Strategic Decisions Have "Major" Consequences: Gender Differences in College Major Choices*

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Abstract

Does the way students navigate college admissions processes contribute to gender gaps in major choices? We study the major choices of applicants to Colombia's largest public university who marginally miss their intended major's cutoff. We find that, even conditional on intending the same major, women scoring just below the cutoff submit additional, less-preferred majors compared to similar men. While women enroll sooner into these less-preferred majors, men instead reapply for admission. As a result, a gender gap in potential earnings of 4.9% emerges at the cutoff. Our findings highlight that differential responses to just failing to qualify for one's intended major can influence enrolled majors and earnings potential.

JEL classification: D81, I21, I23, I25, J16, J31

Keywords: college majors, gender, admissions cutoffs

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1 Introduction

The choice of a college major is highly consequential and can potentially impact future earnings to a similar extent as the decision to enroll in college itself (Kirkebøen et al., 2016; Bleemer and Mehta, 2022). One of the key findings in the college major choice literature is that women tend to choose different majors than men, contributing to the gender pay gap among highly educated workers (Black et al., 2008). Explanations focus largely on demand factors such as expected earnings (e.g., Wiswall and Zafar, 2015) and preferences for non-pecuniary factors (Zafar, 2013; Ahn et al., 2019; Patnaik et al., 2020),[1] though supply-side factors like admissions processes (Patnaik et al., 2020; Arenas and Calsamiglia, 2025) and tuition pricing (Stange, 2015) have also been linked to gender differences.

Among supply-side factors, institutional constraints such as major restrictions have been shown to divert students from their intended fields: Bleemer and Mehta (2021) find that among students who intend the same major, restrictions disproportionately divert under-represented minority students toward less lucrative fields. Admissions cutoffs may similarly elicit different responses from men and women. Evidence from other contexts shows that women are less likely to persist after narrowly failing admission to a graduate program (Landaud and Maurin, 2025) or to major in economics after obtaining a grade below A (Avilova and Goldin, 2018).[2] Yet, we lack direct evidence on whether capacity constraints and admissions cutoffs systematically generate gender gaps in realized majors.

This paper investigates how men and women differ in the college majors they enroll in after narrowly missing the admissions cutoff for their intended program. Comparing men and women who initially intend the same major, we find that a gender gap in college ma-

[1] Other demand-side factors involve ability (Paglin and Rufolo, 1990; Turner and Bowen, 1999), peer composition (Landaud et al., 2020; Brenøe and Zölitz, 2020; Calkins et al., 2023), taste for competition (Buser et al., 2014), and perceived comparative advantage across different academic subjects (Breda and Napp, 2019; Card and Payne, 2021).

[2] Gender gaps in persistence have also been documented in other domains: after failing to advance in competition (Ellison and Swanson, 2018; Buser and Yuan, 2019), exiting competitive environments at a faster rate (Hogarth, Karelaia, and Trujillo, 2012), after losing an election (Wasserman, 2022), and after receiving ego-relevant feedback (Kogelnik, 2022).

jor choices emerges among applicants who marginally miss their intended major's cutoff. Women enroll sooner in majors that have lower earnings potential, while men are more likely to reapply and enroll in majors with similar potential earnings relative to their intended major. These findings show that gender differences in navigating admissions processes contribute to gaps in realized majors and, in turn, to the gender pay gap.

Our setting is the admission process at Universidad Nacional, Colombia's largest public university. The university is capacity constrained due to a small number of slots available per major, and a much larger pool of applicants competing for the slots. We observe each applicant's stated intended major, the cutoff score for each major, and the major in which the applicant ultimately enrolls. Our identification strategy leverages the fact that scoring just below or just above the intended-major-specific cutoff is as good as random.

This context offers three features crucial for our analysis. First, admission is determined solely by exam performance rather than subjective qualifications.[3] Second, our data record both applicants' unconstrained intended majors and their realized enrollments, allowing us to distinguish true preferences from revealed choices under constraints. Third, we can track applicants over multiple admission cycles and across all higher-education institutions in Colombia, enabling us to capture both reapplications to Universidad Nacional and alternative enrollments elsewhere.

We report regression discontinuity (RD) estimates separately by gender and then pool all applicants to estimate the "RD gender gap," or the discontinuity in the gender gap at the cutoff controlling for applicants' intended major and the set of majors available to choose from.

Our first result is that being just below the cutoff reduces enrollment at U. Nacional by 17.1 percentage points (pp) for marginal women and 40.3 pp for marginal men. Because

[3]Universidad Nacional uses a Serial Dictatorship allocation mechanism with a truncated choice list and sequential slot assignment where only the score in the university-specific college entrance exam is used for admission. This mechanism is not strategy-proof (Haeringer and Klijn, 2009). According to the international survey of admission systems by Immorlica, Leshno, Lo, and Lucier (2020), several features of this process—such as decentralized implementation and restricted choice lists—are common in tertiary admission systems worldwide.

applicants who miss their intended major's cutoff can only enroll at U. Nacional in a less-preferred field, this generates an RD gender gap in enrollment in less-preferred majors of 15.7 pp, about one-fifth of the enrollment rate among men scoring above the threshold. This finding is striking given that applicants may retake the college entrance exam (CEE) to U. Nacional up to twice per year for a modest fee, and that the slot allocation mechanism imposes steep penalties for failing to attend once enrolled. Yet many marginal women still choose to enroll immediately in less-preferred majors rather than reapply.

Next, we investigate the approaches to the admissions process that could generate the enrollment gender gap at the cutoff. We find that marginal women who do not score high enough to enroll in their intended major navigate the admission process differently than similar men. Marginal female applicants submit more majors for consideration to the slot allocation mechanism and are more likely to be matched with a major in the first admissions cycle than marginal male applicants. On average, the gender gap in the number of majors submitted for consideration increases discontinuously at the cutoff by 0.19 majors, indicating that marginal women submit more majors to be considered for than marginal men who submit 1.54 majors on average.

Third, we match the data from our first observed admission cycle with data from the next three admission cycles. We find that the discontinuity in the enrollment gender gap fades out quickly. We show that marginal men, who were less likely to be enrolled in the first admission cycle, are more likely to reapply for admission. The discontinuity in the enrollment gender gap falls from 15.7 pp in the first admission cycle to 3.8 pp after four admission cycles (two years later). Most of the reduction takes place by the second admissions cycle, about six months later, indicating that marginal men who were not enrolled succeed in their next attempt.

Fourth, a gender gap in potential earnings opens discontinuously at the cutoff. Even though marginal male applicants are more likely to reapply to this university, they are ultimately no more successful than marginal women at being enrolled in their intended

major. However, they sort into majors with similar potential earnings as their original intended major. As a result, marginal women are ultimately enrolled in majors with potential earnings 4.9% lower than marginal men. To obtain this result, we use administrative data on the earnings of recent graduates of each major collected by the Ministry of Education to proxy for potential earnings upon graduation from each major. We find no statistically significant evidence of a gender gap in the potential earnings of applicants with scores just above the cutoff; i.e., those who could enroll in their intended major given their CEE score. Still, a substantial gender gap in potential earnings emerges just below the cutoff, which persists even after controlling for applicants' intended major and their available major choice set.

Taken at face value, the 4.9% gender gap in potential earnings suggests that, *ceteris paribus*, over their working life and working full time, marginal women would earn the equivalent of two fewer years of labor income relative to marginal men.[4] This gender gap may widen with time after graduation (Bertrand et al., 2010; Cortés et al., 2023). In the broader context, the gender pay gap among individuals with post-secondary education in Colombia is 11.8% (National Ministry of Education, 2017). Our results suggest that gender disparities in college major choices, particularly when navigating high-stakes admissions processes, could be a contributing factor to this overall pay gap.

Our heterogeneity analyses show that the results are driven by whether applicants intend majors with predictable or unpredictable cutoffs based on historical cutoff data. While majors differ in how much their cutoffs vary across admission cycles, we find no evidence that women sort into high- or low-cutoff variance majors differentially. However, cutoff predictability shapes how applicants navigate admissions. Marginal women in majors with predictable cutoffs submit more majors and ultimately sort into less-preferred but similarly paid majors at U. Nacional, while marginal women in majors with unpredictable cutoffs are more likely to enroll in lower-paying fields at less selective institutions.

[4]This "back of the envelope" estimate assumes a working life of 40 years and 4.9% lower earnings. 40 years $\times$ -4.9% lower salary $\approx$ 2 years of salary. We cannot extrapolate to inframarginal applicants.

These findings suggest that predictable cutoffs enable women to anticipate falling short and adjust their strategy, whereas unpredictable cutoffs hinder such preventive measures.

Finally, we discuss applicants' decision making in this college admission process as weighing the expected costs and benefits of continuing on in the process versus dropping out and reapplying in a later admissions cycle. We find no evidence that other baseline covariates fully explain our results. We provide suggestive evidence that neither gender differences in discount factors nor outside options likely drive the results. Direct discrimination also cannot explain our findings because it cannot occur in the institutional setting. We cannot directly test whether unobservable differences by gender such as risk aversion explain the gender gap in navigating the admission process. We note that risk aversion and other unobservables are unlikely to change *discontinuously* at the cutoff within gender; however, heterogeneity analysis shows that the predictability of the cutoff seems to be a factor in shaping marginal women's choices and outcomes when marginally failing.

Our study relates to and builds on several areas of literature. First, we build on the descriptive literature documenting gender differences in approaches to college applications. Prior research shows that women tend to "diversify" more than men by including both selective and safe programs (Delaney and Devereux, 2021), applying to lower-ranking universities and reapplying less often (Saygin, 2016), and, in non–strategy-proof mechanisms, ranking less selective colleges first (Wu and Zhong, 2020). We build on this literature by providing causal evidence that such behavior is not universal: diversification arises primarily among marginal women who narrowly miss their intended major's cutoff. By contrast, men and women scoring above the cutoff navigate the process similarly. We, like Saygin (2016) and Landaud and Maurin (2025), find that women are less likely than men to retake the CEE after just failing to meet their intended program's cutoff. In addition, we find that marginal women increase the number of majors they submit compared to marginal men and highlight the role of cutoff unpredictability in gender differences in responses to missing the cutoff.

Second, we build on the school choice literature in the context of non-strategy proof allocation mechanisms. In strategy-proof mechanisms, gender differences in college major choice would simply reflect preference differences, not strategy. But in non–strategy-proof settings, sophisticated applicants who manipulate their rankings obtain better outcomes than sincere ones (Dur, Hammond, and Morrill, 2018). We leverage an unusual feature of our dataset, that it contains applicants' *intended major*, stated before taking the CEE, so that we can control for applicants' intended major directly as stated rather than having to infer applicants' intended major from their subsequent choices. We can then provide new causal evidence that among men and women who truthfully intend the same majors, and therefore would report the same first-choice major in a strategy-proof mechanism, strategically report different majors in a non-strategy-proof allocation mechanism.[5]

Finally, our paper is related to but different from the literature that estimates major specific returns by exploiting field specific assignment threshold rules e.g., (Hastings et al., 2013; Kirkebøen et al., 2016; Heinesen, 2018; Heinesen and Hvid, 2019; Andersen et al., 2020; Daly et al., 2022; Bleemer and Mehta, 2022).[6] We are not estimating gender differences in returns to major but are instead looking at gender differences in navigating the admissions process. A key insight of that literature is that the return from a specific field of study depends on the next best alternative. Our findings suggest that for applicants who fail to qualify for their intended major their next best choice differs by gender reflecting both differences in preference and differences in strategy within a non-strategy-proof mechanism.

[5]Research has shown that strategic behavior can also arise in strategy-proof mechanisms with information asymmetries. For example, when students do not know their priority in the Serial Dictatorship mechanism because they have to submit choices before knowing their exam score (Chen and Pereyra, 2019) or when they do not know the cardinal and ordinal preferences of others in the Boston mechanism (Chen and Sönmez, 2006). In our setting, applicants know their priority but do not know the preferences of others.

[6]Hastings et al. (2013) and Bleemer and Mehta (2022) find that returns to field of study do not differ by gender though Andersen et al. (2020) finds that enrolling in a program with a larger gender gap has no effect on male earnings and reduces female earnings.

2 Background

2.1 Higher education in Colombia and Universidad Nacional

The higher education system in Colombia consists of public and private institutions, with the latter outnumbering the former by a ratio of 2.6.[7] College admissions are decentralized and using exams as part of the admissions criteria is widespread. Universities use the national standardized high school exam (prueba SABER) or their own entrance exam. Public universities subsidize tuition according to the household income of the student. Universidad Nacional de Colombia is the largest and most prestigious public university in Colombia with 9 branch campuses.[8] Our study focuses on applicants to the Bogotá campus, which offers highly sought-after majors such as medicine and attracts nearly 70% of all applicants, according to our tabulations.

2.2 College Entrance Exam (CEE) and Admissions

Universidad Nacional de Colombia has two admission cycles per year. The university gives the CEE in March for admission the following August, and in September for admission the following January. We study the admission process for applicants who took the CEE in September 2019 for admission in January 2020 (2020-1 or first admission cycle henceforth).

Because the university requires no other application materials besides the CEE,[9] we call all CEE takers "applicants." Up to one month before the CEE takes place, applicants pay the exam fee, which is about $25 USD, and register for the exam. Applicants report the branch campus they are applying to and their intended major on the exam registration form. Their intended major is nonbinding as applicants can change their minds and

[7] There are 83 public and 213 private institutions including vocational, and "university foundations" (fundaciones/corporaciones universitarias in Spanish) https://www.universidad.edu.co/ya-va-en-296-el-numero-de-ies-en-colombia/.

[8] Four branch campuses are located in the Andean region (Bogotá, Medellín, Manizales and Palmira), one in Cesar (La Paz) and four National Presence Campuses, located in the Amazon, Orinoco, Tumaco and San Andrés.

[9] Applicants to music majors must also submit examples of their work and for this reason we exclude intended music majors for our study.

submit any available major to the slot allocation mechanism. The intended major is also unconstrained as the student can chose any major the university offers. The reported intended major plays no role in admissions decisions and is collected solely to inform administrators about the relative demand for different fields. After registering for the CEE, the university informs applicants of the time, date and an individually assigned location to take the CEE in person, on paper. All applicants take the same CEE regardless of their intended major. No other university uses this university's CEE score nor has access to the questions in the CEE. Since students have no incentive to lie, we take their intended major reported at the time of registration to be the students' true preference.

The exam lasts 3.5 hours and contains multiple choice questions in mathematics (25 questions), natural sciences (25 questions), social sciences (25 questions), text analysis (25 questions), and image analysis (20 questions), for a total of 120 questions. Students receive no penalty for wrong answers. A scantron machine grades the exam and scores cannot be disputed or revised. Scores can therefore not be manipulated ex-post nor can the grading be affected by direct discrimination. The final score, a sum of all exam components, is standardized with a mean of 500 and a standard deviation of 100. The standardized score ranges from 0 to 1,000 points (see Appendix Figure A.1). The University releases the exam results within two weeks. At that time, applicants learn their individual score for each exam component, their overall score, their score rank compared to all applicants and compared to applicants to the same branch campus, and their admission priority group. The admission priority group gives the order in which applicants can access an online platform to submit majors for consideration by the slot allocation mechanism.

2.3 College Major Choice Submission

The University assigns applicants who score at least 600 points (1 SD above the mean) into four admission priority groups based on their CEE score. This group determines the applicant's level of priority to submit major choices on the University's online platform.

In the Bogotá Campus, applicants in group 1 score at least 700 (2 SDs above the mean); group 2 applicants have scores between 650 and 700, group 3 applicants between 625 and 650, and group 4 applicants between 600 and 625. Each priority group is assigned a 24-hour period to log into the online platform to submit up to two majors indicating their first and second ranked choice.

When applicants log into the online platform, they see the majors with slots available,[10] and know their CEE score and their admission priority group. Applicants *may* know the major-specific cutoff scores from previous admission cycles from published admission statistics. Applicants do not know how many other applicants are in their priority group, which majors other applicants in their group will submit, or which CEE score will be the cutoff score for any of the majors in the current admission cycle.

After seeing their set of available major choices, applicants must decide first whether or not to submit any majors at all. Applicants who submit no majors drop out of the admissions process.[11] Applicants who decide not to drop out of the process may submit up to two majors to be considered for enrollment. Among applicants who submit at least one major, 78% of male applicants and 75% of female applicants submit two majors within the first 24-hour period they can access the platform.

Once the 24-hour period ends, the University closes the online platform and the slot allocation mechanism assigns available slots in each major. We describe the slot allocation mechanism next.

[10] Applicants in priority group 1 see all the majors, but each subsequent priority group only sees the majors available at the beginning of their 24-hour period. The platform does not provide the number of slots left for each major in real time, but instead the list of majors with slots available.

[11] Table 1 shows that 44.4% of applicants assigned a priority group do not submit any majors in the online platform. Nearly 80% of applicants dropping out are in priority groups 3 and 4, when very few majors are left. A minority of applicants in groups 1 and 2 do not submit any majors. These applicants may be studying at another university, seeking a slot at another institution, taking a test prep course, studying to retake the CEE, working or in the military, etc.

2.4 Slot Allocation Mechanism

The University's admissions process aims to assign slots to the applicants with the top CEE scores. The University uses a Serial Dictatorship slot allocation mechanism with a truncated choice list and sequential slot assignment over four stages (one for each priority group). There are 49 total majors offered at the University.[12] Each major has a predetermined number of slots to be assigned. The international survey of tertiary admission systems by Immorlica et al. (2020) shows that these features are not unique to Colombia: out of the 30 systems they document, 11 use decentralized admissions, 4 use truncated or restricted choice lists, and 3 use priority groups or multi-stage sequential implementations. Our setting thus shares key features with admission processes worldwide while also offering unusually rich data. Specifically, we observe both applicants' unconstrained intended majors—recorded before receiving exam scores—and their realized enrollments after the slot allocation process. This allows us to distinguish between true preferences and revealed preferences in a non–strategy-proof mechanism.

Within priority group, the mechanism ranks all applicants from highest to lowest CEE score. Then the mechanism assigns the top scoring applicant their first choice major. Then the mechanism moves on to the next highest scoring applicant. The mechanism assigns that applicant to their first choice major if a slot is still available and, if not, assigns them to their second choice major if a slot is still available. The mechanism moves on to the next highest scoring applicant and so on and so forth. An applicant could be assigned a slot to their second choice major even if a lower scoring student had chosen this major as their first choice. Applicants who are not assigned a slot for their first or second major choice are not enrolled in that 24-hour period.

After the mechanism considers the choices of each applicant in the priority group, the University updates the set of available majors shown to the next priority group in the

[12] In the admission cycle we study, there are 49 available majors, excluding the music majors which have additional admission requirements beyond the CEE.

online platform. If the allocation mechanism does not assign an applicant to a slot, she has the option of logging into the next 24-hour period (i.e., with the next priority group) and submitting up to two new major choices. Alternatively, she can drop out of the current admission cycle. Therefore, it is possible to observe applicants submitting more than two major choices if they decide to submit majors in more than one 24-hour period. However, most applicants do not submit more than once.[13]

Table 1 shows how many applicants per admission priority group submitted 0, 1 and 2 majors in every 24-hour period. Table 2 shows five examples of applicants' choices and whether the applicant would be enrolled in the University or not. Applicants who decide to submit majors with the next priority group will most likely obtain a slot since they will have one of the highest CEE scores within that next priority group. Applicants who are not assigned a slot are not enrolled. Importantly, a slot assignment is not an offer of admission, but automatic enrollment. Enrollees are expected to attend the University the following semester. The University bars students who do not attend from applying again in the following two admission cycles. In addition, the University's rules makes transferring majors once enrolled almost impossible.[14] The admission cycle ends when all slots are filled.

For the 2020-1 cycle, applicants in priority groups 1 and 2 took 74.5% of the slots in the Bogotá Campus and applicants in group 4 only took 225 slots or 7.4%.

2.5 Major-Specific Cutoffs

The CEE score of the applicant taking the *last* slot in every major determines the cutoff for that major. Even though the major-specific cutoffs are determined during the slot allocation process, there is no real-time feedback to applicants on how far they score from their intended major's cutoff. A list of majors and cutoffs is published online by the

[13] Most applicants (92.9%) from groups 1, 2 and 3 who are not enrolled in the first 24-hour period, but could login to the next 24-period, choose not to do so.

[14] Rules specified here: http://www.legal.unal.edu.co/rlunal/home/doc.jsp?d_i=66330#0.

University a few weeks *after* the end of the admissions process. Therefore, the cutoffs from previous admission cycles are publicly available and applicants can check their score against *previous* cycles' cutoffs. Some majors have similar cutoffs over time so lower-historic variance in the cutoff.

Figure A.2 plots a histogram of the variance of 4 previous admission cycles' major-specific cutoffs. The median cutoff variance is 25.21; that is, half of the majors' have a cutoff variance over the last four admission cycles (2016-1 to 2019-1) of only 25 points. Because the cutoff variance is not high for many majors, it may be possible for applicants to predict the 2020-1 cutoff relatively accurately.

3 Data Sources and Sample

We use several sources of data in this paper. We first use administrative records from Universidad Nacional de Colombia of the universe of applicants for the 2020-1 admission cycle. This dataset includes information from every applicant's registration for the CEE, their performance on the exam, and their major choices within the slot allocation mechanism. Most importantly, the registration data includes applicants' reported intended major, a variable rarely in datasets on school or major choice. With this variable, we do not have to infer applicants' intentions from their choices and can identify applicants who just made or just missed the cutoff for *their* intended major. The CEE registration form also asks applicants to report baseline characteristics about themselves, their schooling and their families. We next matched applicants in the first admission cycle (2020-1) to reapplication records from the three subsequent cycles (2020-2, 2021-1 and 2021-2) to look at reapplications. We call this the "Admissions Data."

Next, we link the Admissions Data with publicly available information on each major, specifically the major-specific cutoffs and numbers of slots for every major. This information can be found for every admission cycle since 2007.[15] We also calculate the admissions

[15] Available here: https://admisiones.unal.edu.co/servicios-en-linea/estadisticas-del

rate for each major defined as the number of slots divided by the number of applicants intending that major. We define a major as "highly selective" if its admission rate is in the top quartile for all majors.[16] We also calculate the historical variance in each major's cutoff score as an indication of how well applicants might predict their chances of being accepted to a major given their score. We take the cutoffs from all cycles 2016-2019 and define the major as low-historic-variance if the variance is below the median or high-historic-variance if it is above the median.[17]

We then link the Admissions Data with data from the National Higher Education Information System (abbreviated SNIES in Spanish) available from 2019-2 to 2021-2. The "SNIES Data" contains individuals' attendance histories at all higher education institutions in Colombia. For every attendee, every semester, the SNIES data provides information on the attendee's major name, institution name and institution type (academic or technical). The SNIES allows us to follow applicants to Universidad Nacional who do not enroll there. Of note, while the slot allocation mechanism used by Universidad Nacional enrolls applicants to available majors, *enrollment* in the Admissions Data does not correspond one for one with *attendance* recorded in the SNIES Data. For example, some applicants who secure a slot at Universidad Nacional may decide to attend another university.

Finally, we use aggregated administrative payroll data provided to us from the Ministry of Education Labor Market Observatory for Education data or the "LMOE Data." The payroll data comes from workers who are in the formal sector (i.e., make public pension contributions). For each major, the Ministry provided us the number of 2018 graduates whose 2019 annual earnings fell within ranges. We then calculated the average earnings of recent graduates within each major-institution bin using the midpoints of the range and

`-proceso-de-admision/`. Tables B.1 and B.2 show the cutoffs and number of slots for every major in the admission cycle we study in this paper (2020-1) and the admission cycle one year before the cycle we study (2019-1).

[16] The top quartile has admission rates between 1.4 and 5.6%.

[17] We did not weigh each major by the number of intended applicants. The median variance is 25.2 points, the minimum 0.68 and the maximum 218.7 points.

the number of graduates in each range. We then used the average earnings for each major at each institution as a proxy for the potential expected benefit of that major.

We restrict the sample to applicants to the Bogotá Campus. The Bogotá campus is the largest and most selective of the University's branch campuses. High demand and capacity constraints raises the stakes for applicants taking the exam. Approximately 61,500 applicants took the University's entrance exam in the 2020-1 cycle. 41,613 (about 68%) of those applied to the Bogotá Campus, which had only 3,086 slots available.[18]

4 Econometric Strategy

In the main analyses we use a regression discontinuity design (RD) to estimate the effects of just missing one's intended major cutoff score. The running variable is the applicant's standardized CEE score centered at the cutoff for their intended major, i.e., the major they stated on the registration form before taking the CEE. By construction, the running variable equals zero at the score an applicant would need to take the last slot in her intended major. This institutional feature generates a sharp RD where applicants at or to the right of the cutoff could be enrolled in their intended major should they submit that major to the slot allocation mechanism in the online platform. Marginal applicants with scores below the cutoff would not be enrolled in their intended major should they submit it.

For our main outcomes of interest we present three sets of results: (i) regression discontinuity plots for women, (ii) regression discontinuity plots for men, and (iii) a table presenting the gender gap discontinuity at the cutoff. At the bottom of each regression discontinuity plot, we present RD estimates and robust standard errors using the econometric methods and optimal bandwidth selection from Calonico, Cattaneo, and Titiunik (2014) and Calonico, Cattaneo, Farrell, and Titiunik (2019) (CCFT) without any additional control variables. These methods estimate local linear regressions using a triangular

[18] Authors' tabulation. See Tables B.1 and B.2 for the number of slots per major.

kernel within the optimal bandwidth.

Next we present a table showing the gender gap discontinuity results from the following specification:

$$Y_i = \alpha_0 + \beta_0(\text{Below}_i \times \text{Female}_i) + \beta_1(\text{Below}_i \times \text{Score}_i) + \beta_2(\text{Female}_i \times \text{Score}_i) + \beta_3(\text{Below}_i \times \text{Female}_i \times \text{Score}_i) + \beta_4\text{Below}_i + \beta_5\text{Female}_i + \beta_6\text{Score}_i + \gamma + \delta + \varepsilon_i \quad (1)$$

Y_i indicates the outcome of interest, including whether applicants are enrolled at different time frames and the potential earnings of their enrolled major. $Below_i$ is an indicator for the applicant's score being below the cutoff of her intended major. $Female_i$ is an indicator for being a female applicant. $Score_i$ is the applicant's CEE score centered at the cutoff of her intended major. We also include a set of fixed effects γ for the intended major and δ for the priority group which determines the applicant's major choice set.[19] To answer the question of whether the gender gap in outcome Y_i changes discontinuously at the cutoff, we focus on coefficients β_0 and β_5. The coefficient β_5 provides an estimate of the gender gap above the cutoff and β_0 estimates the discontinuous jump in the gender gap at the cutoff. We report Eicker-Huber-White standard errors.

Finally, we restrict our sample to individuals with CEE scores close to the cutoff with an ad-hoc bandwidth of $+/-$ 59.89 points. This is the optimal bandwidth as chosen by the Calonico et al. (2019) procedure for a primary outcome of interest, enrollment in the 2020-1 admission cycle. Our results are robust to using outcome-specific bandwidths shown in Section 7. Below each table we report the "Mean men above", the average of the outcome of interest among male applicants with a CEE score above the cutoff but within our ad-hoc bandwidth. We use this value to benchmark our results.

[19] Recent work in econometrics shows that in RD designs with multiple cutoffs, having a unit exactly at the cutoff may challenge identification of average treatment effects. Fort, Ichino, Rettore, and Zanella (2022) show that adding cutoff fixed effects (intended major fixed effects in our context) avoids this problem.

4.1 Analytical Sample and Descriptive Statistics

Our final analysis sample includes 4,287 applicants with CEE scores in the ad-hoc bandwidth. 2,861 (66%) submit at least one major to the slot allocation mechanism in the 2020-1 cycle and 1,308 (31%) reapplied at least once. 2,971 (69%) are enrolled in a major at Universidad Nacional within 4 admissions cycles. Finally, 3,988 (93%) are found in the SNIES Data attending a post-secondary education institution.

Appendix Table B.3 shows summary statistics for all 41,613 applicants to the Bogotá campus (Columns 1-3) and for the 4,287 applicants with CEE scores within the ad-hoc bandwidth (Columns 4-6).[20] Applicants in the ad-hoc bandwidth by construction score higher on average compared to all applicants (664 points vs. 500 points). Applicants in the bandwidth are statistically different from applicants overall on many dimensions; for example, they are less likely to be female than all applicants (37% vs. 52%), less likely to be from a low-SES family (39% vs. 54%), more likely to have taken a test prep course (27% vs. 21%) and more likely to have a mother who went to college (51% vs. 34%).

4.2 RD Validity

Applicants scoring just below and above the major-specific cutoffs should be as good as randomly distributed with no manipulation. The validity of the RD design relies on their potential outcomes evolving smoothly across the cutoffs to identify the effect of just missing to qualify for an intended major on subsequent college major choices. We run several tests of the validity of our RD design. First, Appendix Figure A.4 plots the density of the running variable for women and men separately. We test for a discontinuity in the density at the cutoff using the Cattaneo, Jansson, and Ma (2020) method. We fail to reject the null hypothesis of no discontinuity in the density at the cutoff with p-values

[20] Applicants to Universidad Nacional are similar to high school graduates overall. Using data from the Institute for Higher Education (ICFES), we calculate that in 2019, 52% of students graduating from high school were low-SES and 43% middle-SES. Column 1 shows 54% of the applicants to the Bogotá campus are low-SES and 44% to middle-SES. Low-SES students are in "strata 1 and 2" as defined for utilities billing in Colombia, and middle-SES are in strata 3 and 4 as in (Blanco and Dalton, 2019).

of 0.24 (women's scores) and 0.78 (men's scores) suggesting there is no manipulation of the scores to fall right above the cutoffs.

Second, we check that there is no differential selection into our linked dataset. Appendix Table B.4 shows that there is no statistically significant gender gap discontinuity in the match rate across the three datasets we link.

Third, we look at four characteristics of applicants' intended major (whether the major is highly selective, the average earnings of recent major graduates, the previous cycle's 2019-1 cutoff score and whether the major has a historically predictable, low variance cutoff score) and applicants' priority group in Appendix Table B.5. In columns 1-4 the point estimates on the indicator *Female* are small and not statistically significant suggesting that male and female applicants near the cutoffs do not systematically intend different types of majors; in addition, the the point estimates on the interaction term finds no discontinuity *at the cutoff* in the intentions of male and female applicants. While this finding is not surprising since applicants would not have yet taken the CEE when they declare their intentions, it indicates that any differences in the characteristics of *enrolled* majors are not coming from ex-ante differences in the characteristics of *intended* majors. Column 5 indicates that applicants' choice set, as determined by their priority group, also does not vary by gender or discontinuously at the cutoff. For ease of interpretation, in our main analyses we therefore include intended major and priority group fixed effects. Our results are robust to excluding these fixed effects.[21]

Lastly, we present RD plots of baseline characteristics reported on the CEE registration form including: applicants' demographic characteristics (being female, age, single, living in Bogotá, and SES in Appendix Figure A.5), applicants' schooling characteristics (attended public high school, attended an academic high school, months since graduation and whether the applicant took a CEE test prep course in Appendix Figure A.6), and applicants' family characteristics (mother went to college, father went to college, lives with

[21] Results available upon request.

mother, lives with father, and the number of kids the applicant lives with in Appendix Figure A.7). Below each RD plot we show both the RD estimate (labeled "RD estimate") as well as the gender gap discontinuity from eq. 1 (labeled "Gender diff"). We find no evidence of within gender discontinuities or of gender gap discontinuities at the cutoff in any of the 14 covariates. The p-value for a test of joint significance for a gender gap discontinuity in the 13 covariates (excluding female and including indicators for missing values) using specification 1 is 0.89. We conclude that baseline characteristics do not exhibit a gender gap discontinuously at the major-specific cutoffs suggesting that applicants are indeed as good as randomly distributed across the score cutoff.

5 Results

5.1 Male and female applicants navigate the slot allocation mechanism differently

We find that marginal women submit a larger number of major choices to the slot allocation mechanism both in the first 24-hour period and across all 24-hour periods available in the first admission cycle. Table 3 Column 1 shows a discontinuous increase in the gender gap at the cutoff of 0.195 additional major choices submitted in the first 24-hour period and Column 2 shows a discontinuous increase of 0.190 more majors listed across all possible 24-hour periods in the first admissions cycle (also depicted in Figure 1 Panels (a) and (b), respectively). Importantly, these results are robust to the inclusion of both priority group and intended major fixed effects as we would expect applicants in different priority groups to submit different numbers of majors simply because they face shrinking choice sets.[22]

The fact that women seem to react to being just below the cutoff during the first 24-hour period seems puzzling since applicants should not know exactly what the cutoffs will be when they access the online platform in the first 24-hour period. However, ap-

[22]The majority of applicants in priority groups 1 (62%) and 2 (58%) submit two majors, while fewer than half do in groups 3 (34%) and 4 (23%), groups with few majors available. See Table 1.

plicants may know historical cutoffs form previous admission cycles. In Table 8 we split our sample by whether the applicant's intended major has had low-historical (Column 2) or high-historical (Column 3) variance in its admissions score cutoffs.[23] The discontinuous increase in the gender gap in the number of majors submitted to the slot allocation mechanism is driven by applicants who intend majors with historically-low-cutoff variance (point estimates equal to 0.44 for low- and 0.015 for high-variance majors, respectively). Applicants who intend low-variance majors can presumably better predict whether their own CEE score will be above or below the current year's cutoff.

These findings are in line with previous descriptive work that women act to reduce their risk of not being admitted at all (Delaney and Devereux, 2021). In contrast with previous work, we find that "diversifying" choices by submitting a longer list of majors is not a strategy implemented by all women, but primarily by women who intend majors with low-historical-variance cutoff scores and who score below the current year's cutoff. While men do not submit as many majors as women to this university, we cannot rule out the possibility that marginal men apply to more universities as a way of diversifying. Unfortunately, data on applications to all higher education institutions does not exist to test this hypothesis. However, the fact that marginal men are more likely than men just above the cutoff to submit majors in the second 24-hour period suggests that they react to being just below the cutoff but not in anticipation of being below as is the case for marginal women (see Appendix Figure A.8).

Appendix Table B.6 looks at characteristics of the majors that applicants submit to the slot allocation mechanism. We find small and not statistically significant gender gap discontinuities in whether applicants submit their intended major as first or second choice (Columns 1 and 2), whether applicants submit majors with lower entry requirements proxied by the major's cutoff from last year as their first or second choice (Columns 2 and 3) and whether applicants submit majors with more certain entry requirements proxied by

[23] We check the endogeneity of this sub-sample split in Appendix Table B.5 Column 4 and find no gender gap discontinuity in the likelihood of intending a low-historical-variance cutoff major.

the historical variance as their first or second choice (Columns 4 and 5). While noisy, these results suggest that while women submit more majors, among applicants who submit the same number of majors women are no more likely to submit safe options (i.e., majors with much lower cutoffs) compared to men at the cutoff.

5.2 The enrollment gender gap

First, we look at the likelihood of female and male applicants being enrolled in any major during the first 24-hour period available to them. By construction, applicants with scores below the cutoffs cannot enroll in their intended major, but may enroll in another less-preferred major with available slots. Figure 2 shows a statistically significant discontinuous drop in the likelihood of being enrolled in the first 24-hour period for both female (31.3 pp decline) and male (49.9 pp decline) applicants just below their intended major cutoff (Figure 2 Panel (a)). Table 4 Column 1 shows a discontinuous gender gap of 15.7 pp in the likelihood of being enrolled in the first 24-hour period statistically significant at the 1% level.

Second, we look at the likelihood of female and male applicants being enrolled in any major across all 24-hour periods available to them in the slot allocation mechanism (Figure 2 Panel (b) and Table 4 Column 2). Table 4 Column 2 shows, again, a discontinuous 15.7 pp increase in the gender gap at the cutoff statistically significant at the 1% level. These results show that although women are more likely to submit a longer list of majors, the gender gap discontinuity in enrollment is primarily not coming from marginal women logging into the online platform over multiple 24-hour periods, but from women anticipating that their score may be below the cutoff and submitting more majors already in the first 24-hour period, as discussed in the previous subsection.

5.3 The gender gap in enrollment shrinks over time

Next, we look at enrollment over the three following admission cycles over the next year and a half in Table 4 Column 3 and Figure A.9. 91% of male applicants above the cutoff are eventually enrolled after four admissions cycles and there is no statistical difference compared to women who also score above the cutoff. The enrollment gender gap among marginal applicants also closes to 3.8 pp and is no longer statistically significant. Appendix Figure A.10 shows that the enrollment gender gaps between applicants just above and just below the cutoff appears to shrink just one semester (about 6 months) after the first observed admission cycle.

The gender gap in enrollment shrinks over time because men reapply to the University in future admissions cycles. Appendix Table B.7 Column 1 shows that men scoring below the cutoff are 27.7 pp more likely to reapply compared to men scoring above the cutoff. In addition, women scoring below the cutoff are 12.2 pp less likely to reapply compared to men scoring below the cutoff, significant at the 1% level. Landaud and Maurin (2025) also document a gender gap in reapplication, although in France. We complement their findings by showing that instead of reapplying a larger number of times, women submit a larger number of majors the first time.[24]

5.4 Consequences of gender differences in the approach to the admissions process

In this section we examine whether the different approaches in the admissions process by male and female applicants affect the types of majors they ultimately enroll in after four admissions cycles.

First, in Table 5 we look at three mutually exclusive outcomes to see if applicants who miss the cutoff for their intended major in the first admissions cycle ultimately enroll in

[24] Appendix Table B.7 Column 2 limits the sample to re-applicants and suggests that male re-applicants are no more likely than female re-applicants to improve their CEE score; of course, since reapplication itself is an outcome that differs by gender, we interpret this finding with caution.

their intended major, a major in the same field of study but not their intended major, or a major from a different field of study. By definition, in the first admission cycle we observe, marginal applicants cannot enroll into their intended major because they score below the applicant who took the last slot in that major. However, applicants who decide to reapply could potentially get a slot in their intended major in a subsequent admission cycle if their score is above the major-specific cutoff in that cycle. Column 1 of Table 5 shows that 76% of men at or above the cutoff enroll in their intended major after four admission cycles. Women above the cutoff are 9.3 pp less likely to do so, and men below the cutoff are 51.2 percentage points less likely. We find no statistically significant discontinuity in the gender gap at the cutoff. Therefore, our findings suggest that although marginal men are more likely to wait, reapply and enroll in a later admission cycle, they are not more successful than marginal women at enrolling in their intended major.

We investigate which majors applicants ultimately do enroll in if not their intended major in Columns 2-3 of Table 5. Column 2 shows that men who miss the cutoff to their intended major in the first admissions cycle are 23.9 pp more likely to ultimately enroll in a different major in the same field compared to male applicants who do not miss the cutoff. However, in Column 2 the gender gap at the cutoff for this outcome is not statistically significant. Column 3 shows that male applicants who miss their intended major cutoff are 17.4 pp more likely to ultimately enroll in a major in a different field altogether. In Column 3 again the gender-gap at the cutoff for this outcome is not large nor statistically significant.[25]

A key question remains: do the majors marginal women and marginal men ultimately enroll in have substantially different payoffs? To answer this question, we match the Admission Data with the LMOE Data to obtain a proxy for what those payoffs would be. Table 6 and Figure 3 look at the average earnings by recent college graduates from

[25]When looking at broad fields of study (arts, science, health, humanities/social sciences, business/economics/law, and engineering) we do not see clear changes from one field to another (Appendix Table B.8).

the majors that our applicants ultimately enroll in over four admission cycles.[26] We find no statistically significant discontinuity at the cutoff in the potential earnings for men (Figure 3, right panel). However, we find a discontinuity at the cutoff for women (Figure 3, left panel). The RD estimate for female applicants is 0.242 significant at the 1% level, meaning women who score below their intended major cutoff enroll in majors that earn 242,000 pesos less per month. For reference, the monthly minimum salary in Colombia in 2020 was around 900,000 pesos. The 2020 PPP adjusted potential salary penalty is equivalent to US$205 per month relative to a base of about US$1530 per month reported by all men and women above the cutoff.

Table 6 Column 1 shows the potential earnings among applicants who enrolled in the first admission cycle. We find that men below the cutoff who enroll in the first admission cycle have potential earnings that are 163,000 pesos lower than men who score above the cutoff. The interaction coefficient is not significant, indicating a similar jump among women. The gap amounts to 7.6% of the potential earnings of men above the cutoff. Table 6 Column 2 shows the potential earnings among applicants who enrolled after four admissions cycles and finds a gender pay gap emerging at the cutoff equal to 96,000 pesos statistically significant at the 5% level. This gender gap among marginal applicants is equivalent to 4.5% of the potential earnings of men above the cutoff. The estimated discontinuity at the cutoff among men decreases from 163,000 pesos to 69,000 pesos, suggesting that those men who reapply enroll in majors that pay more. Both marginal men and women experience a potential earnings penalty when enrolled in the first admission cycle; for men the penalty decreases after four admission cycles, but less so for women.

[26] We only have earnings data from recent college graduates, which may not reflect the applicant's percentile rank in the earnings distribution later in life (Chetty, Friedman, Saez, Turner, and Yagan, 2020).

5.5 Effects across the higher education system

All the results in Table 6 include priority group and intended major fixed effects, suggesting that gender differences in intended major do not drive the results. However, these results could be driven by differential selection into enrollment at Universidad Nacional. Of the 4,287 applicants whose 2020-1 cycle CEE score falls in our bandwidth, we only observe enrollment at Univerisdad Nacional for 2,971 (69%) after 4 cycles and Table 4 shows differential enrollment by gender.

To address this limitation, we use the Admissions Data linked to the SNIES Data. Because the SNIES Data contains the universe of post-secondary institution attendees, we use it to find applicants whether or not the slot allocation mechanism enrolled them into a major at the Universidad Nacional. We can find 93% of the 4,287 applicants whose CEE score falls near the cutoffs in the SNIES Data and find no differential selection into the SNIES data by gender or at the cutoffs (Table B.4). Table 7 looks at the characteristics of the institution and major that applicants are last recorded attending (i.e., last semester appearing in the SNIES data up to 2021-2). In Colombia there are two types of post-secondary institutions technical institutions that offer vocational programs and universities. In Table 7 we find no gender difference or gender gap discontinuity in the likelihood of last attending any technical school (Column 1) or any university (Column 2).

In Column 3, however, we find that men with scores below their intended major's cutoff for Universidad Nacional in the 2020-1 cycle are −11.4 pp less likely to have last attended an elite university[27] compared to men scoring above the cutoff, but that this discontinuity closes for women with an estimated gender gap discontinuity of +10 pp. In Column 4 we look at whether the applicant last attends Universidad Nacional and find

[27] "Elite" is defined as the top ten Colombian universitites in the Quacquarelli Symonds (QS) 2023 world rankings: Universidad de Los Andes (private), Universidad Nacional (public), Universidad Javeriana (private), Universidad Pontificia Bolivariana (private), Universidad Externado (private), Universidad Icesi (private), Universidad de Antioquia (public), Universidad de la Sabana (private), Universidad del Rosario (private), Universidad Eafit (private).

that the gender differences in last attending an elite university from Column 3 are largely driven by last attending Universidad Nacional, which is an elite university. Both men and women scoring below their cutoff are less likely to be seen attending U. Nacional. but men even more so than women (by 12.4 pp). These results might indicate that women have a stronger preference for elite universities and Universidad Nacional, the only elite university in Bogotá subsidizing tuition, in particular.

In Table 7 Column 5 we look at whether applicants last attend their intended major at any post-secondary institution. We find that men with scores just below the cutoff are 32.9 pp less likely to last be seen attending their intended major. Compared to 70% of men above the cutoff, this estimate represents a 47% drop. Our findings show that men who score below the cutoff in the 2020-1 cycle are no more likely than women who score below the cutoff to ultimately attend their intended major despite reapplying to Universidad Nacional and attending non-elite universities.

The different approaches by marginal men and marginal women who just miss their intended major's cutoff has consequences on the type of major they ultimately attend in the SNIES data. In Table 7 Column 7, the outcome is the potential earnings taken from the administrative payroll LMOE Data for the last major we see the applicant attending at any post-secondary institution in Colombia. We find that *both* men and women who score just above *and* men who score just below their intended major's cutoff at Universidad Nacional ultimately attend majors at a post-secondary institution with similar average earnings, about 2,170,000 pesos. However, women who score below their intended major's cutoff ultimately attend majors with potential earnings 107,000 peso lower which is about 4.9% less than their peers.

Finally, the heterogeneity analysis in Table 8 shows that marginal women intending majors with *low-variance* cutoffs are more likely to attend U. Nacional. By contrast, the earnings penalty is concentrated among marginal women intending *high-variance* majors, who face a monthly earnings loss of about 156,000 pesos. Taken together, these results

suggest that women applying to majors with unpredictable cutoffs neither diversify their applications nor reapply in later cycles, and instead enroll in lower-quality institutions and programs with lower potential earnings.

6 Understanding women's differential major choices

6.1 Gender differences in observable applicant attributes

The differential outcomes for women from this admissions process could be due to differences in observable characteristics of the men and women who just miss their intended major's cutoff score. Recall that the validity of the RD design rests on the assumption that *within gender* applicants who just miss their intended major's cutoff are essentially identical to applicants who just make the cutoff. On either side of the cutoff, differences in observable characteristics *between the two genders* could still account for the estimated differences in outcomes, which we are attributing to gender per se. For example, if more of the women were from high-SES families than the men, it could be that our results reflect differences due to SES rather than differences due to gender itself. In order to probe the hypothesis that observable differences in covariates between men and women rather than gender per se are driving the results, we modify equation 1 to add covariates. Table 9 Column 2 reports the results. In comparison to the baseline results in Column 1, the inclusion of these additional controls attenuates the estimated coefficient on $(Below_i \times Female_i)$ slightly for some outcomes indicating that our main results do not simply reflect differences in covariates.

We perform a similar analysis in Column 3 but interacting the model with the number of months since high school graduation as a proxy for experience applying to university and again see the results are robust to this inclusion.

6.2 Gender differences in expected costs and benefits of major choices

Applicants decide whether to enroll sooner in the current admission cycle or reapply in a later admission cycle based on expected costs and benefits. We are limited with our data in our ability to investigate what factors in this decision matter most. However, with our data we can make some headway and find that while gender differences in outside options do not seem to be at play in our setting, risk aversion, discount factors and second major "back up" choices do seem to differ by gender in our setting and, therefore, could play a role in generating our main findings.

First we test for gender differences in outside options, albeit with imperfect proxies. In Appendix Table B.9, we use the SNIES Data to create indicator variables of whether applicants were already attending university when they applied in the first cycle. Because we do not have data on what all applicants are doing at the time of application, this is a crude proxy for applicants' outside options at the time they begin the admission process. We find that only 8% of men scoring above the cutoffs were already attending university and further find no gender difference or gender gap discontinuity suggesting that applicants in our analysis sample have similar outside options.

Another possibility is that gender differences in risk aversion drive our results (Croson and Gneezy, 2009; Charness and Gneezy, 2012). Theoretical work shows that with higher levels of risk aversion, all else equal, applicants should play less popular majors with higher probabilities of enrollment *and* to submit a longer list of majors to the slot allocation mechanism, because they value the insurance of having a greater number of options to report (Hernandez-Chanto, 2020). While we do not find that marginal female applicants submit safer major choices on average (see Table B.6), we do find they do submit more major choices to the slot allocation mechanism compared to men (see Table 3) which could reflect risk aversion. In addition, when risk aversion is high and the number of majors an applicant is allowed to submit is low, as in our setting, the risk-averse students have a higher probability of being assigned to a less-preferred slot ex-post (Hernandez-Chanto,

2020), which our findings also point to.

Third, gender differences impatience might drive our results if marginal women are more impatient than marginal men to enroll. While we cannot test out this hypothesis directly using our data, we can back out discount factors (β) for both men and women just below the cutoff by rearranging and dropping the expectation and costs in the following equation:

$$w_L \geq \beta E[w_H - costs] \tag{2}$$

We take w_L to be the potential earnings of marginal applicants who enroll in admission cycle 1 (Table 6 Column 1), and w_H to be the potential earnings of marginal applicants who enroll in admission cycles 2 to 4, i.e. those applicants who wait, reapply and enroll. Our back of the envelope calculations do imply that marginal women are more impatient than marginal men with a $\beta \leq 0.91$ for marginal women and $\beta \leq 0.90$ for marginal men.[28] These implied discount factors are similar to the mean discount factors estimated by Patnaik, Venator, Wiswall, and Zafar (2020), which are equal to 0.88 for women and 0.86 for men in a sample of U.S. college students,[29] and suggest no large differences in impatience between marginal men and women.

Finally, if there are gender differences in applicants' first and second majors choices submitted to the slot allocation mechanism, even conditional on their intended major, then a gender gap in potential earnings could emerge mechanically at the cutoff due to the way the slot allocation mechanism works. A gender gap could also arise due to different behavioral responses to just failing to meet the cutoff for the intended major. To see how applicants' first and second majors choices affects the gender gap in potential earnings, we add first and second major choice fixed effects to the base model[30] while also controlling

[28] Using the potential earnings of the last attended major in the SNIES data rather than potential earnings from those who enroll at U. Nacional in cycles 2 to 4 we get $\beta \leq 0.84$ for marginal women and $\beta \leq 0.82$ for marginal men.

[29] Other previous literature in contrast finds boys to be less patient than girls (Bettinger and Slonim, 2007; Castillo et al., 2011).

[30] We include an indicator for missing major choices.

for priority group and intended major. In Table 9 Column 6 we find that after controlling for first and second major choice fixed effects, the gender gap in enrollment falls by half and the point estimate on potential earnings remains largely unchanged. These results suggest that both gender differences in strategy in navigating the application process and gender differences in applicants' second "backup" choice play a role.

7 Robustness Checks

We perform a series of robustness checks on the main outcomes. Appendix Table 9 shows the estimated gender gap discontinuity; that is, the interaction between female and the indicator for being below the intended major cutoff in equation 1 for the main outcomes. Column 1 presents the baseline model. Column 4 uses the larger of the two optimal bandwidths when estimating the RD separately by gender and using the Calonico et al. (2019) procedure. Column 5 excludes applicants who intend to major in medicine, the most sought-after field, to ensure the results are not driven by these applicants, since enrolling in medicine at a private institution is often unaffordable. Our results are robust to these variations in the bandwidth selection or the sample.

Appendix Table B.10 present a series of falsification tests where we estimate the coefficient corresponding to the gender gap below *placebo* cutoffs. For example, Column 2 shows the interaction between female and an indicator for being below a placebo cutoff set 50 points below the actual intended major cutoff. Comparing our baseline estimates from Column 1 to those in Columns 2-5 we see that the estimated impacts come only from being below the actual intended major cutoff.

8 Conclusion

The literature has emphasized factors such as preferences, ability, confidence, competitiveness, risk aversion, and discrimination to explain gender differences in college major choice. We add to this work by showing that gender differences in responses to narrowly failing admissions requirements also shape realized majors. Conditional on ability and intended major, we find that women and men who just miss the cutoff diverge: women tend to enroll sooner in less-preferred, lower-earning majors, while men are more likely to wait and reapply. As a result, a 4.9% gender gap in potential earnings emerges at the margin, even in the absence of explicit discrimination.

Our analysis points to differences in how applicants navigate the admissions process as a central channel. In particular, the gap in potential earnings is driven by marginal women who apply to majors with unpredictable cutoffs. These women neither diversify their applications nor reapply in later cycles, and instead end up in lower-quality institutions and lower-paying majors. By contrast, women who apply to majors with predictable cutoffs are more likely to submit more major and attend U. Nacional.

Taken together, these findings highlight that institutional features of admissions, not just preferences, shape realized majors and earnings. Future research should probe more deeply how cutoff predictability and other forms of uncertainty interact with gender to generate labor market inequality.

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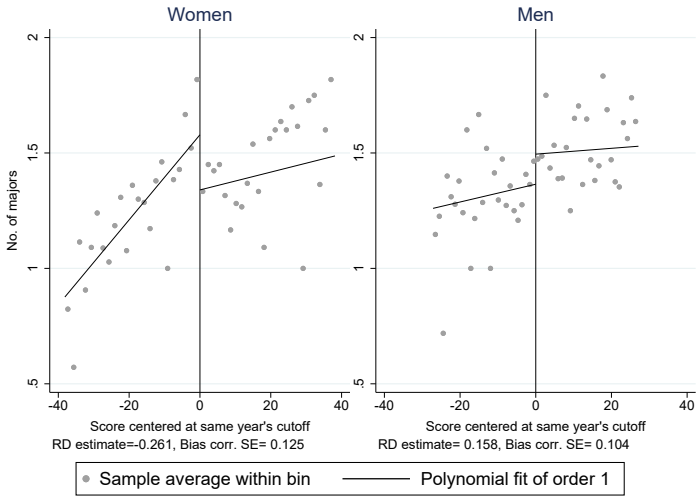
9 Figures

(a) Within first 24-hour period



(b) Across 24-hour periods

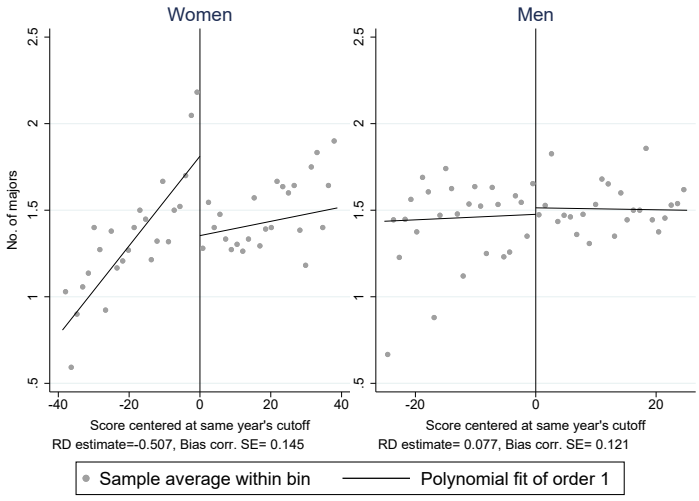
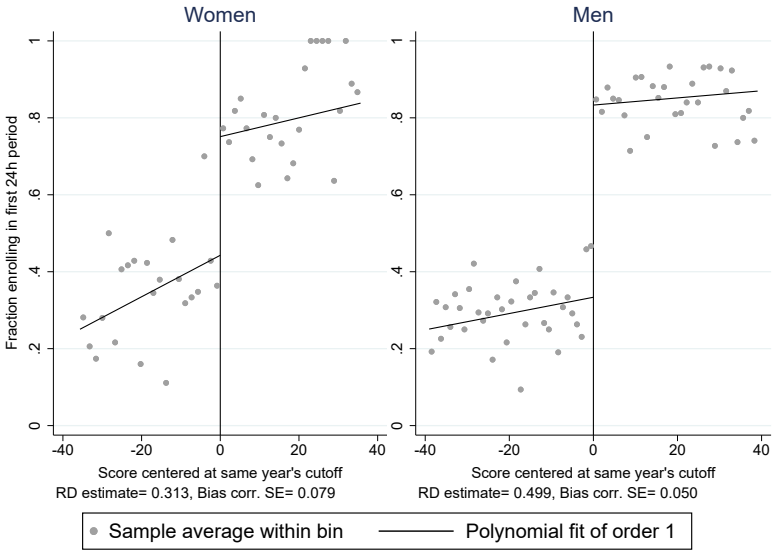


Figure 1: Number of submitted majors within and across 24-hour periods

Notes: RD plots of the raw outcome. The outcome in both panels adds the number of majors that applicants submit in the period specified in the panel heading. When applicants do not obtain a slot the first 24-hour period they access the online platform, they can have new access with the next priority group. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles.

(a) Within first 24-hour period



(b) Across 24-hour periods

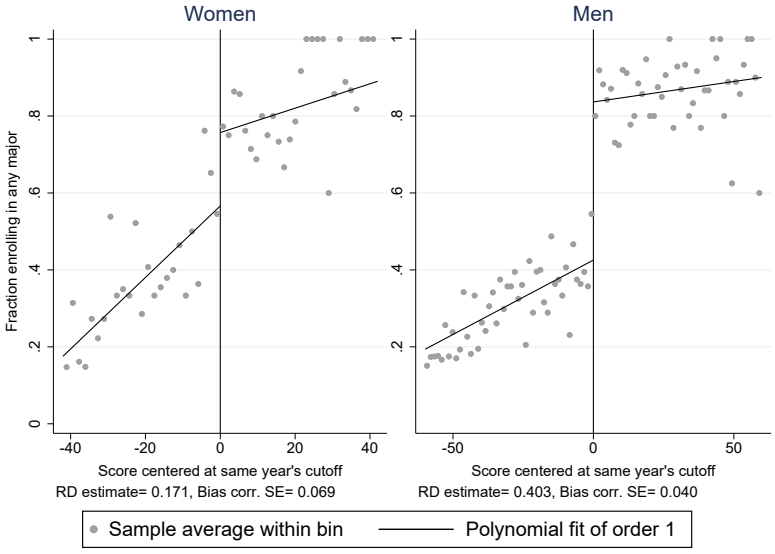


Figure 2: Likelihood of enrolling during the first admission cycle

Notes: RD plots of the raw outcomes. The outcome is an indicator of whether the applicant enrolls into any major in the first admission cycle covered by our data in the period specified in the panel headings. To the left of the major-specific cutoffs, applicants cannot enroll in their intended major by definition, but can enroll into a different major. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. The outcome for applicants who did not submit majors to the slot allocation mechanism is coded as zero.

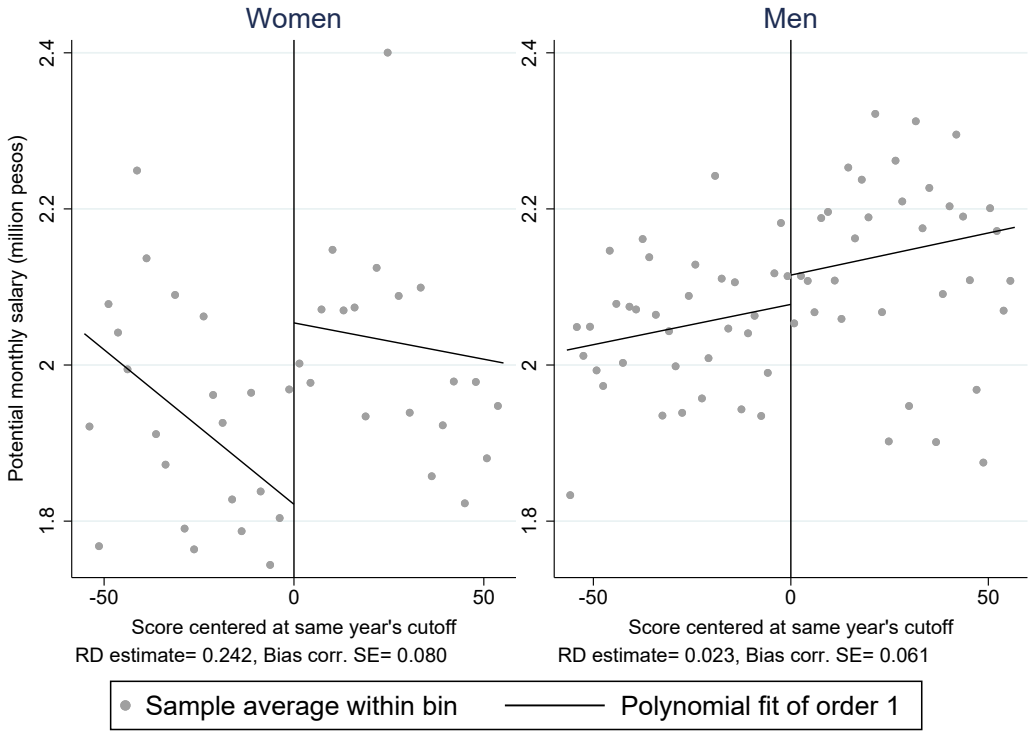


Figure 3: Potential earnings of enrolled majors

Notes: RD plot of the raw outcome. The outcome measures the potential earnings upon graduation of enrolled majors. Enrolled majors include the major that applicants in the first admission cycle enrolled in during that cycle or in any of three subsequent admission cycles. Potential earnings are an average of the salaries one year after graduation of 2017-2018 graduates from this university for each major from the LMOE dataset. We calculate the mean using the midpoints of the ranges. The salary data is in million pesos and the exchange rate in 2020 fluctuated between 3,300 pesos per dollar to 4,000 pesos per dollar. Sample: all applicants who enrolled in a major in any of the admission cycles covered by our data.

10 Tables

Table 1: Majors submitted by priority group and 24-hour period

		Applicants in priority group:			
		1	2	3	4
Panel A. Major selection and slot allocation					
24h period	**Majors submitted**				
1	0	180			
	1	389			
	2	920			
2	0	308	532		
	1	4	335		
	2	29	1,200		
3	0	308	1,004	971	
	1	0	20	139	
	2	0	87	570	
4	0	308	1,002	1,134	1,692
	1	0	1	9	101
	2	0	1	37	543
Panel B. No. of slots and applicants by priority group					
Majors with slots available		49	43	20	7
Total applicants in priority group		1,489	2,067	1,680	2,336
% women		30.6	34.4	36.1	40.2
% men		69.4	65.6	63.9	59.8
Not enrolled at the end of cycle 1		308	1,002	1,135	2,262
% of total women		22.4	45.2	65.6	95.7
% of total men		19.9	50.2	68.7	97.6

Notes: Panel A shows how many majors applicants submit in each of the 24-hour periods they have access to according to their priority group. Among the reasons why some applicants who do not submit any majors are: their intended major is no longer available and they decide not to select any of the available majors, they may have a access to a slot at another university, or they take the CEE just to know how well they perform. Panel B shows the number of majors with at least one slot available at the time each priority group logs in the online platform. The university offered 64 majors in the 2020-1 semester. Excluding music majors, which require a specific exam in addition to the CEE, applicants have 49 options to choose from, which is the basis for our sample. Panel B also shows the total number of applicants and applicants not enrolled at the end of the process by priority group.

Table 2: Example of slot allocation

		Preference rankings		**No. of slots**		**Cutoffs**			
Applicant	*Score*	*Choice 1*	*Choice 2*	*Choice 1*	*Choice 2*	*Choice 1*	*Choice 2*	*Admitted*	*Major enrolled*
A	760	Medicine	Law	128	80	758	681	Yes	Medicine
B	680	Mechanical eng.	Industrial eng.	81	44	686	684	No	
C	650	Zootechnics	Sociology	60	45	621	647	Yes	Zootechnics
D	620	Occup. therapy		55		620		Yes	Occup. therapy
E	700							No	

Notes: Scores approximated to the nearest unit. Applicant A obtained a score of 760 points in the CEE and submitted medicine and law as her first and second choices. Even though there were more slots for medicine than for law, the cutoffs (score of the last admitted student) is much higher for medicine than for law, suggesting that there is a higher demand for medicine among students scoring high in the CEE. According to the allocation mechanism, the university ranks all students according to their CEE and starts assigning slots. In this case, the score of this applicant allows her to obtain a slot in both majors she submitted, and because she gave priority to medicine, she is admitted into that major. Applicant B submitted two majors that ended up having higher cutoffs than her score, so she is not admitted. Applicant C's score would be high enough for both choices and her second choice ended up with a higher cutoff that the first. However, she submitted Zootechnics first, so this is the slot she receives. Some applicants decide to submit only one major as applicant D, or no majors as applicant E (see Table 1 for exact numbers by priority group). Reasons to not choose any program or only one program include not finding the program(s) one wishes to enroll into when accessing the online platform, studying the intended program at another institution, taking the exam just to try one's luck, among others.

Table 3: Gender differences in number of majors submitted in admission cycle 1

	(1) Within 1st 24h period	(2) Across 24h periods
Below=1	-0.020	0.121*
	(0.055)	(0.062)
Female	-0.159**	-0.142**
	(0.069)	(0.071)
Below=1 × Female	0.195**	0.190*
	(0.094)	(0.106)
Constant	1.869***	1.969***
	(0.055)	(0.060)
Mean men above	1.53	1.54
Priority group FE	Yes	Yes
Intended major FE	Yes	Yes
BW	59.89	59.89
Observations	4287	4287

Notes: The table presents estimates of equation 1 for the outcomes in the column headings. Applicants can submit 0, 1 or 2 majors in each 24-hour period they access the online platform. Columns 2-3 and 5-6 split the sample by classifying the historical cutoff (including cutoffs from 2016-1, 2017-1, 2018-1 and 2019-1) of applicants' intended major as low variance if the variance for their intended major is below the median variance or high variance if it is above the median. The median variance is 25.2 points, while the minimum and maximum variances are 0.68 and 218.7 points, respectively. There are no gender differences in intending a low-variance major at the cutoff. See the heterogeneity analysis for all outcomes in Appendix Table 8. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. EHW standard errors at the student level.

Table 4: Gender differences in likelihood of enrolling across four admission cycles

	Cycle 1		Cycles 1-4
	(1)	(2)	(3)
	Within 1st 24h period	Across 24h periods	
Below=1	-0.487***	-0.400***	-0.099***
	(0.029)	(0.030)	(0.027)
Female	-0.083**	-0.075**	-0.041
	(0.034)	(0.034)	(0.029)
Below=1 × Female	0.157***	0.157***	0.038
	(0.050)	(0.051)	(0.046)
Constant	0.882***	0.885***	0.918***
	(0.028)	(0.028)	(0.024)
Mean men above	0.84	0.86	0.91
Priority group FE	Yes	Yes	Yes
Intended major FE	Yes	Yes	Yes
BW	59.89	59.89	59.89
Observations	4287	4287	4287

Notes: The table presents estimates of equation 1 for the outcomes in the column headings. The outcomes in columns 1-3 are obtained from the Admissions data. Column 1 shows the fraction of applicants who obtain a slot resulting from their choices submitted in the first 24-hour period of the admissions mechanism. Columns 2 shows whether they obtain a slot by the end of admissions cycle 1 (i.e., after allocation across all 24-hour periods). Column 3 shows whether the applicants in admission cycle 1 eventually obtain a slot in that admission cycle or in any of the subsequent three cycles up to the second semester of 2021. Sample: all applicants who are classified into a priority group in the first admission cycle. EHW standard errors at the student level.

Table 5: Gender differences in intended major enrollment and field of study across four admission cycles

	Enrolled in intended major	Not enrolled in intended major	
	(1)	(2) Enrolled in same field as intended major	(3) Enrolled in different field from intended major
Below=1	-0.512***	0.239***	0.174***
	(0.031)	(0.024)	(0.025)
Female	-0.093**	0.040*	0.012
	(0.040)	(0.024)	(0.026)
Below=1 × Female	0.055	-0.018	0.002
	(0.052)	(0.041)	(0.043)
Constant	0.781***	0.081***	0.056**
	(0.034)	(0.023)	(0.025)
Mean men above	0.76	0.07	0.09
Priority group FE	Yes	Yes	Yes
Intended major FE	Yes	Yes	Yes
BW	59.89	59.89	59.89
Observations	4287	4287	4287

Notes: The table presents estimates of equation 1 for the likelihood of enrolling in any major and three mutually exclusive outcomes: enrolling in the applicant's intended major (column 1), and if not enrolling in the intended major, whether the enrolled major is in the same field of study or a different field according to the fields classification in Table B.8 (columns 3 and 4, respectively). Sample: all applicants who are classified into a priority group in the first admission cycle, along with those who reapplied and enrolled in any of the subsequent admission cycles. EHW standard errors at the student level.

Table 6: Gender differences in potential earnings of enrolled majors

	(1) Cycle 1	(2) Cycles 1-4
Below=1	-0.163***	-0.069**
	(0.040)	(0.030)
Female	-0.003	-0.014
	(0.029)	(0.028)
Below=1 × Female	-0.074	-0.096**
	(0.057)	(0.049)
Constant	2.147***	2.176***
	(0.032)	(0.029)
Mean men above	2.13	2.13
Priority group FE	Yes	Yes
Intended major FE	Yes	Yes
BW	59.89	59.89
Gender pay gap above (%)	0.1	0.7
Gender pay gap below (%)	3.9	5.2
Observations	2021	2971

Notes: The table presents estimates of equation 1 for the potential earnings during the first admission cycle (column 1) and across four admission cycles (column 2). Potential earnings are an average of the salaries one year after graduation of 2017-2018 graduates from U. Nacional for each major. The LMOE data contains the number of graduates from each major within pre-specified earnings ranges. We then calculate the average earnings using the midpoints of the range and the number of graduates in each range. The salary data is in million pesos and the exchange rate in 2020 fluctuated between 3,300 pesos per dollar to 4,000 pesos per dollar. We calculate the gender gaps as the difference in salary between men and women over the salary of men based on estimates from equation 1 with potential salaries as the outcome. The gender gap above the cutoff is calculated as $\frac{\alpha_0-(\alpha_0+\beta_5)}{\alpha_0} \times 100$. The gender gap below the cutoff is calculated as $\frac{(\alpha_0+\beta_4)-(\alpha_0+\beta_4+\beta_5+\beta_0)}{\alpha_0+\beta_4}$. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. EHW standard errors at the student level.

Table 7: Gender differences in characteristics of attended programs at any institution

	(1) Any technical	(2) Any university	(3) Elite university incl. U. Nacional	(4) U. Nacional	(5) Intended major anywhere	(6) Potential earnings
Below=1	0.004	-0.017	-0.114***	-0.203***	-0.329***	-0.032
	(0.012)	(0.021)	(0.029)	(0.034)	(0.034)	(0.033)
Female	-0.002	0.027	-0.005	-0.080*	-0.040	0.002
	(0.012)	(0.022)	(0.032)	(0.042)	(0.042)	(0.035)
Below=1 × Female	-0.012	0.022	0.100**	0.124**	0.033	-0.107**
	(0.018)	(0.032)	(0.047)	(0.058)	(0.057)	(0.054)
Constant	0.028**	0.922***	0.856***	0.796***	0.726***	2.220***
	(0.012)	(0.020)	(0.028)	(0.035)	(0.036)	(0.033)
Mean men above	0.01	0.93	0.87	0.77	0.70	2.17
Priority group FE	Yes	Yes	Yes	Yes	Yes	Yes
Intended major FE	Yes	Yes	Yes	Yes	Yes	Yes
BW	59.89	59.89	59.89	59.89	59.89	59.89
Gender pay gap above (%)	8.4	-3.0	0.6	10.0	5.5	-0.1
Gender pay gap below (%)	43.7	-5.4	-12.7	-7.4	1.8	4.8
Observations	4287	4287	4287	4287	4287	3988

Notes: The table presents estimates of equation 1 for the outcomes in the column headings using matched Admissions and SNIES datasets. Technical programs are post-secondary vocational programs. Elite universities are the top 10 Colombian universities listed in the QS world ranking, U. Nacional refers to be observed last attending Universidad Nacional. Intended major anywhere is a binary variable equal to one if the applicant is observed attending a major with the same name as her intended major at U. Nacional in the last institution attended. Potential earnings are an average of the salaries one year after graduation of 2018 graduates in the last institution we observe them attending in the SNIES data. The LMOE data contains the number of graduates from each major-institution within pre-specified earnings ranges. We then calculate the average earnings using the midpoints of the range and the number of graduates in each range. The salary data is in million pesos and the exchange rate in 2020 fluctuated between 3,300 pesos per dollar to 4,000 pesos per dollar. EHW standard errors at the student level.

Table 8: Heterogeneity analysis

	Base model	Historical cutoff variance	
	(1)	(2)	(3)
		Low	High
No. majors submitted (first 24h)	0.195**	0.442***	0.015
	(0.094)	(0.148)	(0.121)
No. majors submitted (cycle 1)	0.190*	0.451***	0.003
	(0.106)	(0.169)	(0.134)
Enrolled in any major (first 24h)	0.157***	0.228***	0.101
	(0.050)	(0.077)	(0.067)
Enrolled in any major (cycle 1)	0.157***	0.232***	0.100
	(0.051)	(0.079)	(0.067)
Enrolled in any major (cycles 1-4)	0.038	0.124*	-0.028
	(0.046)	(0.075)	(0.058)
Potential earnings (cycles 1-4)	-0.096**	-0.053	-0.125*
	(0.049)	(0.068)	(0.067)
Potential earnings (any inst.)	-0.107**	-0.045	-0.156**
	(0.054)	(0.080)	(0.072)
Last attended postsec. (any inst.)	0.010	0.009	0.011
	(0.028)	(0.042)	(0.037)
Last attended U. Nacional	0.124**	0.220**	0.056
	(0.058)	(0.090)	(0.075)

Notes: The table presents the interaction coefficient between female and below the cutoff in equation 1, that is, the gender gap for applicants just below the cutoff. The column headings indicate the source of heterogeneity. Columns 2 and 3 split the sample by classifying the historical cutoff (including cutoffs from 2016-1, 2017-1, 2018-1 and 2019-1) of applicants' intended major as low variance if the variance for their intended major is below the median variance or high variance if it is above the median. The median variance is 25.2 points, while the minimum and maximum variances are 0.68 and 218.7 points, respectively. There are no gender differences in intending a low-variance major at the cutoff. Columns 4 and 5 split the sample by classifying applicants depending on whether they graduated high school recently or not. The full specification includes an indicator for being below the cutoff, an indicator for being female, a linear polynomial on the running variable, and interactions between these terms. All the estimates are obtained within the CCFT optimal bandwidth. All regressions in this table include priority group and intended major fixed effects. EHW standard errors at the student level.

Table 9: Robustness checks

	(1) Base model	(2) Covariates	(3) Months from/to HS graduation	(4) Optimal BW	(5) No medicine	(6) 1st and 2nd choice FEs
No. majors submitted (first 24h)	0.195**	0.175*	0.196**	0.192*	0.216**	-0.000***
	(0.094)	(0.093)	(0.097)	(0.098)	(0.098)	(0.000)
No. majors submitted (cycle 1)	0.190*	0.170	0.201*	0.195*	0.216*	-0.027
	(0.106)	(0.106)	(0.108)	(0.111)	(0.111)	(0.041)
Enrolled in any major (first 24h)	0.157***	0.149***	0.169***	0.159***	0.164***	0.093**
	(0.050)	(0.050)	(0.052)	(0.051)	(0.052)	(0.038)
Enrolled in any major (cycle 1)	0.157***	0.151***	0.176***	0.157***	0.170***	0.080**
	(0.051)	(0.051)	(0.052)	(0.051)	(0.053)	(0.037)
Enrolled in any major (cycles 1-4)	0.038	0.027	0.039	0.036	0.029	-0.003
	(0.046)	(0.046)	(0.048)	(0.046)	(0.047)	(0.042)
Potential earnings (cycles 1-4)	-0.096**	-0.098**	-0.112**	-0.096*	-0.092*	-0.100**
	(0.049)	(0.049)	(0.050)	(0.050)	(0.049)	(0.045)
Potential earnings (any inst.)	-0.107**	-0.102*	-0.119**	-0.117**	-0.070	-0.100*
	(0.054)	(0.053)	(0.055)	(0.057)	(0.054)	(0.051)
Last attended postsec. (any inst.)	0.010	0.001	-0.012	0.004	-0.008	0.002
	(0.028)	(0.027)	(0.027)	(0.025)	(0.028)	(0.028)
Last attended U. Nacional	0.124**	0.110*	0.127**	0.118**	0.091	0.082
	(0.058)	(0.057)	(0.059)	(0.058)	(0.058)	(0.056)

Notes: The table presents the interaction coefficient between female and below the cutoff in equation 1, that is, the gender gap for applicants just below the cutoff. The column headings indicate the modification to the main model while the rows indicate the main outcomes of interest. The fully interacted model (column 2) adds SES, type of high school, mother's education and age flexibly by using interactions with the running variable and the treatment indicator. The covariates in column 4 include age, indicator for being single, for being born in Bogota, for being from a low SES family, for attending a public high school, for attending an academic high school, for attending an exam preparation course, months since high school graduation, indicators for maternal and parental college attainment, and for living with one's mother and father, number of kids under the age of 13 that the applicant lives with, whether the applicant was in high school enrolled at another university or at an elite university at the time of application, and indicators if the controls are missing. Column 5 presents the results using the optimal bandwidth obtained from (Calonico et al., 2019) rather than the fixed bandwidth. Applicants intending medicine are eliminated in Column 6. Column 7 adds first and second choice fixed effects, with applicants not selecting a second choice receiving a dummy code. All regressions in this table include priority group and intended major fixed effects. Column EHW standard errors at the student level. *** p<0.01, **p<0.05, * p<0.1.

A Appendix Figures (for online publication)

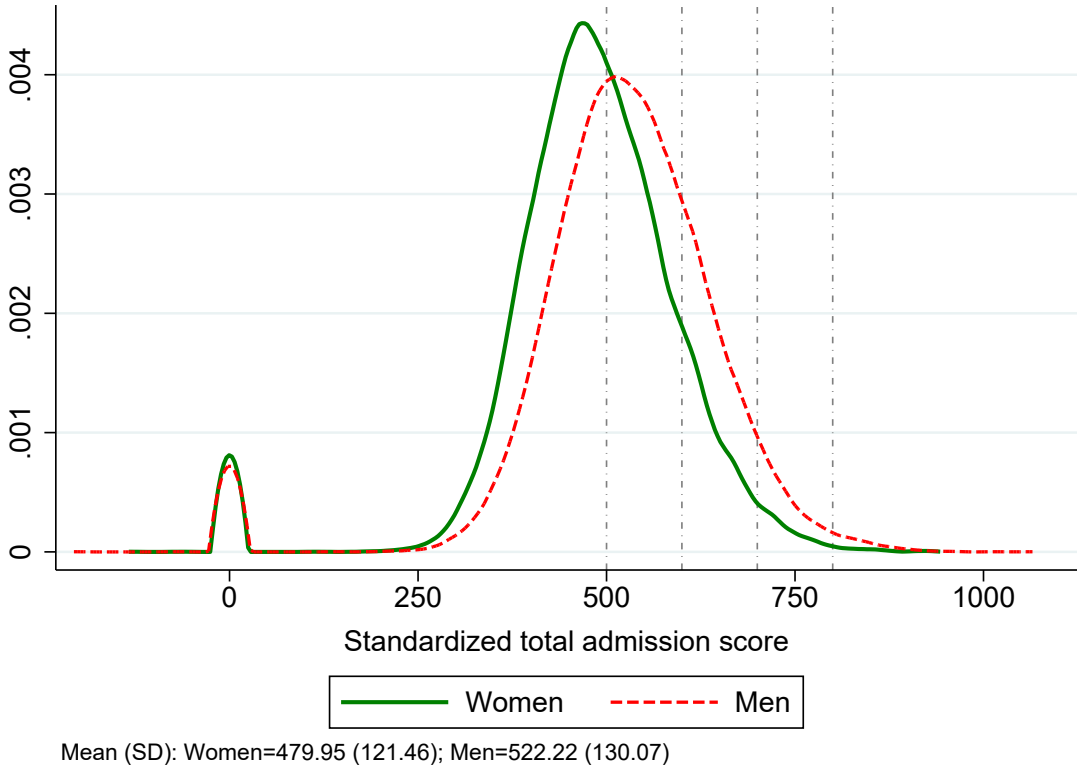


Figure A.1: Distribution of standardized scores by gender

Notes: Scores of applicants to the first admission cycle (2020-1). The exam is standardized to have a mean of 500 and a standard deviation of 100 (indicated by vertical dotted lines). The mass at zero corresponds to applicants who sign up and do not show up on the day of the exam. The model used to standardize the score assigns a negative score to the few students who take the exam but perform extremely poorly. There are no penalties for wrong answers in this exam. In most countries in the world women perform worse in academic tests involving high-stakes and high competition (Jurajda and Münich, 2011; Ors et al., 2013; Azmat et al., 2016; Cai et al., 2019), especially in math (Ellison and Swanson, 2010; OECD, 2015; Iriberri and Rey-Biel, 2019).

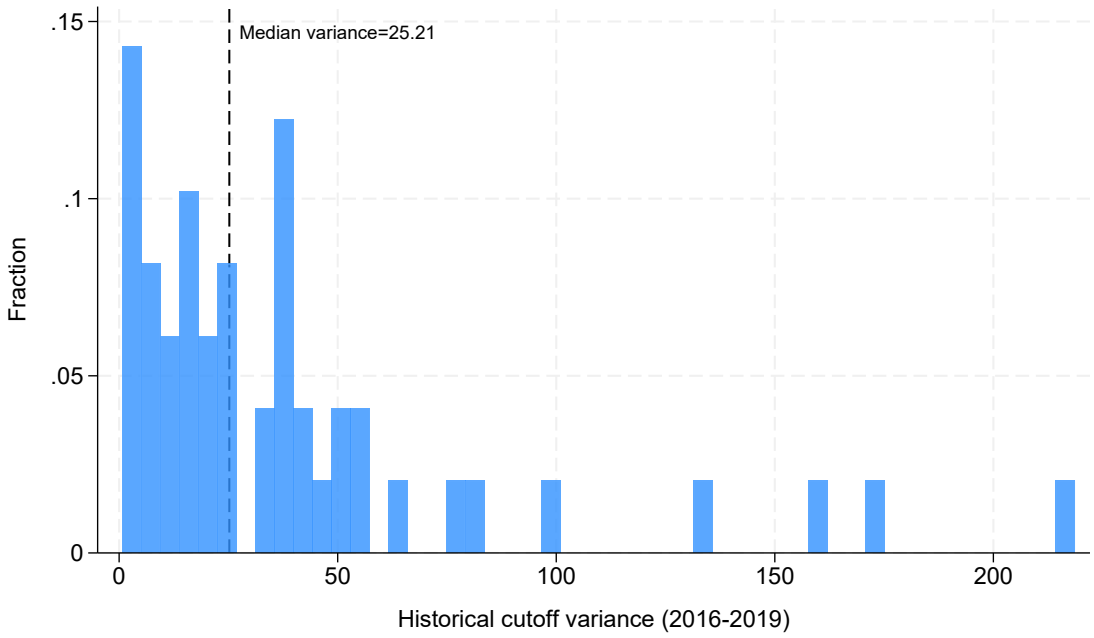
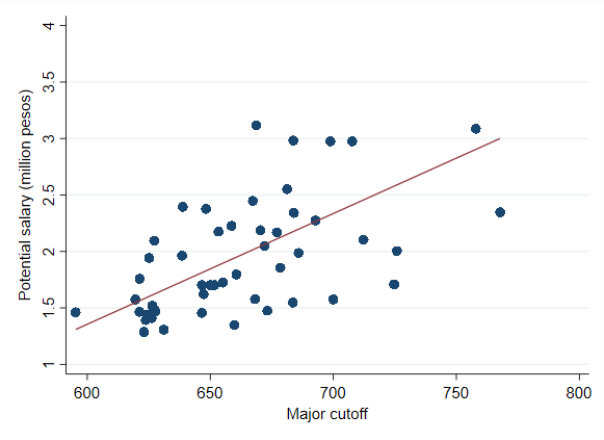


Figure A.2: Cutoff variance across three previous admission cycles

Notes: Cutoff variance is calculated using the cutoffs from four recent admission cycles per major (2016-1, 2017-1, 2018-1 and 2019-1).

(a) Overall earnings



(b) Gender-specific earnings

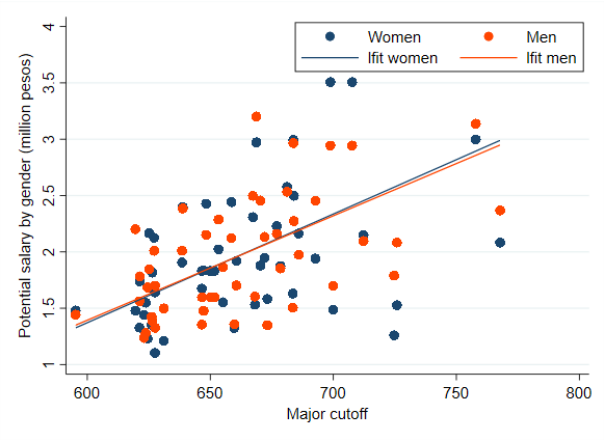


Figure A.3: Cutoffs and potential earnings by major

Notes: Cutoffs and potential earnings for the each major offered in the first admission cycle. Potential earnings are an average of the salaries one year after graduation of 2017-2018 graduates from U. Nacional for each major. The LMOE data contains the number of graduates from each major within pre-specified earnings ranges. We then calculate the average earnings using the midpoints of the range and the number of graduates in each range. The salary data is in million pesos and the exchange rate in 2020 fluctuated between 3,300 pesos per dollar to 4,000 pesos per dollar.

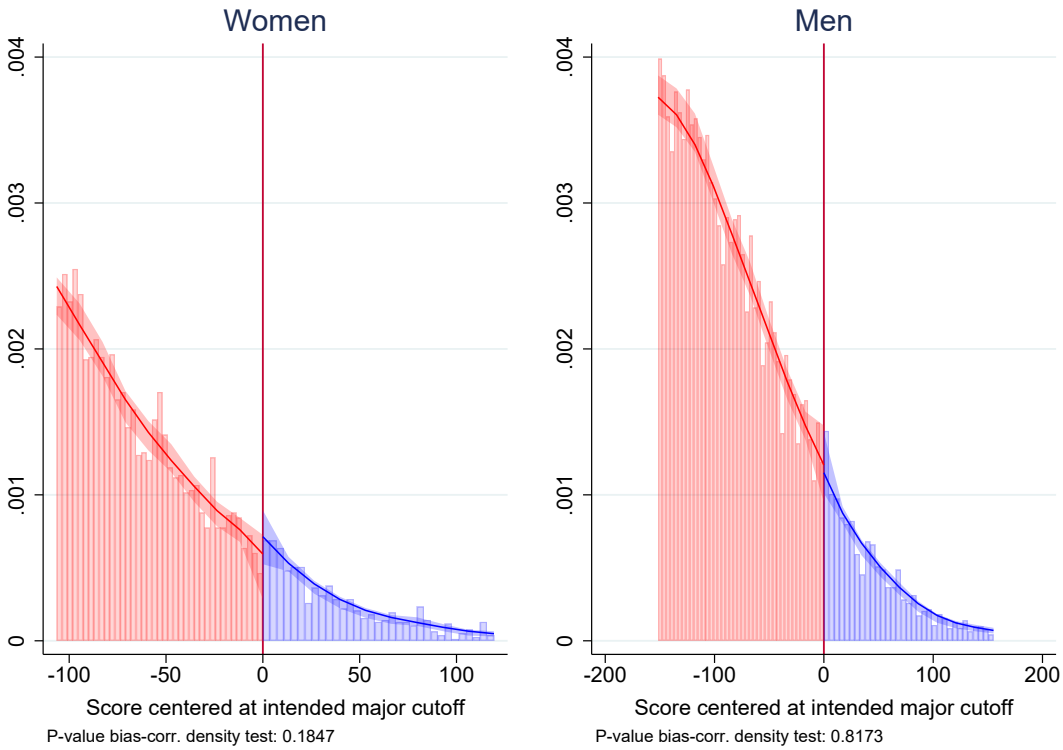


Figure A.4: Density of the running variable by gender

Notes: Scores of applicants to the first admission cycle centered at their intended major cutoff. The value of zero corresponds to the applicants taking the last available slot in every major.

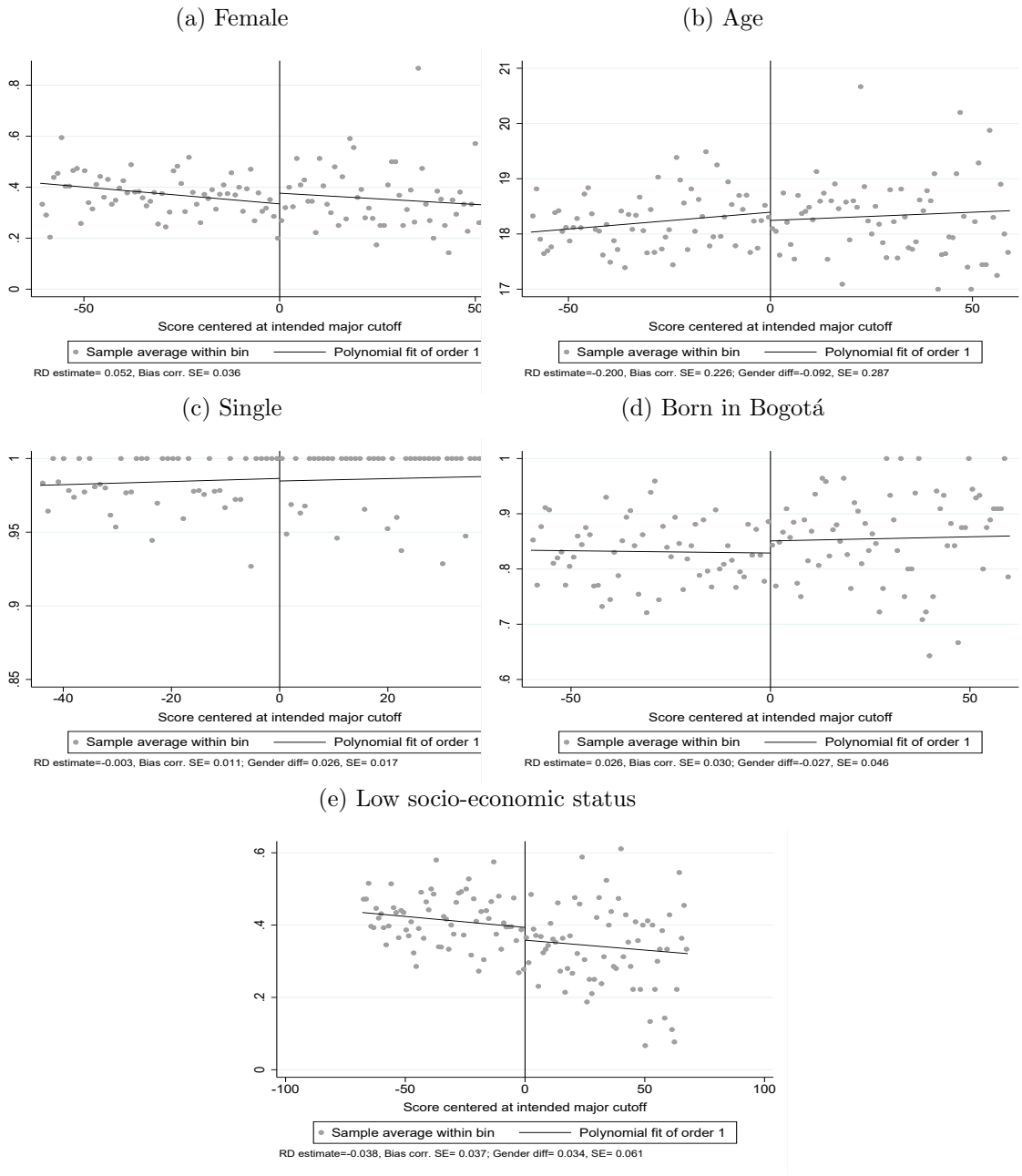


Figure A.5: Covariates - applicants' characteristics

Notes: RD plots for applicants with scores within the bandwidth defined by the CCFT selector. For covariates other than female, the gender difference estimate and standard error from equation 1 are also reported at the bottom left. Low SES corresponds to strata 1 and 2 in Colombia's utility bill classification (1 to 6). An omnibus test including all covariates in Figures A.5, A.6 and A.7 within a bandwidth of +/-60 has a p-value equal to 0.89. The bias-corrected RD estimate and standard error are reported at the bottom of each plot.

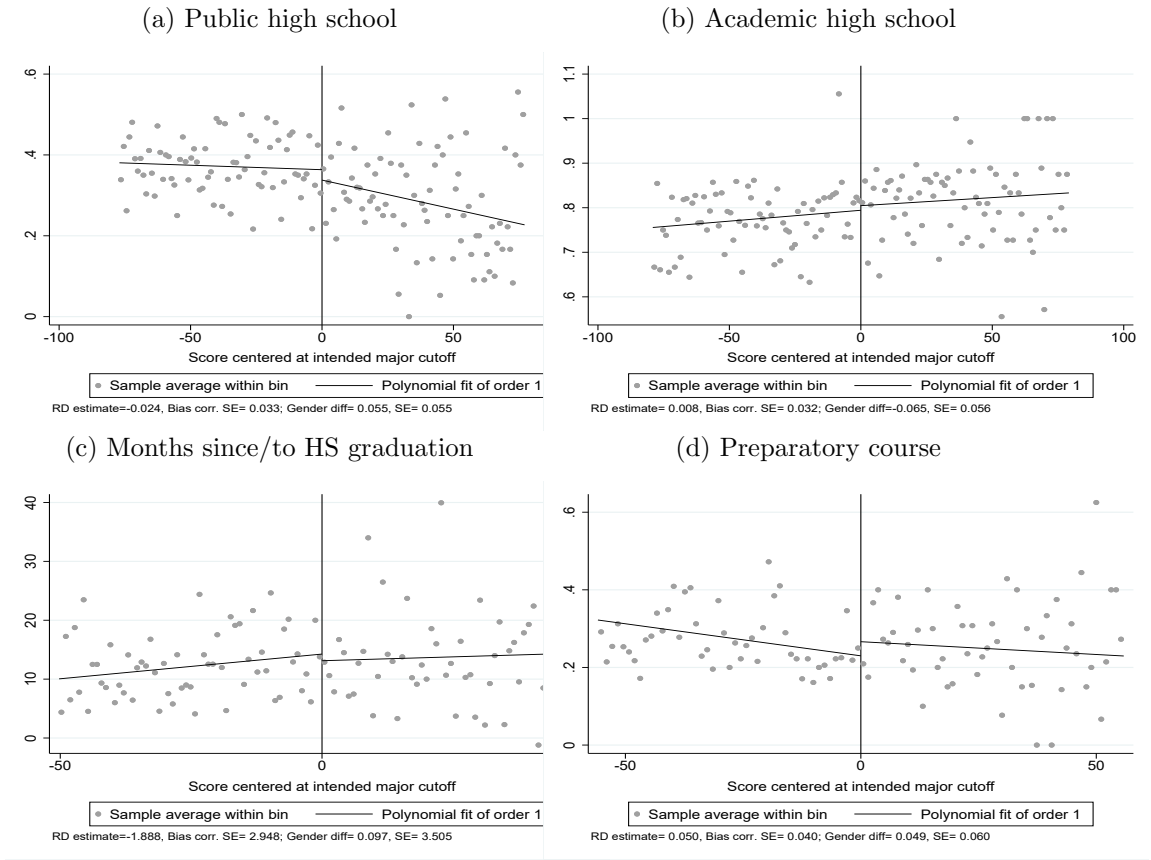
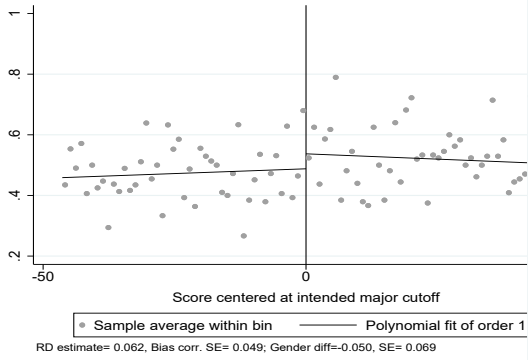


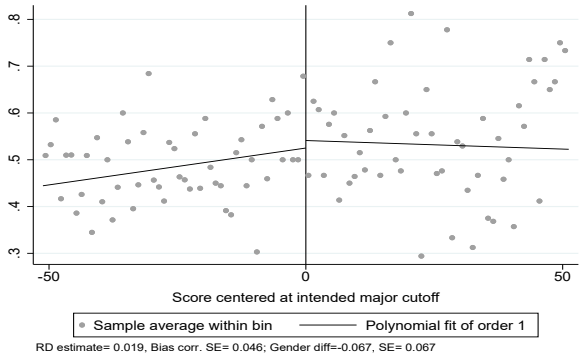
Figure A.6: Covariates - applicants' schooling characteristics

Notes: RD plots for applicants with scores within the bandwidth defined by the CCFT selector. The gender difference estimate and standard error from equation 1 are reported at the bottom left. High school ends at grade 11 in Colombia. Public high school means graduating from a school sponsored by the government rather than a private high school. All high schools in Colombia have the same curriculum, but vocational high schools have additional vocational subjects relative to academic high schools. Months since/to high school graduation are counted based on the date applicants register for the exam and the approximate month in which they graduated or will graduate (most students graduate in November and a minority in June). Preparatory courses are paid courses that students may enroll in to help them improve their scores in this university exam or the national standardized test. An omnibus test including all covariates in Figures A.5, A.6 and A.7 within a bandwidth of +/-60 has a p-value equal to 0.89. The bias-corrected RD estimate and standard error are reported at the bottom of each plot.

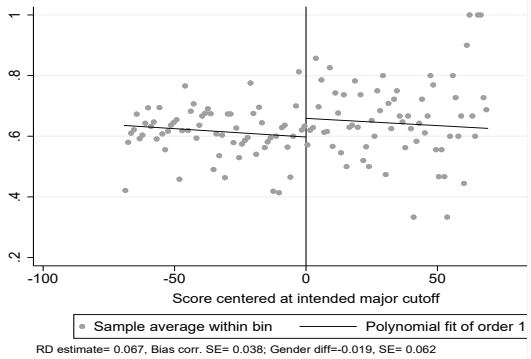
(a) Father with college



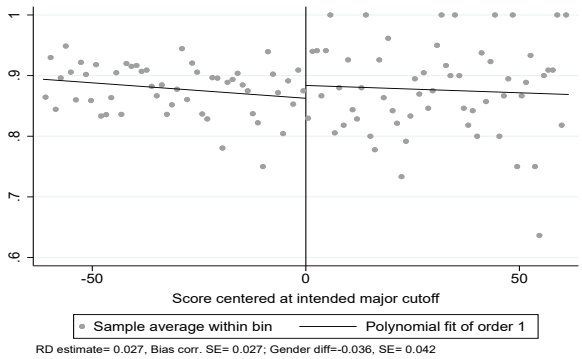
(b) Mother with college



(c) Lives with father



(d) Lives with mother



(e) No. of kids (<13) applicant lives with

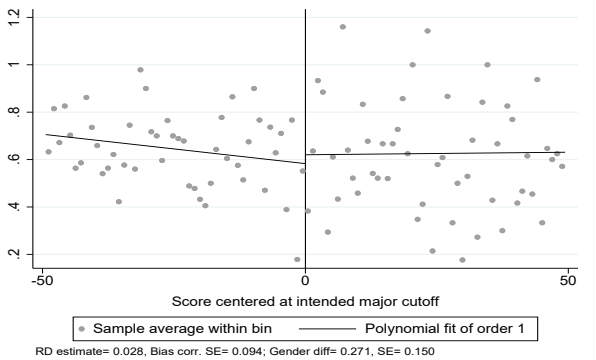
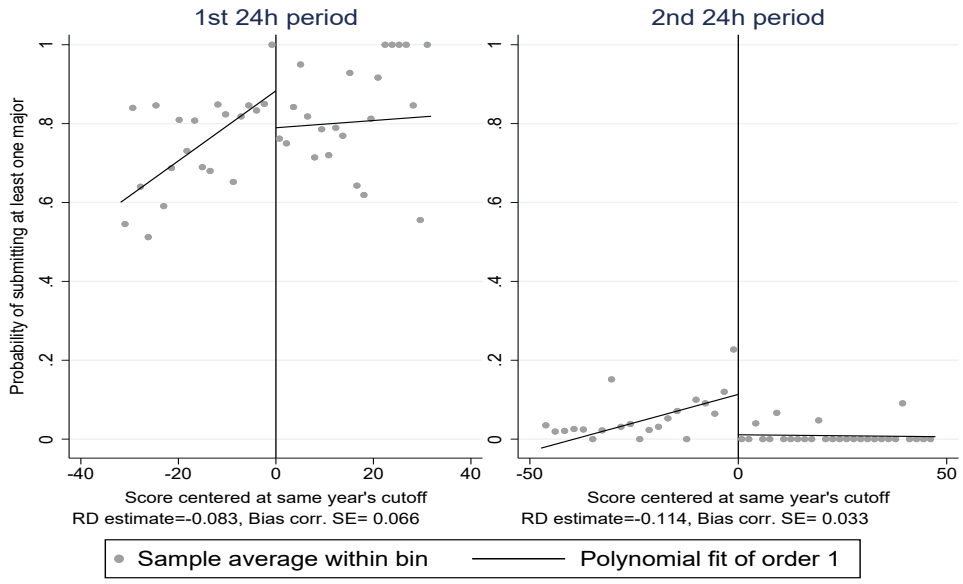


Figure A.7: Covariates - parental characteristics

Notes: RD plots for applicants with scores within the bandwidth defined by the CCFT selector. The gender difference estimate and standard error from equation 1 are reported at the bottom left. Parental and family characteristics are reported by the applicant at the time of exam registration. An omnibus test including all covariates in Figures A.5, A.6 and A.7 within a bandwidth of +/-60 has a p-value equal to 0.89. The bias-corrected RD estimate and standard error are reported at the bottom of each plot.

(a) Women



(b) Men

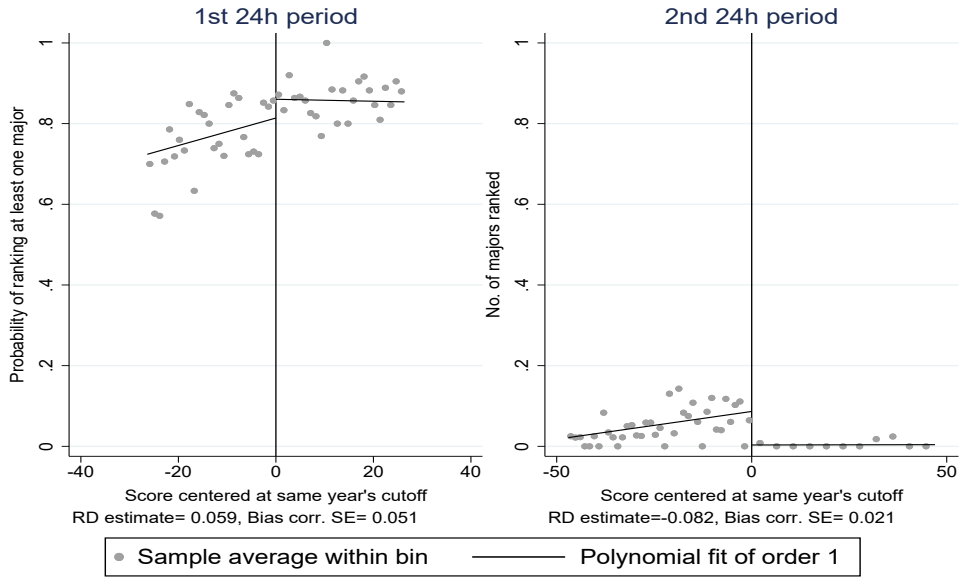


Figure A.8: Probability of submitting majors in first and second 24-hour period

Notes: RD plots of the raw outcome. First 24-hour period is the period corresponding to the priority group applicants were assigned to. Second 24-hour period is the following period, i.e., applicants log in with the next priority group when they are not matched to any major in their first chance. The bias-corrected RD estimate and standard error are reported at the bottom of each plot.

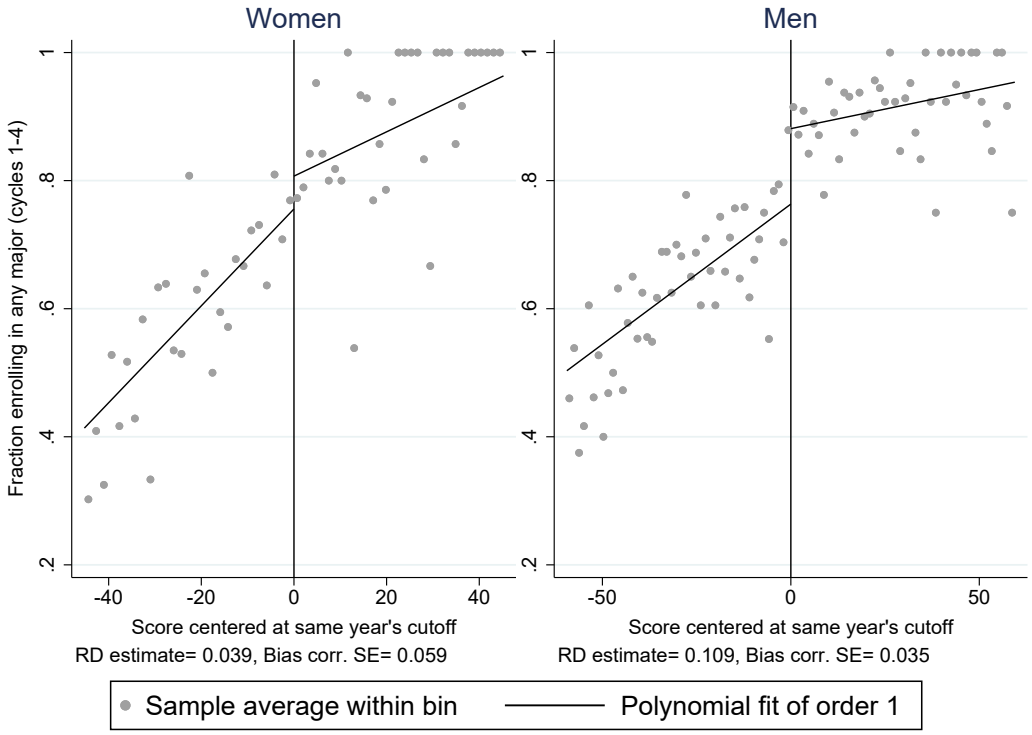
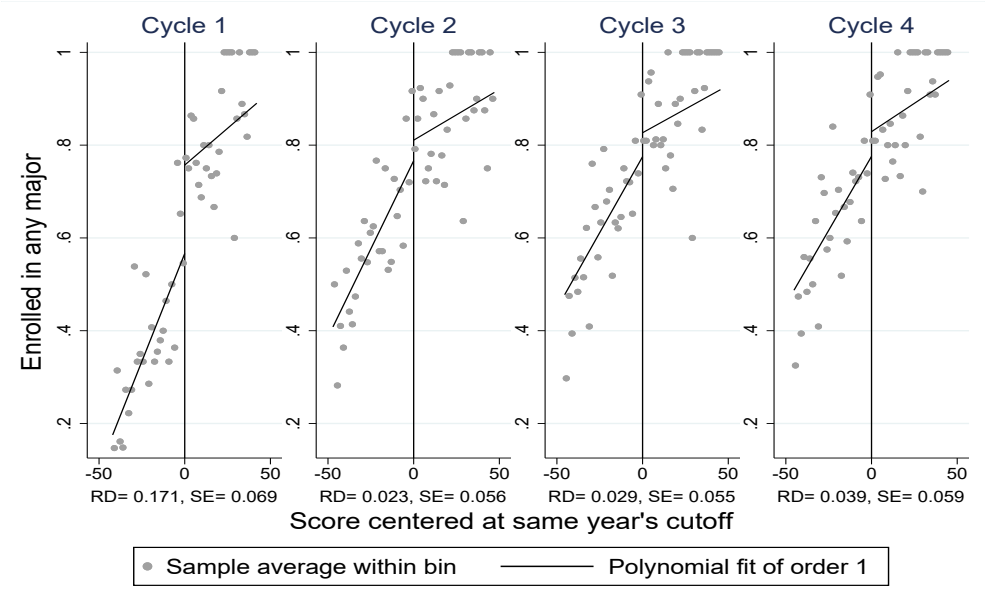


Figure A.9: Likelihood of enrolling in *any* major over four admission cycles

Notes: RD plot of the raw outcome. The outcome is an indicator of whether the applicant enrolls into any major in any of the admission cycles covered by our data (2020-1, 2020-2, 2021-1, 2021-2). Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. The outcome for applicants who did not submit majors to the slot allocation mechanism in the first admission cycle is coded as zero.

(a) Women



(b) Men

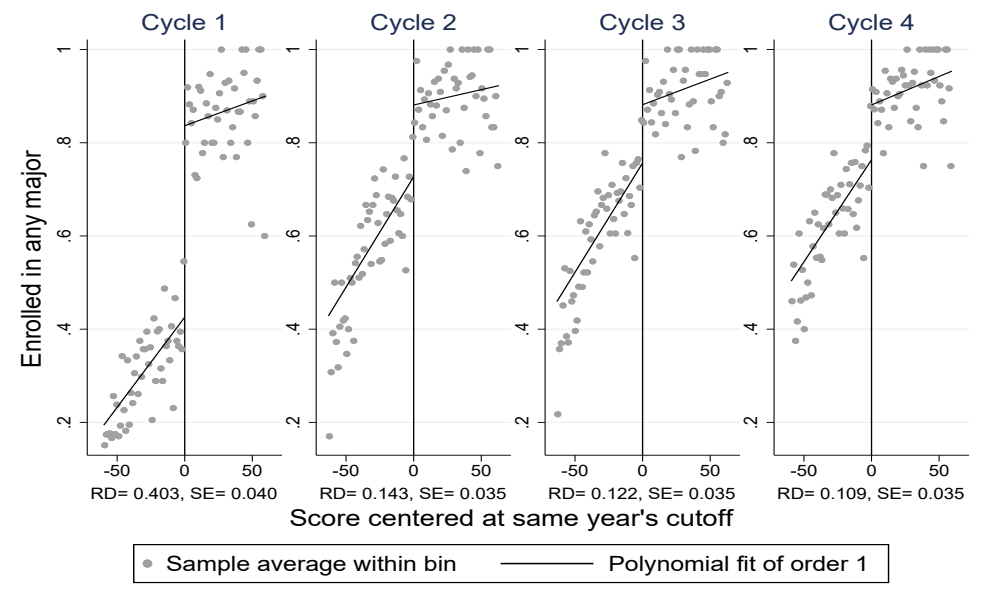


Figure A.10: Cycle-by-cycle enrollment for women and men

Notes: RD plots of the raw outcome. The outcome measures cumulative enrollment in any major across the four admission cycles in our sample. The bias-corrected RD estimate and standard error are reported at the bottom of each plot.

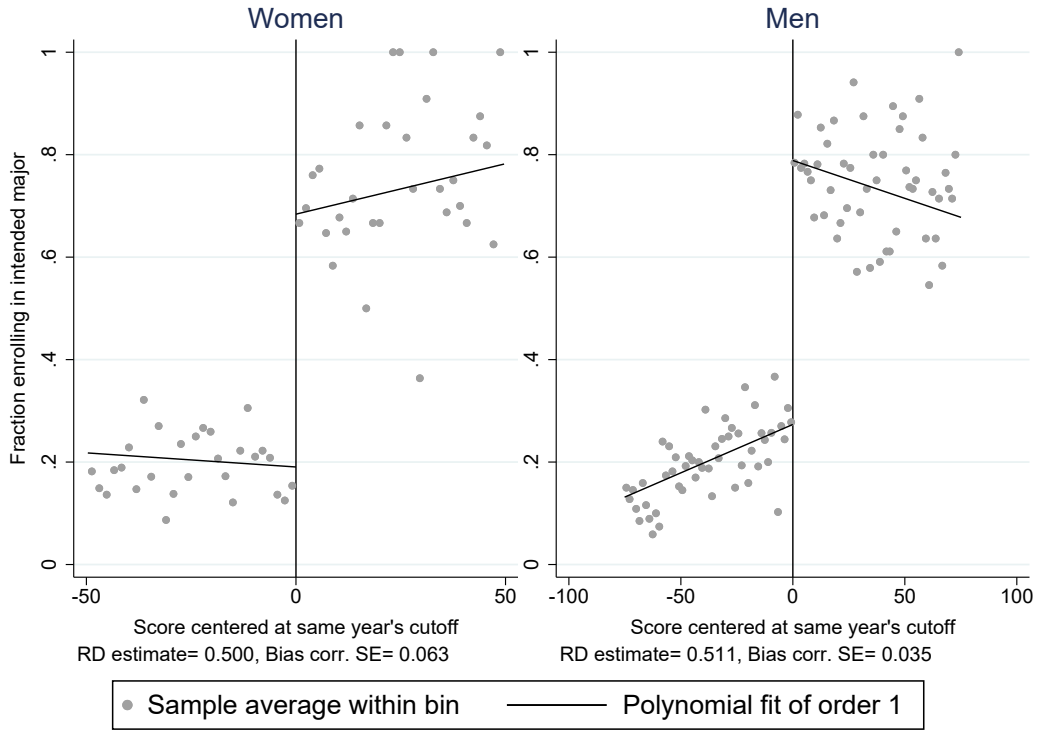


Figure A.11: Likelihood of enrolling in their intended major over four admission cycles

Notes: RD plot of the raw outcome. The outcome measures whether the applicant enrolled in their intended major —as reported in the registration form for the first admission cycle —across any of the four admission cycles covered by our data. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. The outcome for applicants who did not submit majors to the slot allocation mechanism in the first admission cycle is coded as zero.

B Appendix Tables (for online publication)

Table B.1: Cutoffs and number of slots by major (part 1)

College major	Cutoff 2019-1	No. slots 2019-1	Cutoff 2020-1	No. slots 2020-1
Agricultural Engineering	637.8989	106	627.5051	105
Agronomic Engineering	635.624	90	625.1466	100
Anthropology	662.0044	35	658.6011	35
Architecture	694.9775	66	668.1536	82
Biology	728.266	30	699.9824	48
Business Administration	652.3063	120	653.3345	70
Chemical Engineering	687.6607	129	672.054	134
Chemistry	700.1125	75	670.3881	69
Cinema and Television	613.6038	28	623.0564	28
Civil Engineering	694.696	109	678.5037	109
Computer and Systems Engineering	700.5173	100	698.8107	100
Computer's Science	707.0986	33	707.6533	28
Dentistry	638.5678	75	627.1788	90
Economics	681.2656	120	667.314	105
Electric Engineering	690.7929	55	677.0153	60
Electronic Engineering	721.8709	60	712.2769	60
Geography	629.0294	35	626.4404	32
Geology	706.6311	33	692.7388	33
Graphic Design	678.183	32	683.5642	32
History	645.4142	60	627.5738	60
Industrial Design	672.6489	50	659.7461	46
Industrial Engineering	710.3484	44	683.9687	44
Law	688.647	82	681.2057	80
Linguistics	626.2433	45	624.5093	50
Literary Studies	650.4933	43	660.6105	44

Notes: The cutoffs are determined by the score of the applicant taking the last slot for each major every semester. The number of slots is predetermined by the university and announced before every admission cycle. The statistics from every admission cycle since 2007 can be consulted: https://admisiones.unal.edu.co/servicios-en-linea/estadisticas-del-proceso-de-admision/.

Table B.2: Cutoffs and number of slots by major (part 2)

College major	Cutoff 2019-1	No. slots 2019-1	Cutoff 2020-1	No. slots 2020-1
Mathematics	713.0775	45	724.7126	32
Mechanical Engineering	702.5432	81	685.9037	81
Mechatronics Engineering	775.8461	45	767.7845	45
Medicine	776.6215	122	757.9305	128
Nursing	643.9633	89	638.8036	79
Nutrition and Diet	652.4565	50	648.2854	46
Occupational Therapy	625.2646	60	619.5499	55
Pharmacy	682.9627	56	683.7646	54
Philology and Languages: English	652.0954	44	651.7011	43
Philology and Languages: French	649.1097	22	646.6024	22
Philology and Languages: German	648.5624	21	650.06	22
Philosophy	645.7763	50	626.1694	50
Physics	726.0368	73	725.8575	89
Plastic Arts	616.9134	25	595.265	32
Political Science	657.8519	90	647.2855	86
Psychology	663.7908	75	673.1798	60
Public Accounting	637.2641	128	638.5212	100
Social Work	637.7145	41	631.1059	42
Sociology	653.783	39	646.568	45
Spanish and Classical Philology	637.3839	40	623.7555	44
Speech Therapy	625.3862	75	621.3111	60
Statistics	681.5716	55	668.7146	47
Veterinary Medicine	658.7451	50	655.1168	50
Zootechnics	629.7345	55	621.2348	60

Notes: The cutoffs are determined by the score of the applicant taking the last slot for each major every semester. The number of slots is predetermined by the university and announced before every admission cycle. The statistics from every admission cycle since 2007 can be consulted: https://admisiones.unal.edu.co/servicios-en-linea/estadisticas-del-proceso-de-admision/.

Table B.3: Descriptive statistics

	All applicants			Applicants within BW			Difference		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Mean	SD	Obs	Mean	SD	Obs	Mean	p-value	Obs
Female	0.52	0.50	41,613	0.37	0.48	4,287	0.17	0.00	41,613
Age as of September 2019	18.18	3.02	41,613	18.23	2.94	4,287	-0.06	0.23	41,613
Single	0.98	0.14	41,613	0.98	0.13	4,287	-0.00	0.08	41,613
Born in Bogotá	0.78	0.41	41,306	0.84	0.37	4,234	-0.06	0.00	41,306
Low SES	0.54	0.50	41,613	0.39	0.49	4,287	0.17	0.00	41,613
Graduated form a public HS	0.48	0.50	41,613	0.35	0.48	4,287	0.14	0.00	41,613
Graduated from a vocational HS	0.70	0.46	41,603	0.75	0.43	4,286	-0.06	0.00	41,603
Months since/to HS graduation	11.66	126.51	39,437	12.36	33.67	4,106	-0.78	0.38	39,437
Took a prep course	0.21	0.41	31,639	0.27	0.44	3,183	-0.06	0.00	31,639
Father has some college or higher	0.32	0.47	33,335	0.50	0.50	3,453	-0.20	0.00	33,335
Mother has some college or higher	0.34	0.47	35,445	0.51	0.50	3,622	-0.18	0.00	35,445
Lives with father	0.60	0.49	36,570	0.63	0.48	3,730	-0.03	0.00	36,570
Lives with mother	0.86	0.34	36,570	0.88	0.33	3,730	-0.02	0.00	36,570
No. of kids (< 13) applicant lives with	2.01	2.99	41,613	1.79	3.04	4,287	0.24	0.00	41,613
Standardized overall score	500.12	127.40	41,613	664.96	44.56	4,287	-183.77	0.00	41,613

Notes: We calculate age as of September 2019, which is the month in which applicants take the CEE. Low SES corresponds to strata 1 and 2 in Colombia's utility bill classification (1 to 6). High school ends at grade 11 in Colombia. Public high school means graduating from a school sponsored by the government rather than a private high school. All high schools in Colombia have the same curriculum, but vocational high schools have additional vocational subjects relative to academic high schools. Months since/to high school graduation are counted based on the date applicants register for the exam and the approximate month in which they graduated or will graduate (most students graduate in November and a minority in June). Preparatory courses are paid courses that students may enroll in to help them improve their performance. The CEE overall score is standardized with a mean of 500 and a standard deviation of 100. Column 7 shows the differences in the means presented in columns 1 (all applicants) and 4 (applicants within the ad-hoc bandwidth).

Table B.4: Match rates between datasets

	(1) Applicant in SNIES data	(2) Program and institution matched to LMOE data
Below=1	-0.018	-0.016
	(0.019)	(0.023)
Female	0.015	0.042
	(0.019)	(0.023)
Below=1 × Female	0.009	-0.019
	(0.028)	(0.035)
Constant	0.944	0.903
	(0.013)	(0.016)
Priority group FE	No	No
Intended major FE	No	No
BW	59.89	59.89
Observations	4287	4287

Notes: Column 1 shows the likelihood that an applicant in the Admissions Data is found attending a post-secondary institution in Colombia in the SNIES data for the period 2020-1 to 2021-2. Some reasons for not finding an applicant in the SNIES data are that the applicant decides to study abroad, decides to work or travel, or dead or the ID numbers do not match. Column 2 shows whether we can find the 2019 earnings of 2018 graduates from the program and institution that the applicant attends in the LMOE Data. Some reasons for not finding the earnings data are that the program is too new and had no graduates or very few graduates in 2019.

Table B.5: Gender differences in characteristics of intended majors and priority group

	Intended major				Priority group
	(1)	(2)	(3)	(4)	(5)
	Highly selective	Potential earnings	2019-1 cutoff	Low cutoff variance	
Below=1	0.038	0.005	1.494	0.015	0.003
	(0.055)	(0.036)	(1.642)	(0.037)	(0.032)
Female	-0.047	0.028	1.270	-0.025	-0.022
	(0.073)	(0.045)	(2.297)	(0.047)	(0.045)
Below=1 × Female	0.021	-0.064	-4.738*	-0.012	-0.051
	(0.093)	(0.058)	(2.668)	(0.061)	(0.054)
Constant	1.308***	2.558***	738.486***	0.145***	1.961***
	(0.045)	(0.032)	(1.745)	(0.030)	(0.027)
Mean men above	1.57	2.09	687.35	0.43	1.66
Priority group FE	Yes	Yes	Yes	Yes	No
Intended major FE	No	No	No	No	Yes
BW	59.89	59.89	59.89	59.89	59.89
Observations	4287	4287	4287	4287	4287

Notes: The table presents estimates of equation 1 for the outcomes in the column headings. Highly selective majors are those in the top quartile of admission rates (i.e., majors with admission rates between 1.4 and 5.6%). Potential earnings are an average of the salaries one year after graduation of 2017-2018 graduates from U. Nacional for each major. The LMOE data contains the number of graduates from each major within pre-specified earnings ranges. We then calculate the average earnings using the midpoints of the range and the number of graduates in each range. The salary data is in million pesos and the exchange rate in 2020 fluctuated between 3,300 pesos per dollar to 4,000 pesos per dollar. The 2019-1 cutoff outcomes measures what was the cutoff of applicants' intended major in the 2019-1 cycle (one year earlier). The low cutoff variance outcome is an indicator for whether the historical cutoff variance of the applicants' intended major is below the median of 25.2 points. The priority group outcome measures the order in which applicants are allowed to submit majors and takes values from 1 to 4. Sample: all applicants who are classified into a priority group in the first admission cycle, and those who applied in the first admission cycle and reapplied in any of the subsequent admission cycles. EHW standard errors at the student level.

Table B.6: Gender differences in characteristics of submitted majors

	Submitted intended major as:		2019-1 cutoff of:		Low historical cutoff variance of:	
	(1)	(2)	(3)	(4)	(5)	(6)
	First choice	Second choice	First choice	Second choice	First choice	Second choice
Below=1	-0.002	-0.015	6.212***	2.122	0.027	-0.026
	(0.032)	(0.017)	(1.235)	(2.183)	(0.027)	(0.049)
Female	-0.061	-0.018	-2.706*	-4.510	-0.043	0.009
	(0.043)	(0.022)	(1.501)	(3.016)	(0.033)	(0.062)
Below=1 × Female	0.002	0.013	-0.404	6.145	0.022	-0.037
	(0.053)	(0.027)	(2.033)	(3.757)	(0.046)	(0.080)
Constant	0.998***	0.065***	706.283***	687.596***	0.377***	0.451***
	(0.035)	(0.019)	(1.464)	(2.716)	(0.028)	(0.051)
Mean men above	0.70	0.07	694.35	684.20	0.41	0.49
Priority group FE	Yes	Yes	Yes	Yes	Yes	Yes
Intended major FE	Yes	Yes	Yes	Yes	Yes	Yes
BW	59.89	59.89	59.89	59.89	59.89	59.89
Observations	4287	4287	2861	2145	2861	2145

Notes: The table presents estimates of equation 1 for the outcomes in the column headers for each applicant's first choice and second choice. Columns 1-2 show if the intended major was submitted; Columns 3-4 show the cutoffs from 2019-1, one year before the first admissions cycle in our data. Columns 5-6 show whether the major has a low historic cutoff variance. The specification includes an indicator for being below the cutoff, an indicator for being female, a linear polynomial on the running variable, and double and triple interactions between these variables (coefficients related to the running variable not reported in the table). All columns include priority group and intended major fixed effects. EHW standard errors at the student level.

Table B.7: Gender differences in reapplying in any of the three subsequent admission cycles

	(1) Reapplied	(2) Difference best reapplication score and initial score
Below=1	0.277***	-2.294
	(0.029)	(7.598)
Female	0.031	-6.913
	(0.028)	(7.216)
Below=1 × Female	-0.122**	4.006
	(0.048)	(8.470)
Constant	0.081***	-2.841
	(0.026)	(13.085)
Mean men above	0.08	-2.21
Priority group FE	Yes	Yes
Intended major FE	Yes	Yes
BW	59.89	59.89
Observations	4287	1308

Notes: The table presents estimates of equation 1 using the probability of reapplying as the outcome. The bandwidth for the pooled regression is chosen based on the largest CCFT bandwidth chosen when obtaining RD estimates separately by gender. The specification includes an indicator for being below the cutoff, an indicator for being female, a linear polynomial on the running variable, and double and triple interactions between these variables (coefficients related to the running variable not reported in the table). All columns include priority group and intended major fixed effects. EHW standard errors at the student level.

Table B.8: Gender differences in field of study of enrolled majors

	(1) Arts	(2) Science	(3) Health	(4) Humanities/ social	(5) Business/ Econ/Law	(6) Engineering
Below=1	-0.001	-0.032*	0.004	-0.018	-0.009	-0.040*
	(0.015)	(0.017)	(0.016)	(0.018)	(0.019)	(0.024)
Female	-0.008	0.008	0.029	-0.000	0.001	-0.066***
	(0.020)	(0.019)	(0.019)	(0.024)	(0.023)	(0.025)
Below=1 × Female	0.029	0.003	-0.001	-0.018	0.012	0.028
	(0.027)	(0.028)	(0.030)	(0.035)	(0.033)	(0.036)
Constant	0.036**	0.214***	0.025	0.137***	0.134***	0.379***
	(0.016)	(0.021)	(0.016)	(0.017)	(0.016)	(0.025)
Mean men above	0.09	0.17	0.10	0.14	0.14	0.27
Priority group FE	Yes	Yes	Yes	Yes	Yes	Yes
Intended major FE	Yes	Yes	Yes	Yes	Yes	Yes
BW	59.89	59.89	59.89	59.89	59.89	59.89
Observations	4287	4287	4287	4287	4287	4287

Notes: The table presents estimates of equation 1 for the specific field of study that applicants enrolled in. Sample: all applicants who are classified into a priority group in the first admission cycle, along with those who reapplied and enrolled in any of the subsequent admission cycles. EHW standard errors at the student level.

Table B.9: Gender differences in outside options

	(1) Attending any program at application	(2) Attending intended major at application
Below=1	0.003	0.013
	(0.022)	(0.012)
Female	-0.022	-0.002
	(0.026)	(0.012)
Below=1 × Female	-0.010	-0.021
	(0.034)	(0.017)
Constant	0.090***	0.021
	(0.023)	(0.013)
Mean men above	0.08	0.02
Priority group FE	Yes	Yes
Intended major FE	Yes	Yes
BW	59.89	59.89
Observations	4287	4287

Notes: The table presents estimates of equation 1 using the probability of reapplying as the outcome. The bandwidth for the pooled regression is chosen based on the largest CCFT bandwidth chosen when obtaining RD estimates separately by gender. The specification includes an indicator for being below the cutoff, an indicator for being female, a linear polynomial on the running variable, and double and triple interactions between these variables (coefficients related to the running variable not reported in the table). All columns include priority group and intended major fixed effects. EHW standard errors at the student level.

Table B.10: Placebo Cutoffs

	Placebo cutoffs				
	(1)	(2)	(3)	(4)	(5)
	Base model	At -50	At -25	At -5	At +5
No. majors submitted (first 24h)	0.195**	0.021	-0.128	0.012	0.126
	(0.094)	(0.086)	(0.089)	(0.092)	(0.096)
No. majors submitted (cycle 1)	0190*	-0.002	-0.077	-0.069	0.117
	(0.106)	(0.094)	(0.101)	(0.109)	(0.106)
Enrolled in any major (first 24h)	0.157***	-0.002	-0.108**	0.055	0.083
	(0.050)	(0.038)	(0.048)	(0.053)	(0.052)
Enrolled in any major (cycle 1)	0.157***	-0.020	-0.077	0.027	0.094
	(0.051)	(0.039)	(0.049)	(0.052)	(0.052)
Enrolled in any major (cycles 1-4)	0.038	0.019	-0.046	0.013	0.018
	(0.046)	(0.046)	(0.048)	(0.047)	(0.046)
Potential earnings (cycles 1-4)	-0.096**	-0.082	0.059	-0.076	-0.073
	(0.049)	(0.060)	(0.055)	(0.052)	(0.047)
Potential earnings (any inst.)	-0.107**	-0.075	0.007	-0.128	-0.024
	(0.054)	(0.058)	(0.057)	(0.055)	(0.053)
Last attended postsec. (any inst.)	0.010	0.026	-0.007	-0.036	0.019
	(0.028)	(0.027)	(0.029)	(0.027)	(0.029)
Last attended U. Nacional	0.124**	-0.035	-0.054	0.123	0.044
	(0.058)	(0.047)	(0.053)	(0.056)	(0.058)

Notes: The table presents the interaction coefficient between female and below the cutoff in equation 1, that is, the gender gap for applicants just below the cutoff. The column headings indicate the placebo cutoff being evaluated. The placebo cutoffs redefine the cutoff to be 50, 25 and 5 points to the left, and 5 points to the right (the mass of observations to the right of the original cutoff is very small). The full specification includes an indicator for being below the cutoff, an indicator for being female, a linear polynomial on the running variable, and interactions between these terms. All regressions in this table include priority group and intended major fixed effects. EHW standard errors at the student level.