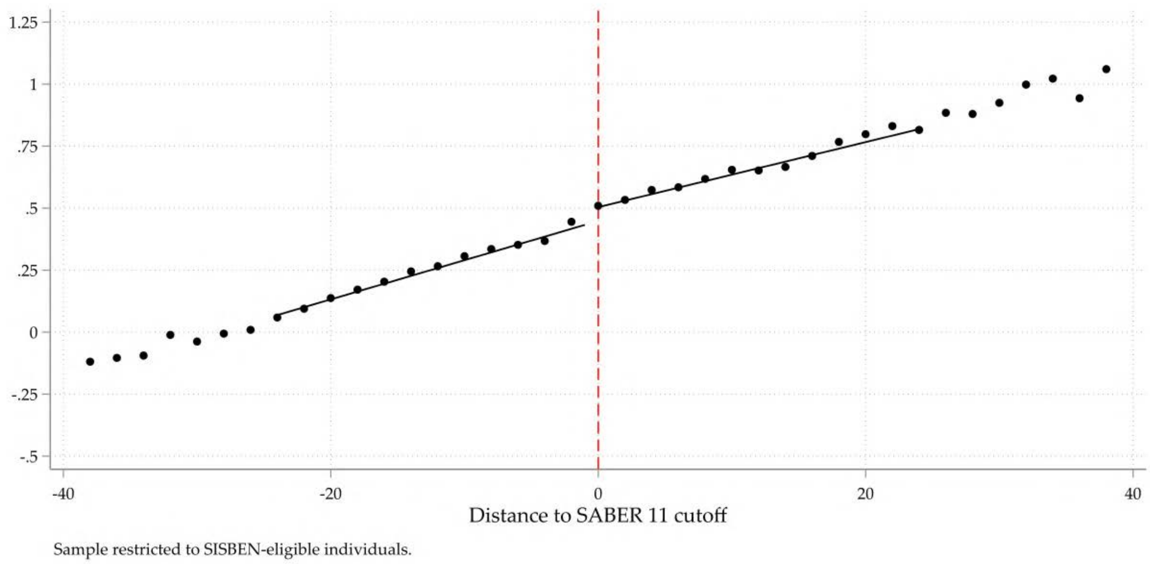
(b) Need Cutoff



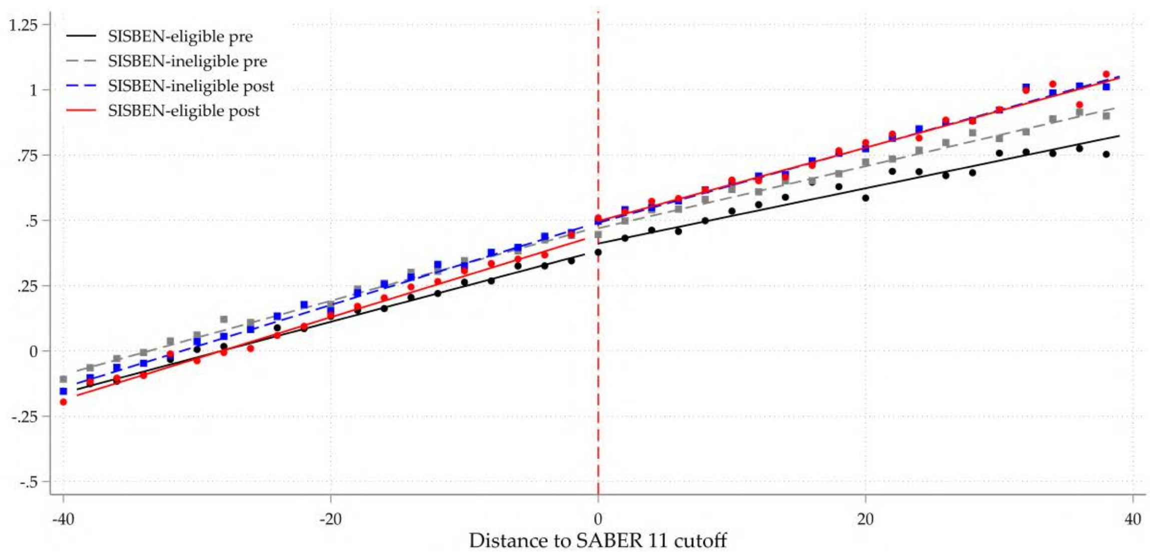
Notes: The figures plot the RD coefficients and 95% confidence intervals, decomposing any degree attainment (proxied by taking the SABER PRO or SABER T&T exams) by HQ, LQ, private, and public colleges. Panel A (B) uses SABER 11 (SISBEN) as the running variable and restricts the sample to need- (merit-) eligible students. The bandwidth selected by Cattaneo et al. (2014) for "Total" is 22.71 (8.72) in Panel A (B), and we use this bandwidth for all subcategories, so they add up to the "Total" coefficient. Table II reports the reduced-form estimates when the bandwidth is not fixed.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SABER PRO (ICFES), and SABER T&T (ICFES).

Figure A.15: Standardized College Exit Test Score Within Seven Years

(a) Merit Cutoff



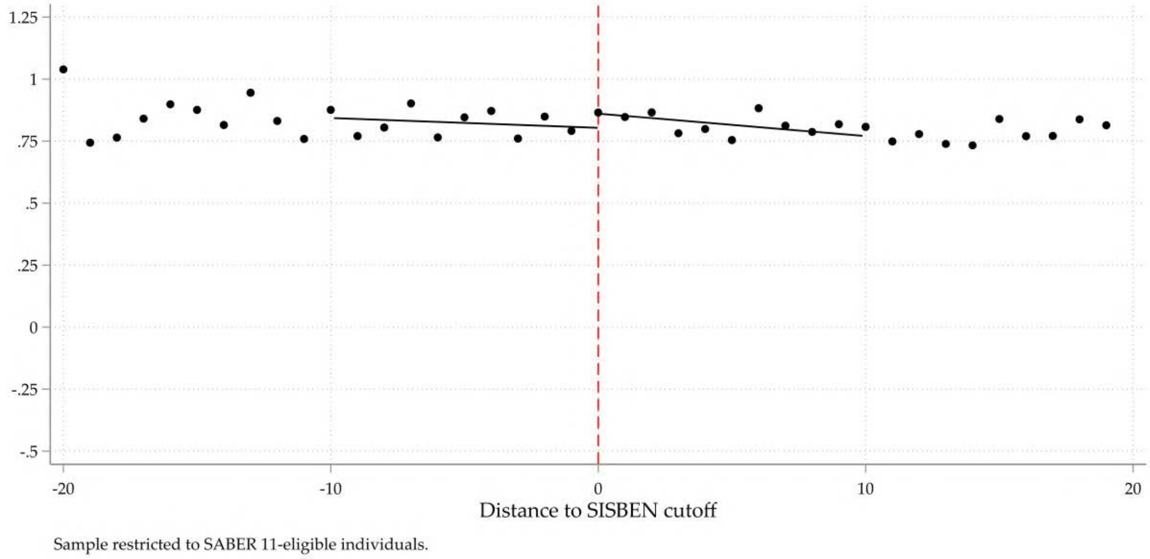
(b) Placebo and Impacts on Equity



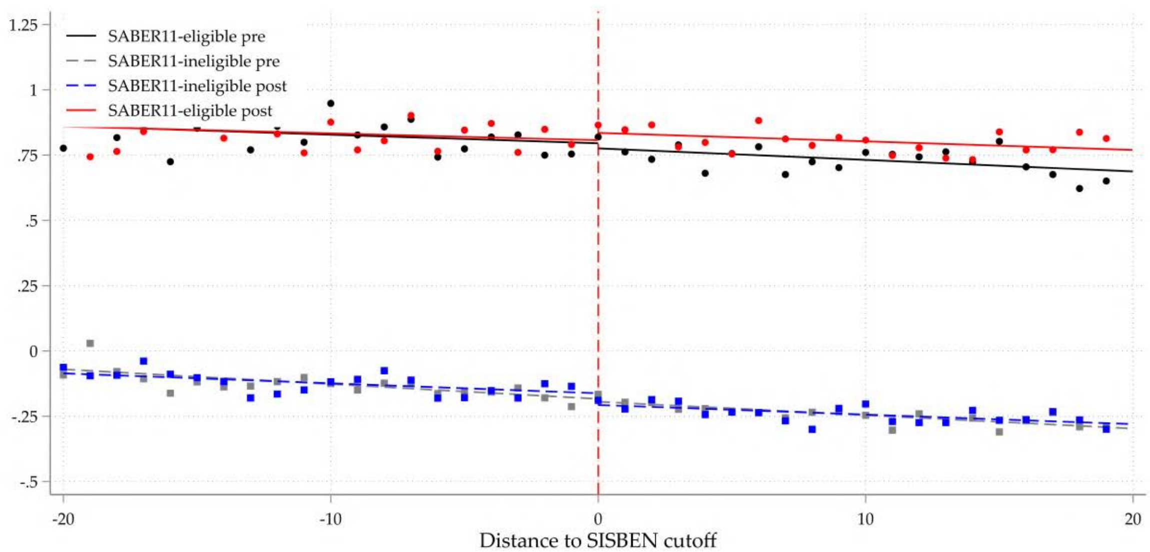
Notes: The figures plot students' performance in Colombia's mandatory standardized college exit exam, SABER PRO, within seven years from high school completion as a function of the distance to the test score cutoff. Panel A restricts the sample to need-eligible students (Table IV reports the reduced-form estimate). Panel B compares that series (in red) with several placebo series: SISBEN-eligible and SISBEN-ineligible students in 2012 and 2013 (in black and gray, respectively), and SISBEN-ineligible students in 2014 (in blue).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure A.16: Standardized College Exit Test Score Within Five Years

(a) Need Cutoff



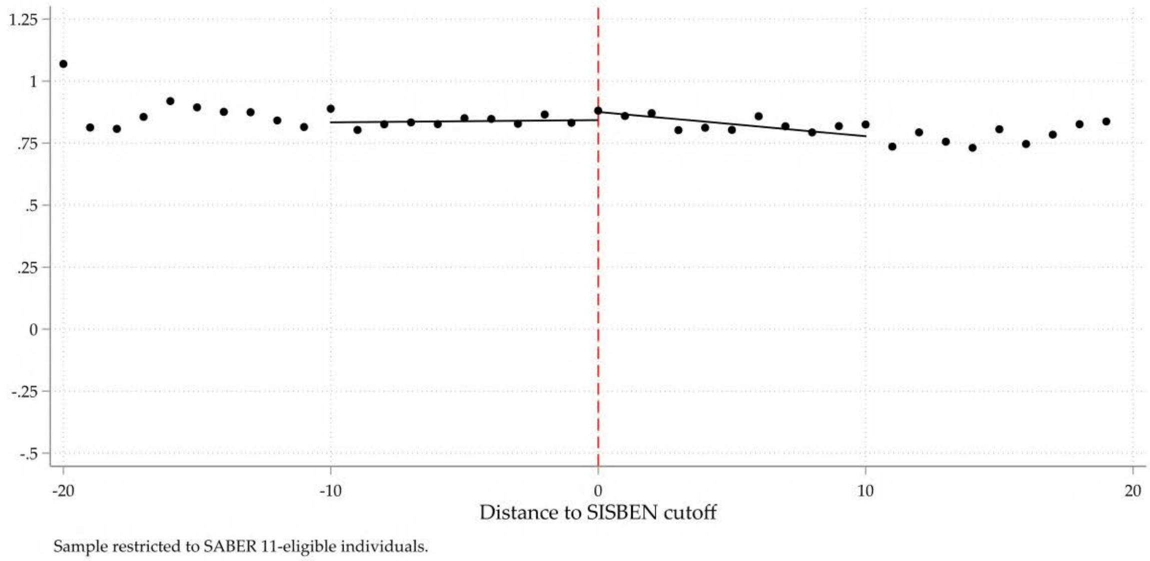
(b) Placebo



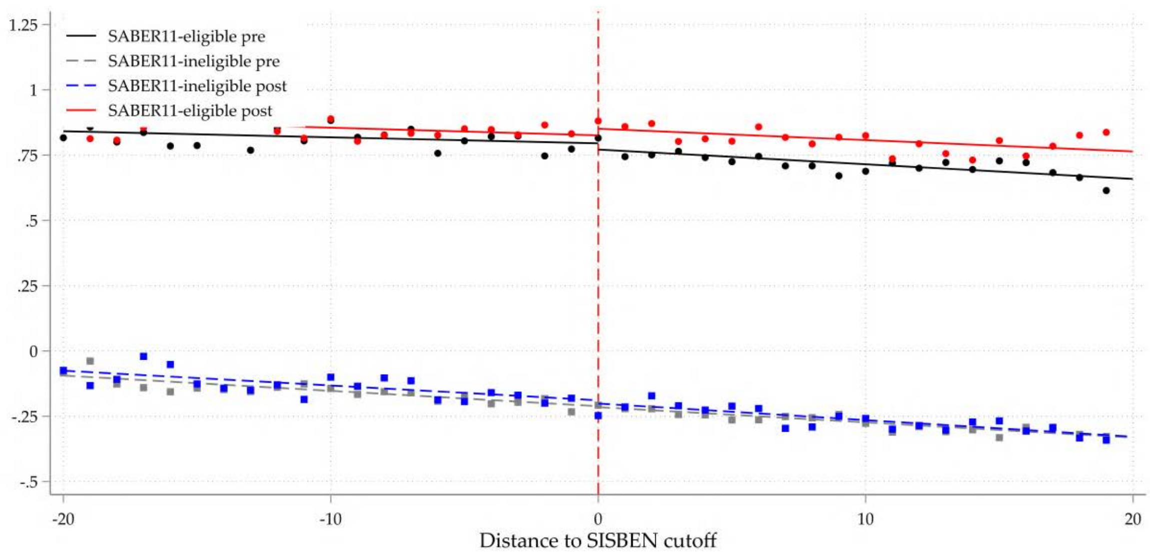
Notes: The figures plot students' performance in Colombia's mandatory standardized college exit exam, SABER PRO, within five years from high school completion as a function of the distance to the need cutoff. Panel A restricts the sample to merit-eligible students (Table IV reports the reduced-form estimate). Panel B compares that series (in red) with several placebo series: SABER 11-eligible and SABER 11-ineligible students in 2012 and 2013 (in black and gray, respectively), and SABER 11-ineligible students in 2014 (in blue).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure A.17: Standardized College Exit Test Score Within Seven Years

(a) Need Cutoff

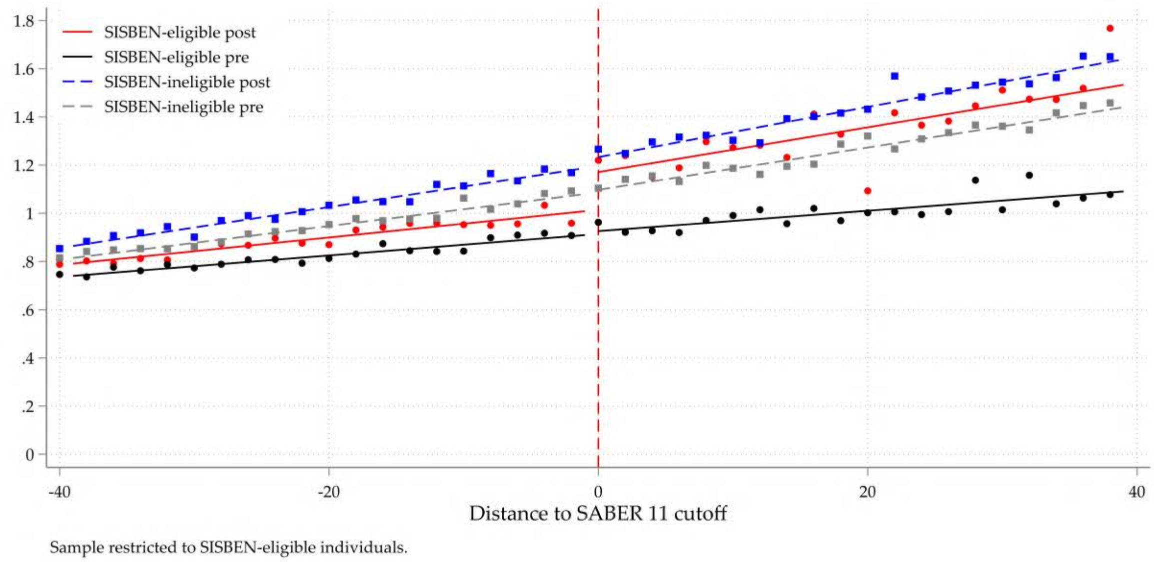


(b) Placebo



Notes: The figures plot students' performance in Colombia's mandatory standardized college exit exam, SABER PRO, within seven years from high school completion as a function of the distance to the need cutoff. Panel A restricts the sample to merit-eligible students (Table IV reports the reduced-form estimate). Panel B compares that series (in red) with several placebo series: SABER 11-eligible and SABER 11-ineligible students in 2012 and 2013 (in black and gray, respectively), and SABER 11-ineligible students in 2014 (in blue).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

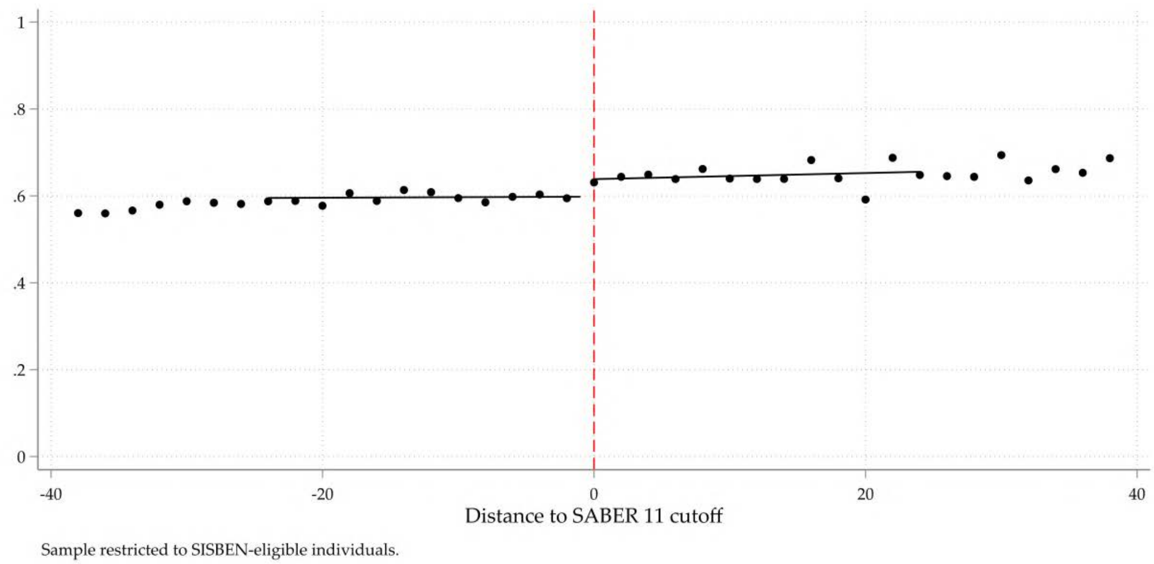
Figure A.18: Impacts on Earnings Equity Including 2012 in the Comparison Group



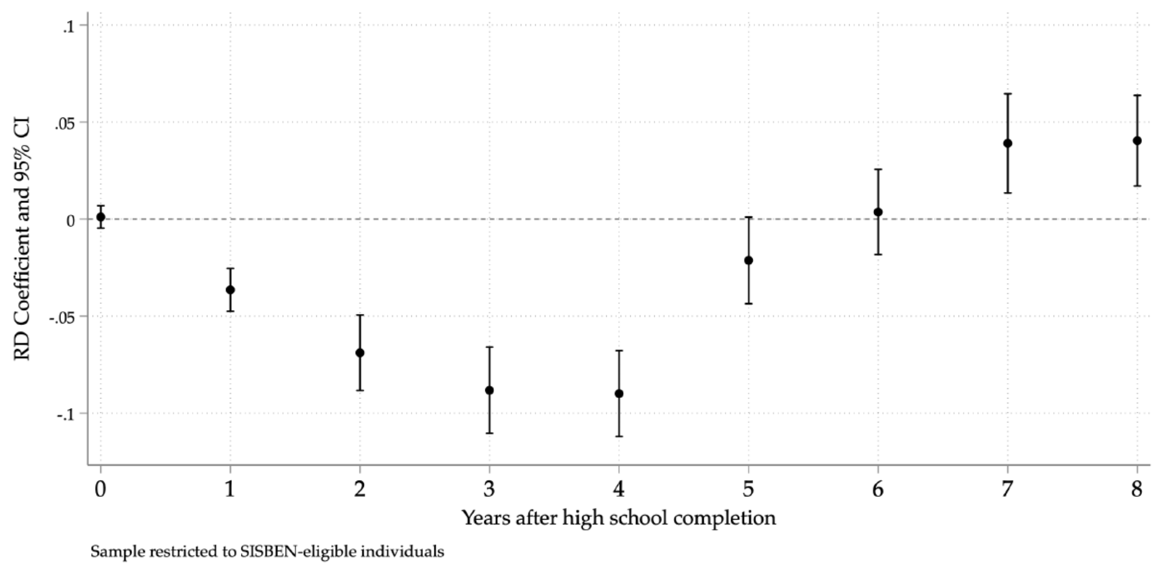
Notes: This figure reproduces VII including the 2012 cohort in the comparison group.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure A.19: Formal Employment (Merit Cutoff)

(a) Eight Years After High School Completion



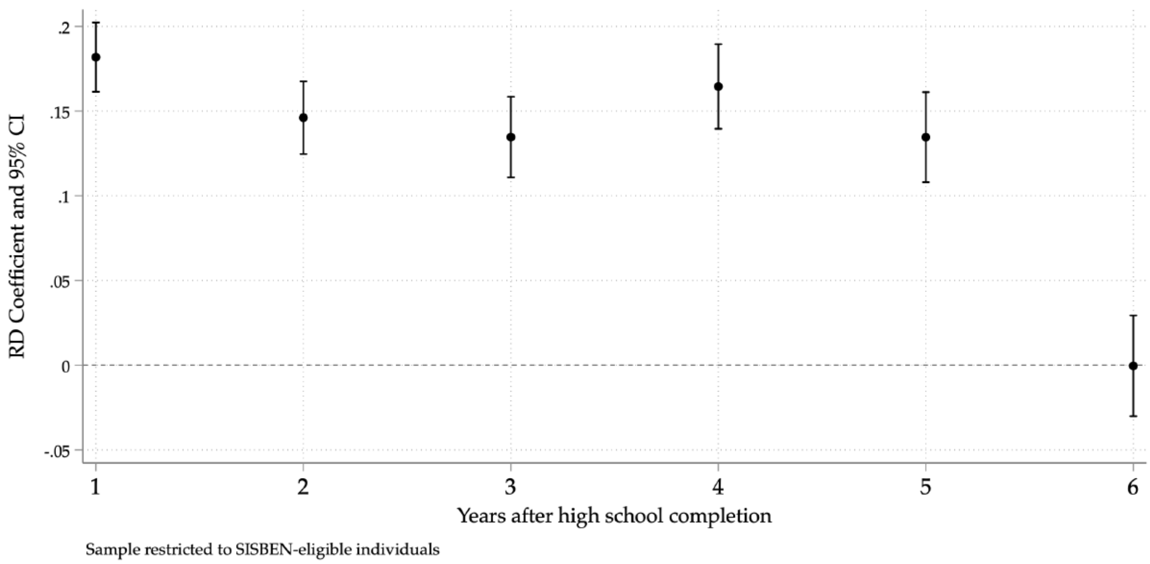
(b) The Dynamics of the Employment Effect



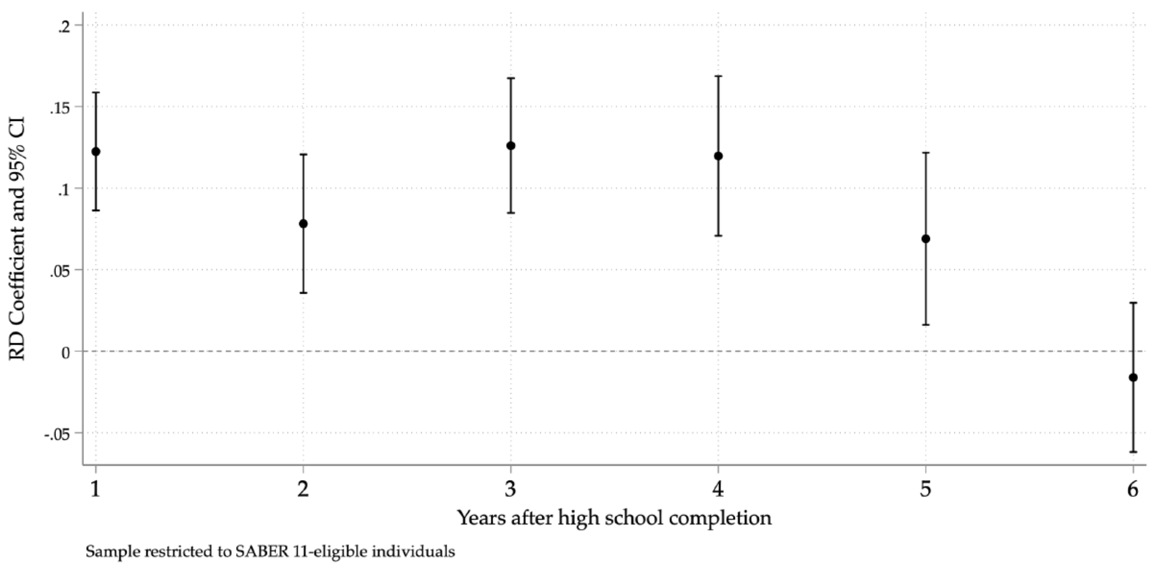
Notes: Panel A plots the probability of formal employment eight years after high school completion as a function of the distance to the test score cutoff for need-eligible students. Table V reports the reduced-form estimate. Panel B plots the RD coefficient over time. Figure A.21 shows similar effects using SISBEN as the running variable.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure A.20: Persistence: Likelihood of Being Enrolled in College Over Time

(a) Merit Cutoff



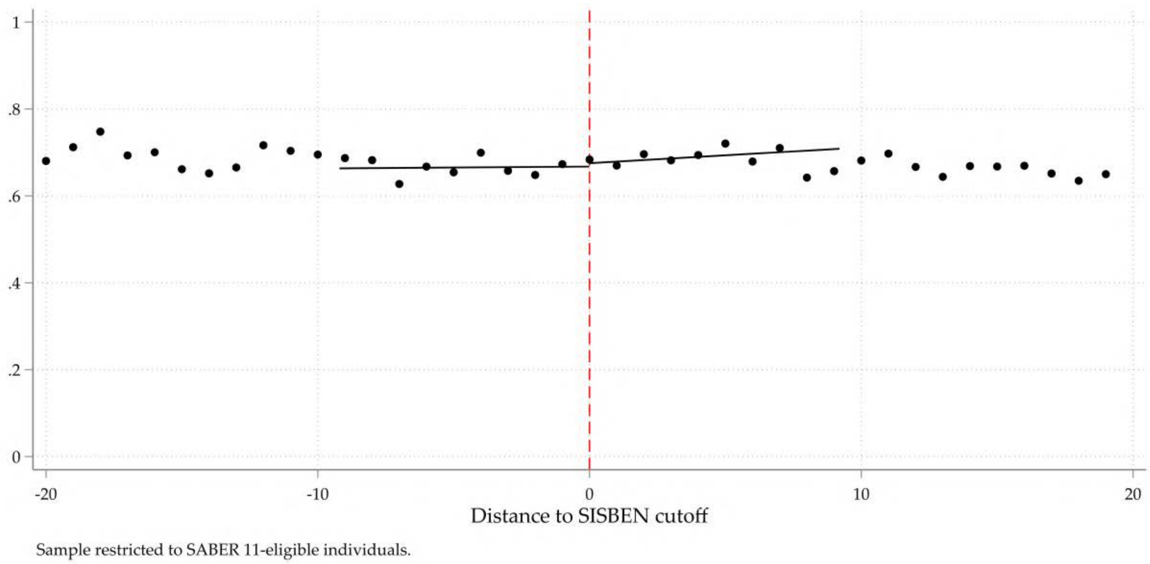
(b) Need Cutoff



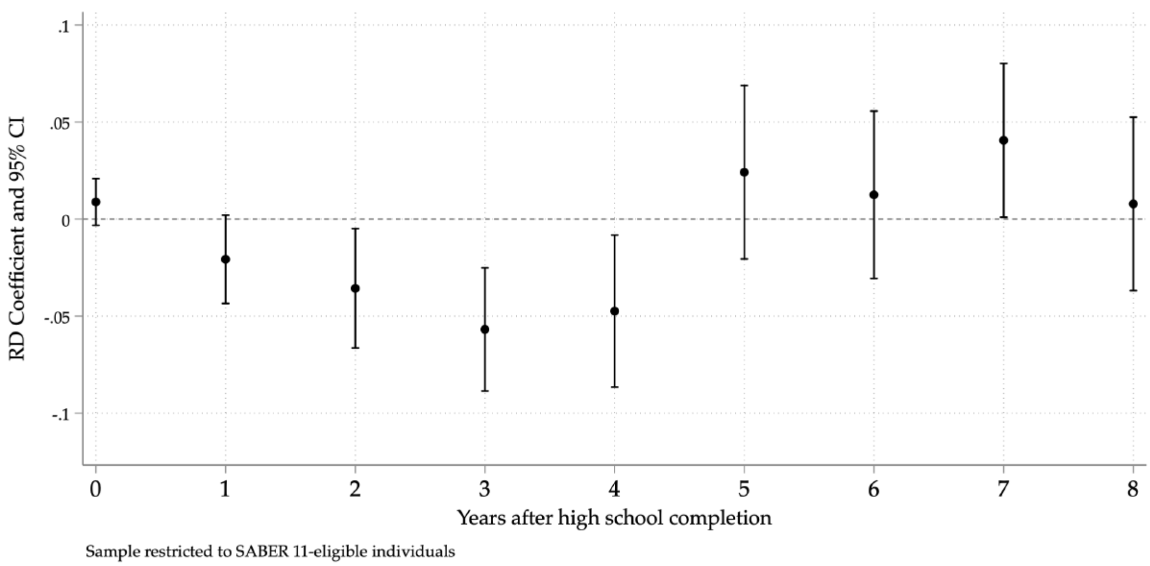
Notes: The figures plot the RD coefficient and 95% confidence intervals on the likelihood of being enrolled in college in a given year one to six years after high school completion. Panel A (B) uses SABER 11 (SISBEN) as the running variable and restricts the sample to need- (merit-) eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure A.21: Formal Employment (Need Cutoff)

(a) Eight Years after High School Completion



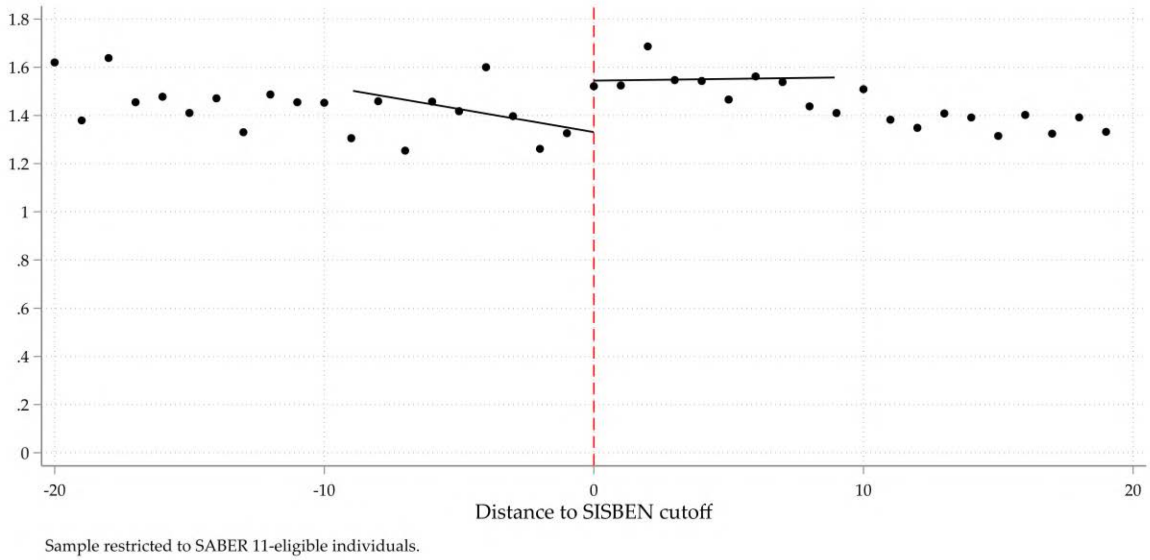
(b) The Dynamics of the Employment Effect



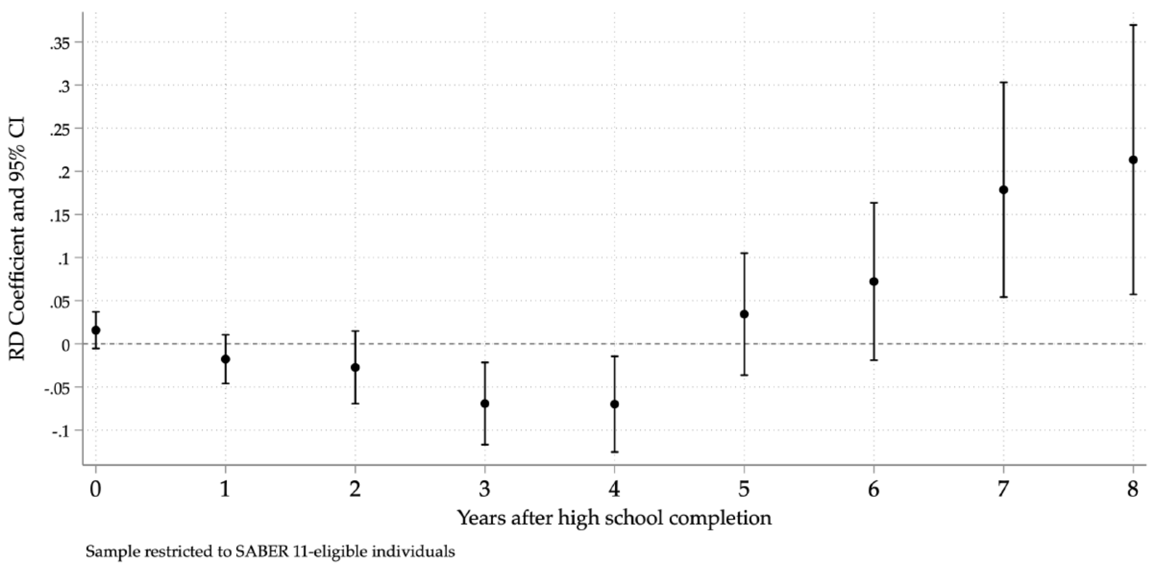
Notes: Panel A plots the probability of formal employment eight years after high school completion as a function of the distance to the need cutoff (for merit-eligible students). Panel B plots the RD coefficient over time. Table V reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure A.22: Formal Earnings (Need Cutoff)

(a) Eight Years after High School Completion



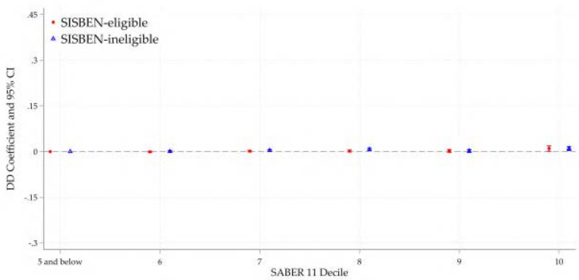
(b) The Dynamics of the Earnings Effect



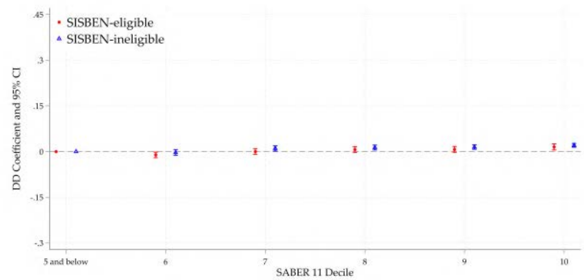
Notes: Panel A plots individuals' formal earnings (expressed as multiples of the monthly minimim wage) eight years after high school completion as a function of the distance to the need cutoff (for merit-eligible students). Individuals without formal employment are assigned zero earnings. Panel B plots the RD coefficient over time. Table V reports the reduced-form estimates.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure A.23: DD Placebo Using the Fall 2013 Cohort

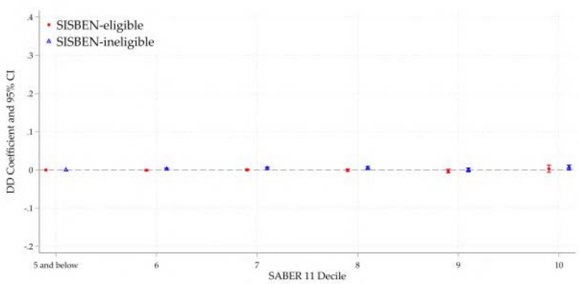
(a) Immediate Access to HQ Colleges



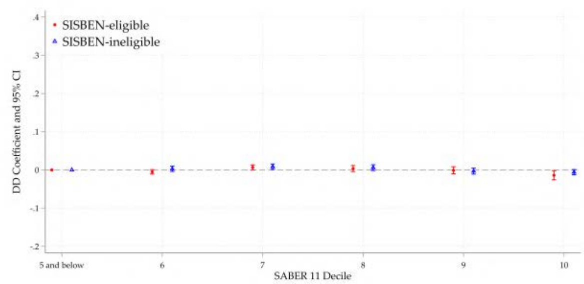
(b) Any College Within Six Years



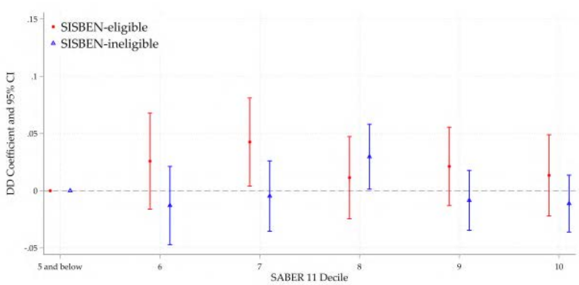
(c) Bachelor's Attainment in HQ Colleges



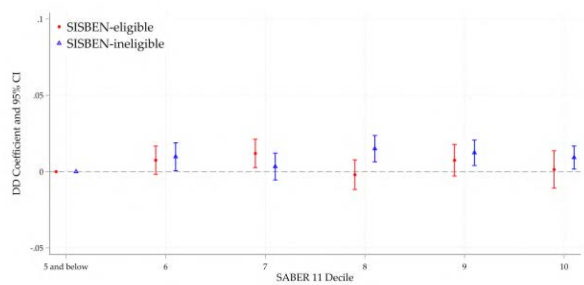
(d) Any Bachelor's Degree Attainment



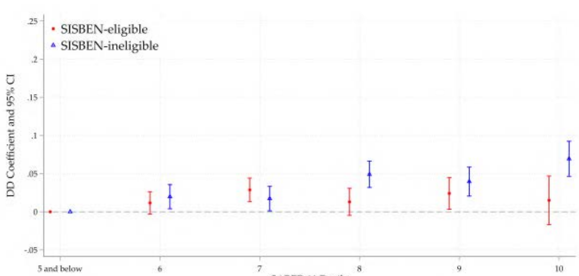
(e) Learning



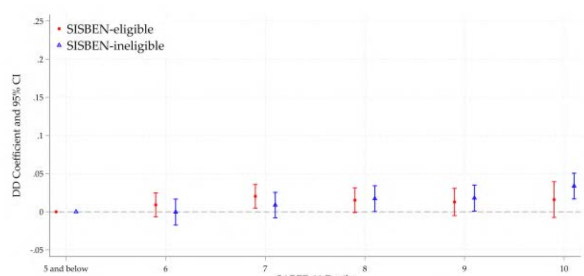
(f) Formal employment



(g) Earnings



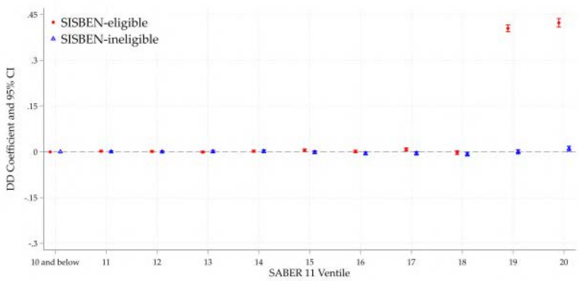
(h) Log earnings



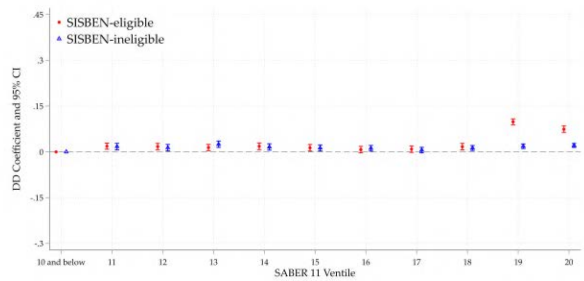
Notes: This figure reports the placebo results from comparing outcomes for the 2013 and 2012 cohorts using Specification (2). The outcome is immediate access to an HQ college in Panel A, access to any college within six years in Panel B, taking SABER PRO in an HQ college within seven years in Panel C, taking SABER PRO from any college in Panel D, the SABER PRO scores within five years in Panel E, formal employment eight years later in Panel F, formal earnings (in multiples of the minimum wage, including zeros) in Panel G, and log formal earnings in Panel H.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), and PILA (MinSalud).

Figure A.24: DD Using Ventiles

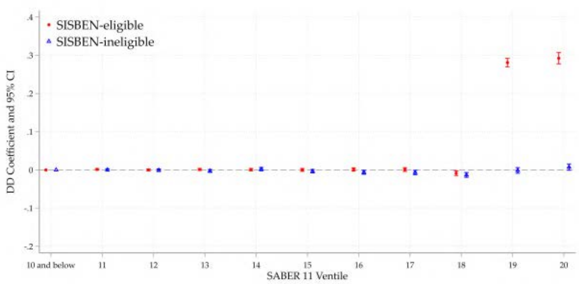
(a) Immediate Access to HQ Colleges



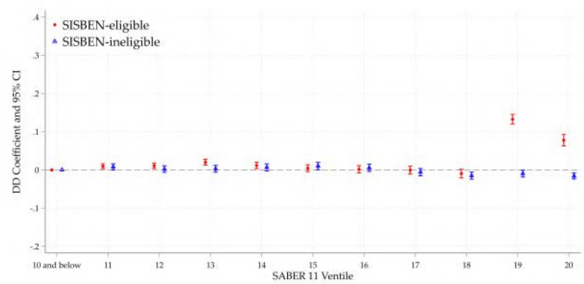
(b) Any College Within Six Years



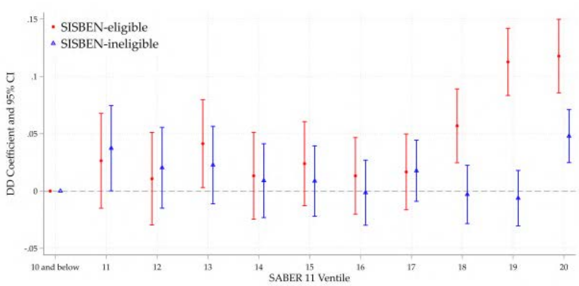
(c) Bachelor's Attainment in HQ Colleges



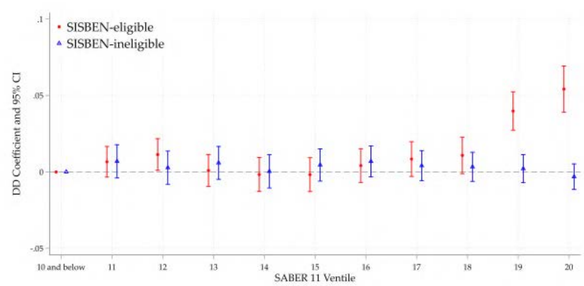
(d) Any Bachelor's Degree Attainment



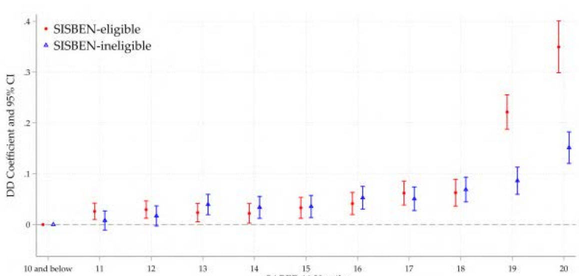
(e) Learning



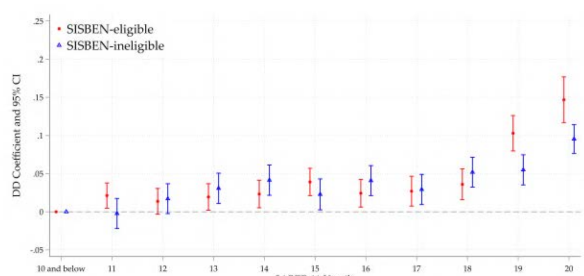
(f) Formal employment



(g) Earnings



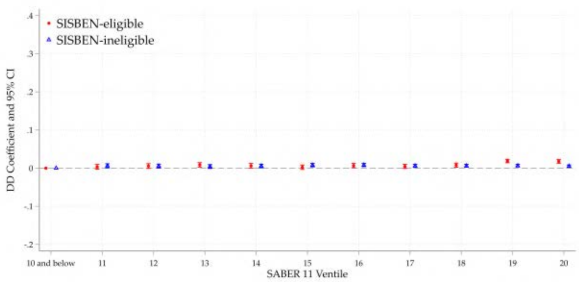
(h) Log earnings



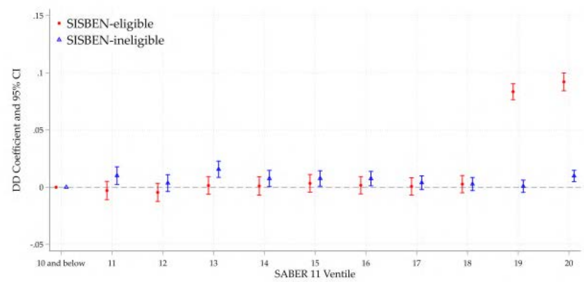
Notes: This figure plots the β_k coefficients and 95% confidence intervals from a modified version of Specification (2) using test score ventiles instead of deciles. For all outcomes, the comparison group is based on the 2012 and 2013 cohorts.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), and PILA (MinSalud).

Figure A.25: The Impact on the College-Program "Value Added" Using Ventiles

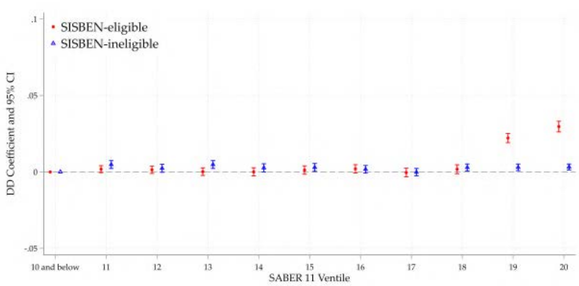
(a) Bachelor's Graduation Fixed Effect



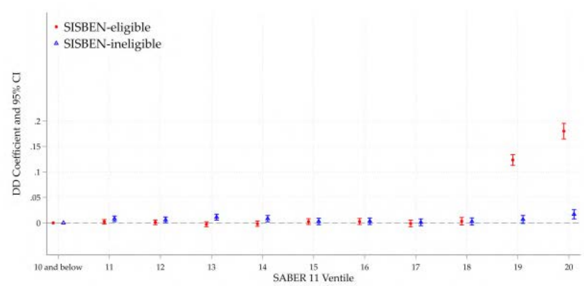
(b) Learning Fixed Effect



(c) Employment Fixed Effect



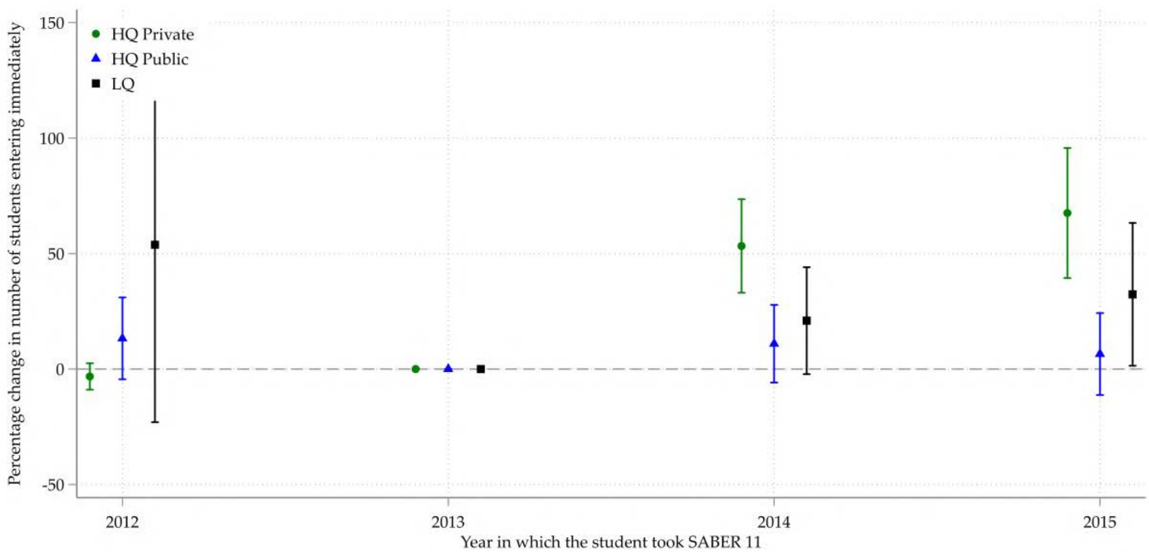
(d) Earnings Fixed Effect



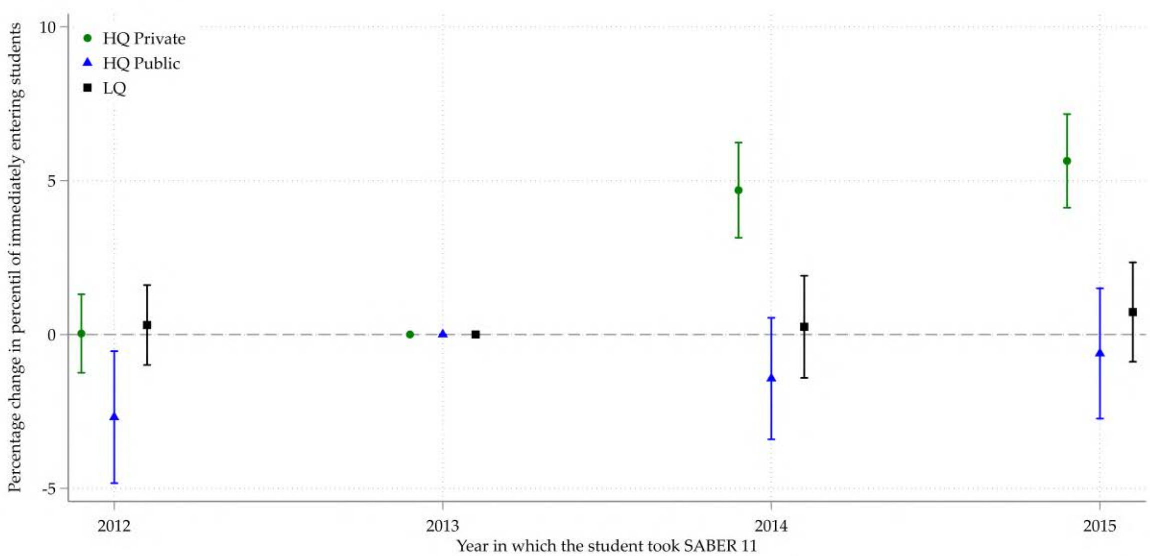
Notes: This figure plots the β_k coefficients and 95% confidence intervals using a modified version of Specification (2) using test score ventiles instead of deciles. The outcome is the college-program fixed effect, as described in Appendix D; specifically, the bachelor's graduation fixed effect (proxied by taking SABER PRO within seven years after high school) in Panel A, the learning fixed effect (using SABER PRO scores within five years after high school) in Panel B, the formal employment fixed effect (measured eight years after high school completion) in Panel C, and the formal earnings fixed effects (realized eight years after high school) in Panel D.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), and PILA (MinSalud).

Figure A.26: Changes in Cohort Size and Student Ability Before and After the Expansion of Financial Aid by College Type

(a) Cohort Size

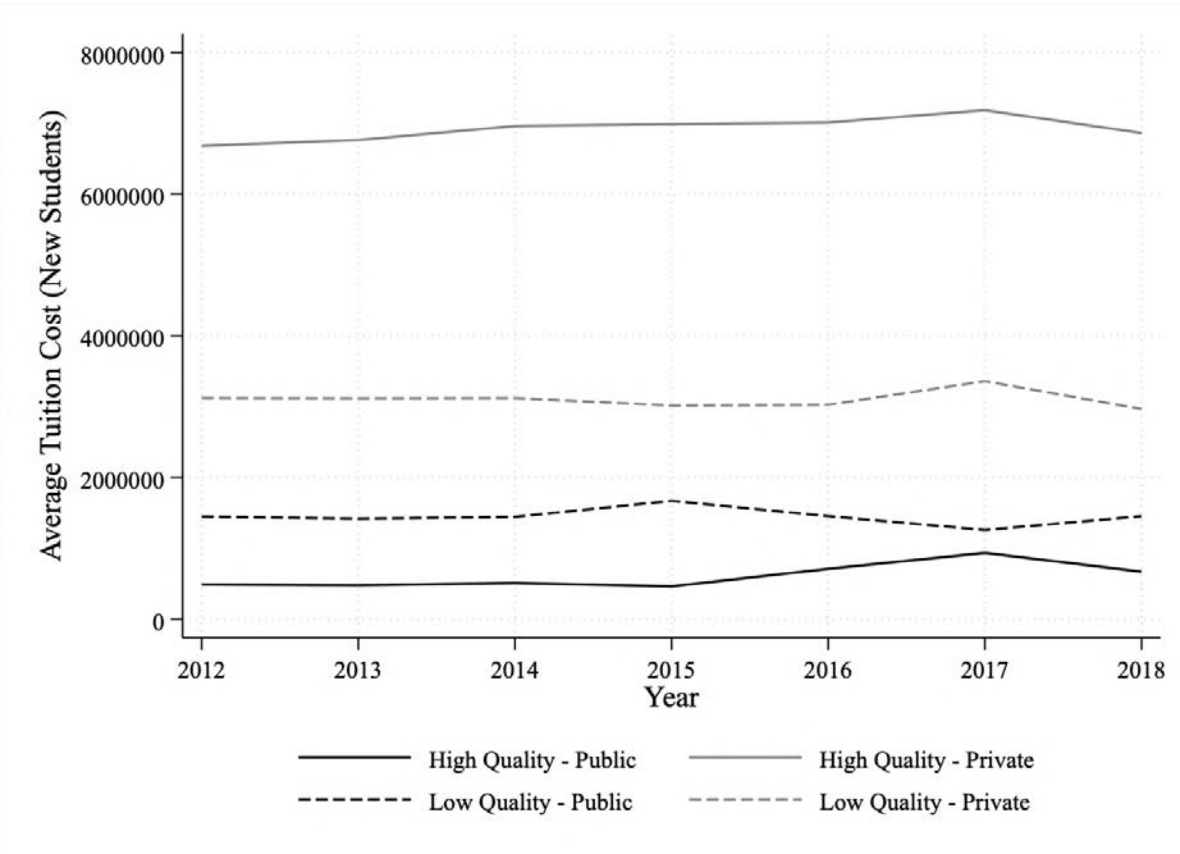


(b) Entering Students' SABER 11 Score



Notes: This figure compares outcomes across SABER 11 cohorts from the fall semesters of 2012 to 2015. The coefficients are relative to the college-specific mean for the 2013 cohort and averaged by college type. In Panel A, the outcome is the number of students who immediately accessed a given college after high school. Following the 2014 financial aid expansion, the cohort size increased by approximately 50% for HQ *private* colleges, but not for HQ *public* college or LQ colleges. In Panel B, the outcome is the average SABER 11 percentile of entering students. The average percentile increased by 5% at HQ *private* colleges, while there was no change for other college types.
Sources: Authors' calculations based on SABER 11 (ICFES) and SNIES (MEN).

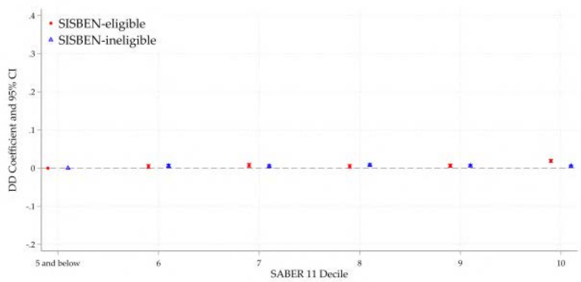
Figure A.27: Tuition Fees by College Type



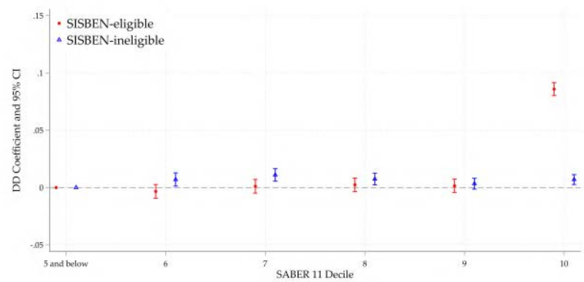
Notes: This figure plots the average annual tuition fee (in constant pesos) for new undergraduate students between 2012 and 2018 by college type. The sample is restricted to colleges reporting tuition fees for at least five years.
Sources: Authors' calculations based on SNIES (MEN).

Figure A.28: The Impact of Financial Aid on the College-Program "Value Added"

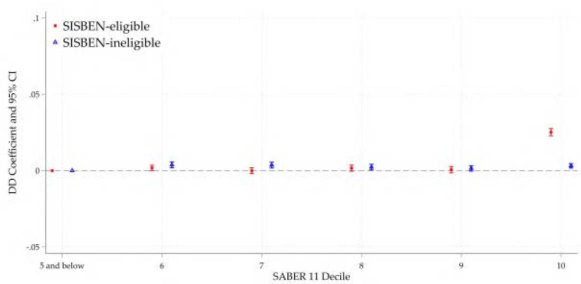
(a) Bachelor's Graduation Fixed Effect



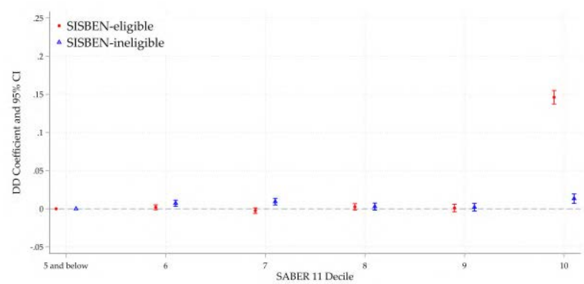
(b) Learning Fixed Effect



(c) Employment Fixed Effect



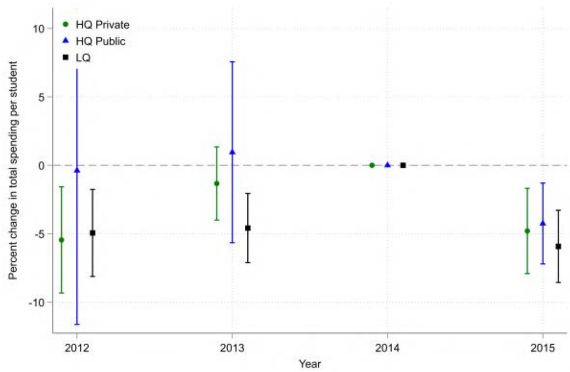
(d) Earnings Fixed Effect



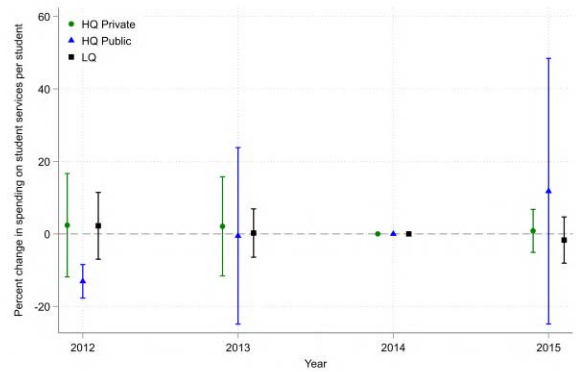
Notes: This figure plots the β_k coefficients and 95% confidence intervals from Specification (2) when the outcome is the college-program fixed effect, as described in Appendix D; specifically, the bachelor's graduation fixed effect (proxied by taking SABER PRO within seven years after high school) in Panel A, the learning fixed effect (using SABER PRO scores within five years after high school) in Panel B, the formal employment fixed effect (measured eight years after high school completion) in Panel C, and the formal earnings fixed effects (realized eight years after high school) in Panel D.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), and PILA (MinSalud).

Figure A.29: Per Student Spending Before and After the Expansion of Financial Aid

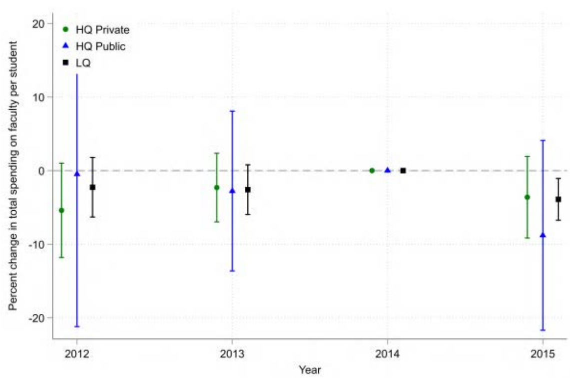
(a) Total spending



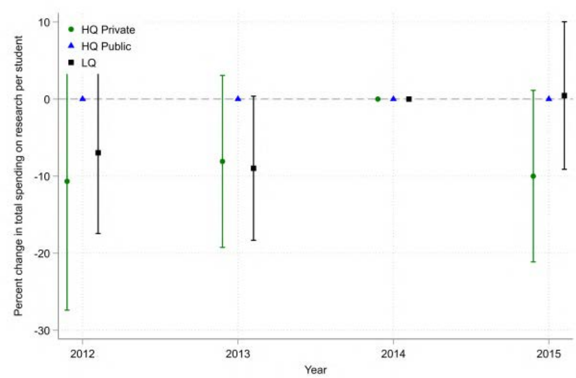
(b) Spending on student services



(c) Spending on instruction



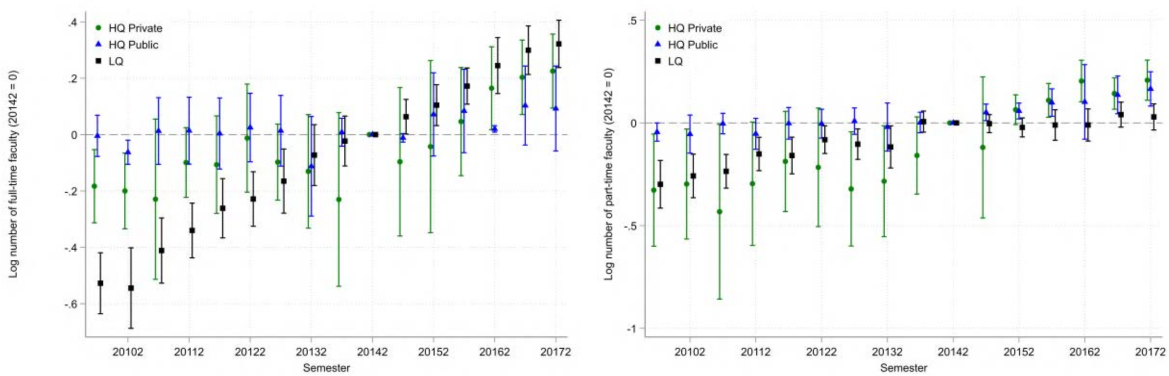
(d) Spending on research



Notes: This figure compares expenses across college types. Panel A reports total expenses (in constant pesos), while Panels B, C, and D show the type of expense. Annual information on institutional expenses is available only for a subsample of colleges. The sample is balanced from 2012 to 2015. For total expenses, the sample includes 16 HQ private colleges, 8 HQ public colleges, and 147 LQ colleges, but fewer institutions report expense type. The coefficients are relative to the college-specific mean for 2014 and averaged by college type.
Sources: Authors' calculations based on institutional financial accounts and balance sheets (MEN).

Figure A.30: Number of Instructors Before and After the Expansion of Financial Aid

(a) All full-time instructors (b) All part-time instructors



Notes: This figure compares the log number of full-time and part-time instructors. The coefficients are relative to the college-specific mean for the second semester of 2014 and averaged by college type. *Sources:* Authors' calculations based on SNIES (MEN).

Table A.1: Baseline Characteristics by College Type

	High quality		Low quality	
	Private	Public	Private	Public
	(1)	(2)	(3)	(4)
SABER 11 score	303.1	293.3	259.0	261.9
(Standardized) SABER 11 score	1.77	1.44	0.30	0.40
(Standardized) SABER PRO score	0.50	0.27	-0.18	-0.15
Graduation rate (%)	75.1	66.6	59.3	60.2
Faculty with PhD (%)	11.9	15.2	1.9	2.4
Program length (in semesters)	9.2	9.6	9.2	9.4
Sticker price of tuition (in min wages)	17.7	6.4	8.1	3.7
Public spending per student (in min wages)		14.5		8.5
N students	50,642	60,704	214,203	267,636
N college campuses	21	16	207	79
N colleges	20	13	181	66

Notes: This table reports descriptive statistics by college type. The information is based on high school exit test takers from the fall 2012 and 2013 cohorts who ever accessed college within six years from high school completion. *Sources:* Authors' calculations based on SABER 11 (ICFES), SABER PRO (ICFES), SNIES (MEN), and institutional financial accounts and balance sheets (MEN).

Table A.2: Baseline Covariate Balance Test around SPP Eligibility Threshold

	Running variable					
	SABER 11			SISBEN		
	Mean (1)	RD Coeff. (2)	p-value (3)	Mean (4)	RD Coeff. (5)	p-value (6)
SABER 11 percentile				95.287	0.143	0.345
Wealth percentile (including missing SISBEN)	31.765	-0.494	0.209			
Took the Saber 11 test as a student	0.970	0.006	0.109	0.984	-0.007	0.467
Female	0.469	-0.011	0.316	0.443	0.002	0.877
Age	16.608	-0.018	0.628	16.355	0.073	0.582
Ethnic minority	0.037	0.001	0.835	0.024	0.016	0.060
Employed	0.044	0.002	0.739	0.045	-0.008	0.349
Family size	4.599	-0.039	0.386	4.385	-0.137	0.041
Mother's education: primary	0.252	-0.012	0.213	0.130	0.003	0.909
Mother's education: secondary	0.502	-0.011	0.446	0.476	-0.056	0.048
Mother's education: T&T	0.135	0.002	0.837	0.185	-0.005	0.815
Mother's education: professional	0.111	0.021	0.006	0.209	0.055	0.008
Father's education: primary	0.342	-0.005	0.620	0.181	0.015	0.729
Father's education: secondary	0.429	-0.001	0.754	0.450	-0.062	0.020
Father's education: T&T	0.104	0.002	0.649	0.174	-0.008	0.516
Father's education: professional	0.122	0.007	0.407	0.196	0.056	0.013
Household SES: Stratum 1	0.341	0.000	0.823	0.128	-0.013	0.303
Household SES: Stratum 2	0.461	-0.017	0.205	0.506	0.005	0.873
Household SES: Stratum 3	0.183	0.011	0.285	0.333	0.005	0.823
Household SES: Stratum 4	0.009	0.006	0.017	0.020	0.009	0.305
Household SES: Stratum 5	0.003	0.001	0.632	0.007	-0.003	0.476
Household SES: Stratum 6	0.001	-0.001	0.224	0.001	0.000	0.746
School hours: Full day	0.197	-0.004	0.702	0.291	0.025	0.207
School hours: Morning	0.614	0.000	0.955	0.541	-0.033	0.180
School hours: Evening	0.008	0.002	0.596	0.006	0.001	0.815
School hours: Afternoon	0.173	0.000	0.925	0.156	0.016	0.342
School hours: Weekends	0.008	0.003	0.444	0.008	-0.007	0.041
Private school	0.170	0.001	0.934	0.304	0.058	0.012
School schedule: A	0.999	0.000	0.798	0.997	0.000	0.864
School schedule: B	0.001	0.000	0.982	0.000	0.001	0.455
School schedule: Other	0.001	0.000	0.515	0.002	-0.002	0.464
Floor: cement/ gravel/ brick	0.433	-0.014	0.161	0.263	0.005	0.706
Floor: wood, board, wooden plank	0.039	0.002	0.613	0.039	0.014	0.167
Floor:polished wood, tile, marble, carpet	0.500	0.010	0.261	0.688	-0.009	0.659
Floor: land, sand	0.027	0.001	0.773	0.009	0.000	0.857
Family has internet	0.589	0.019	0.136	0.782	0.003	0.771
Family has a laptop	0.732	0.002	0.865	0.878	0.030	0.039
Family has a car	0.172	0.013	0.235	0.260	0.060	0.014
Family has a cellphone	0.943	0.010	0.074	0.944	0.024	0.034
Student resides: Urban	0.862	-0.008	0.355	0.936	-0.005	0.739
School location: Urban	0.917	-0.006	0.540	0.965	-0.005	0.554
Joint F-Stat (p-value, LB on bandwidth)		0.470			0.168	
Joint F-Stat (p-value, UB on bandwidth)		0.703			0.176	

Notes: This table plots the reduced-form coefficient from an RD specification where the outcome is a baseline characteristic and the running variable is either SABER 11 test scores in Columns (1)–(3) or SISBEN poverty index in Columns (4)–(6). The sample is restricted to SISBEN-eligible individuals in Columns (1)–(3) and SABER 11-eligible individuals in Columns (4)–(6). Columns (1) and (4) present control means, Columns (2) and (5) present conventional coefficients, and Columns (3) and (6) present p-values based on conventional standard errors. The last two rows report the p-value from a joint significance test using all baseline characteristics and small or large bandwidths: $\pm$ 20 or 40 test score units in Column (2) and $\pm$ 7 or 15 household wealth units in Column (5). All results are estimated with package rdrobust (Cattaneo et al., 2014). *Sources:* Authors' calculations based on SABER 11 (ICFES) and SISBEN (DNP).

Table A.3: Baseline Covariate Balance Test around SPP Eligibility Threshold Conditional on Taking SABER PRO Within Seven Years

	Running variable					
	SABER 11			SISBEN		
	Mean (1)	RD Coeff. (2)	p-value (3)	Mean (4)	RD Coeff. (5)	p-value (6)
SABER 11 percentile				95.703	0.010	0.937
Wealth percentile (including missing SISBEN)	31.622	0.534	0.301			
Took the Saber 11 test as a student	0.974	0.013	0.023	0.986	0.003	0.602
Female	0.561	-0.019	0.262	0.492	0.009	0.842
Age	16.352	-0.055	0.171	16.162	0.002	0.866
Ethnic minority	0.035	0.000	0.962	0.033	0.005	0.520
Employed	0.030	0.008	0.282	0.032	0.002	0.958
Family size	4.628	-0.095	0.076	4.362	-0.054	0.400
Mother's education: primary	0.208	-0.002	0.686	0.113	-0.004	0.718
Mother's education: secondary	0.492	-0.013	0.361	0.463	-0.055	0.129
Mother's education: T&T	0.141	0.009	0.319	0.191	0.001	0.900
Mother's education: professional	0.158	0.007	0.449	0.233	0.058	0.043
Father's education: primary	0.289	0.012	0.572	0.157	0.019	0.744
Father's education: secondary	0.422	0.011	0.858	0.421	-0.048	0.148
Father's education: T&T	0.133	-0.016	0.345	0.185	-0.004	0.859
Father's education: professional	0.147	0.006	0.516	0.222	0.051	0.092
Household SES: Stratum 1	0.333	-0.018	0.264	0.116	-0.010	0.501
Household SES: Stratum 2	0.441	0.018	0.385	0.495	0.011	0.781
Household SES: Stratum 3	0.205	0.001	0.873	0.353	-0.013	0.691
Household SES: Stratum 4	0.012	0.004	0.310	0.025	0.013	0.265
Household SES: Stratum 5	0.003	0.002	0.438	0.006	-0.001	0.978
Household SES: Stratum 6	0.001	-0.001	0.565	0.002	-0.001	0.749
School hours: Full day	0.220	-0.003	0.827	0.318	0.024	0.314
School hours: Morning	0.623	-0.014	0.478	0.561	-0.083	0.018
School hours: Evening	0.002	0.002	0.362	0.000	0.002	0.322
School hours: Afternoon	0.152	0.011	0.374	0.121	0.059	0.021
School hours: Weekends	0.003	0.003	0.284	0.006	-0.004	0.262
Private school	0.204	-0.024	0.074	0.323	0.049	0.094
School schedule: A	1.001	-0.002	0.033	0.998	0.001	0.439
School schedule: B	-0.001	0.001	0.053	0.000	0.000	0.318
School schedule: Other	0.000	0.001	0.124	0.001	-0.001	0.350
Floor: cement/ gravel/ brick	0.416	-0.016	0.270	0.254	0.009	0.713
Floor: wood, board, wooden plank	0.031	0.007	0.334	0.043	0.004	0.848
Floor:polished wood, tile, marble, carpet	0.527	0.007	0.493	0.698	-0.016	0.549
Floor: land, sand	0.026	-0.001	0.816	0.007	0.003	0.626
Family has internet	0.645	-0.002	0.957	0.819	-0.009	0.967
Family has a laptop	0.783	-0.012	0.362	0.902	0.017	0.287
Family has a car	0.200	0.005	0.603	0.295	0.039	0.161
Family has a cellphone	0.953	0.005	0.454	0.937	0.037	0.016
Student resides: Urban	0.890	-0.028	0.013	0.934	0.012	0.364
School location: Urban	0.932	-0.016	0.096	0.976	-0.016	0.204
Joint F-Stat (p-value, LB on bandwidth)		0.006			0.000	
Joint F-Stat (p-value, UB on bandwidth)		0.004			0.000	

Notes: This table plots the reduced-form coefficient from an RD specification where the outcome is a baseline characteristic and the running variable is either SABER 11 test scores in Columns (1)–(3) or SISBEN poverty index in Columns (4)–(6). Unlike in Table A.2, the sample is restricted to individuals who took the SABER PRO exam within seven years from high school completion. *Sources:* Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Table A.4: Reduced-Form Estimates on Other Labor Market Outcomes

	Type of employment		Days	Conditional on working						
				Days	In 13	Firm size				
	Employee	Independent	worked	worked	largest cities	No. of employees	Micro	Small	Medium	Large
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: *SABER 11 is the running variable*										
Reduced form	0.033	0.011	1.199	0.059	0.033	299.98	0.005	0.003	0.001	-0.009
	(0.013)	(0.004)	(0.360)	(0.162)	(0.012)	(216.18)	(0.013)	(0.010)	(0.010)	(0.015)
Mean control	0.513	0.019	17.092	28.56	0.701	2011.25	0.230	0.176	0.147	0.446
Observations	297,279	297,279	297,279	146,252	149,762	146,087	149,595	149,595	149,595	149,595
BW loc. poly.	21.69	24.57	24.77	31.80	33.60	23.10	25.99	35.05	27.42	25.11
Effect obs. control	18,948	23,070	23,070	19,879	22,893	13,042	15,160	24,932	16,858	15,160
Effect obs. Treat	9,489	10,299	10,299	7,579	8,042	6,507	7,028	8,203	7,307	7,028
Panel B: *SISBEN is the running variable*										
Reduced form	0.019	0.016	0.935	1.377	0.038	240.085	-0.034	0.025	0.042	-0.018
	(0.022)	(0.009)	(0.646)	(0.446)	(0.024)	(400.45)	(0.022)	(0.022)	(0.023)	(0.027)
Mean control	0.554	0.029	18.923	28.05	0.775	2393.50	0.259	0.153	0.112	0.468
Observations	22,552	22,552	22,552	14,975	15,469	14,886	15,378	15,378	15,378	15,378
BW loc. poly.	10.88	9.86	10.82	5.26	9.00	11.77	12.00	8.99	6.66	11.06
Effect obs. control	4,536	4,188	4,525	1,543	2,635	3,249	3,426	2,609	1,983	3,163
Effect obs. Treat	4,648	4,229	4,632	1,548	2,720	3,408	3,568	2,699	1,981	3,284

Notes: This table presents the reduced-form estimates of the effect of financial aid on labor market outcomes eight years after high school completion using an RD design. Columns (1) and (2) indicate whether the individual is employed as a wage earner or an independent contractor. Column (3) reports the effects on the number of days formally employed and assigns zeros for people with no formal employment. Columns (4)–(10) restrict the sample to individuals who are formally employed eight years after high school. See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Table A.5: Reduced-Form Estimates on Employment Sector

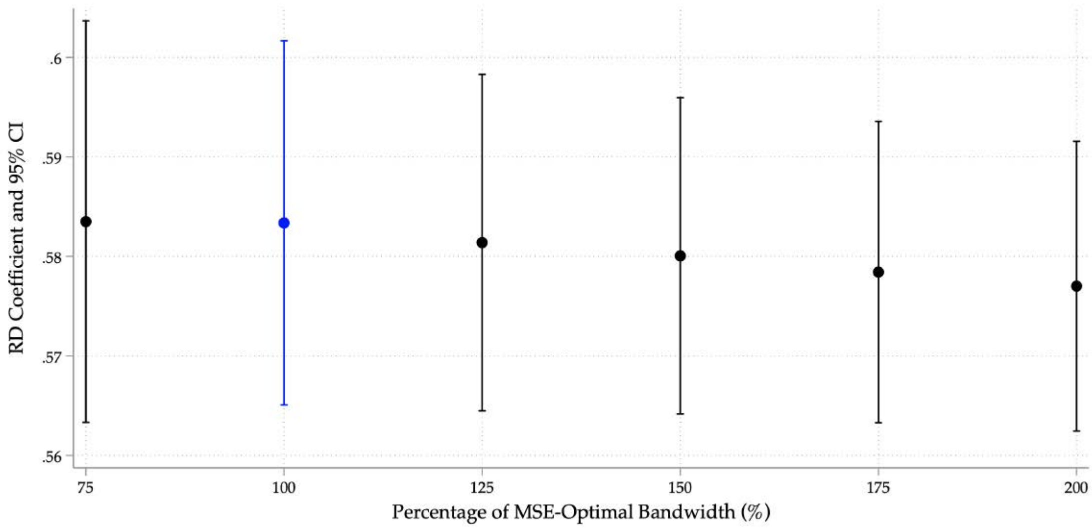
	Conditional on working												
	Agriculture	Mining and quarrying	Manufacturing	Electricity, gas, water supply	Construction	Trade, transport, accomodation, food	Information and communication	Finance and insurance	Real estate	Professional, scientific, technical, admin	Public admin, eduction, health, social work	Arts, entertainment, other service	Extra-territorial orgs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Panel A: *SABER 11 is the running variable*													
Reduced form	-0.006	-0.003	0.002	0.002	-0.008	-0.013	0.011	0.002	0.002	0.012	0.004	-0.003	0.000
	(0.004)	(0.002)	(0.007)	(0.002)	(0.007)	(0.010)	(0.007)	(0.005)	(0.002)	(0.016)	(0.011)	(0.007)	(0.001)
Mean control	0.02	0.01	0.06	0.00	0.06	0.16	0.06	0.03	0.00	0.38	0.13	0.07	0.00
Observations							146,252						
BW loc. poly.	32.43	27.63	27.14	22.99	26.99	32.78	26.04	29.75	20.79	23.48	23.71	29.68	21.55
Effect obs. control	21,000	16,354	16,354	12,188	15,351	21,000	15,351	18,089	10,721	13,072	13,072	18,089	11,312
Effect obs. Treat	7,686	7,099	7,099	6,325	6,943	7,686	6,943	7,316	5,991	6,520	6,520	7,316	6,095
Panel B: *SISBEN is the running variable*													
Reduced form	-0.011	-0.002	-0.004	-0.009	0.000	-0.006	0.034	-0.008	-0.004	0.032	-0.034	0.003	0.000
	(0.008)	(0.004)	(0.013)	(0.005)	(0.011)	(0.018)	(0.015)	(0.010)	(0.004)	(0.026)	(0.023)	(0.016)	(0.000)
Mean control	0.03	0.005	0.069	0.015	0.048	0.131	0.055	0.043	0.006	0.385	0.138	0.073	0.000
Observations							14,975						
BW loc. poly.	9.45	10.16	11.76	10.97	12.34	10.58	9.41	12.47	7.68	12.79	6.96	9.01	3.79
Effect obs. control	2,710	2,888	3,283	3,073	3,400	2,979	2,702	3,425	2,186	3,480	1,999	2,558	1,124
Effect obs. Treat	2,791	2,978	3,421	3,199	3,567	3,094	2,775	3,593	2,262	3,653	2,044	2,668	1,118

Notes: This table presents the reduced-form estimates of the effect of financial aid on employment sector for individuals who are formally employed eight years after high school completion using an RD design. See the notes under Table I for other details.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

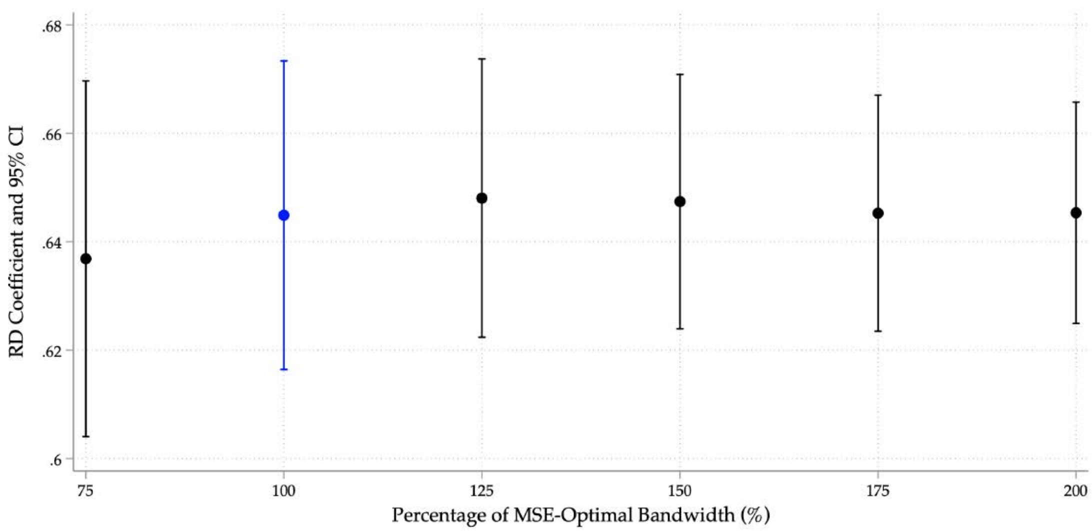
Appendix B Robustness to RD Bandwidth Selection

Figure B.1: Probability of Receiving SPP Financial Aid

(a) Merit Cutoff



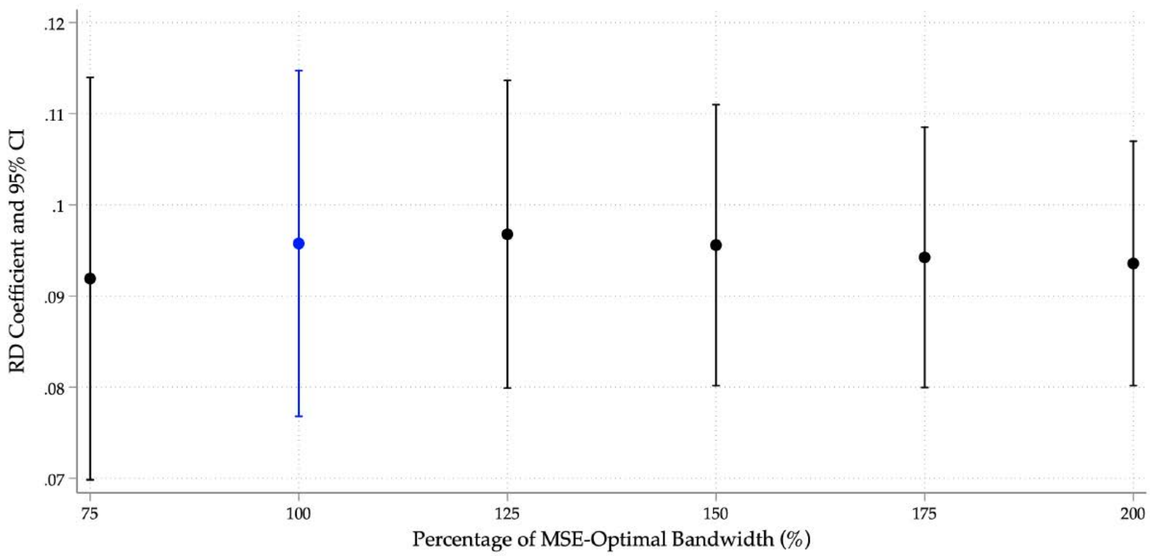
(b) Need Cutoff



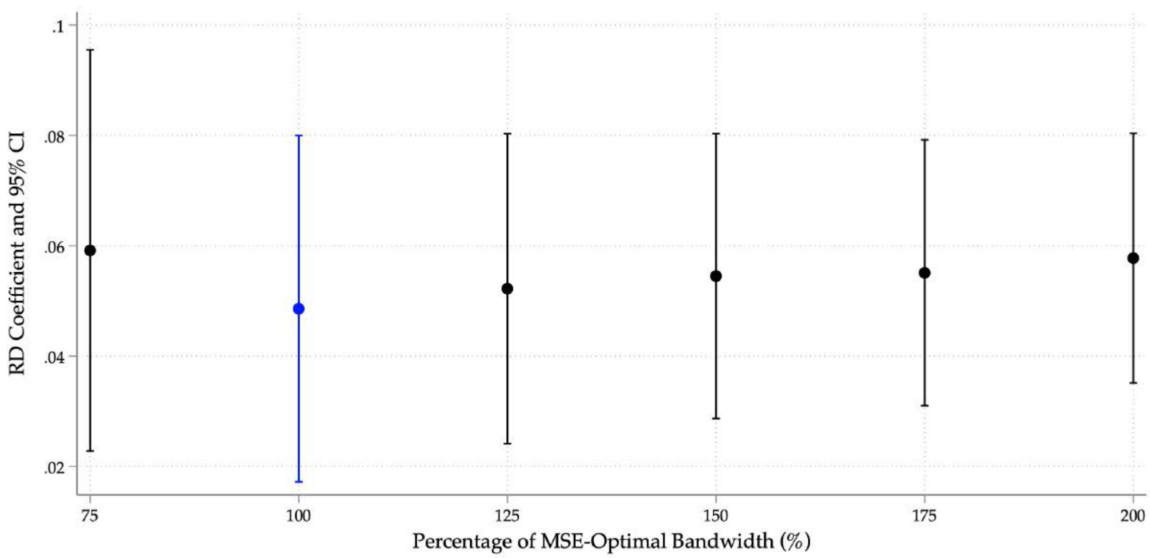
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is likelihood of receiving SPP financial aid.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure B.2: Access to Any College Within Six Years from High School Completion

(a) Merit Cutoff



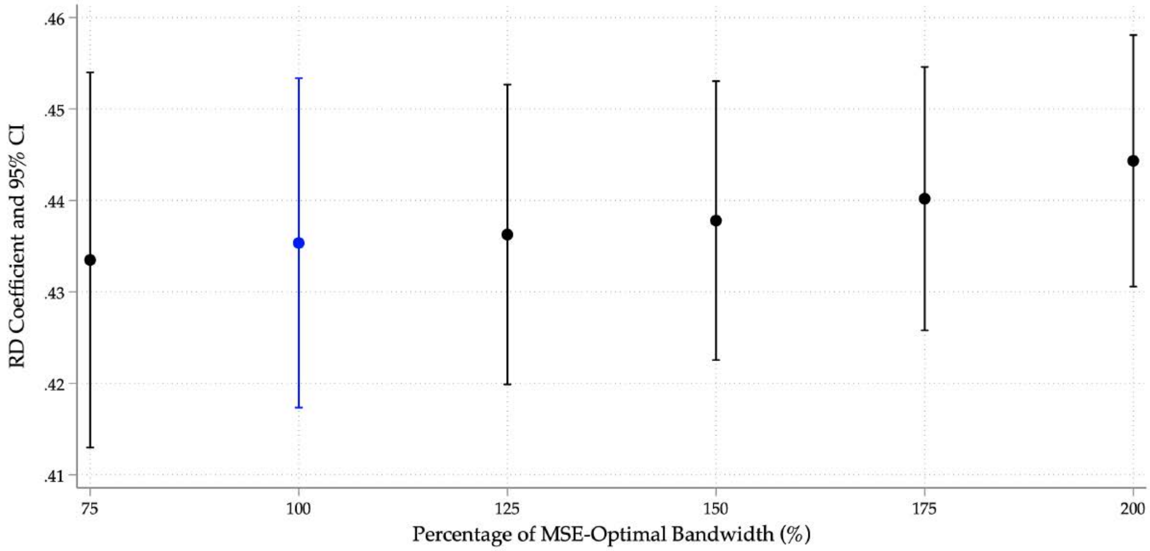
(b) Need Cutoff



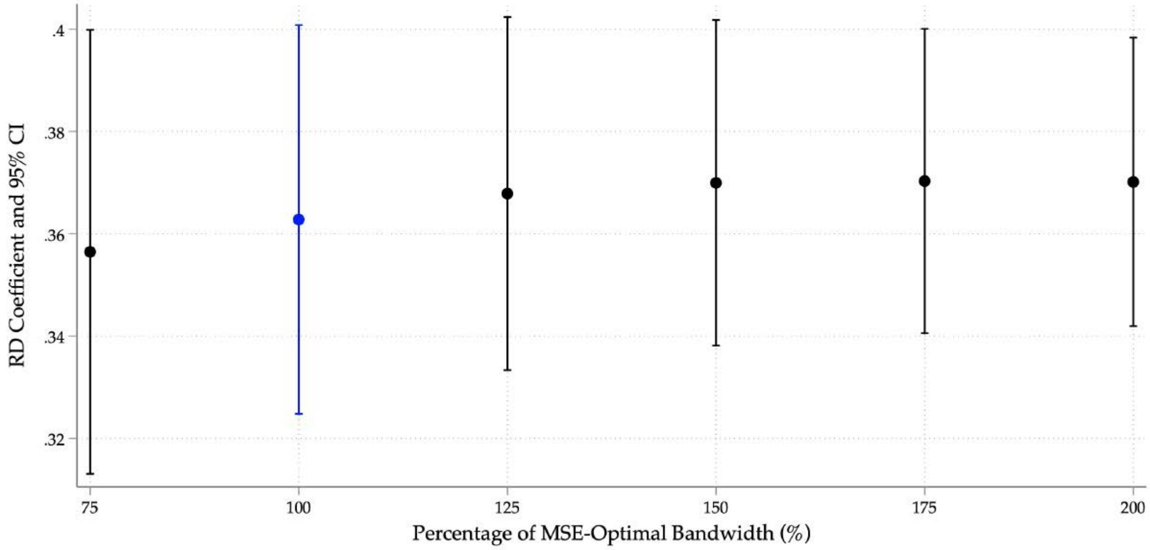
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of accessing any college within six years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure B.3: Access to a High-Quality College Within Six Years from High School

(a) Merit Cutoff



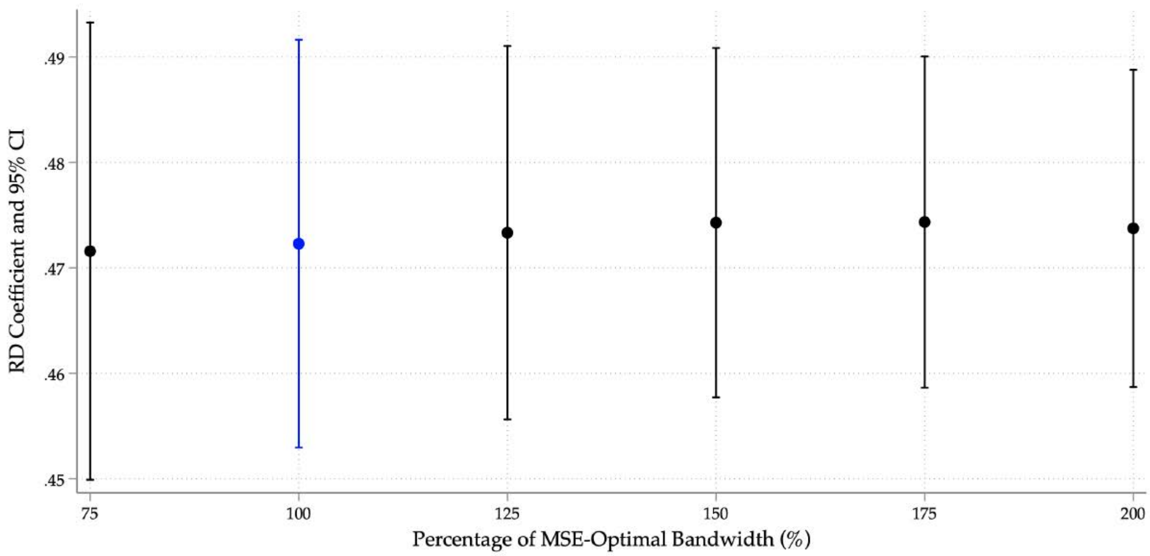
(b) Need Cutoff



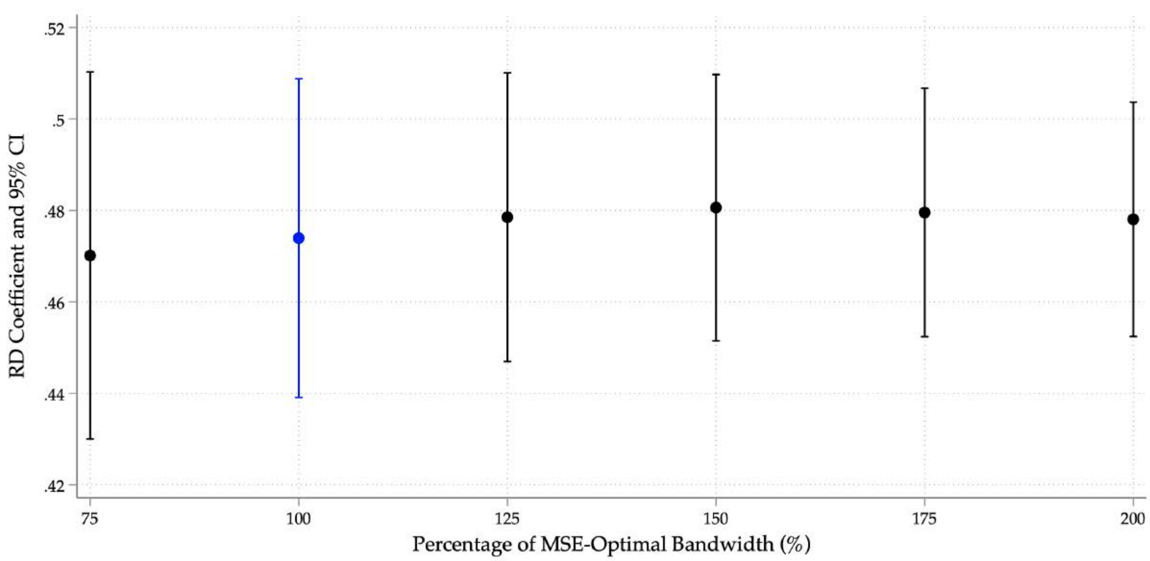
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of accessing an HQ college within six years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure B.4: Access to a High-Quality Private College Within Six Years from High School

(a) Merit Cutoff



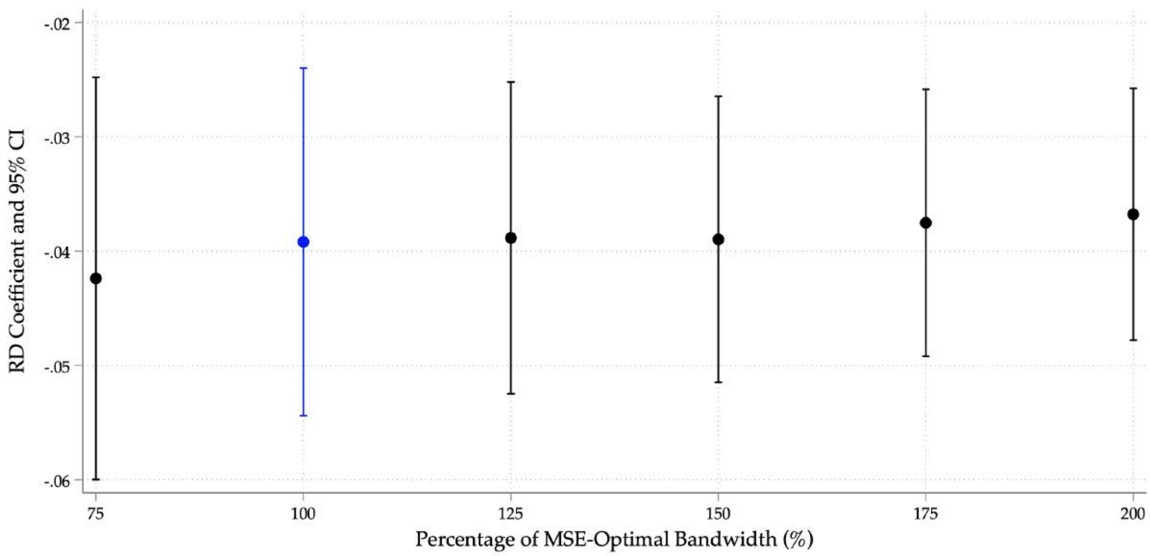
(b) Need Cutoff



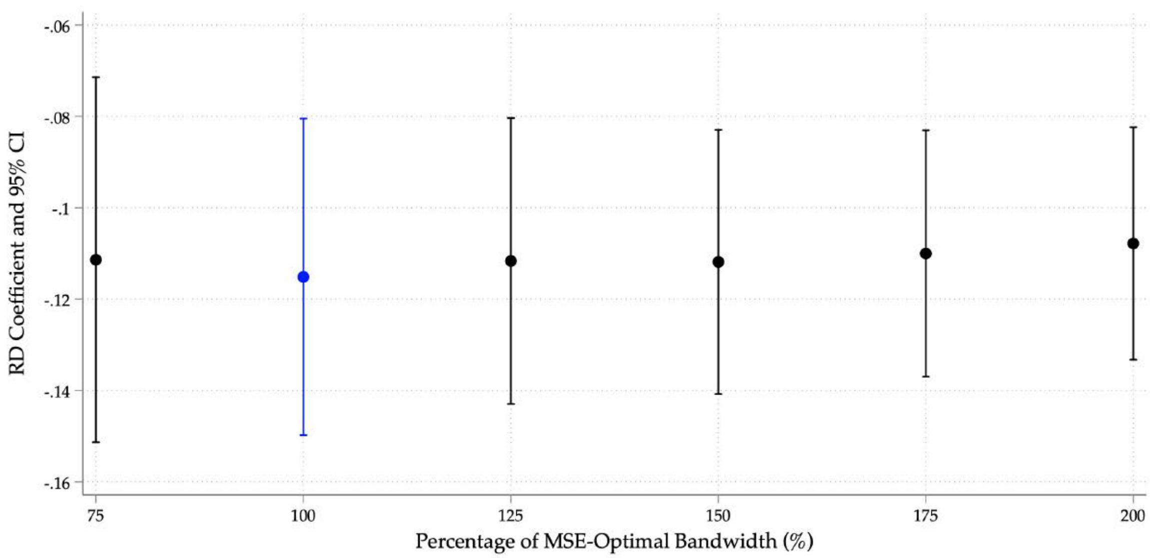
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of accessing an HQ private college within six years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure B.5: Access to a High-Quality Public College Within Six Years from High School

(a) Merit Cutoff



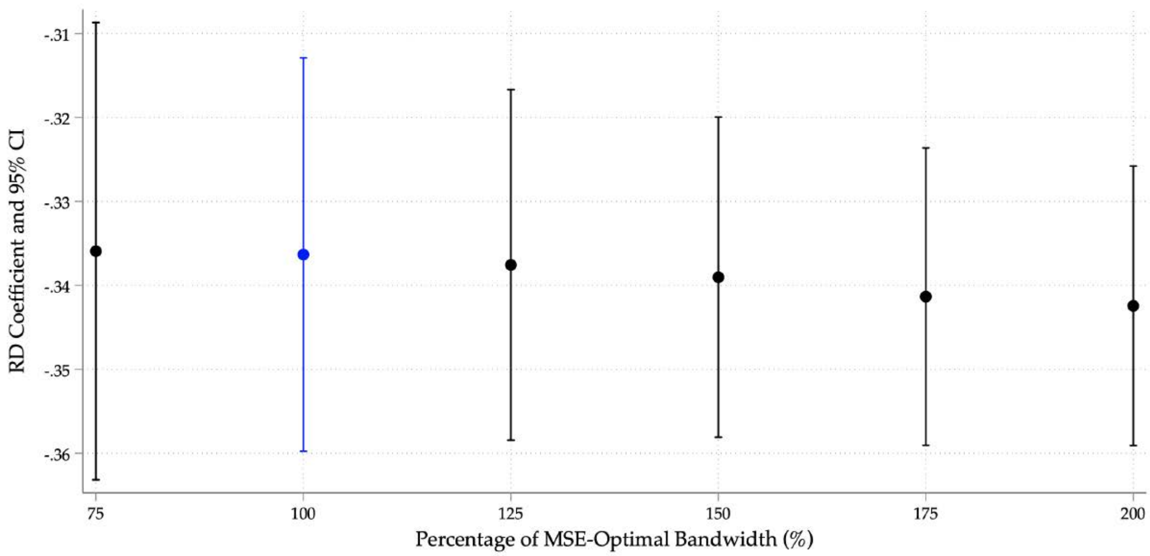
(b) Need Cutoff



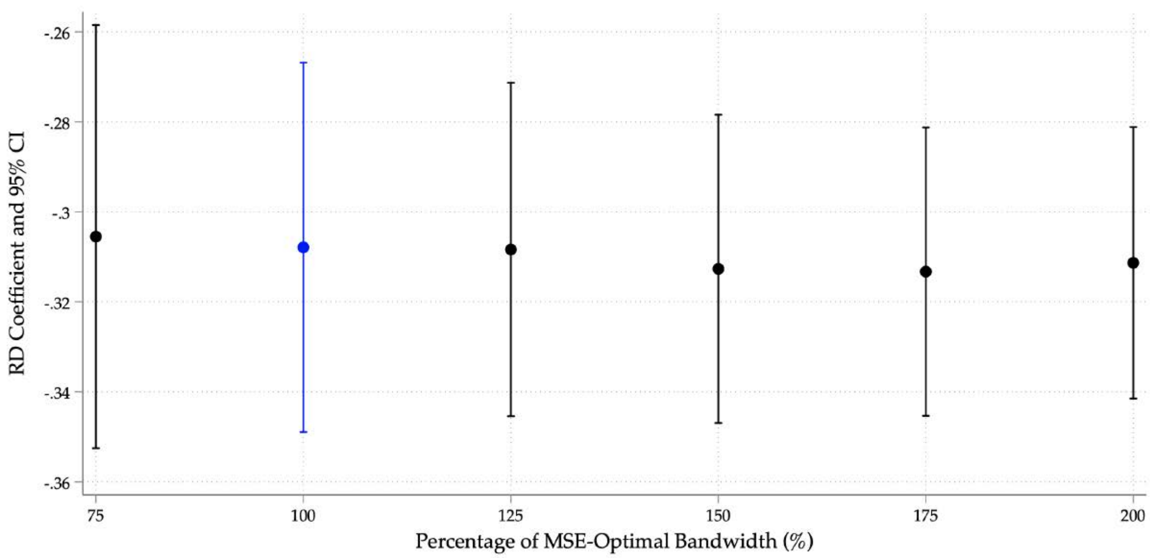
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of accessing an HQ public college within six years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure B.6: Access to a Low-Quality College Within Six Years from High School

(a) Merit Cutoff



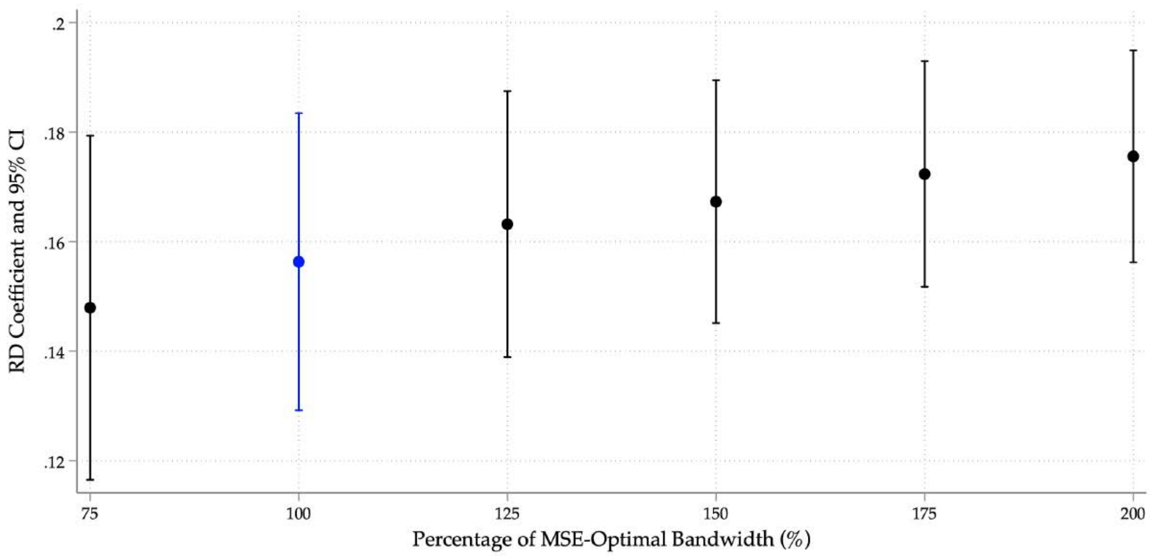
(b) Need Cutoff



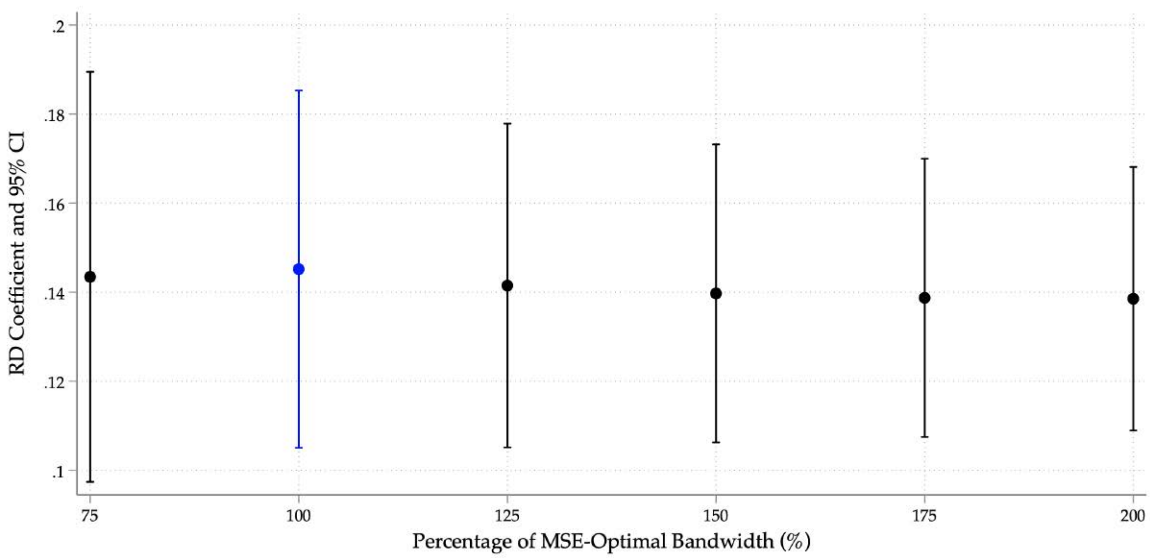
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of accessing an LQ college within six years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure B.7: Bachelor's Degree Earned Within Seven Years from High School

(a) Merit Cutoff



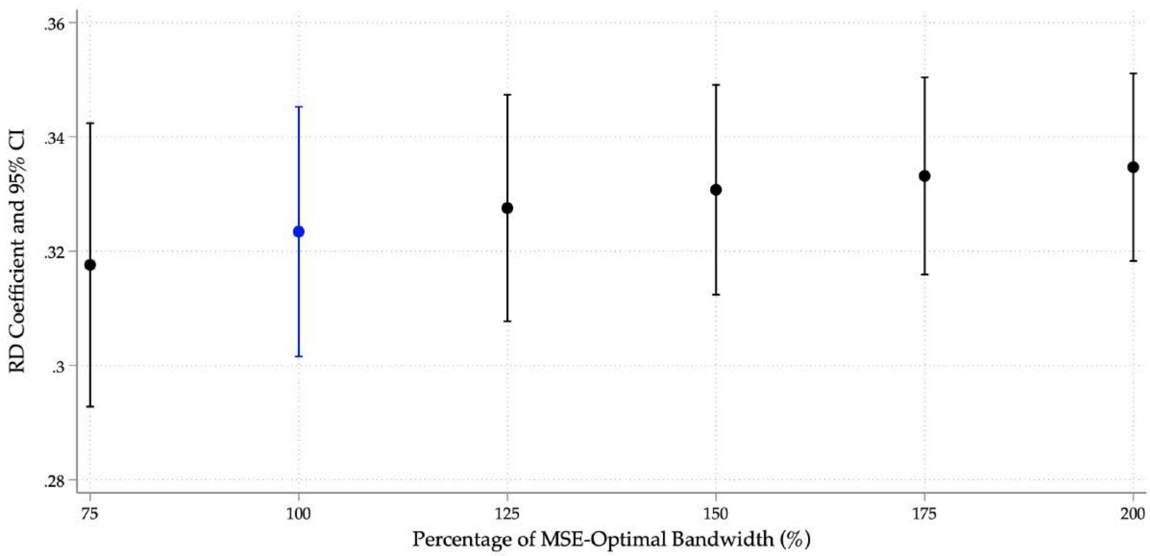
(b) Need Cutoff



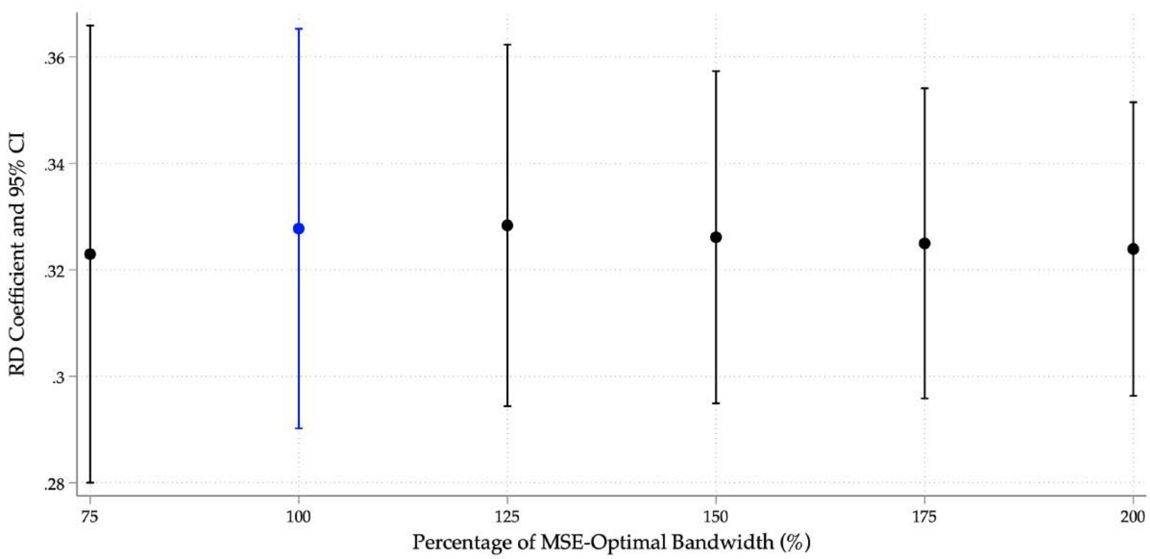
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of earning a bachelor's degree, proxied by taking SABER PRO, within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.8: Bachelor's Degree Earned from a High-Quality College Within Seven Years from High School

(a) Merit Cutoff



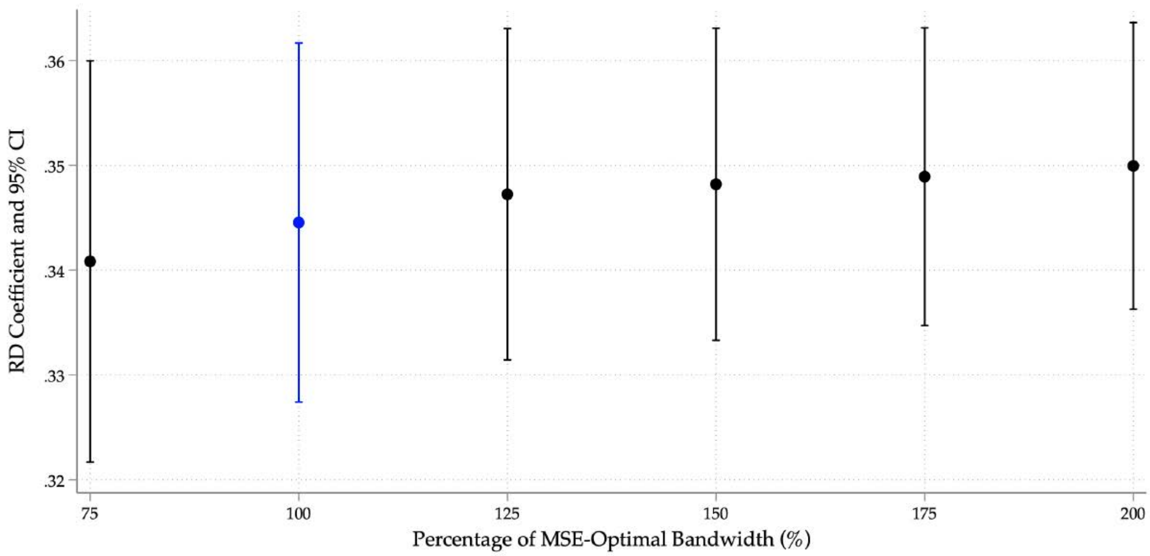
(b) Need Cutoff



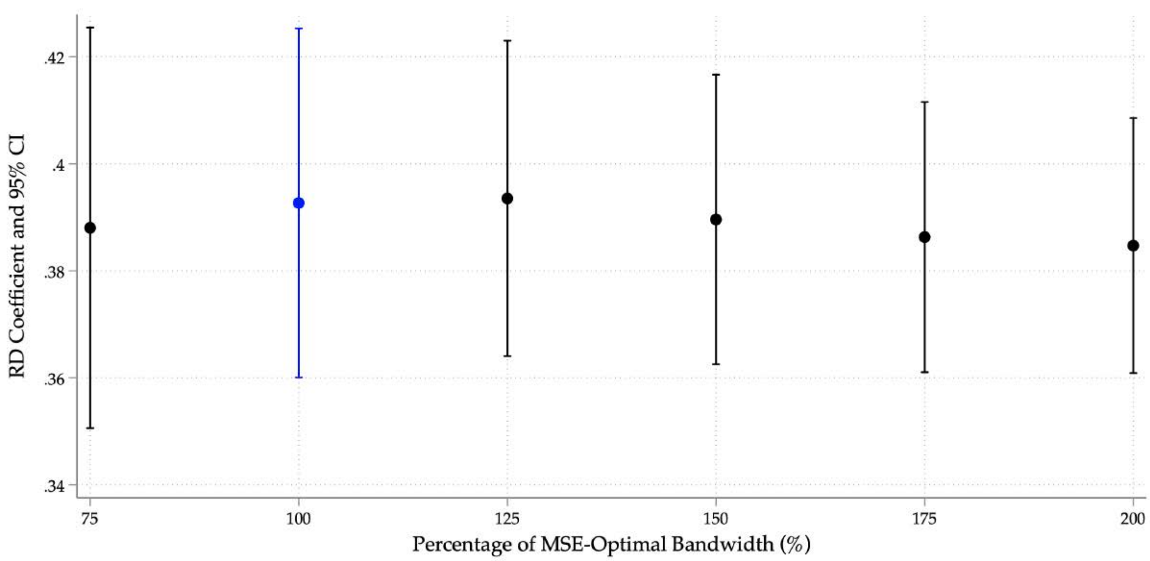
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of earning a bachelor's degree, proxied by taking SABER PRO, from an HQ college within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.9: Bachelor's Degree Earned from a High-Quality Private College Within Seven Years from High School

(a) Merit Cutoff



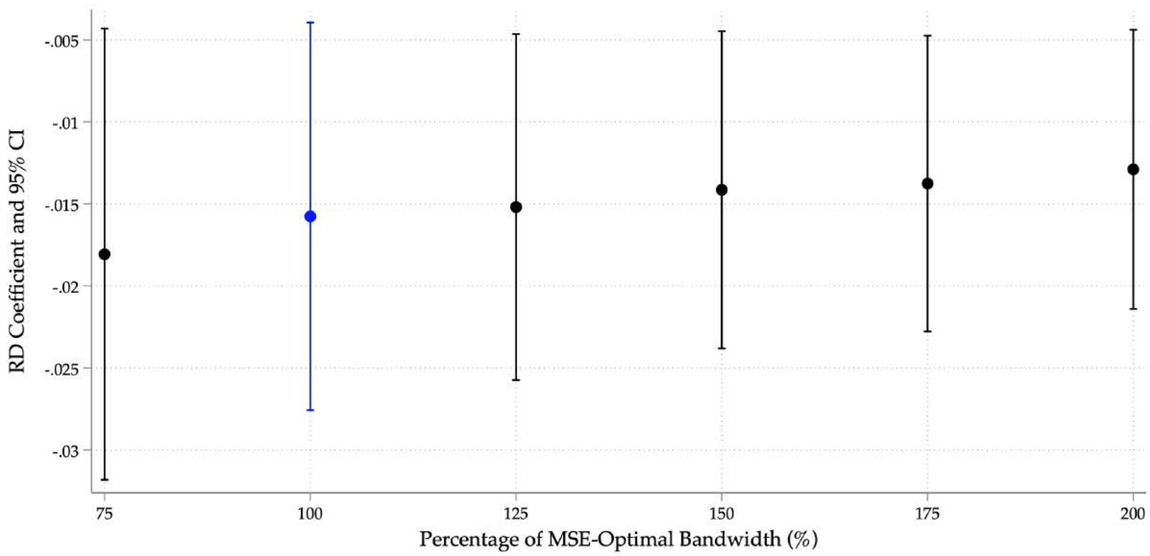
(b) Need Cutoff



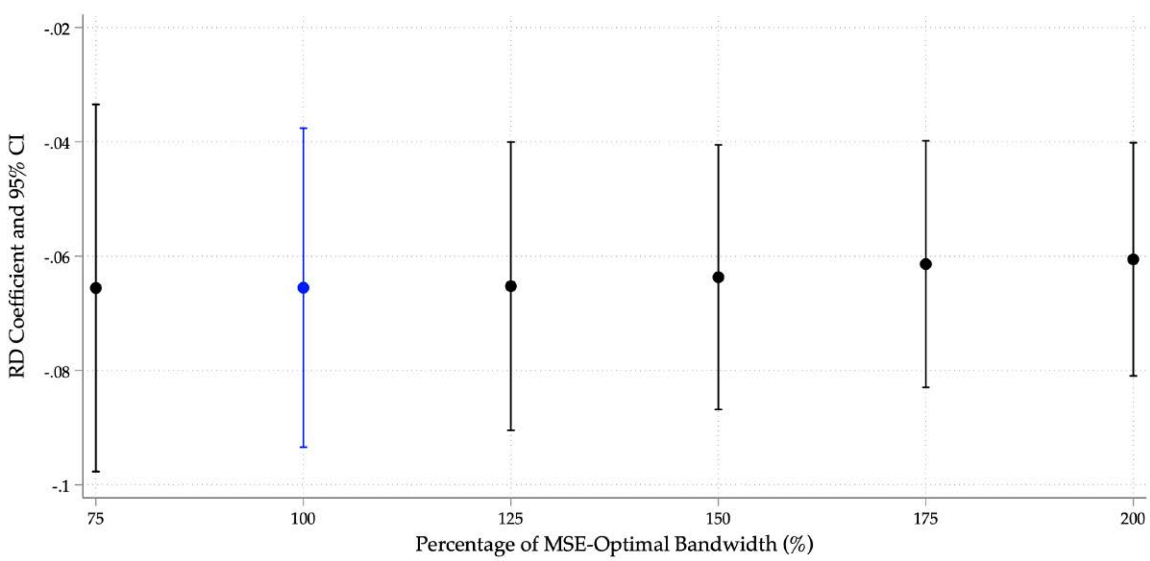
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of earning a bachelor's degree, proxied by taking SABER PRO, from an HQ private college within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.10: Bachelor's Degree Earned from a High-Quality Public College Within Seven Years from High School

(a) Merit Cutoff



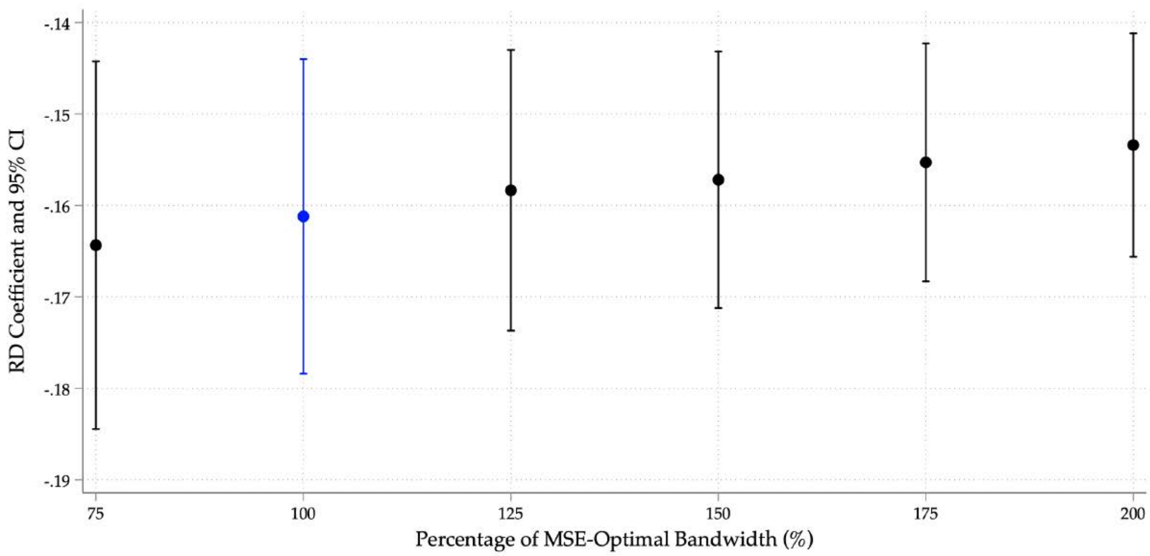
(b) Need Cutoff



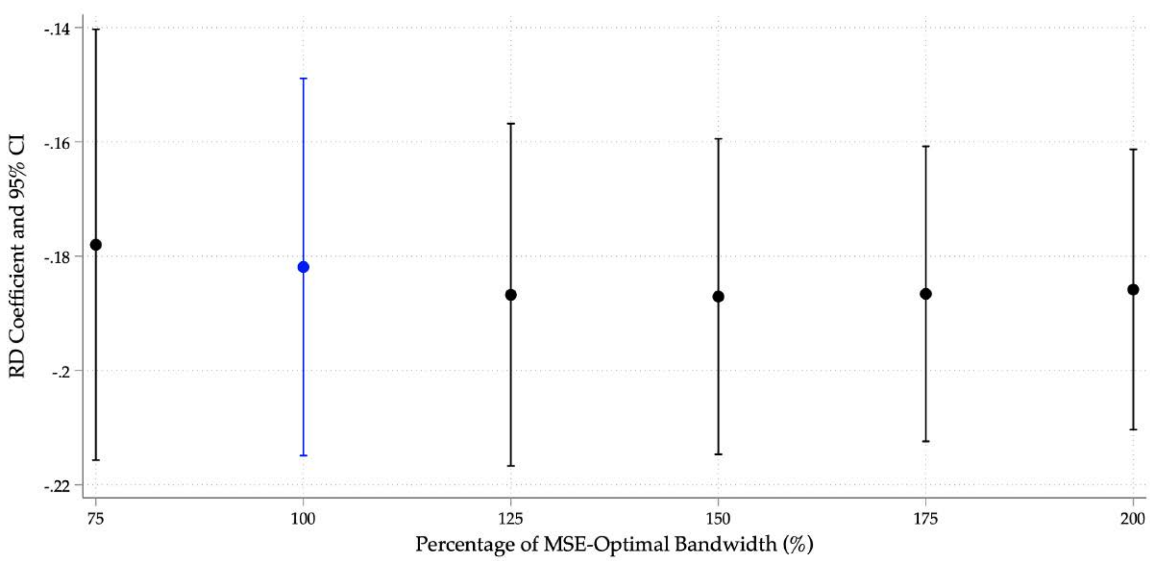
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of earning a bachelor's degree, proxied by taking SABER PRO, from an HQ public college within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.11: Bachelor's Degree Earned from a Low-Quality College Within Seven Years from High School

(a) Merit Cutoff



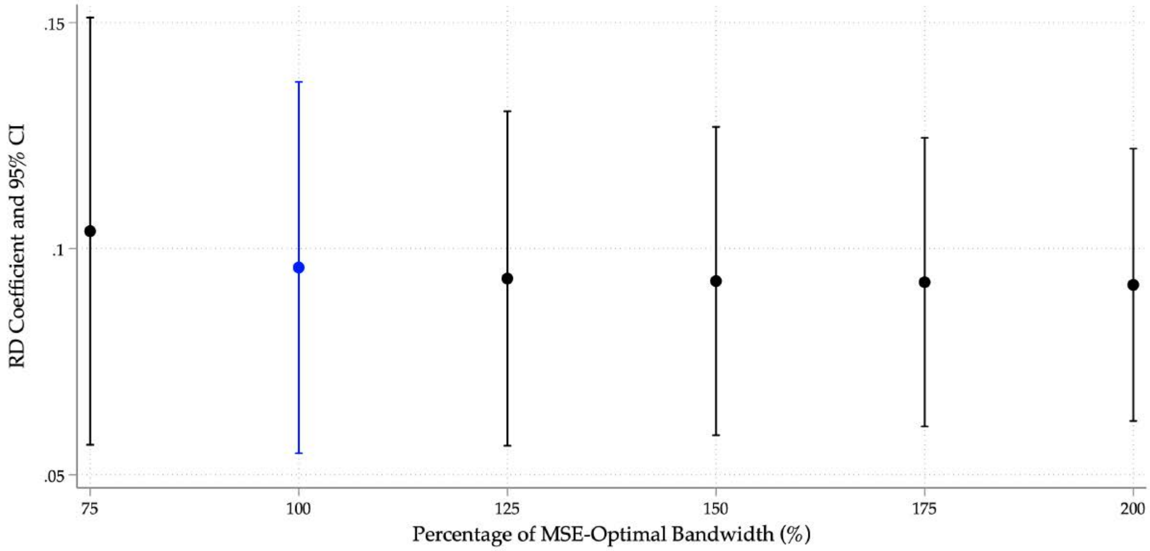
(b) Need Cutoff



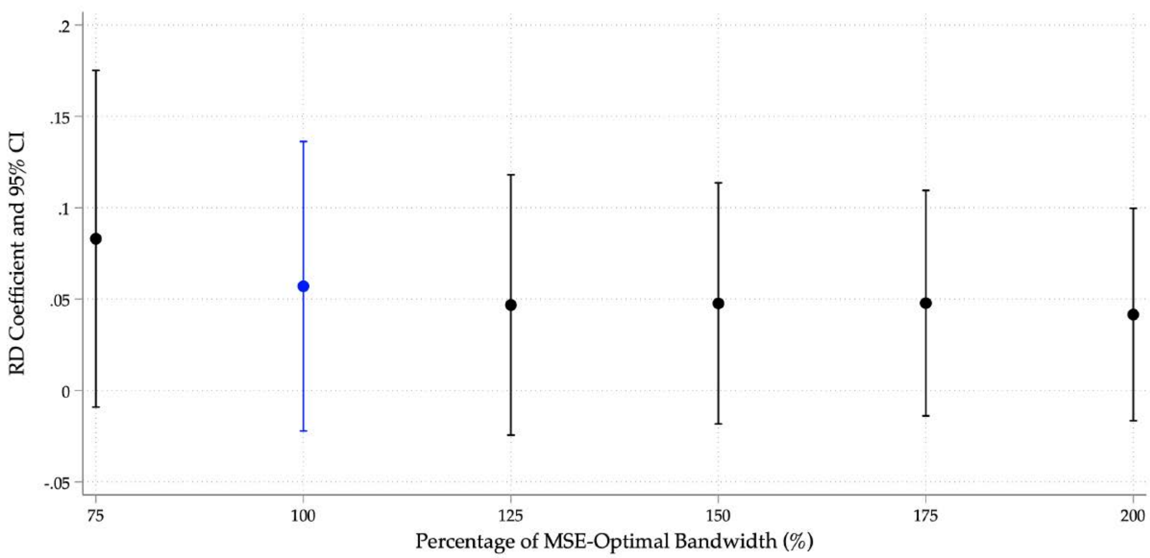
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of earning a bachelor's degree, proxied by taking SABER PRO, from an LQ college within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.12: Standardized College Exit Test Score Within Five Years from High School

(a) Merit Cutoff



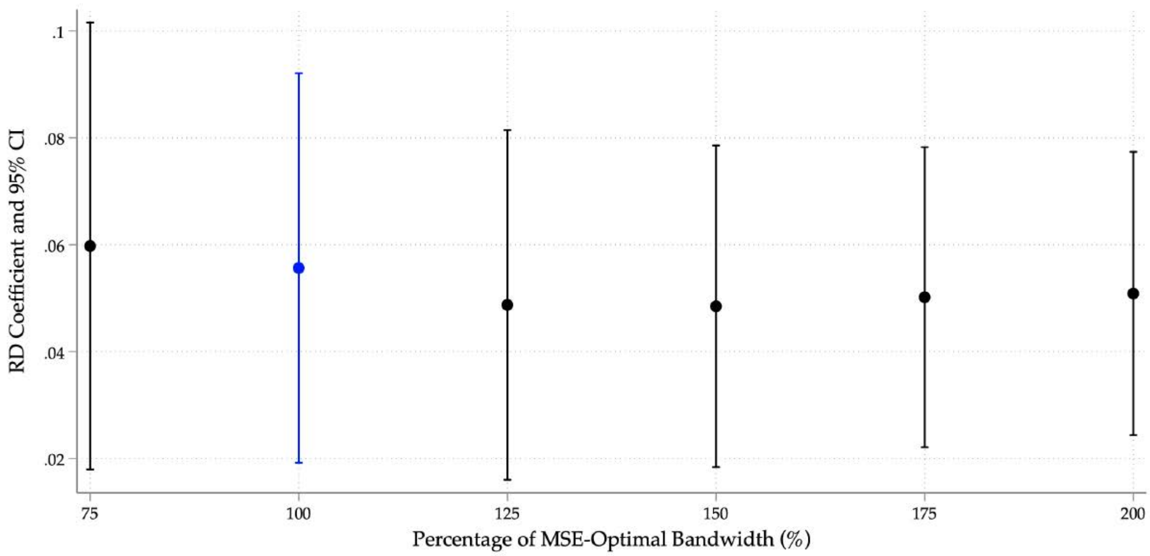
(b) Need Cutoff



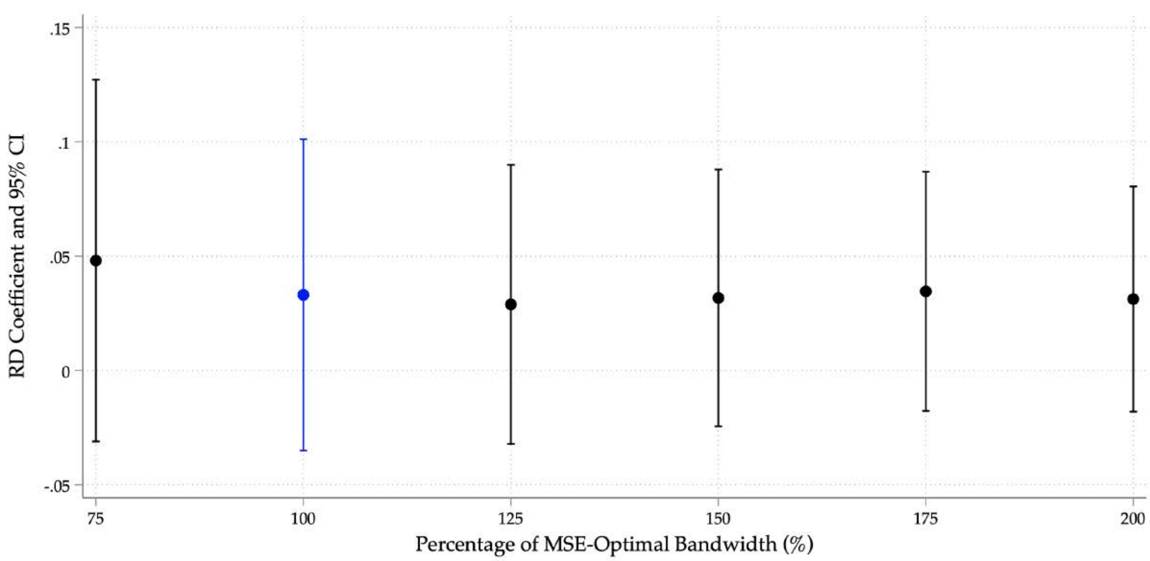
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the student's performance in SABER PRO for exams taken within five years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.13: Standardized College Exit Test Score Within Seven Years from High School

(a) Merit Cutoff



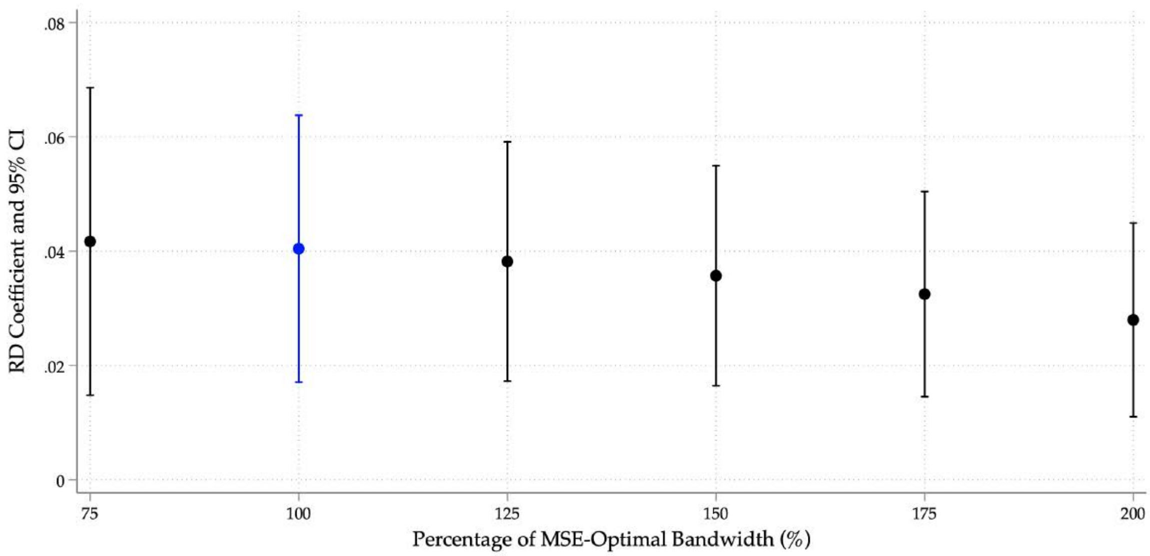
(b) Need Cutoff



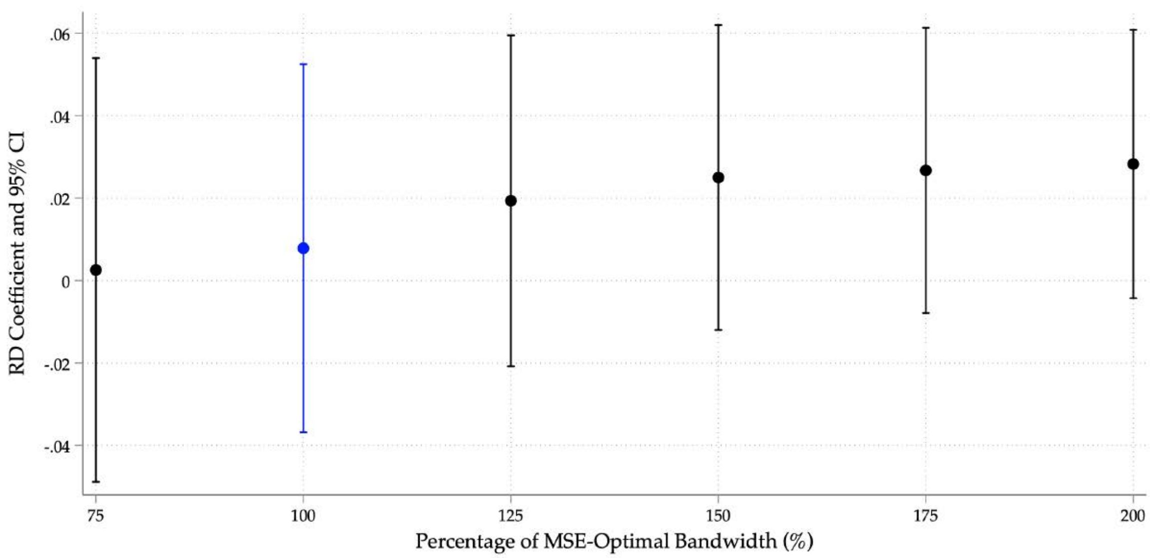
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the student's performance in SABER PRO for exams taken within seven years from high school completion.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Figure B.14: Formal Employment Eight Years after High School

(a) Merit Cutoff



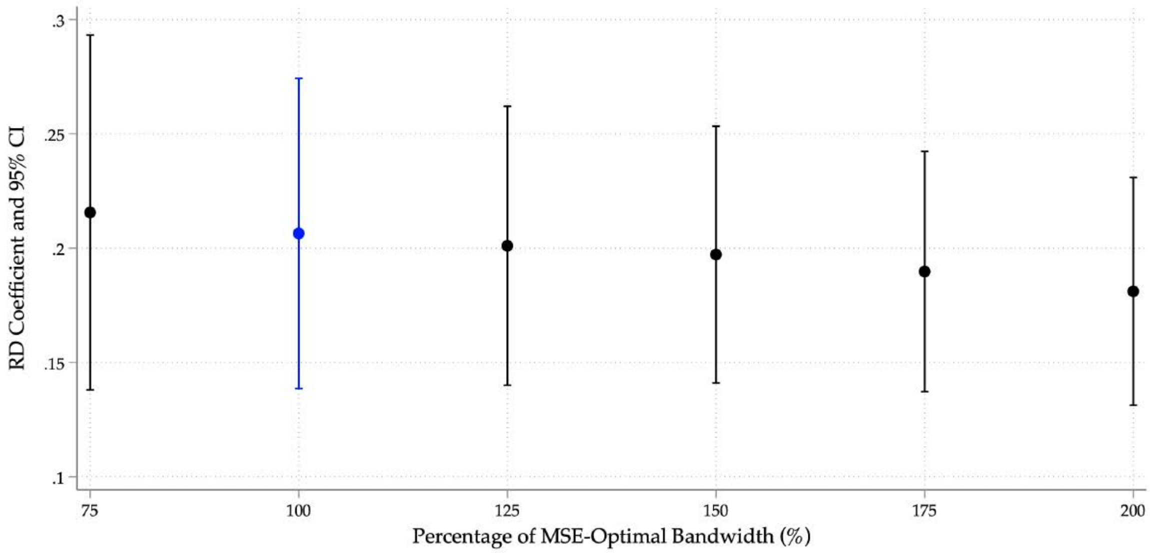
(b) Need Cutoff



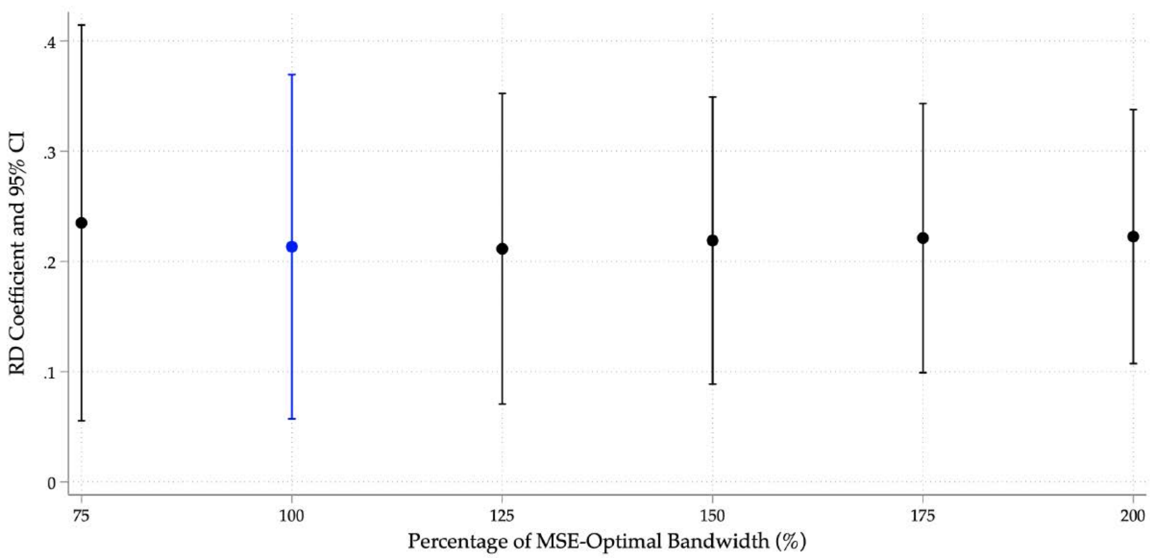
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is the likelihood of being formally employed eight years after high school.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure B.15: Formal Earnings (in Min Wages) Eight Years after High School

(a) Merit Cutoff



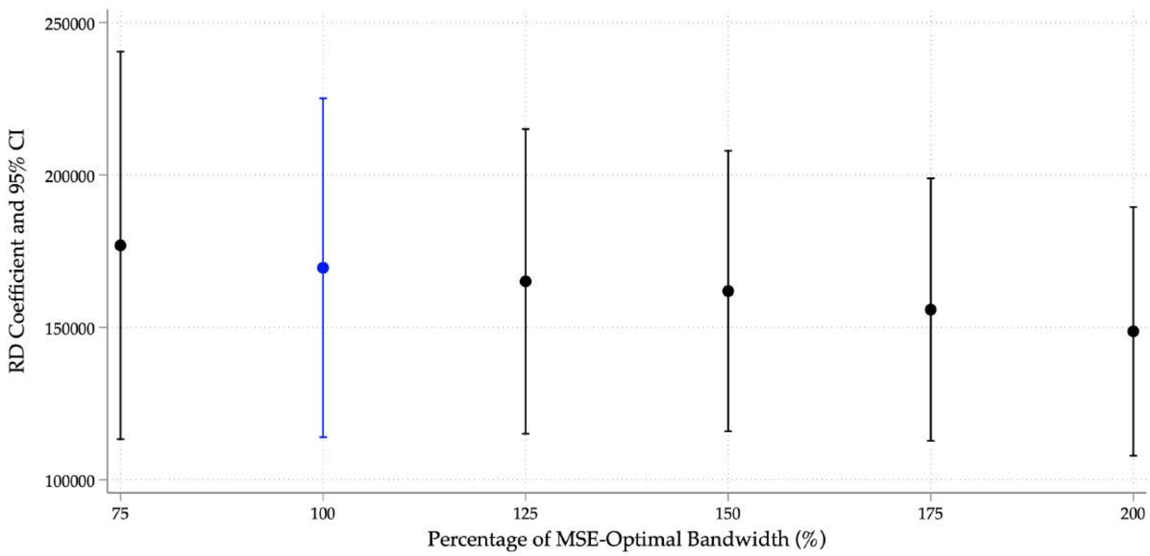
(b) Need Cutoff



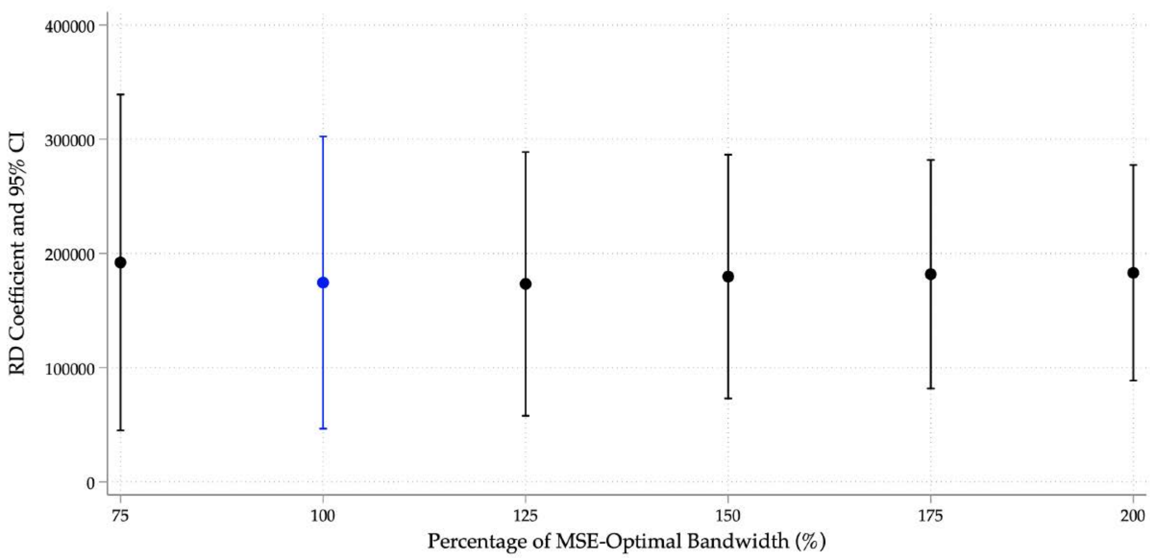
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is formal earnings, measured in multiples of the monthly minimum wage, eight years after high school.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure B.16: Formal Earnings (in Constant Pesos) Eight Years after High School

(a) Merit Cutoff



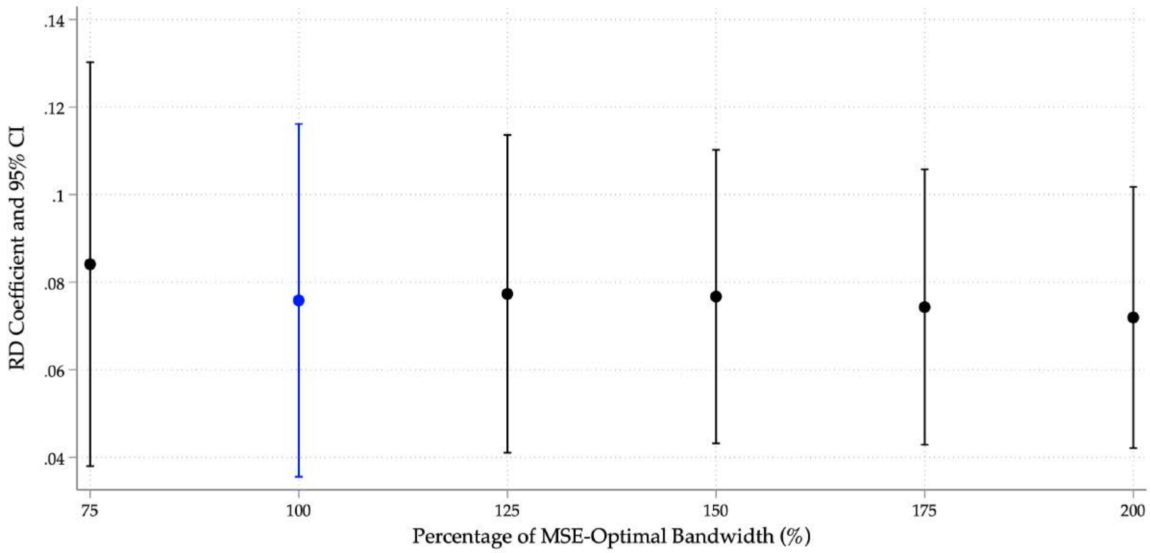
(b) Need Cutoff



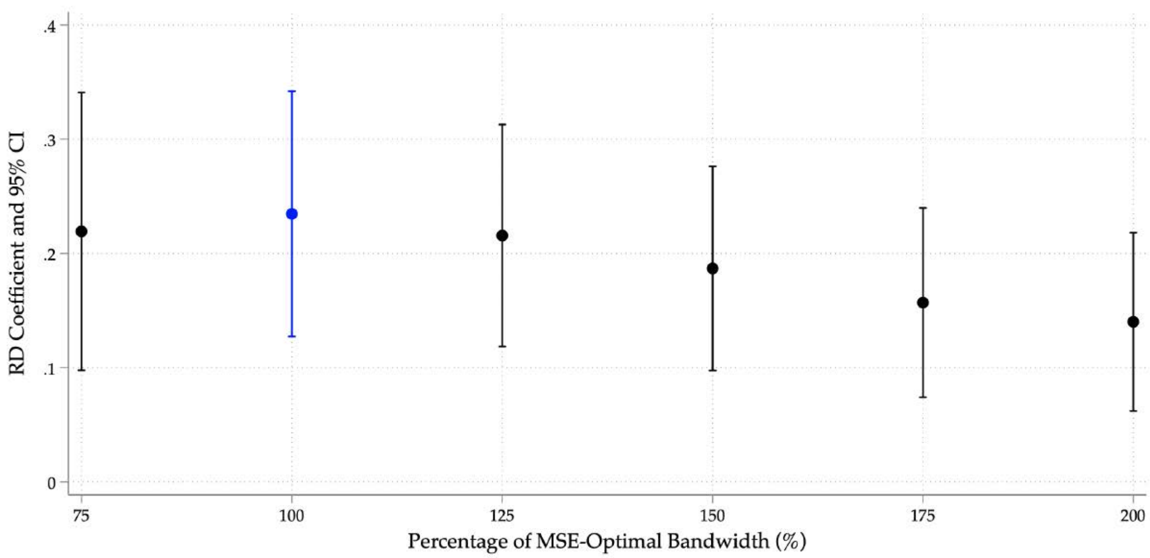
Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is formal earnings, measured in December 2021 pesos, eight years after high school.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Figure B.17: Log Formal Earnings Eight Years after High School

(a) Merit Cutoff



(b) Need Cutoff



Notes: The figures plot the reduced-form, conventional RD coefficient, and 95% confidence intervals for different bandwidth choices estimated with package rdrobust (Cattaneo et al., 2014). The series in blue is the mean squared error (MSE)-optimal selected bandwidth. Panel A (B) uses the SABER 11 test score (SISBEN wealth score) as the running variable, restricting the sample to need- (merit-) eligible students. The dependent variable is log formal earnings, measured in December 2021 pesos, eight years after high school.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and PILA (MinSalud).

Appendix C Heterogeneity

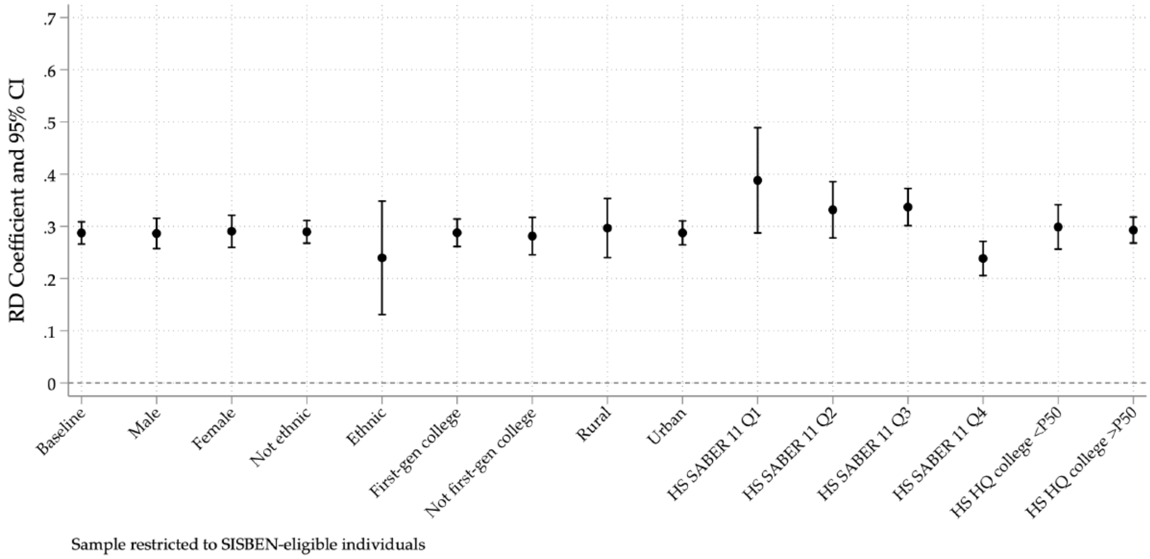
This section provides an overview of the heterogeneous treatment effects of financial aid on students' educational and labor market outcomes. We compare the reduced-form effects of financial aid on college access, quality, bachelor's degree attainment from an HQ college, learning performance, and earnings eight years after high school completion. We analyze these effects by individual, household, and high school characteristics. The results are presented in Figures C.1 to C.5.

Overall, financial aid has positive and significant gains across virtually all baseline characteristics. However, there are three main sources of heterogeneity. First, financial aid has the greatest impact on students from disadvantaged schools. Students graduating from high schools with low test scores and fewer attendees to HQ colleges experience larger gains in college access, graduation, learning, and earnings. However, the effects are noisy at the need cutoff due to the limited number of merit-eligible students from these schools (2%). Second, females benefit disproportionately from financial aid in accessing and graduating from HQ colleges. However, females have similar learning and earnings gains to males, as they tend to graduate from fields with lower returns, such as social sciences and humanities (Figure C.6). Third, first-generation college students benefit as much from financial aid as students with college-educated parents.

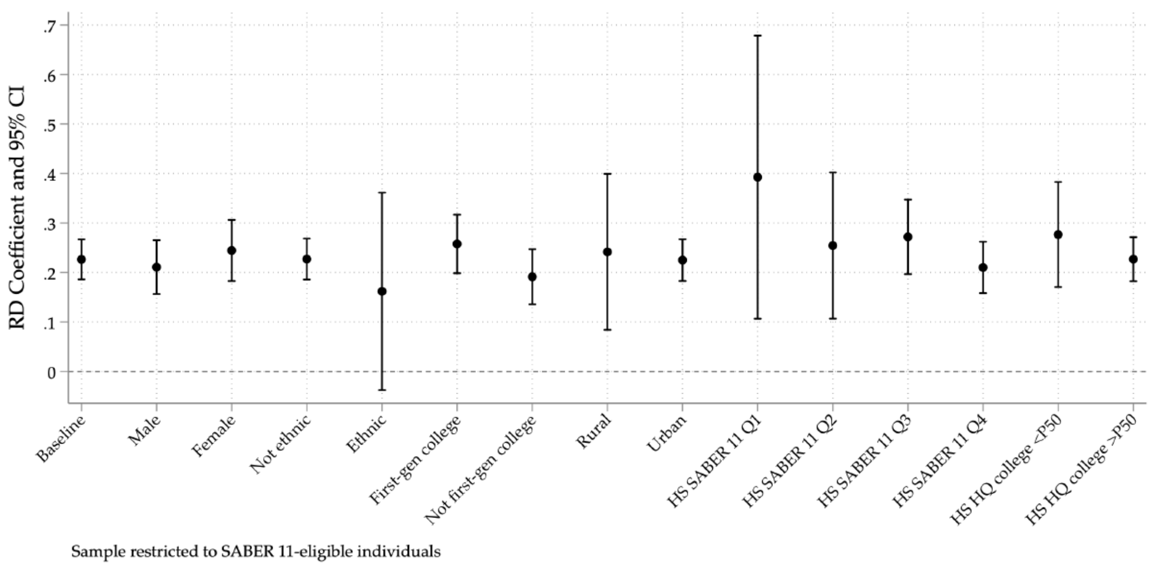
Furthermore, urban students have larger and more precise effects, as the majority of both need-eligible (75%) and merit-eligible (90%) students come from urban areas. However, financial aid also benefits rural students. Regarding ethnicity, the small proportion of self-reported ethnic groups (less than 5% in our study sample) limits the results. However, those who persist in college demonstrate higher learning outcomes, although the impact on earnings remains uncertain.

Figure C.1: Heterogeneous Effects in Immediate Access to Any College

(a) Merit Cutoff



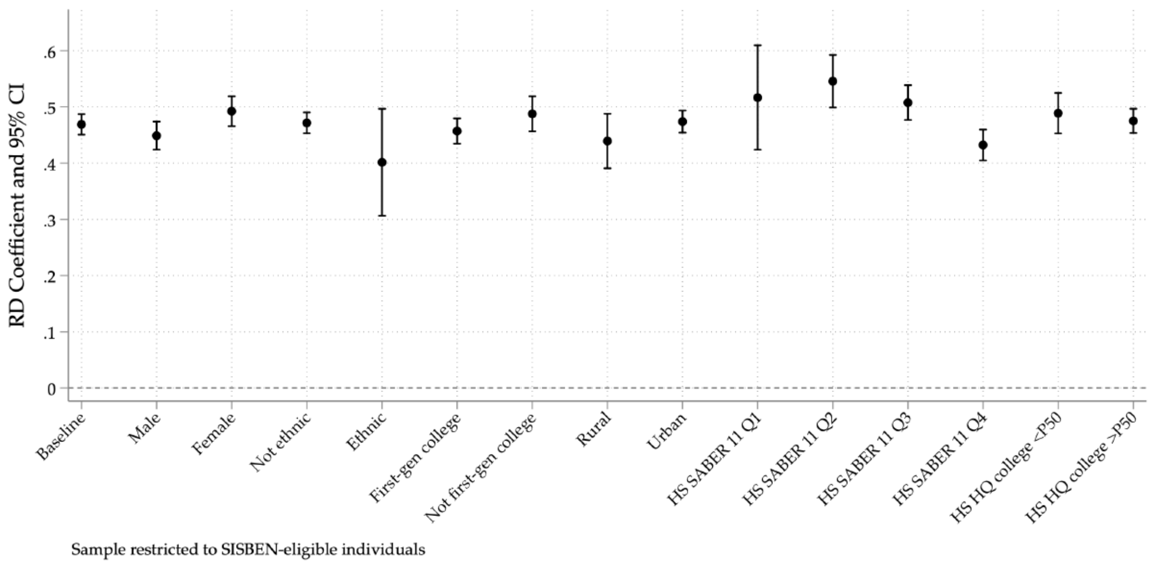
(b) Need Cutoff



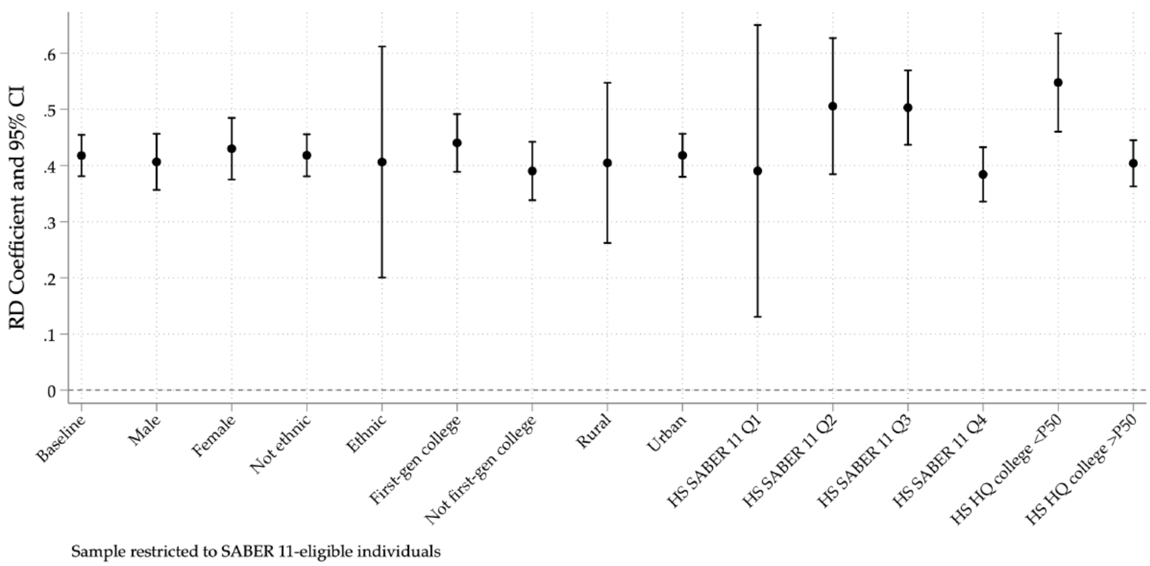
Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on immediate access to any college after high school completion. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure C.2: Heterogeneous Effects in Immediate Access to a High-Quality College

(a) Merit Cutoff



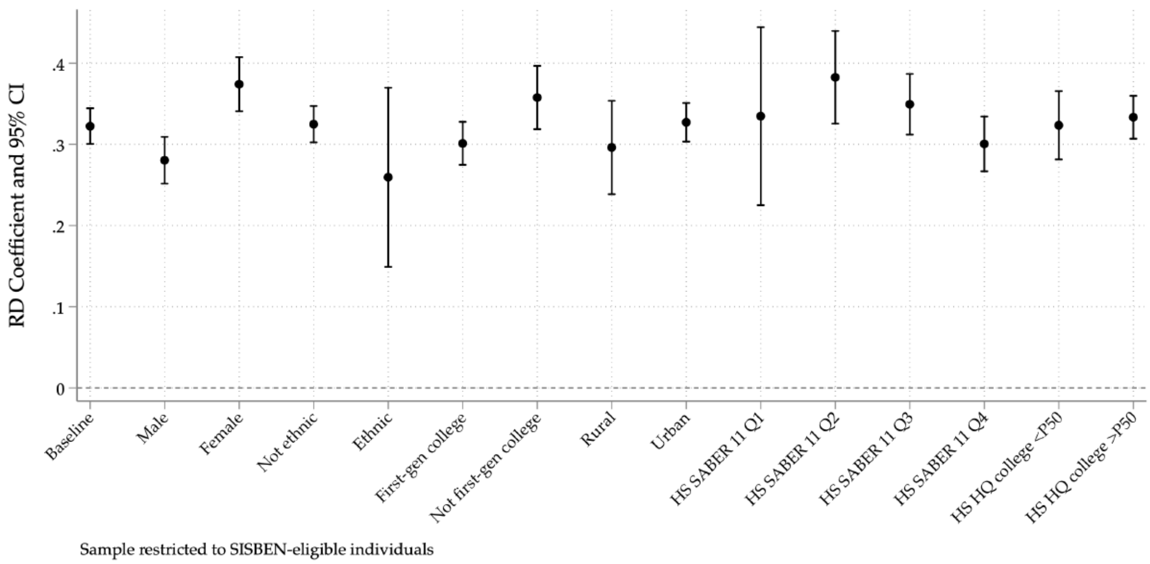
(b) Need Cutoff



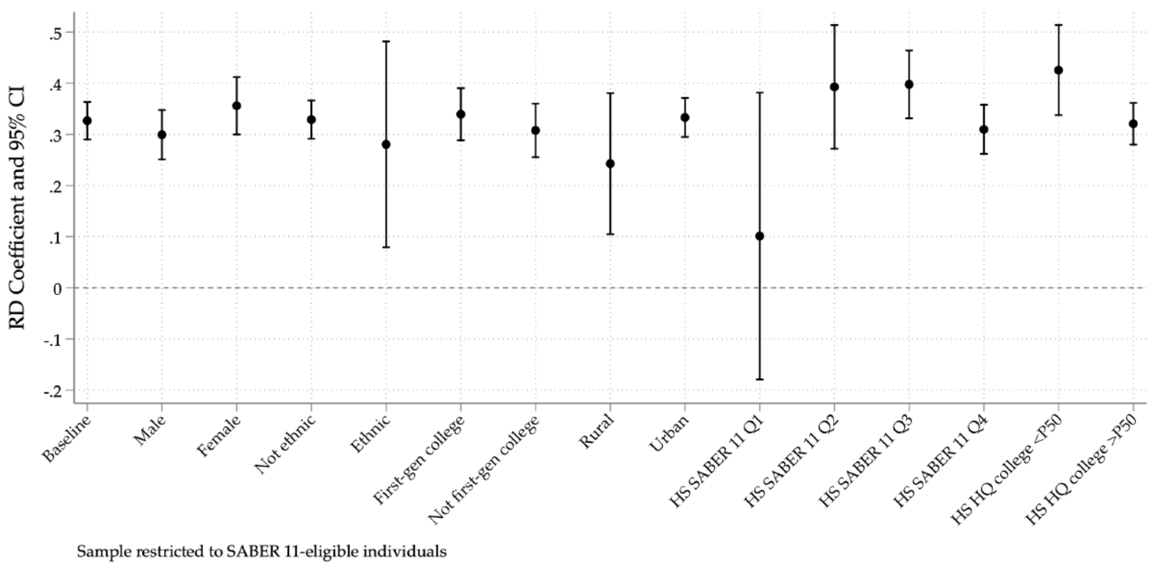
Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on immediate access to an HQ college after high school completion. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SNIES (MEN).

Figure C.3: Heterogeneous Effects in Earning a B.A. from a High-Quality College

(a) Merit Cutoff



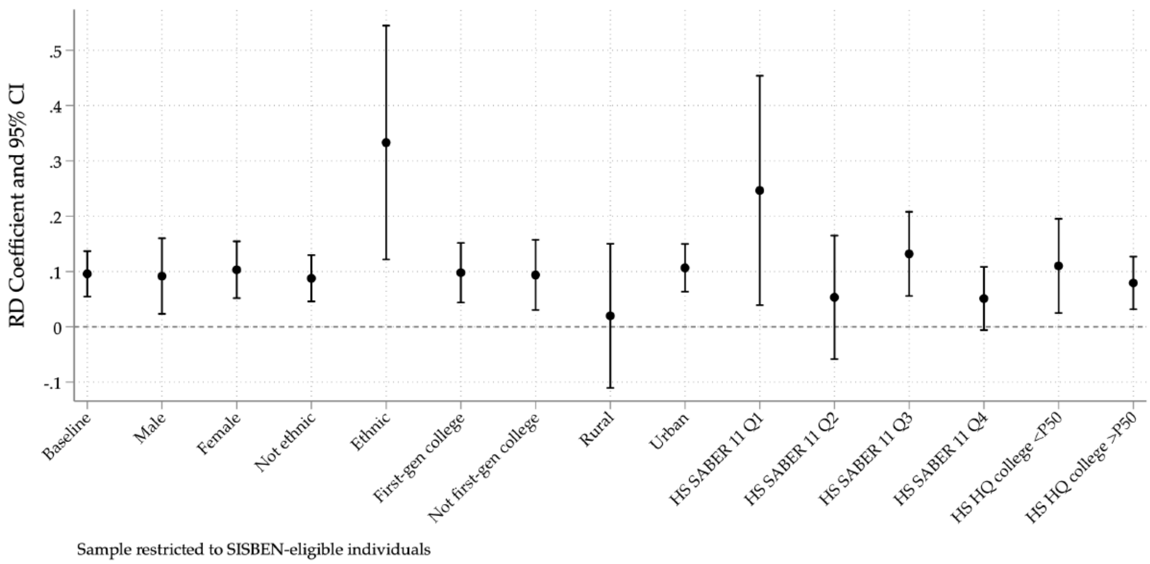
(b) Need Cutoff



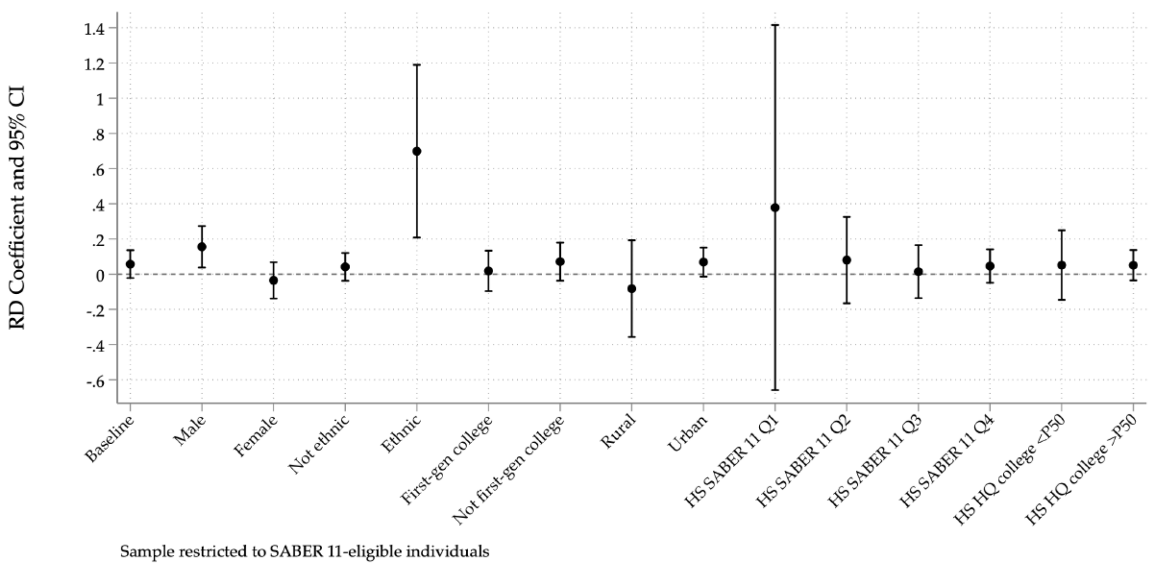
Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on the likelihood of earning a bachelor's degree (proxied by taking the SABER PRO exam) from an HQ college within seven years from high school completion. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure C.4: Heterogeneous Effects in College Exit Test Scores

(a) Merit Cutoff



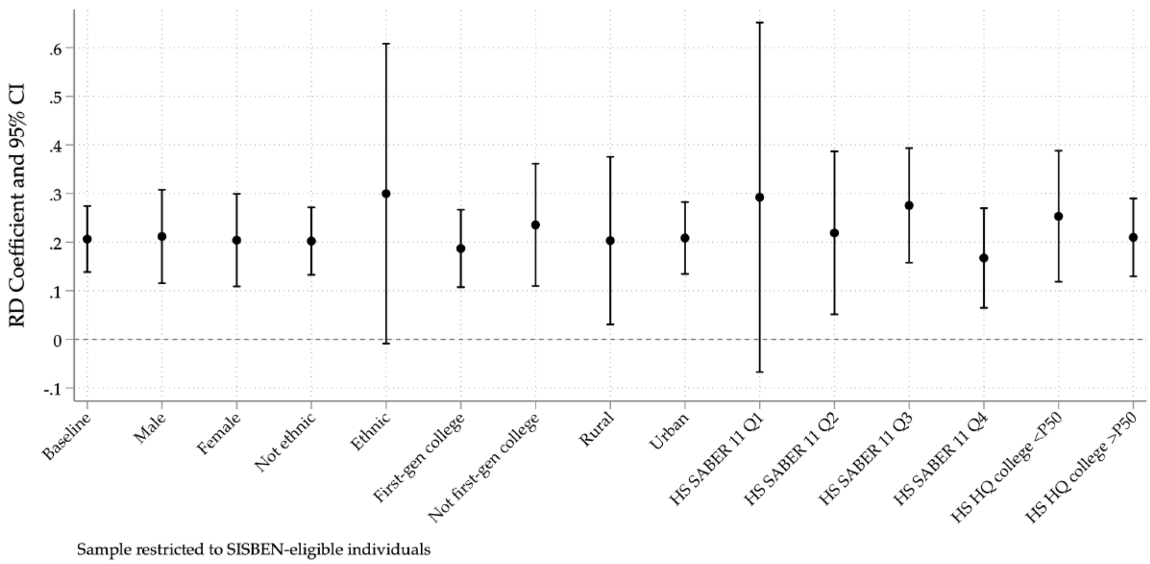
(b) Need Cutoff



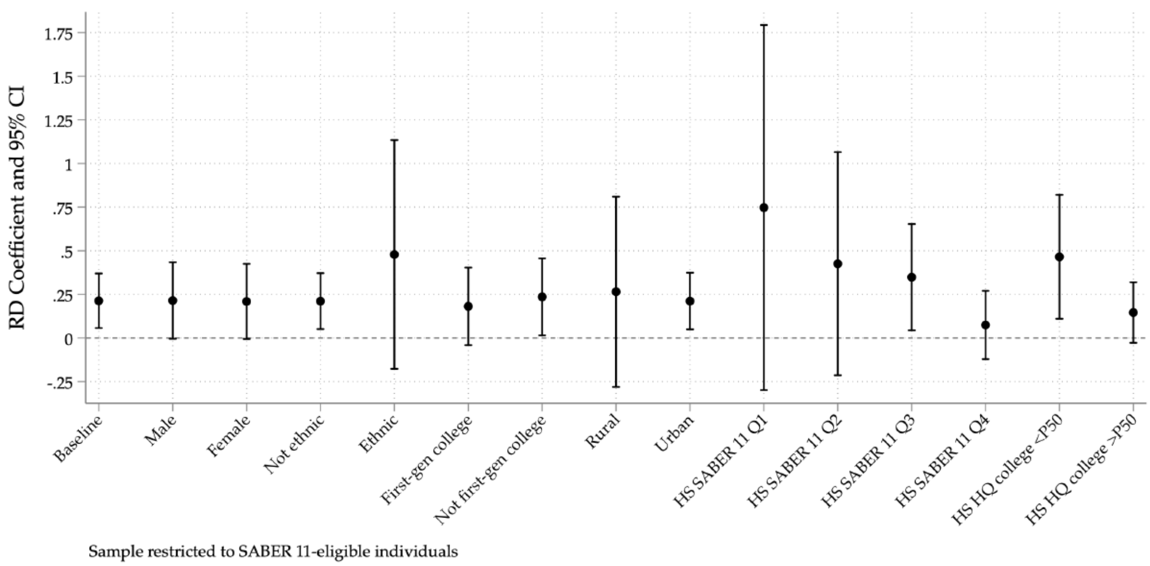
Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on the standardized college exit test score for SABER PRO exams taken within five years from high school completion. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure C.5: Heterogeneous Effects in Formal Earnings

(a) Merit Cutoff



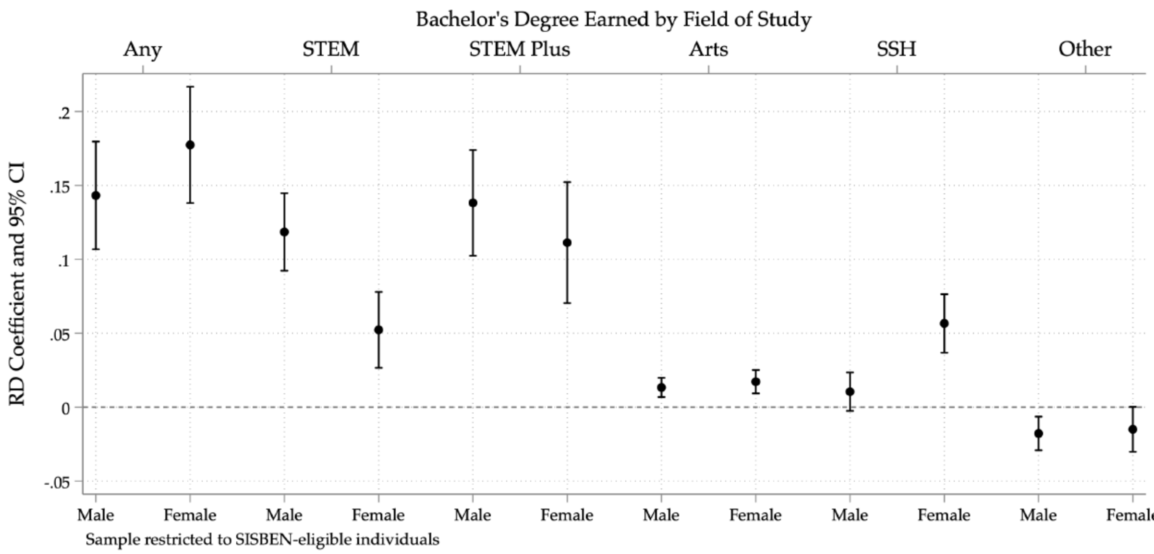
(b) Need Cutoff



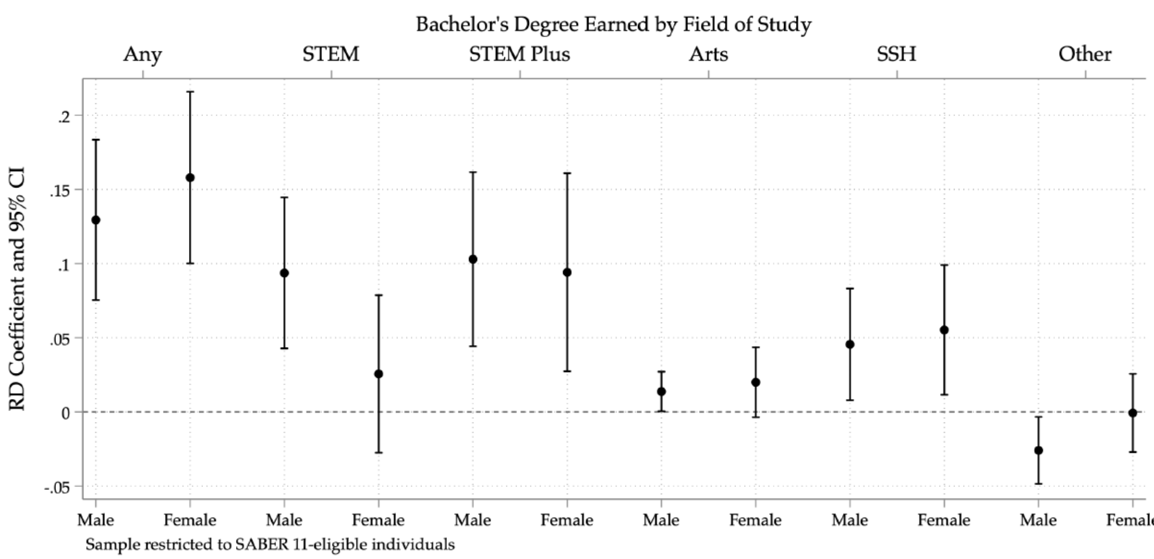
Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on formal earnings eight years from high school completion. Earnings are expressed in multiples of the monthly minimum wage and include zeros for individuals without formal employment. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and PILA (MinSalud).

Figure C.6: Heterogeneous Effects in Earning a B.A. by Gender and Field of Study

(a) Merit Cutoff



(b) Need Cutoff



Notes: The figures plot the reduced-form RD coefficient and 95% confidence intervals on the likelihood of earning a bachelor's degree (proxied by taking the SABER PRO exam) within seven years from high school completion by field of study and sex. Panel A uses the SABER 11 test score as the running variable, restricting the sample to need-eligible students. Panel B uses the SISBEN wealth index as the running variable, restricting the sample to merit-eligible students.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), and SABER PRO (ICFES).

Appendix D Approximating College "Value Added"

This section describes how we approximate college graduation, learning, and earning "value added." Our first objective is to estimate the "value added" by colleges in terms of graduating students from their programs, giving them knowledge and skills, and increasing students' success in the labor market. Having estimated these college and program-specific productivities, we then use these measures as our outcomes of interest using an RD approach.

We use student-level data from fall 2012 and 2013 test takers to estimate the fixed effects. These cohorts graduated from high school before Colombia introduced SPP. Since we are interested in their outcomes realized within seven or eight years from high school completion, the outcomes will be realized by 2019 to 2021 for these cohorts.

We predict the fixed effects from the following individual-level regression:

$$y_{i,t} = \alpha + \mathbf{X_i}'\Gamma + \delta_{j(i,t)} + \epsilon_{i,t} \tag{3}$$

where $y_{i,t}$ is the outcome for individual i taking the SABER 11 exam in semester t, $\mathbf{X}$ is a vector of baseline covariates, $\delta_{j(i,t)}$ are the college fixed effects based on the first institution attended, and $\epsilon_{i,t}$ is a student-specific error term.

We focus on five main outcomes: (1) any degree attainment, proxied by an indicator for taking the SABER PRO or SABER T&T exams, (2) bachelor's degree attainment, proxied by an indicator for taking the SABER PRO exam, (3) the SABER PRO test score, (4) formal employment, and (5) formal monthly earnings, measured in multiples of the monthly minimum wage.

Our empirical specification includes relevant student demographic information related to these outcomes of interest and selection into specific colleges, majors, and programs. When estimating the model at the college level, we drop students attending colleges with fewer than 50 students. This leaves us with 288 colleges. However, prospective students apply to specific college-program pairs from the moment they first apply for access to higher education in Colombia, and programs vary significantly in their selectivity. For this reason, we estimate the "value-added" contributions by more granular cells to account for within-college variation across programs:

1. There are eight study areas (*áreas del conocimiento*) according to SNIES: agriculture and veterinary, arts, education, health, social sciences and humanities, economics and business, engineering and architecture, and math and natural sciences. Following Ferreyra et al. (2020), we drop cells with fewer than 10 students. This leaves us with 1,145 college-field cells.

2. There are 55 study majors (*núcleos básicos del conocimiento*) according to SNIES, e.g.,

economics. Following Ferreyra et al. (2020), we drop cells with fewer than 10 students. This leaves us with 2,653 college-major cells.

3. There are many more study programs, which is the level at which most students apply to college. Following Ferreyra et al. (2020), we drop cells with fewer than 10 students. This leaves us with 4,688 college-program cells.

Thus, we estimate four models replacing the college fixed effect $\delta_{j(i,t)}$ in Specification (3) with a college-field fixed effect $\delta_{j(i,t)f(i,t)}$, a college-major fixed effect $\delta_{j(i,t)m(i,t)}$ or a college-program fixed effect $\delta_{j(i,t)p(i,t)}$.

In addition, we examine how the estimated fixed effects for these three models vary when progressively including a denser set of baseline covariates controlling for differential peer cohort qualities to obtain "value-added" college contributions purged of cohort effects:

- **Model A** controls for individual and household characteristics; specifically, students' age and SABER 11 score (using third-degree polynomials), sex, whether he or she self-identifies as an ethnic minority, household size, socioeconomic stratum, SISBEN score, parental educational attainment, an indicator for the semester in which the student took the SABER 11 exam, and third-degree polynomials of distance to the college. These variables enable controlling for selection bias due to students' choices of colleges, fields, majors, and programs.

- **Model B** adds dummies for high school schedules, private institutions, and being located in an urban area.

- **Model C** includes the high school-by-cohort leave-one-out mean socioeconomic stratum, SABER 11 test scores, and parental education.

- **Model D** adds the leave-one-out average SABER 11 score of the entering cohort in the college (or college-field, college-major, or college-program), which controls for a big part of the selection into colleges (Melguizo et al., 2017).

- **Model E** adds the leave-one-out mean socioeconomic strata and parental education of the cohort in the college (or college-field, college-major, or college-program), as students' outcomes might be influenced by the socioeconomic characteristics of their peers.

- **Model F** includes the leave-one-out mean SISBEN score of the cohort in the college (or college-field, college-major, or college-program).

We begin by examining the impact of including baseline covariates on the estimated college fixed effects, using bachelor's degree attainment as an example. To focus on students who have the opportunity to graduate from four- or five-year undergraduate programs, we exclude those who do not access any such program within six years of high school. Figure D.1 compares the distributions of college fixed effects estimated using Models A through F, while Table D.1 displays the means by college type. A naive model that does not control for $\mathbf{X}$ suggests that HQ *private* colleges have the highest graduation "value added." However, this finding can be attributed to the fact that these institutions admit students with exceptionally high test scores and privileged socioeconomic backgrounds, who are generally less likely to drop out. When we account for observable differences in Model A, such as baseline test scores and socioeconomic and demographic characteristics, the graduation "value added" for HQ colleges decreases, indicating significant sorting of students across programs and college types. Furthermore, Models B through F include a more comprehensive set of baseline covariates, resulting in further reductions in the "value added" of HQ colleges. This indicates that a significant portion of the graduation effect is explained by differences in individual, household, high school, and peer qualities across college-program combinations. Our preferred model, Model F, controls for the fullest set of baseline characteristics. According to this model, LQ *private* colleges exhibit the highest graduation "value added," while HQ *public* colleges demonstrate the lowest. Overall, these findings highlight the importance of accounting for baseline covariates when estimating college fixed effects and reveal the nuanced factors that contribute to graduation "value added" across different college types.

Figure D.2 presents a comparison of fixed effects for Model F, focusing on different levels of granularity: colleges, college-field pairs, college-major pairs, and college-program pairs. By analyzing more specific cells, we can observe how the spread in graduation "value added" across college types decreases. This is because students choose specific programs, and colleges vary in their selectivity across different fields, majors, and programs. Among these levels of analysis, our preferred unit is the college-program pair. This is the level at which most prospective students apply for access to higher education. Examining fixed effects at this level allows us to gain valuable insights into the factors influencing graduation "value added" and understand the variations across different college-program pairs.

Table D.1 provides a comparison of the college-program fixed effects for various outcomes and different models that control for different levels of baseline covariates. The table reveals three main findings. Firstly, after adjusting for entry test scores, the coefficients on learning "value added" are relatively stable across models.[31]Furthermore, HQ colleges demonstrate strong performance in imparting knowledge and skills, with HQ *private* institutions exhibiting the highest "value added" in this aspect. Secondly, when it comes to employment outcomes, *private* colleges, both HQ and LQ, outperform public colleges. Interestingly, HQ *public*

[31] Indeed, conditioning the sample to students close to graduation gets rid of a major source of selection of students by ability and SES.

institutions exhibit the lowest employment "value added." Thirdly, HQ *private* colleges demonstrate the highest "value added" in terms of earnings, with a "value added" twice as large as that of LQ *private* colleges. Conversely, HQ *public* colleges display the lowest "value added" in terms of earnings compared to all other types of colleges, after accounting for selection across programs and the qualities of peer cohorts. Interestingly, the table also reveals that many colleges and programs have a negative "value added" for employment and earnings. This implies that students' labor market outcomes eight years after high school would have been better if they had not attended any college.

Table D.2 presents the reduced-form RD coefficients for various educational and labor market outcomes, along with the estimates based on the college-program "value added." Figures D.3 to D.7 visualize these effects using Model F. It is important to note that the college-program fixed effects are estimated using pre-policy cohorts (2012 and 2013), while the RD sample consists of the post-policy cohort (2014).

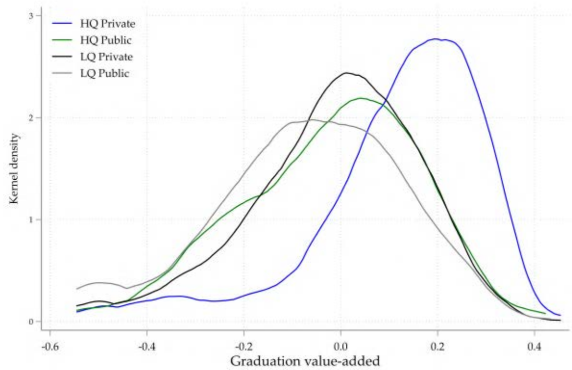
There are three key findings. Firstly, the shift in financial aid from short-cycle programs to bachelor's programs, which are more challenging to complete, would have been expected to result in reduced degree attainment and only a slight increase in bachelor's degree attainment. (The predicted impact is twice as large for students near the need cutoff compared to those near the test score cutoff, as the former switched away from HQ public colleges with lower graduation "value added.") Surprisingly, financial aid significantly increased the likelihood of graduating from these programs. This suggests that the attainment gains are not driven by the specific college-program combinations chosen by students but may be influenced by the strong graduation incentives of the SPP program.

Secondly, financial aid influenced students to opt for college-program combinations with higher learning "value added." The effect is notably larger for students near the test score cutoff, as they were more inclined to attend LQ colleges, which exhibit lower learning "value added" according to Table D.1. However, the predicted effect exceeds the observed impact of financial aid at both cutoffs, indicating that financial aid encouraged some students who might have dropped out to successfully graduate.

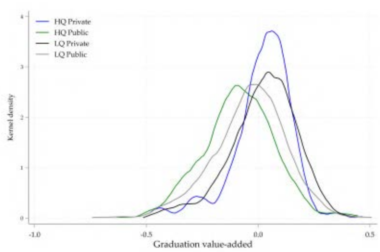
Thirdly, financial aid directed students toward colleges with higher earnings "value added," although the effects are approximately half the size of the observed effects. This implies that the gains experienced by financial aid recipients surpass the average returns associated with the college-program combinations they choose to attend.

Figure D.1: The Distribution of College Fixed Effects for Four-Year Degree Attainment By Baseline Controls

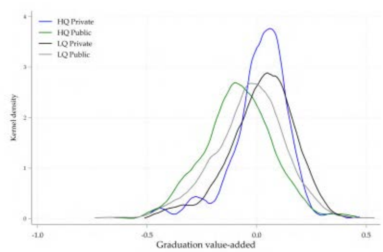
(a) No controls



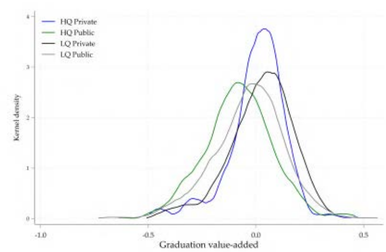
(b) Model A



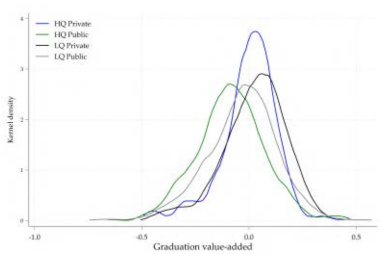
(c) Model B



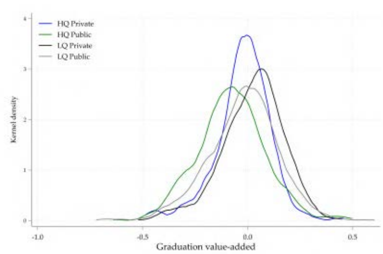
(d) Model C



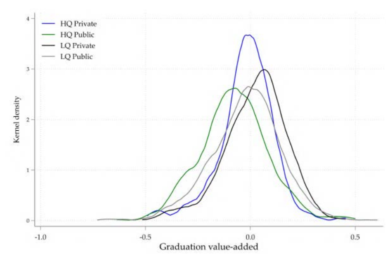
(e) Model D



(f) Model E



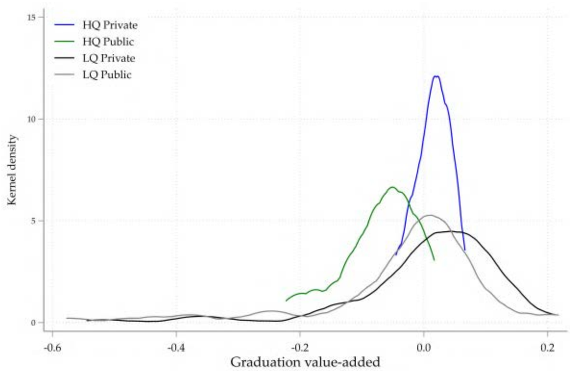
(g) Model F



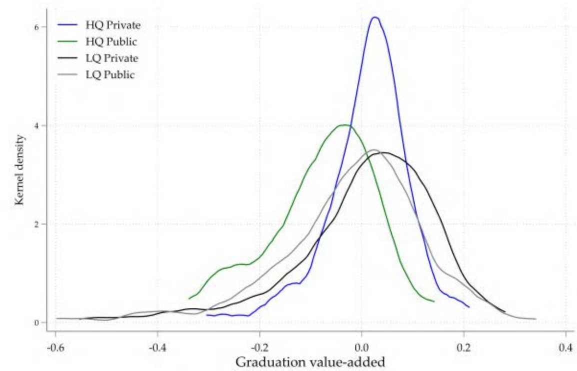
Notes: The figure plots the distribution of college-program fixed effects $\hat{\delta}_{j(i,t)p(i,t)}$ estimated using Specification (1), where the outcome variable is the likelihood of taking a SABER PRO exam within seven years from high school completion. The fixed effects are plotted separately by college type, and models A through F progressively add baseline covariates. The sample is restricted to students who ever attended a four- or five-year undergraduate program within six years from high school completion. Table D.1 reports the mean fixed effects by college type.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure D.2: Graduation Productivities of Colleges, Fields, Majors, and Programs

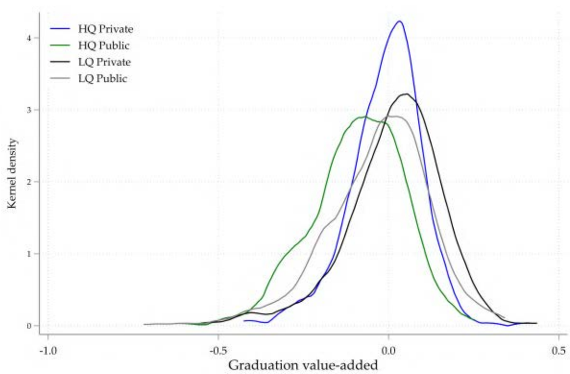
(a) College Fixed Effects



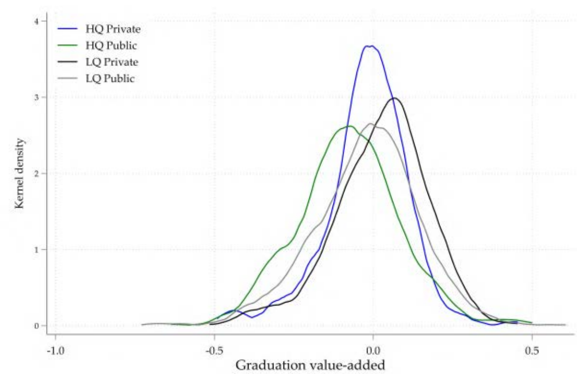
(b) College-Field Fixed Effect



(c) College-Major Fixed Effect



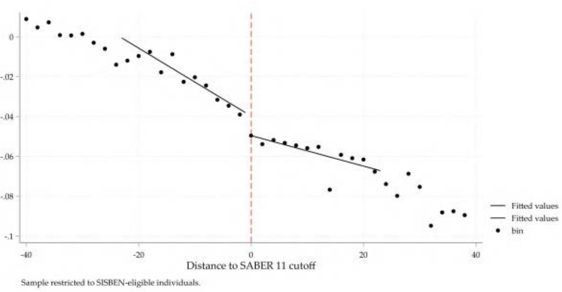
(d) College-Program Fixed Effect



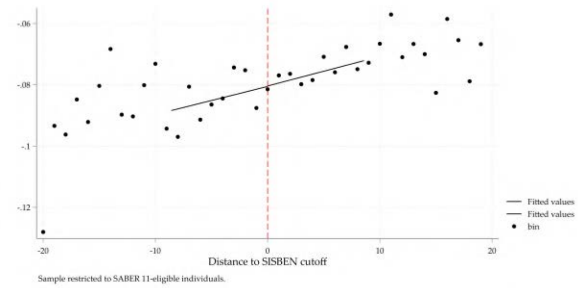
Notes: The figure plots the distribution of college, college-field, college-major, and college-program fixed effects estimated using Specification (1) and Model F where the outcome variable is the likelihood of taking a SABER PRO exam within seven years from high school completion. The fixed effects are plotted separately by college type.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure D.3: Financial Aid’s Impact on College-Program Graduation "Value Added"

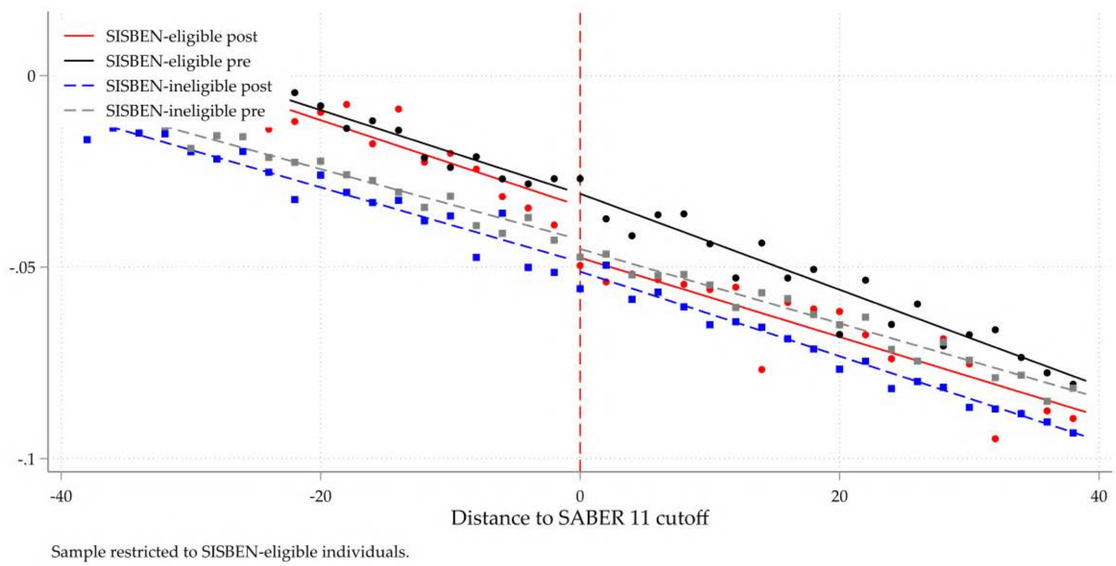
(a) Merit Cutoff



(b) Need Cutoff



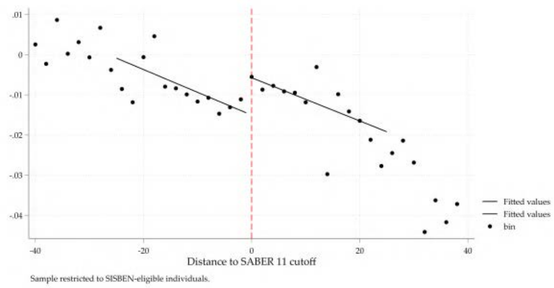
(c) Impacts on Equity



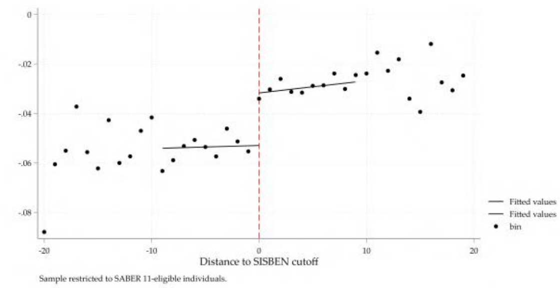
Notes: The figures presented depict the average college-program fixed effect based on Model F for any degree completion (measured by taking the SABER PRO and SABER T&T exams) within seven years after completing high school. Panels A and B plot this outcome based on the proximity to the test score and need cutoff, respectively. The results are summarized in Column (2) of Table VI. Panel C compares the series from Panel A (highlighted in red) and a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively.
Sources: Authors’ calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER T&T (ICFES), and SABER PRO (ICFES).

Figure D.4: Financial Aid's Impact on College-Program Bachelor's Graduation "Value Added"

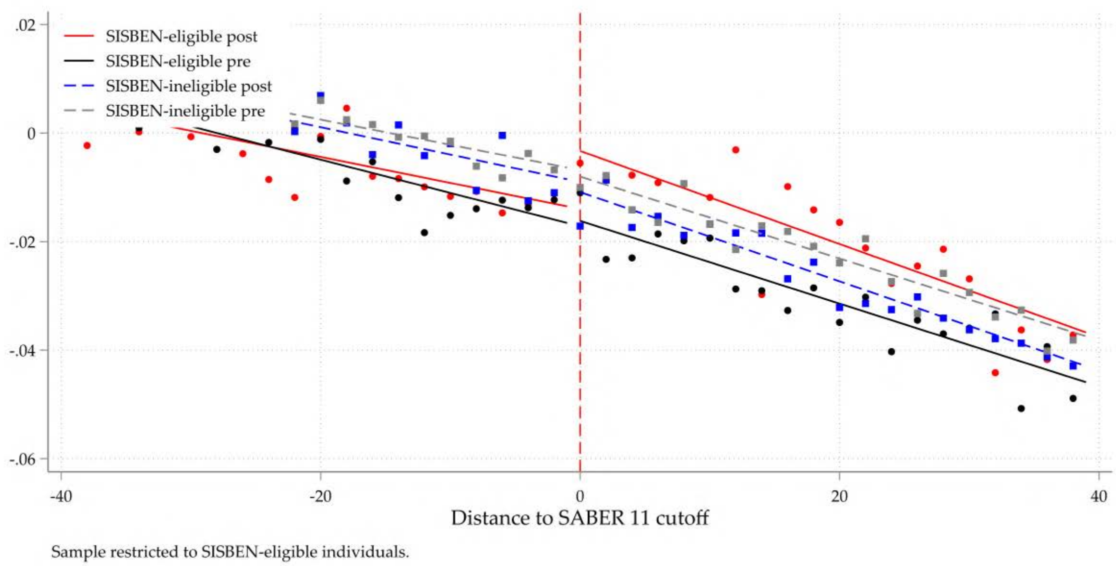
(a) Merit Cutoff



(b) Need Cutoff



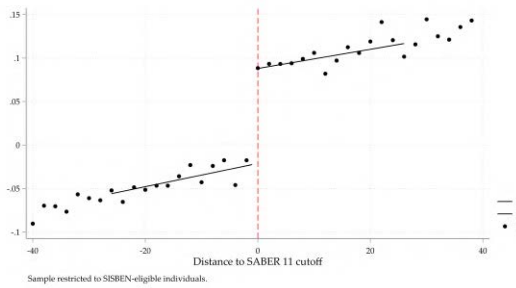
(c) Impacts on Equity



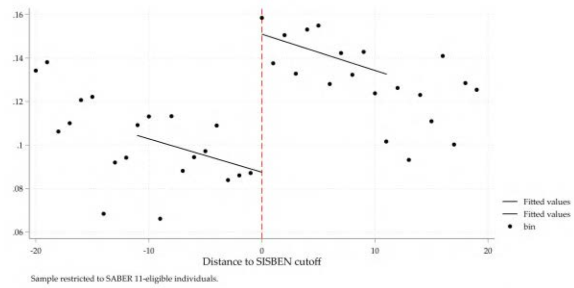
Notes: The figures presented depict the average college-program fixed effect based on Model F for bachelor's degree completion (measured by taking the SABER PRO and SABER T&T exams) within seven years after completing high school. Panels A and B plot this outcome based on the proximity to the test score and need cutoff, respectively. The results are summarized in Column (4) of Table VI. Panel C compares the series from Panel A (highlighted in red) and a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure D.5: Financial Aid's Impact on College-Program Learning "Value Added"

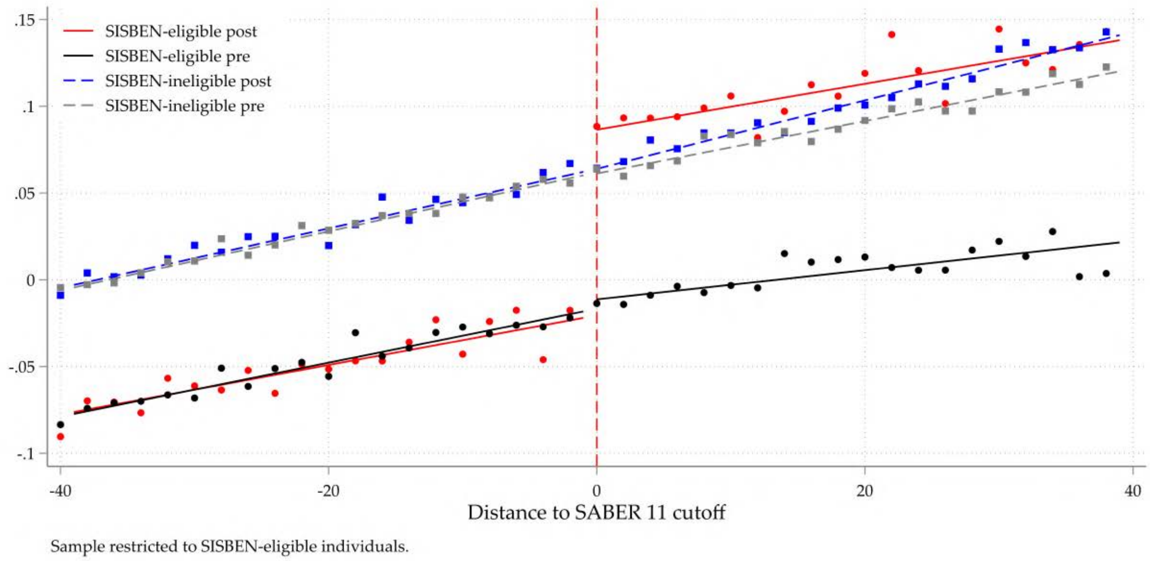
(a) Merit Cutoff



(b) Need Cutoff



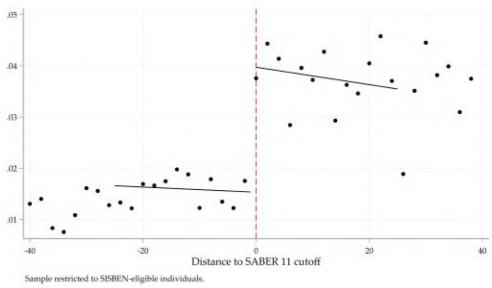
(c) Impacts on Equity



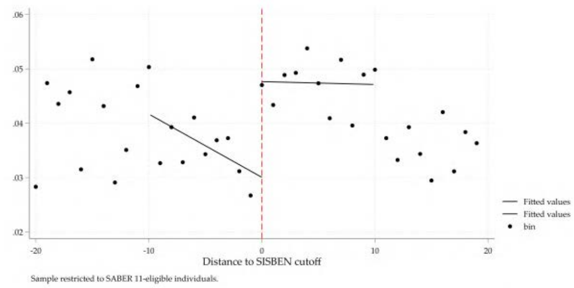
Notes: The figures presented depict the average college-program fixed effect based on Model F for SABER PRO scores within seven years after completing high school. Panels A and B plot this outcome based on the proximity to the test score and need cutoff, respectively. The results are summarized in Column (6) of Table VI. Panel C compares the series from Panel A (highlighted in red) and a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and SABER PRO (ICFES).

Figure D.6: Financial Aid's Impact on College-Program Employment "Value Added"

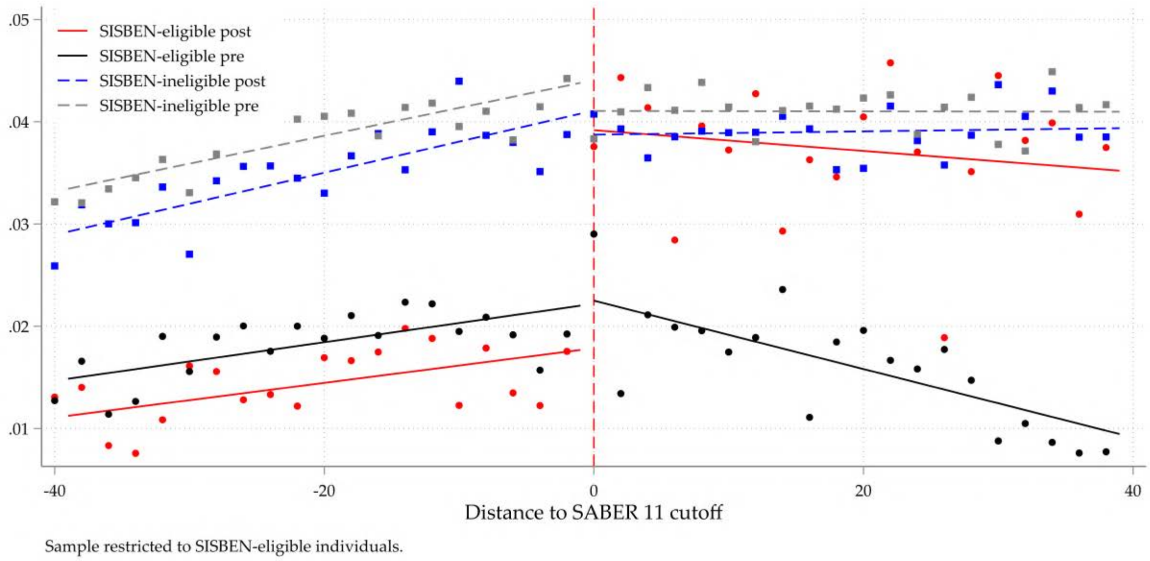
(a) Merit Cutoff



(b) Need Cutoff



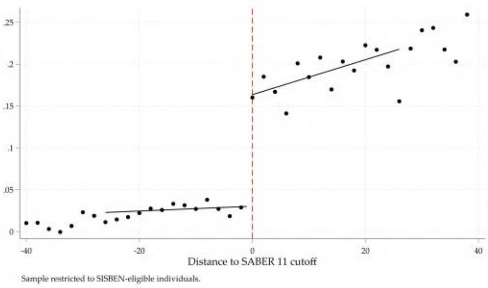
(c) Impacts on Equity



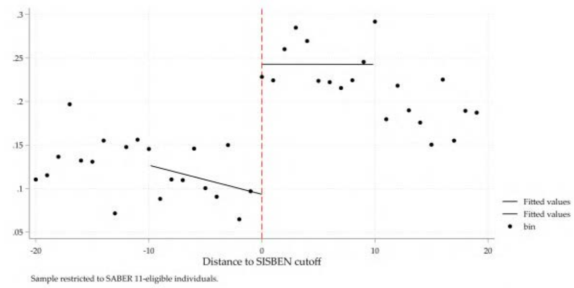
Notes: The figures presented depict the average college-program fixed effect based on Model F for formal employment eight years after completing high school. Panels A and B plot this outcome based on the proximity to the test score and need cutoff, respectively. The results are summarized in Column (6) of Table VI. Panel C compares the series from Panel A (highlighted in red) and a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and PILA (MinSalud).

Figure D.7: Financial Aid's Impact on College-Program Earnings "Value Added"

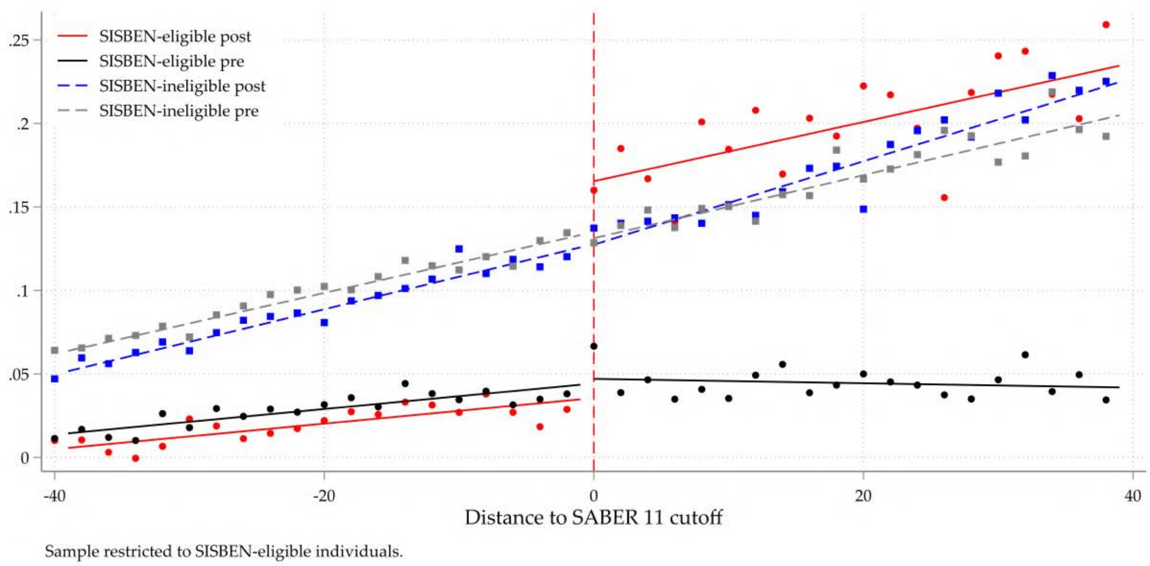
(a) Merit Cutoff



(b) Need Cutoff



(c) Impacts on Equity



Notes: The figures presented depict the average college-program fixed effect based on Model F for formal monthly earnings eight years after completing high school. Panels A and B plot this outcome based on the proximity to the test score and need cutoff, respectively. The results are summarized in Column (6) of Table VI. Panel C compares the series from Panel A (highlighted in red) and a placebo series of SISBEN-eligible students from 2012 and 2013, which predates the expansion of financial aid (represented in black). Additionally, pre- and post-policy outcomes for SISBEN-ineligible students are displayed in gray and blue, respectively.
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), and PILA (MinSalud).

Table D.1: Average College-Program Fixed Effects by College Type

	HQ		LQ	
	Private	Public	Private	Public
	(1)	(2)	(3)	(4)
Any degree attainment				
No controls	0.110	-0.027	-0.029	0.008
A	0.000	-0.086	-0.029	0.043
B	-0.004	-0.087	-0.030	0.045
C	-0.020	-0.084	-0.030	0.047
D	-0.025	-0.088	-0.030	0.049
E	-0.065	-0.086	-0.036	0.061
F	-0.056	-0.087	-0.033	0.058
Bachelor's degree attainment				
No controls	0.158	-0.014	-0.002	-0.067
A	0.044	-0.093	0.031	-0.030
B	0.038	-0.093	0.031	-0.027
C	0.026	-0.089	0.031	-0.024
D	0.022	-0.093	0.033	-0.023
E	-0.003	-0.087	0.032	-0.011
F	-0.001	-0.089	0.032	-0.012
SABER PRO score				
No controls	0.441	0.393	-0.270	-0.226
A	0.139	0.079	-0.048	-0.080
B	0.139	0.079	-0.048	-0.080
C	0.142	0.077	-0.049	-0.082
D	0.148	0.084	-0.053	-0.085
E	0.176	0.071	-0.057	-0.103
F	0.180	0.070	-0.056	-0.108
Employment				
No controls	0.175	0.016	0.107	0.059
A	0.096	-0.039	0.088	0.072
B	0.094	-0.040	0.086	0.070
C	0.077	-0.045	0.083	0.066
D	0.081	-0.042	0.084	0.066
E	0.046	-0.050	0.068	0.064
F	0.074	-0.044	0.081	0.063
Earnings				
No controls	0.669	0.149	0.217	0.078
A	0.409	-0.046	0.180	0.102
B	0.406	-0.049	0.176	0.099
C	0.379	-0.056	0.171	0.094
D	0.389	-0.047	0.173	0.095
E	0.311	-0.064	0.139	0.092
F	0.358	-0.057	0.159	0.088

Notes: This table presents the average college-by-program fixed effects by college type for different educational and labor market outcomes estimated using Specification (3).
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), SABER T&T (ICFES), and PILA (MinSalud).

Table D.2: The Impact of Financial Aid on the College-Program "Value Added"

	Running variable					
	Panel A: SABER 11			**Panel B:** SISBEN		
	Coef.	SE	N	Coef.	SE	N
	(1)	(2)	(3)	(4)	(5)	(6)
Any degree attainment	0.032	(0.013)	130,376	0.079	(0.026)	19,471
Attainment VA: No controls	0.064	(0.004)	130,376	0.059	(0.008)	19,471
Attainment VA: A	0.020	(0.004)	130,376	0.030	(0.007)	19,471
Attainment VA: B	0.017	(0.004)	130,376	0.028	(0.007)	19,471
Attainment VA: C	0.009	(0.004)	130,376	0.018	(0.007)	19,471
Attainment VA: D	0.007	(0.004)	130,376	0.017	(0.007)	19,471
Attainment VA: E	-0.015	(0.004)	130,376	-0.002	(0.007)	19,471
Attainment VA: F	-0.010	(0.004)	130,376	0.002	(0.007)	19,471
Bachelor's degree attainment	0.062	(0.016)	68,416	0.082	(0.023)	17,605
Bachelor's VA: No controls	0.078	(0.005)	68,416	0.065	(0.008)	17,605
Bachelor's VA: A	0.036	(0.004)	68,416	0.045	(0.006)	17,605
Bachelor's VA: B	0.032	(0.004)	68,416	0.042	(0.006)	17,605
Bachelor's VA: C	0.026	(0.004)	68,416	0.034	(0.006)	17,605
Bachelor's VA: D	0.025	(0.004)	68,416	0.033	(0.006)	17,605
Bachelor's VA: E	0.008	(0.004)	68,416	0.020	(0.006)	17,605
Bachelor's VA: F	0.009	(0.004)	68,416	0.021	(0.006)	17,605
SABER PRO score	0.054	(0.019)	35,493	0.021	(0.033)	12,488
SABER PRO score VA: No controls	0.200	(0.014)	35,374	0.085	(0.026)	12,466
SABER PRO score VA: A	0.081	(0.006)	35,374	0.042	(0.010)	12,466
SABER PRO score VA: B	0.080	(0.006)	35,374	0.041	(0.010)	12,466
SABER PRO score VA: C	0.081	(0.006)	35,374	0.045	(0.010)	12,466
SABER PRO score VA: D	0.084	(0.006)	35,374	0.046	(0.010)	12,466
SABER PRO score VA: E	0.103	(0.006)	35,374	0.062	(0.010)	12,466
SABER PRO score VA: F	0.108	(0.007)	35,374	0.064	(0.011)	12,466
Employment	0.044	(0.013)	284,782	-0.004	(0.025)	21,219
Employment VA: No controls	0.065	(0.004)	284,782	0.044	(0.007)	21,219
Employment VA: A	0.034	(0.003)	284,782	0.026	(0.006)	21,219
Employment VA: B	0.034	(0.003)	284,782	0.026	(0.006)	21,219
Employment VA: C	0.026	(0.003)	284,782	0.019	(0.006)	21,219
Employment VA: D	0.028	(0.003)	284,782	0.020	(0.006)	21,219
Employment VA: E	0.012	(0.003)	284,782	0.007	(0.006)	21,219
Employment VA: F	0.025	(0.003)	284,782	0.017	(0.006)	21,219
Earnings (in min wage)	0.223	(0.036)	284,782	0.226	(0.083)	21,219
Earnings VA: No controls	0.252	(0.013)	284,782	0.227	(0.029)	21,219
Earnings VA: A	0.160	(0.011)	284,782	0.167	(0.025)	21,219
Earnings VA: B	0.160	(0.011)	284,782	0.167	(0.025)	21,219
Earnings VA: C	0.148	(0.011)	284,782	0.156	(0.024)	21,219
Earnings VA: D	0.151	(0.011)	284,782	0.157	(0.025)	21,219
Earnings VA: E	0.116	(0.011)	284,782	0.127	(0.024)	21,219
Earnings VA: F	0.137	(0.011)	284,782	0.146	(0.024)	21,219

Notes: This table displays the reduced-form RD coefficients for different educational and labor market outcomes, alongside the corresponding estimates based on the college-program "value added."
Sources: Authors' calculations based on SABER 11 (ICFES), SISBEN (DNP), SNIES (MEN), SABER PRO (ICFES), SABER T&T (ICFES), and PILA (MinSalud).