The Gender Gap in Gender-Blind University Admissions*

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Abstract

We document that equally qualified female students are significantly less likely to apply to and be admitted to elite universities than male students in China's gender-blind university admissions system, creating a substantial gender gap in expected future earnings. Using linked administrative and survey data, we demonstrate that this gap is not explained by gender differences in risk preferences, confidence, competitiveness, or perceived returns to elite education. Rather, women forgo the substantial returns to elite education because they prioritize proximity to home and educational-career-focused universities. Despite reporting similar personal preferences as men, female students perceive stronger parental pressure to remain close to home and to choose educational-career-focused universities. They are also more likely to align their actual choices with these parental preferences. The gap is concentrated among students with strong gender stereotype beliefs and disappears among those with weak stereotype beliefs. These findings indicate that even with a level playing field in institutional design, differing social expectations can lead men and women with similar qualifications and preferences to make different choices, with long-term economic consequences.

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1 Introduction

Understanding the factors driving the persistent gender pay gap represents one of the most critical challenges in labor economics. A growing body of evidence indicates that much of this gap results from supply-side factors: Women and men make systematically different choices in education and career paths. Women often select occupations, industries, and work arrangements that offer proximity to home, flexibility, and work-life balance but typically provide lower pay and fewer promotion opportunities (Goldin, 2014; Blau and Kahn, 2017; Wiswall and Zafar, 2018; Le Barbanchon et al., 2021; Fluchtmann et al., 2024).

However, there are two fundamental challenges when analyzing supply-side factors. First, the demand side can influence the supply side through anticipated discrimination or by offering different choice sets to men and women (Fisk and Overton, 2019; Exley et al., 2024). When women anticipate future discrimination in certain career paths, they may rationally avoid those paths despite having the qualifications and interests. Second, even when we can establish that choice differences drive outcomes, a deeper question emerges: Do these choices reflect inherent preferences, or do they result from men and women facing fundamentally different decision environments? External factors such as parental influence, social norms, and stereotype beliefs may shape choices in ways that vary systematically by gender.

To address these challenges, we study China's university admissions system, which offers a unique setting in which to isolate supply-side decision-making. Admissions are strictly based on students' rankings in the national university entrance examination (*Gaokao*)—gender, race, or extracurricular activities are not considered. This centralized process, utilizing a so-called parallel mechanism based on the student-proposing deferred acceptance algorithm (Chen and Kesten, 2017), removes both actual and anticipated gender discrimination, as students are well aware of the system's gender-blind nature. The Gaokao ranking is the sole qualification measure and provides students with clear information about their admission chances. All students with the same ranking can submit the same fixed number of applications at no cost, allowing us to directly compare equally qualified male and female students while ruling out differences in confidence or application costs as potential explanations for gender differences in application choices.

Yet, despite this gender-blind institutional design, we document a substantial gender gap in elite university applications and admissions. Between 2018 and 2023, female students constituted approximately 49% of all students admitted to nonvocational universities but only 45% of those admitted to elite universities. To investigate the causes of this gap, we compiled a comprehensive dataset of 6,440 high-school students from a county in China's Henan Province who participated in the Gaokao between 2018 and 2023. Our data combines administrative records of students' university applications, Gaokao percentile ranks, and admission outcomes with three waves of surveys that elicited both students' own preferences and their perceived parents' preferences for university attributes, as well as measures of stereotype beliefs.

Our analysis shows that female students are significantly less likely to apply to elite universities than male students with the same Gaokao percentile rank. Despite similar Gaokao ranking distributions between the two gender groups, only 11% of female students' applications are for elite universities compared to 19% of male students' applications. This gap is most pronounced in higher-order choices and among high-achieving students with good admission prospects at elite universities, ultimately resulting in a substantial gap in elite university admissions: 13% of male students but only 7% of female students are admitted to elite universities. These differences translate into meaningful economic consequences: The average universities *chosen* by female students are associated with 4.4% lower expected salaries one year after graduation and 5.4% lower salaries five years after graduation compared to those chosen by equally qualified male students. The gap in expected salaries for the universities to which female students are *admitted* is even larger (6.3% after one year and 7.6% after five years), indicating that the gender gap is most pronounced in the higher-ranked choices that determine admission outcomes.

We find that this gender gap in elite university applications is primarily driven by women's stronger tendency to prioritize proximity to home and specialization in educational careers over university prestige. Female students more frequently apply to universities located within their home province and those specializing in educational careers. When controlling for both factors, we find that the gender gap in elite university applications decreases by approximately 60%, with proximity and specialization each accounting for roughly 30% of the gap.

Our finding that women prioritize proximity and specialization in educational careers over elite status raises a key question: Do they understand the economic consequences of this tradeoff, or might information gaps explain these gendered patterns? Previous research has shown that disadvantaged groups often underestimate returns to education (Boneva and Rauh, 2018; Boneva et al., 2022). To test whether female students might similarly underestimate the value of elite education when sacrificing it for proximity and education-focused career paths, we conducted incentivized belief elicitation about average graduate salaries for a range of universities, including both elite and nonelite institutions. We find no gender differences in the estimation of returns to elite education: Female and male students expect similar salary differences between elite and nonelite universities. We further elicited beliefs regarding students' *own* expected returns to elite universities, which could be lower for women if they believe elite universities are more beneficial for men. Again, we find no gender gap that could explain our results. Reassuringly, female students also do not believe they would face discrimination at elite universities or that they would underperform relative to men. Thus, women appear fully aware of the economic consequences of their strategy of applying less frequently to elite universities.

If they are not due to information gaps, what explains these gendered application patterns? The differences could reflect either inherent preferences or social influences. Linking stated preferences to actual application choices, our evidence strongly supports the latter explanation. While female and male students report similar personal preferences for university proximity, female students perceive stronger parental pressure to remain close to home and are more likely to align their choices with these perceived parental preferences than men. Similarly, female students more commonly believe that their parents prefer universities that prepare students for careers in education, and this perceived parental preference influences their application decisions more strongly than it does for male students.

Beyond parental influence, gender stereotypes play a crucial role in shaping gendered patterns in revealed preferences for proximity and specialization. By measuring students' agreement with stereotypical statements about gender roles, such as "Girls should stay near family" and "Boys excel in STEM, girls in humanities," we find that the gender gap in elite university applications is primarily driven by students with strong stereotype beliefs. Among these students, women are significantly more likely to apply to in-province and educational-career-focused universities and are consequently less likely to apply to elite universities. In contrast, the gap in elite university applications disappears among students with weak stereotype beliefs, suggesting that women's tendency to prioritize proximity and specialization in educational careers does not reflect inherent preferences but rather the influence of social forces.

The matched administrative and survey datasets have enabled us to exclude various alternative explanations for the gender gap in elite university applications. First, differences in risk preferences do not account for the gender gap. Female and male students exhibit similar levels of risk-taking in their application choices, as measured by both admission probabilities for individual choices and the overall risk of being unmatched. Second, the survey reveals no significant gender differences in competitiveness, consistent with previous findings for Chinese students (Zhang, 2019). Third, the gender gap is not caused by women's stronger preferences for their preferred majors. Women actually demonstrate stronger preferences for university quality over specific majors by more frequently choosing options that allow universities to assign them to any major. Fourth, female students exhibit greater strategic sophistication than their male counterparts; they make fewer mistakes in ranking universities and demonstrate a better understanding of admission procedures in survey quizzes.

This study contributes to the growing literature on the supply-side factors explaining the gender pay gap. While recent studies document that women make different work choices than men (Goldin, 2014; Card et al., 2016; Blau and Kahn, 2017; Wiswall and Zafar, 2018; Le Barbanchon et al., 2021; Hakimov et al., 2023; Charpin et al., 2024; Fluchtmann et al., 2024; Haegele, 2024; Adams et al., 2025), these studies face two key challenges: distinguishing between choices driven by inherent preferences versus external influences and isolating supply-side decisions from the effects of actual or anticipated discrimination. We have tackled the discrimination concern by studying China's university admissions system, where the gender-blind, transparent process eliminates both actual and anticipated discrimination. We have addressed the preference measurement challenge by systematically eliciting both students' personal preferences and the external pressures they face, including perceived parental preferences and stereotype beliefs. Comparing revealed preferences (actual application choices) with these distinct personal and external factors, we show that the gender gap in elite university applications is primarily driven by external social influences rather than inherent preference differences, emphasizing the critical role of external factors in shaping supply-side choices. While we do not directly observe work choices, our analysis demonstrates that differences in elite university applications already generate substantial gender gaps in expected earnings and divergent career trajectories, making university choice a critical early determinant of long-term economic outcomes.

Building on this supply-side framework, we contribute to the literature on gender differences in educational choices. Previous studies have extensively documented persistent gender gaps in educational paths (Carrell et al., 2010; Zafar, 2013; Buser et al., 2014; Wiswall and Zafar, 2015; Reuben et al., 2017; Delavande and Zafar, 2019; Porter and Serra, 2020; Hakimov et al., 2023), identifying several factors driving these differences, including competitiveness (Buser et al., 2014), confidence (Hakimov et al., 2023), beliefs about returns (Wiswall and Zafar, 2015; Reuben et al., 2017), preferences for various job attributes (Zafar, 2013), and external influences (Carrell et al., 2010; Delavande and Zafar, 2019). Our contribution is threefold. First, while this literature has predominantly focused on *what* to study (field and major), we contribute to the analysis on *where* to study, demonstrating that gender stereotypes and parental influences shape university choices beyond just the choice of major. Specifically, we show that women sacrifice prestige and expected earnings for proximity and specialization in educational careers when selecting universities. Second, our comprehensive approach simultaneously examines multiple potential mechanisms, including preferences, competitiveness, confidence, beliefs about returns, and external influences, allowing us to precisely identify that parental pressure and stereotype beliefs—not inherent preferences or other factors—drive the observed gender gap. Third, we document the long-term economic consequences of these university choices, showing that the gender gap in application strategies translates into a widening gap in expected earnings trajectories.

Our findings on parental influence complement the recent experimental literature on parents' role in educational choices. Müller (2023) shows that making students' educational aspirations visible to their parents aligns these plans with their socioeconomic background and shifts preferences toward higher-earning majors. Carlana and Corno (2024) find that thinking about one's parents increases gender-stereotypical subject choices in experimental tests, though making choices visible to parents has no effect, unlike in Müller (2023). Tungodden and Willén (2023) demonstrate that parents choose less competitive options for daughters than sons and that these choices correlate with children's track choices. While these experimental studies provide causal evidence, they leave open questions about the magnitude of these effects in real-world, high-stakes decisions and their long-term consequences. Our work fills this gap by examining actual university enrollment decisions in a field setting with significant economic implications. In addition, by eliciting both own preferences and perceived parental preferences, we are able to study gender differences in compliance with parental pressure and document that female students are significantly more responsive to parental pressure than male students. To the extent that parents' expectations are well-intentioned, our findings are consistent with the notion of *paternalistic discrimination* (Buchmann et al., 2023), highlighting the role of parental expectations in guiding daughters away from high-reward elite universities.

Lastly, our work adds to the literature examining the pervasive influence of gender stereotypes on economic decisions. If decision-makers hold stereotypical beliefs about the role of gender, this can affect performance (Spencer et al., 1999), beliefs about own ability (Bordalo et al., 2019), and hiring decisions (Reuben et al., 2014; Bordalo et al., 2016). Gender stereotypes held by teachers lead to lower math performance by girls and result in fewer girls selecting demanding high schools (Carlana, 2019a). A number of studies—e.g., Coffman et al. (2021), Bohren et al. (2019, 2023), and Barron et al. (2024)—demonstrate a relationship between stereotypes and discrimination, while our work demonstrates how students' own gender stereotype beliefs and their perceptions of their parents' stereotype beliefs influence their university application decisions.

2 Background

The Chinese university admission process is designed to ensure fairness and transparency in allocating students to universities. The Gaokao, also referred to as the university entrance exam, is the sole determinant of whether a student is admitted to a university. This standardized test is administered annually in June to all students in a province simultaneously. In Henan, the province we studied, the two-day exam consists of four subject tests: Chinese, mathematics, English, and natural or social sciences, depending on the student's high-school track. Two high-school tracks are available—STEM and non-STEM—with STEM and non-STEM students taking the natural science and social science exams, respectively.

Application. After the Gaokao results are released, students have two weeks to submit their rank-order lists (ROLs), an ordered list of preferred universities and majors, through the application system. The number of universities that students can include in their ROLs is restricted and depends on their Gaokao performance. In China, universities are officially categorized into three tiers of descending prestige: tier-1 universities, tier-2 universities, and vocational schools.

In Henan province, students' application eligibility is determined by their Gaokao ranking relative to tier-specific cutoffs. Between 2018 and 2022, students scoring above the tier-1 cutoff could list up to six tier-1 universities, nine tier-2 universities, and six vocational schools. Those scoring between the tier-1 and tier-2 cutoffs could list nine tier-2 universities and six vocational schools, while those who were only above the vocational school cutoff were restricted to six vocational schools. In 2023, these limits were uniformly increased to 12 choices for each tier.

When they decide to include a university in their ROLs, students can choose up to five majors at that university. In addition, they can choose to "accept any major" (*fu cong tiao ji*), meaning students not admitted to their chosen majors may be reassigned to another major by the university. This option requires students to accept the reassignment without prior knowledge of the major.[1] STEM and non-STEM students have different major options. STEM students can only select STEM majors at universities and vice versa for non-STEM students.

Admission process. In China, the process for matching students to universities is carried out by a centralized platform. The mechanism employed is the so-called parallel mechanism (Chen and Kesten, 2017), which uses the student-proposing deferred acceptance (SP-DA) algorithm for each tier. The factors considered are student preferences, university priorities, determined solely by the Gaokao score, and university capacity, denoted by q. These are used to generate admission outcomes. The process works as follows:

Round 1: The first round concerns tier-1 universities and students whose university entrance exam scores exceed the tier-1 cutoff. In Step 1, students apply to their first choice in their tier-1 choice band. Each university s tentatively accepts at most q_s of the highest-ranking students in terms of their Gaokao score. The university rejects all other applicants.

Step 2: Students rejected by their first choice apply to the second choice in their tier-1 choice band. Each university s pools the new applicants and the applicants tentatively accepted in the first step and ranks all of them by their Gaokao score. The university then tentatively accepts at most q_s students and rejects the remaining applicants.

Step 3 and onwards: Students rejected in step n apply to their next choice. The algorithm terminates when all students who qualify for tier-1 universities are either accepted by a university or rejected by all their k choices in the tier-1 choice band.

Round 2: This round concerns tier-2 universities, students whose Gaokao score is between the tier-1 and tier-2 cutoffs, and students whose score exceeds the tier-1 cutoff but are unassigned in

[1]There are severe consequences of not choosing the "accept any major" option. Students who are admitted to a university but are rejected by all five majors will not be considered for admission by any other listed university in the same tier. They will be assigned to the next tier, and only their choices in that tier will be considered. As a result, more than 90% of students in our sample chose to "accept any major" for all their listed universities.

round 1. The procedure in round 2 is identical to round 1, except that the relevant university choices are students' rank-order lists in the tier-2 choice band.

Round 3: This round is identical to round 2, except that unassigned students will not be assigned to a university and must retake the university entrance exam in the following year to be admitted to any university.

Gender-blind admission. One noteworthy aspect of the admission process is that universities do not have autonomy in selecting applicants. They are obliged to accept the applicants with the highest Gaokao scores until they reach their quotas. Universities do not know who the applicant is or have gender or other demographic information about them. Even if such data were available, it would be illegal to utilize them during the selection process. This feature of the admission process makes it impossible for universities to discriminate against any group. The gender blindness of the admission process is made transparent to all students.

Elite universities. In China, elite universities are highly prestigious institutions that are officially recognized by the government. "Project 211," initiated in 1995, is a national program that originally designated the top 100 universities for the 21st century and has since expanded to include 124 universities in our study period (2018–2023). Universities included in this project receive additional funding and resources from the government to support their development and research. In this paper, we define these 124 Project 211 institutions as elite universities. Out of all 1,251 universities in our sample, elite universities make up about 10% of the total.

The elite status of these universities is widely recognized by students and parents, and admission to them is associated with significant labor market returns. According to Jia and Li (2021), attending an elite university in China leads to a 28–45% increase in monthly earnings compared to narrowly missing the cutoff for admission. Consequently, competition for admission to these universities is intense. Only around 3–14% of the applicant pool to elite universities are actually admitted in a typical year, with the exact number depending on the applicants' home province.

The vast majority of elite universities are tier-1 universities, meaning that they are exclusively accessible to students who score above the tier-1 cutoff on the Gaokao exam. There are three exceptions to this where elite universities feature programs that are open to students who score between the tier-1 and the tier-2 cutoff. Some elite universities exclusively offer either STEM or non-STEM programs, thereby restricting access based on the student's high-school track. Among the 124 elite universities, 21 of them are only accessible to STEM track students and six of them are only accessible to non-STEM track students.

Despite roughly gender-balanced admissions to nonvocational universities overall (49% of students between 2018 and 2023 were female), women were significantly under-represented at elite universities during this period. Based on data we collected from 115 elite universities that published their gender ratios at least three times between 2018 and 2023, women only accounted for 45% of the students admitted to these elite institutions. This under-representation was even more pronounced among the most prestigious universities: In the "Project 985" group of universities—a subset of 39 universities within the broader elite university group—women accounted for just 38% of admitted students during our study period.

3 Data and empirical strategy

Data sources. We constructed an administrative dataset of 6,440 high-school students from a county in Henan Province that encompassed all the cohorts participating in the university entrance exam between 2018 and 2023. The dataset included the students' rankings in the university entrance exam, the admission results, the rank-order lists, and demographic information (gender, age, and poverty status), all of which were collected by the government education department.

We supplemented this dataset with three surveys conducted between 2021 and 2023, summarized in Table 1. We reached out to the students through their high schools, and they received a survey link from their teachers, which ensured a high level of trust. The response rate was around 50% on average in the three waves.

The surveys contained questions about the students' considerations when choosing universities, including their preferences regarding university proximity and university specialization. They also addressed the importance of university quality versus major choice and students' perceptions of their parents' preferences on all the issues. We also elicited the students' economic preferences, which might influence university choice, such as competitiveness and risk aversion. Finally, we asked about beliefs that are critical for university application decisions. These included students' beliefs regarding admission probabilities to various universities, their anticipated academic performance in these universities, and expected salaries after graduation. We chose to repeat some questions in each wave but also added new questions and dropped some, as detailed in the last column of Table 1.

Table 1: Survey summary

	Year (1)	Valid responses (2)	Admin sample (3)	Response rate (4)	Information collected (5)
Wave 1	2021	379	994	38.1%	university quality vs. major preference, understanding of matching rules
Wave 2	2022	662	957	69.1%	risk, university quality vs. major preference, preference for proximity (self and parents), understanding of matching rules, ambiguity aversion
Wave 3	2023	438	1111	39.4%	risk, university quality vs. major preference, preference for proximity (self and parents), preference for specialization (self and parents), beliefs (e.g., perceived expected salaries), competitiveness, ambiguity aversion
Total		1479	3062	48.3%	

Notes: This table provides an overview of the three surveys conducted between 2021 and 2023, including the number of valid responses and the information collected. The administrative sample of 3,062 students represents the cohorts participating in the Gaokao between 2021 and 2023, which is a subset of the 6,440 students in our full dataset spanning from 2018 to 2023. The response rate is calculated as the ratio of valid responses to the administrative sample for each wave.

In each wave, the students completed the survey after receiving their Gaokao scores but before learning about their admission to specific universities and majors. We chose this point in time for the following reasons. Students start submitting their university ROLs shortly after receiving their exam scores. By having students complete the questionnaire during this period, we were able to capture the students' intentions when selecting universities. At the same time, being aware of admission outcomes can potentially influence their preferences and beliefs. Therefore, administering the survey prior to the announcement of the admission results ensured that students responded in a manner consistent with their application choices.

Variables. To assess whether students with equal qualifications applied to universities of the same quality, we needed a measure of the quality of a university. To complement our main measure of elite status, we included a second indicator of a university's quality: the average salary of its alumni.[2] This organization surveys the monthly income of graduates from 900 tier-1 and tier-2 universities in China, which accounts for 72% of the universities included in our sample. In particular, we accessed

[2]We obtained this information from the Chinese salary statistics organization (`www.xinchou.cn`).

data on the average salaries of the 2013 and 2017 cohorts in the year 2018. The average salary earned by the class of 2017 represents how much an average student can expect to earn right after graduating from the university, while the salary earned by the class of 2013 reflects the mid- to long-term value of attending the university.

We had access to the complete ROLs of students and their corresponding matching outcomes, allowing us to assess both the quality of each university that students listed and the quality of the university they were ultimately matched with. The students' qualifications were determined by their Gaokao scores, which we had access to through administrative records. To account for factors such as variations in Gaokao scores across years and high-school academic tracks (STEM versus non-STEM), we standardized the Gaokao raw scores into rankings within high-school tracks.

Our main variable of interest was gender, but we also obtained data on students' other personal characteristics, including age, high-school academic track, residence status, poverty status, and whether they were first-time Gaokao takers or not.

Sample of students' university choices. We limited our analysis to students who scored above the admission cutoff for tier-2 universities in the Gaokao. This sample accounted for around 50% of students in the county we studied, which was typical for Henan province. We imposed this restriction because we did not have a reliable measure of the quality of tier-3 (vocational) schools.[3] We removed unfilled and invalid observations (such as those students who did not meet the minimum score requirement for tier-1 universities but still applied to one). As a result, the final sample consisted of 66,847 observations of university choices.

Summary statistics. Table 2 presents the summary statistics of the key variables. The sample was gender balanced, with approximately 50% male and female students. Both genders were inclined toward choosing the STEM track in high school, but men chose it more often. Of the entire sample, 13.1% of students were repeat exam takers, with male students being more likely to be in this group. The slight age difference between male and female students can also be explained by this difference in exam retaking. Less than 10% of the students in our sample had official poverty status, with equal

[3]We could not use elite status to measure the quality of vocational schools because all elite universities are in tier 1 or tier 2. Likewise, we could not use the average salary of the alumni to measure vocational school quality because the salary data only covered tier-1 and tier-2 universities.

proportions of female and male students. Regarding the percentile rankings in the Gaokao score, on average, female and male students did not differ.

We collected 1,479 valid survey responses across three waves in 2021, 2022, and 2023 from the 3,062 students in our administrative dataset of the three cohorts, implying an average response rate of approximately 50% (see Table 1). The demographic characteristics of the survey respondents closely matched those of the entire administrative sample, as detailed in Appendix Table A1.[4]

[4]The only difference was a lower percentage of repeat exam takers and thus a slightly lower age in the survey sample compared to the entire administrative dataset.

Table 2: Summary statistics

	Total (1)	Male (2)	Female (3)	Difference (2)-(3)
Panel (a): Individual characteristics				
STEM track	0.809	0.923	0.693	0.230***
	(0.393)	(0.267)	(0.462)	(0.009)
Repeat exam taker	0.131	0.150	0.112	0.037***
	(0.338)	(0.357)	(0.316)	(0.008)
Local residence	0.970	0.971	0.968	0.003
	(0.172)	(0.167)	(0.176)	(0.004)
Age	18.305	18.369	18.240	0.129***
	(0.772)	(0.781)	(0.756)	(0.019)
Poverty status	0.095	0.091	0.098	-0.007
	(0.293)	(0.288)	(0.298)	(0.008)
Percentile ranking	0.232	0.232	0.232	0.000
	(0.163)	(0.163)	(0.162)	(0.004)
Elite university admission	0.101	0.129	0.072	0.057***
	(0.301)	(0.335)	(0.259)	(0.007)
Observations	6,440	3,262	3,178	
Panel (b): Application choice characteristics				
Share of elite university	0.151	0.187	0.114	0.073***
	(0.358)	(0.389)	(0.318)	(0.003)
Share of in-province university	0.445	0.398	0.494	0.096***
	(0.497)	(0.490)	(0.500)	(0.004)
Share of education university	0.178	0.111	0.249	0.138***
	(0.383)	(0.314)	(0.432)	(0.003)
Share of STEM university	0.379	0.470	0.282	-0.189***
	(0.485)	(0.499)	(0.450)	(0.004)
Observations	66,847	34,259	32,588	

NOTES:.This table reports the summary statistics of high-school students and their application choices. Panel (a) shows individual characteristics and Panel (b) shows their university choices. Column (1) shows overall sample statistics, Columns (2) and (3) show the means and standard deviations for each variable, differentiated by gender, and Column (4) shows the differences between male and female students. "STEM" is a binary indicator for students who chose the STEM track in high school; "Repeat exam taker" refers to students who have taken the entrance exam more than once; "Local Hukou" indicates students possessing a local residency permit (hukou); "Poverty status" represents students with official poverty status; "Percentile ranking" is a student's Gaokao rank; "Elite university" classifies the university applied to as elite or not. Statistical significance levels are indicated as: *** p<0.01, ** p<0.05, * p<0.1.

4 Results: Gender differences in applications and admissions

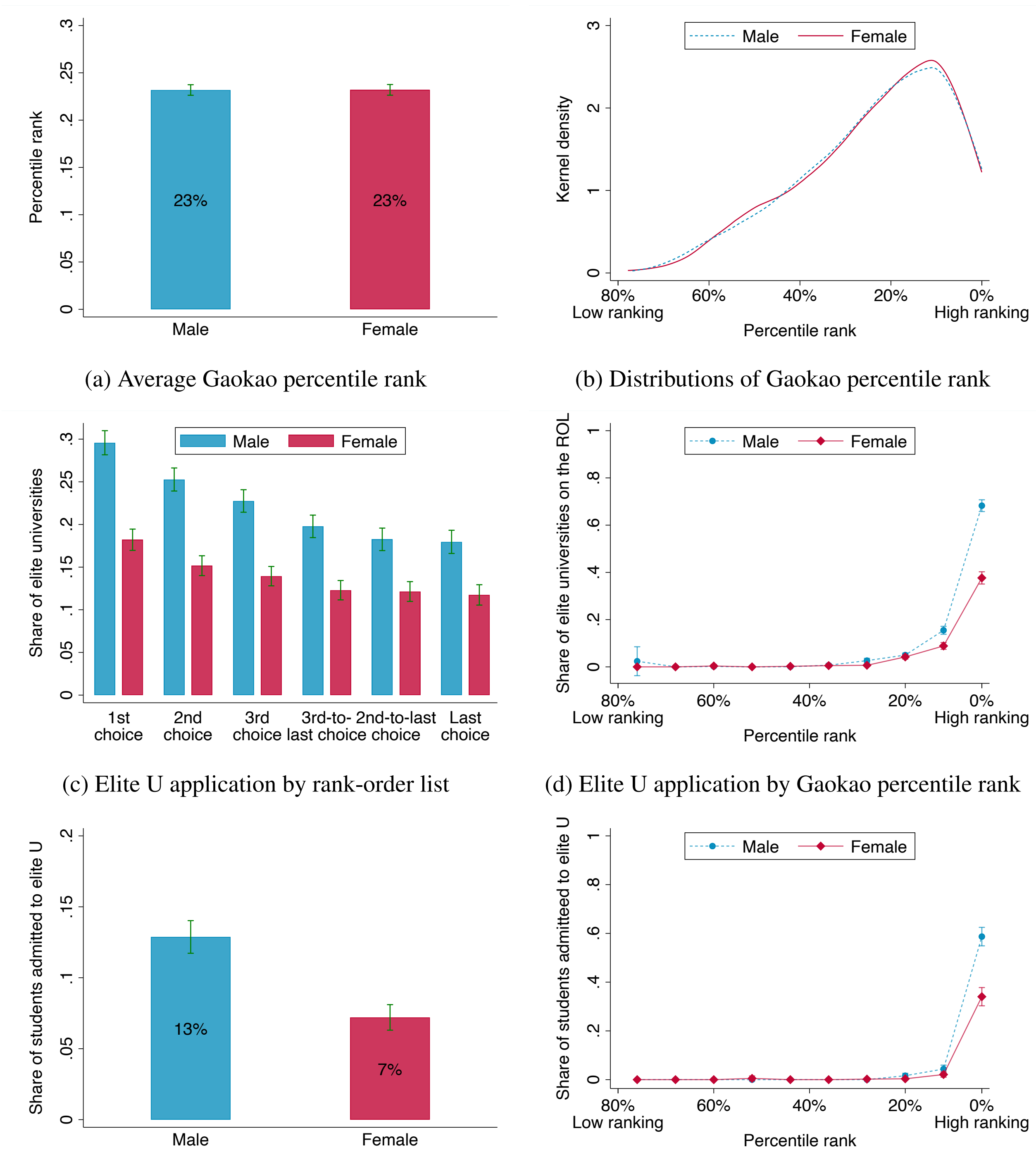
In this section, we document how applications and admission outcomes differ for men and women. We first show that female students are less likely to apply and be admitted to elite universities than male students, even though they are equally qualified on average. Next, we provide graphical and econometric evidence that the gender gap in elite university applications holds for male and female students with the same qualifications. Lastly, we examine gender differences in expected salaries after graduation.

Figure 1 displays the gender gap in elite university applications and admissions. Panels (a) and (b) show the average and the distribution of students' Gaokao percentile ranks, respectively. The average ranking of both male and female students is at the 23rd percentile, and the distributions do not differ systematically.

At the same time, we observe a substantial difference in applications to elite universities between male and female students. Elite universities account for 19% of the universities on male students' ROLs, while, for female students, the share is only 11%. There is a gender gap, both at the extensive and the intensive margin. While 33% of male students apply to at least one elite university, only 22% of female students do so. Among those who apply to elite universities, male students also include more elite universities on their ROLs than their female counterparts (54% versus 47%). Panel (d) of Figure 1 displays gender differences in elite university applications across the Gaokao ranking distribution. Notably, only the students with the highest Gaokao rankings allocate a significant share of their choices to elite universities, a phenomenon that can be explained by the constrained ROLs. In the range of Gaokao rankings where students apply to elite universities, a clear pattern emerges: Male students consistently include more elite universities on their ROLs than female students.

Next, we examine whether these gender differences in applications translate into admission outcomes. While application patterns might reflect inconsequential choices, our analysis shows otherwise. We first test whether the gender gap in elite university applications persists in the higher-ranked choices on the ROLs, which carry greater weight in the admission process. Panel (c) of Figure 1 demonstrates that while both male and female students are more likely to select elite universities at the top of their ROLs, a significant gender gap exists across all choice positions. The gap is most pronounced in the higher-ranked choices, with an 11 percentage point difference in the first choice (29% for men versus 18% for women) compared to a 6 percentage point difference in the last choice (19% for men versus 13% for women).

Figure 1: Gender differences in Gaokao performance, elite university applications, and admissions



(a) Average Gaokao percentile rank

(b) Distributions of Gaokao percentile rank

(c) Elite U application by rank-order list

(d) Elite U application by Gaokao percentile rank

(e) Admission rate to elite universities

(f) Admission rate by Gaokao percentile rank

Notes: The figure reports gender differences in Gaokao performance, elite university applications, and admission rates. Panel (a) shows the average Gaokao percentile rank for male and female students. Panel (b) shows the distribution of Gaokao percentile rank for male and female students, with the percentile cutoff at the 80th percentile, because we only include students who scored above the tier-2 cutoff in our analysis. Panel (c) shows the average share of elite universities on male and female students' rank-order lists (ROLs) by application choice order. Panel (d) shows the share of elite universities in the ROL by male and female students' Gaokao percentile ranks. Panel (e) shows the share of students admitted to elite universities by gender. Panel (f) shows the admission rate to elite universities by Gaokao percentile rank.

These systematic differences in application strategies translate into admission outcomes. As shown in Panels (e) and (f) of Figure 1, there is a substantial gender gap: 13% of male students are admitted to elite universities compared to only 7% of female students ($p < 0.01$). This admission gap persists across the entire Gaokao ranking distribution, with male students consistently achieving higher elite university admission rates than female students of the same ranking range at all performance levels with a nonzero admission probability, see Panel (f).

When focusing only on students qualified for tier-1 universities, a particularly relevant subset, since all but three elite universities only admit tier-1 students, we find that the gender gap in applications and admissions persists (see Appendix Figure A1).

Taken together, our results indicate that female students are less likely to apply to and be admitted to elite universities than male students, despite performing similarly on the Gaokao.

Gender gap in elite university applications among equally qualified female and male students. To test for the gender gap in elite university applications for male and female students of the same Gaokao percentile rank, we estimate the following equation:

$$Elite_{ijt} = \beta_1 female_j + \theta X_j + \gamma_i + \delta_t + \varepsilon_{ijt}, \tag{1}$$

where $Elite_{ijt}$ is an indicator variable that equals 1 if student j, who took the Gaokao in year t, chooses an elite university in their ith choice. The indicator variable $female_j$ equals 1 for female students. Choice-order fixed effects are captured by γ_i and absorb all choice-specific characteristics. Year fixed effects δ_t account for any annual shocks that are common across students in the same cohort (e.g., the popularity of certain types of universities in a given year). The term X_j is a vector of individual-level characteristics, including student j's Gaokao percentile rank, high-school academic track (STEM or non-STEM), age, residence status, poverty status, and whether they are a repeat exam taker. Lastly, ε_{ijt} is the error term, and standard errors are clustered at the individual level to allow for correlation across choices within an individual's ROL.

We compare the elite university application choices of equally qualified male and female students by controlling for their Gaokao percentile rank and their high-school track (STEM or non-STEM). Instead of assuming a linear relationship between ranking and elite applications, we use Gaokao percentile rank indicator variables, with one indicator for each percentile. As shown in Figure 1, the likelihood of applying to an elite university is very low among lower-ranked students and increases sharply for higher-ranked students. This indicator variable approach allows us to compare male and female students with equivalent qualifications while appropriately accounting for the sharp changes in application behavior across different Gaokao rankings. We also control for high-school track, because students only compete with other students in the same track in university admissions. The track choice is made in the second year of high school and cannot be altered at the time of university application. Thus, it is not one of the university application choices that our study focuses on.

We report the gender gap in elite university applications between equally qualified male and female students in Table 3. The first column indicates that female students are 1.3 percentage points less likely to choose elite universities on their ROLs than their male counterparts with the same Gaokao percentile rank. Given that the average share of elite universities on male students' ROLs is 18.7%, a 1.3% decrease indicates a 7.0% gender gap in elite university applications.

Table 3: Gender differences in elite university applications

Dependent variable	Chosen university is elite		Admitted university is elite	
	(1)	(2)	(3)	(4)
Female	-0.013***	-0.013***	-0.011**	-0.011*
	(0.005)	(0.005)	(0.006)	(0.006)
Gaokao ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓		
Demographic controls		✓		✓
Observations	66,847	66,847	6,440	6,440
R-squared	0.538	0.539	0.518	0.519
Mean DV	0.151	0.151	0.101	0.101
Std.Dev. DV	0.358	0.358	0.301	0.301

Notes: This table presents regression results analyzing the likelihood of applying and being admitted to an elite university by gender, controlling for Gaokao performance. The unit of observation is a student choice in Columns (1) to (2) and a student in Columns (3) to (4). The dependent variables are binary, indicating whether the chosen university is elite or not in Columns (1) to (2) and whether the university to which the student is admitted is elite or not in Columns (3) to (4). "Female" is an indicator variable equal to 1 for female students. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution, and the high-school track. Year FE are fixed effects for the year of Gaokao. Rank-order FE are fixed effects for the order of the choice on the ROL. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Standard errors, reported in parentheses, are clustered at the student level to accommodate multiple choices on the ROL per student in Columns (1) to (3). *** p<0.01, ** p<0.05, * p<0.1.

In the second column of Table 3, we report results with additional control variables for individual characteristics, including age, residence status, poverty status, and repeat exam taker status. Adding these control variables addresses concerns regarding systematic differences in family background between male and female students. Our results remain qualitatively unchanged after controlling for these demographic variables.

While our findings demonstrate a substantial gender gap in elite university applications, one might argue that this gap could be driven by choices that are inconsequential for admission outcomes. To address this concern, we examine whether gender differences in applications to elite universities persist in the more consequential first three choices on the ROL. We observe that gender differences in elite university applications exist in each of the first three choices, with the difference being the largest in the first choice and smallest in the third choice (see Appendix Table A2). Notably, the gender gaps for the first three choices are all larger than the average gender gap among all choices, indicating that the gender difference is even stronger for more consequential choices.

Ultimately, these differences in application choices translate into a substantial gap in admission outcomes. As shown in Columns (2) to (4) of Table 3, female students are on average 1.1 percentage points less likely to be admitted to an elite university than male students of the same percentile rank. Given male students' 13.0% admission rate to elite universities in our sample, this difference represents an 8.5% gender gap in elite university admissions, demonstrating that the observed gender differences in applications have real consequences for admission outcomes. Again, we find that the gender gap is even more pronounced among students who scored above the tier-1 cutoff (see Appendix Table A3). Compared to male students of the same Gaokao percentile rank, female tier-1 students exhibit a 1.9 percentage point lower probability of listing elite universities on their ROLs, which causes a 2.4 percentage point lower probability of admission to elite universities.

Taken together, our findings indicate that female students are less likely to apply to elite universities than male students with the same qualifications and are less likely to be admitted to elite universities.

Gender differences in expected salaries after graduation. To quantify the economic consequences of women's application strategies, we analyze the expected earnings gap resulting from their university choices. Our salary data is at the university level and represents what past graduates from a given university earn on average rather than individual earnings. Specifically, we use two measures of expected earnings of attending a university: "1 year" represents the average salary of the 2017 graduates of the university measured in 2018, and "5 years" captures the 2013 cohort's average salary in 2018. While this university-level approach cannot account for potential gender differences in returns within each university, it provides a valuable benchmark for the economic trade-offs students face when making application decisions. These university-level salary figures likely represent the information available to students during their decision-making process, making them particularly relevant for understanding how women's versus men's application strategies translate into expected economic outcomes.

As shown in Panel (a) of Figure 2, the average expected salary one year after graduation for universities chosen by male students is higher than for those chosen by female students across all positions on their rank-order lists. The salary gap is more pronounced for first choices, which have a greater impact on admission outcomes, and the gap is more pronounced for five-year salaries, indicating a widening gender gap in expected earnings over time. The aggregate effect is substantial: Universities chosen by male students are associated with average monthly earnings of 4,496 yuan (approximately \$626) one year after graduation compared to 4,313 yuan (approximately \$601) for universities chosen by female students, i.e., a 4.4% difference. This gap widens to 5.4% when considering five-year postgraduation earnings (5,941 yuan versus 5,621 yuan).

Panel (b) of Figure 2 demonstrates that the gender gap in expected salaries persists across the entire performance distribution. Expected earnings remain relatively flat from the 80th to the 20th percentile of Gaokao performance, with a pronounced surge occurring only among the top 20% of performers—precisely those with access to elite universities. This pattern demonstrates the substantial economic returns to elite university attendance and explains why the application gap at these institutions translates into meaningful earnings differences. Regression results in Appendix Table A4 further quantify this relationship, showing that approximately half of the gender gap in expected salaries is directly attributable to women's lower application rates to elite universities.

Panel (c) and (d) of Figure 2 show that the gender gap in expected earnings is even larger (6.3% for one-year and 7.6% for five-year salaries) when comparing the universities that students are ultimately admitted to rather than the universities they apply to. This is due to the fact that gender differences are most pronounced for higher-ranked choices, which are most consequential for admission outcomes.

Perceived returns to elite education. Our findings indicate that female students are less likely to apply to elite universities than male students with the same qualifications, which has long-term consequences for labor market outcomes. A natural question is whether women are aware of the consequences of their strategy of applying less to elite universities. It is possible that female students are misinformed about the returns to elite education, which could explain their choices.

Figure 2: Gender differences in expected salaries by Gaokao rankings

(a) Expected salary, by choice rank

(b) Expected salary, by Gaokao percentile rank

(c) Expected salary of U admitted to

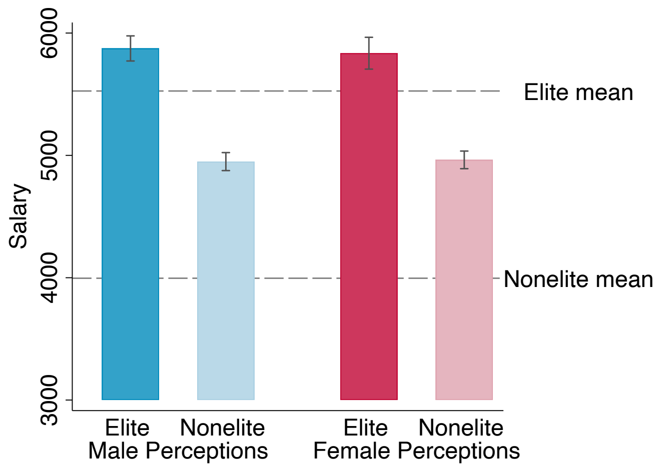
(d) Expected salary of U admitted to, by Gaokao percentile rank

Notes: This figure reports expected salaries for graduates from universities on students' rank-order lists (ROLs). Expected salaries are measured as the average monthly salaries of graduates from each university. Panel (a) shows expected salaries by choice order, comparing average salaries one year ("1 year") and five years ("5 year") after graduation. Panel (b) presents expected salaries by Gaokao percentile rank. The horizontal axis represents the Gaokao percentile rank, from lower (left) to higher (right) rankings.

To address this possible explanation, we elicited students' perceived returns to elite education in our survey. To ensure the comparability and relevance of these survey questions, we employed a customized approach. We categorized students into different groups based on their high-school track (STEM and non-STEM) and their ranking in the Gaokao. Within each group, we presented the same set of eight universities to the students. This approach serves two purposes: First, it accounts for the fact that universities admit students based on their academic track and ranking, leading to varying university options for students with different academic tracks and rankings. For instance, a student who only meets the cutoff for tier-2 universities has a probability of zero for admission to a tier-1 university. Thus, their beliefs regarding tier-1 universities are not relevant. Second, by presenting the same universities rather than relying on students' chosen universities on the ROLs, we are able to elicit students' beliefs about the same universities, which ensures comparability between male and female students.

To test whether female students are more likely to underestimate returns to elite education, we asked students to estimate the average salaries of graduates from each of the eight universities presented to them. To enhance the accuracy of their estimations, we provided a reference point of the average starting salary of graduates from a well-known university. We further incentivized accurate estimates by offering an extra monetary reward for answers within 100 yuan of the true monthly salary.

Figure 3: Gender differences in perceived average salaries



Notes: This figure reports average perceived monthly salaries (in yuan) for elite and nonelite universities by gender. The left pair shows male students' salary estimates, while the right pair shows female students' estimates. Darker bars represent elite universities, lighter bars represent nonelite universities. Horizontal dashed lines indicate the actual average salaries: "Elite mean" for elite universities and "Nonelite mean" for nonelite universities. Error bars represent 95% confidence intervals.

Figure 3 reports gender differences in perceived expected salaries for elite versus nonelite universities. Both male and female students recognize the substantial returns to elite education, reporting significantly higher expected salaries for elite than for nonelite universities. However, even though men and women slightly overestimate all average salaries, they underestimate the earnings gap between elite and nonelite universities. Most importantly, there is no gender difference in the perceived returns to elite education: male and female students have similar beliefs regarding the expected salaries of both elite and nonelite universities. The regression results in Appendix Table A5 show that this absence of a gender difference in perceived returns also holds when controlling for Gaokao performance and demographics.

Additionally, it is possible that women expect their own returns to attending an elite university to be low, even if they believe average returns are high (Kiessling et al., 2024). To explore this possibility, we asked students to assess their future salaries after graduation if they were to attend each of the eight universities. Columns (3) and (4) of Appendix Table A5 present the regression results on gender differences in estimated own future salaries. As was also evident in the estimates of average salaries for past graduates, when it comes to returns to elite education for themselves, female students are not significantly more pessimistic. Thus, the gender gap in elite university applications is not driven by gender differences in perceived returns to elite education. Women seem to be aware of the economic consequences of their strategy of applying to fewer elite universities.

5 What explains the gender gap in elite university applications?

Having established that there is a gender gap in applying to elite universities among equally qualified male and female students, that this gap has long-term economic consequences, and that women seem to be aware of the consequences, we now investigate the factors driving this gender gap. We first show that a substantial share of this gap can be explained by women's stronger tendencies to choose nearby universities and those that focus on educational careers. We then use survey data to explore the origins of these tendencies, focusing on the roles of parental influence and gender stereotype beliefs. Finally, we examine and rule out several alternative explanations by combining administrative and survey data, including differences in risk aversion, strategic sophistication, confidence, perceived returns to elite universities, the trade-off between university quality and major choice, and competitiveness.

5.1 Proximity and specialization of universities

One potential reason for not applying to an elite university is that students may value other university attributes more highly than the university's elite status. Female students, in particular, may hold stronger preferences for these alternative attributes and be more inclined to pursue them, at the cost of attending an elite university. We identify two such attributes: geographical proximity and specialization of universities.

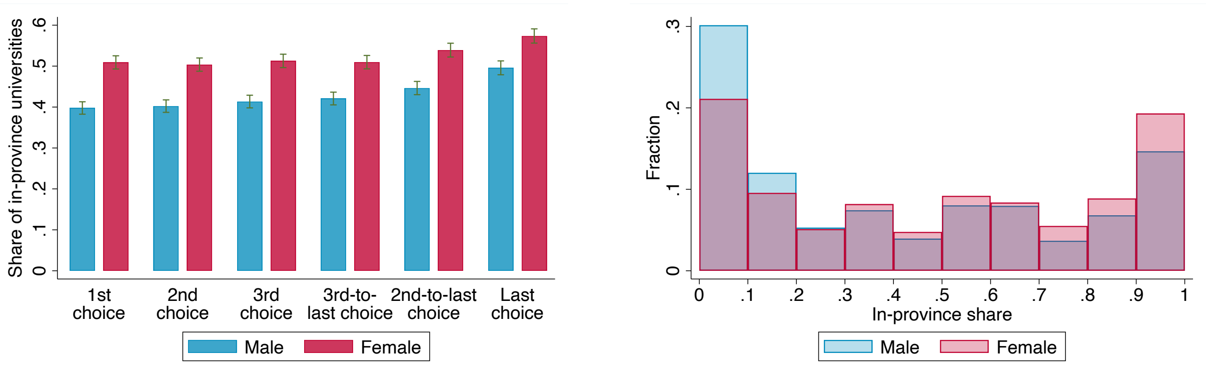
Geographical proximity. Recent research has found that women exhibit a preference for proximity to home when it comes to job search in France (Le Barbanchon et al., 2021), Sweden (Bütikofer et al., 2024), and Denmark (Fluchtmann et al., 2024), as well as in university choice in the US (Mattern and Wyatt, 2009; Birnbaum et al., 2024; Toutkoushian et al., 2024) and Germany (Boelmann, 2024). If female students value proximity more than male students, they are more likely to face a trade-off between universities that are closer to home but of lower quality and universities that are further away but of higher quality. A preference for proximity could thus cause female students to apply to fewer elite universities. In Appendix A2, we provide a simple conceptual framework and a numerical example illustrating how the preference for proximity affects university choices on students' ROLs.

In our sample, we observe that female students list more nearby universities than male students. Figure 4 illustrates the differences between male and female students in their university location choices. Panel (a) shows the share of in-province universities, which are defined as universities whose campus is located in the same province as the county of residence, among students' choices. While 40% of male students' listed universities are in-province universities, the share is significantly higher for female students, at 49% ($p < 0.01$). We observe this gender difference in university choice both for higher-order choices and the last choices on the ROLs, with the difference being slightly higher for the more consequential higher-ordered choices. We find similar results if we compare the average distance from home to the universities listed by male and female students.[5] On average, the universities chosen by male students are approximately 71 kilometers further away from their county of residence than those of female students, which is roughly 10% of the average distance to universities listed by female students. It is worth noting that more women exclusively choose in-province universities. In Panel (b) of Figure 4, we calculate the distribution of the share of in-province universities on the ROLs for both male and female students. Among female students, 21% listed only in-province universities on their entire ROLs, compared to 16% of male students ($p < 0.01$).

In order to investigate whether these geographical preferences can explain gender differences in elite university applications, we conduct the main regression analysis (specified in Equation 1), adding students' preferences for proximity as a control variable. We measure students' proximity preferences by the share of in-province universities on their ROLs and the average driving distance to the universities listed on the ROLs. The regression results are presented in Table 4, Columns (1)

[5]We calculated the university-to-home driving distance using data obtained from Baidu Maps (`map.baidu.com`).

Figure 4: Preference for university proximity



(a) Share of in-province universities by choice order (b) Distribution of in-province share on the ROLs

Notes: The figure reports the choices of male and female students regarding the location of universities. Panel (a) shows the share of universities located in Henan province and included on the ROLs of male or female students. Panel (b) shows the distribution of the in-province university share for both male and female students. In-province share is defined as the percentage of in-province universities on a student's ROL.

and (2). The inclusion of control variables representing proximity reduces the gender gap in elite university applications by 31% compared to the benchmark regression. Listing more in-province universities is significantly negatively correlated with the probability of applying to elite universities, providing evidence of a trade-off between university quality and proximity. Thus, gender differences in choosing nearby universities account for a sizable share of the gender gap in applying to elite universities.

While our findings on proximity preferences are based on data from a specific province, it is important to consider their broader implications and generalizability. First, the gender difference in preference for proximity is not unique to this province or to China. As mentioned earlier, similar patterns have been observed in the United States and Europe, both for job search and university applications (Mattern and Wyatt, 2009; Le Barbanchon et al., 2021; Birnbaum et al., 2024; Boelmann, 2024; Bütikofer et al., 2024; Fluchtmann et al., 2024; Toutkoushian et al., 2024). Second, one might argue that the trade-off between elite status and proximity in elite university applications could disappear in regions like Beijing and Shanghai, where many elite universities are located. Indeed, we could expect students in these areas to face this trade-off less often due to the higher number of in-province elite universities. However, this quality versus proximity trade-off would only be completely eliminated in the extreme case where all elite universities are concentrated in a single region. Moreover, this degree of concentration of elite universities would mean an even stronger trade-off for students in other regions. In fact, Beijing and Shanghai combined are home to only 30% of China's elite universities, and students in these regions still face the quality versus proximity trade-off. To examine

Table 4: University proximity, specialization, and the gender gap in elite university applications

Dependent variable	Chosen university is elite			
	(1)	(2)	(3)	(4)
Female	-0.013***	-0.009*	-0.008	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)
Driving distance		0.013		0.013
		(0.009)		(0.009)
In-province share		-0.076***		-0.075***
		(0.009)		(0.009)
Education university share			-0.050***	-0.007
			(0.011)	(0.011)
STEM university share			0.005	0.021*
			(0.012)	(0.012)
Gaokao ranking FE	✓	✓	✓	✓
Rank-Order FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓
Observations	66,847	66,847	66,847	66,847
R-squared	0.539	0.543	0.540	0.543
Mean DV	0.151	0.151	0.151	0.151
Std.Dev. DV	0.358	0.358	0.358	0.358

Notes: This table reports regression results examining the factors explaining the gender gap in elite university applications. The dependent variable is a binary indicator of whether the chosen university is elite. "Female" is an indicator of female students. "Driving distance" is the log-transformed average driving distance from home to the university on a student's ROL. "In-province share" represents the share of in-province universities on a student's ROL. "Education university share" and "STEM university share" are indicators of university specialization share. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution, and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and Rank-Order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

this trade-off, we collected the admission cutoff scores for universities among students in Beijing and Shanghai, where a higher cutoff score for a university represents a stronger preference. In both regions, approximately 10% of out-of-province elite universities have lower cutoff scores than one or more nonelite in-province universities, indicating that students in these regions also sacrifice elite status for proximity.

University specialization. Another potential explanation of the gender gap in elite university applications is differential preferences for university specialization, reflecting differences in career aspirations. A large literature has explored gender differences in job types and career paths, consistently revealing differences in men's and women's preferences for occupations and industries (Cejka and Eagly, 1999; Croson and Gneezy, 2009; Blau and Kahn, 2017). Specifically, girls often aim for occupations such as teaching (Bayard et al., 2003; Pan, 2015), while boys appear more likely to pursue careers in STEM fields (O'Dea et al., 2018; Brenøe and Zölitz, 2020). These differences in career preferences may contribute to the gender difference in elite university applications.

To investigate the role of differences in career preferences, we examine the shares of men and women selecting universities with different specializations. In China, university specializations are officially categorized by the Ministry of Education, providing public information easily accessible to students and parents. This specialization indicates that a university focuses on and is known for a particular subject category, offering more majors in that discipline. For instance, STEM universities specialize in science, technology, engineering, and mathematics majors, while "education universities" (known as "normal universities" in China) focus on training teachers. It is important to note that while these universities specialize in certain fields, they also offer majors in other disciplines.

We find systematic gender differences in choosing university specializations. Among male students, STEM universities are the most popular choice, accounting for 47% of their applications.[6] This is a significantly higher share than is evident among female students, with a difference of approximately 19%. Conversely, about 25% of female students opt for education universities, compared to only 11% of male students. These substantial gender differences in applying to STEM versus education universities could be a contributing factor in the observed gender gap in elite university applications.

To study the quantitative effect of gender differences in preferences for university specialization on the gender gap in elite university applications, we add the share of education universities and the share of STEM universities on students' ROLs to the main regression analysis as control variables. The results are shown in Column (3) of Table 4. When preferences for specialization are added to the regression, the *Female* coefficient decreases by 38% and is no longer statistically significant.

Furthermore, Column (4) of Table 4 shows that controlling for both preferences for university proximity and specialization reduces the *Female* coefficient by 62%, causing the gender difference to almost disappear. Notably, the remaining gender gap in elite university applications is likely an

[6] In our sample of 1,251 universities, STEM universities are the most prevalent (31%), followed by comprehensive universities (24%), education universities (16%), and business universities (9%).

upper bound. While the share of in-province and education universities can account for students' preferences for in-province and education universities respectively, they are noisy measures of the underlying preference. Measurement error leads to an overestimation of the *Female* coefficient because part of the effect that should be attributed to the preference for in-province or education universities is instead attributed to the effect of gender on elite university applications.

To understand how much of the gender gap in elite university applications can be explained by tendencies for proximity and specialization, we perform a Gelbach decomposition (Gelbach, 2016). This method takes into account the correlation between factors that can explain the gender gap, which are relevant in our setting, because preferences for proximity and specialization are likely to be correlated with each other, meaning that the difference in the point estimates of the gender gap with and without controlling for each preference also captures the influence of the other preference. Our analysis reveals that these two factors together explain 64% of the gender gap in elite university applications, with the preference for in-province universities accounting for 34% and the tendency to choose education-focused universities explaining 30% of the gap. The remaining 36% of the gap persists even after controlling for both proximity and specialization preferences.

Taken together, we find that most of the gender gap in elite university applications can be explained by gender differences in preferences for university proximity and specialization.

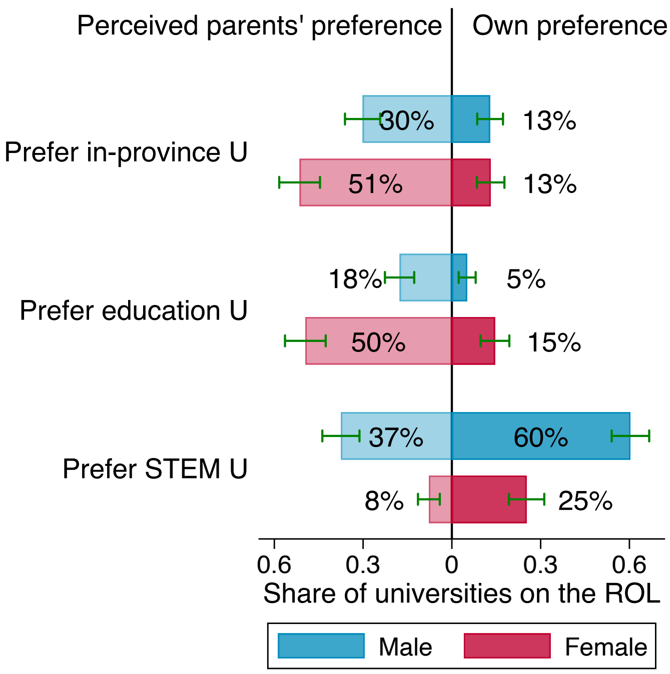
5.2 Inherent preferences or external influences?

Our analysis indicates that differences in choices regarding proximity and specialization explain a substantial proportion of the gender gap in elite university applications. This finding raises the question of why these preferences differ between men and women. Understanding the origins of this difference is not just of academic interest but also has important policy implications. If the preferences are homegrown, there might be little justification for policies designed to change them. However, if they are primarily shaped by external forces, such as parental influence or gender stereotype beliefs, targeted interventions could potentially reduce the gender gap in elite university applications and, by extension, long-term career outcomes.

We included questions in the survey to identify various influences on students' university choices. The survey directly asked students about their own preferences in university applications, their perceptions of their parents' preferences, and their own and their perceived parental stereotype beliefs.

Students' stated preferences and perceived parents' preferences. To explore the source of the difference in university preferences, we first investigate students' own preferences for in-province and out-of-province universities, along with their perceptions of their parents' preferences. The results, shown in the top panel of Figure 5, indicate that the majority of students either favor out-of-province universities or are indifferent between in-province and out-of-province universities. Only 13% of female students prefer in-province universities, a share that does not significantly differ from that of male students. However, a gender difference emerges when considering perceived parental preferences: More than half of female students believe that their parents want them to stay within the province (51%), while only 30% of male students hold this belief. Thus, despite female and male students stating similar preferences for proximity, they perceive their parents as having different preferences for them.

Figure 5: Stated preferences for proximity and specialization: Self and parents



Notes: This figure reports students' own preferences (right of the vertical line) and their perceptions of their parents' preferences (left of the vertical line) for university proximity and specialization. Bars represent the share of survey participants indicating each preference, with separate results for male and female students.

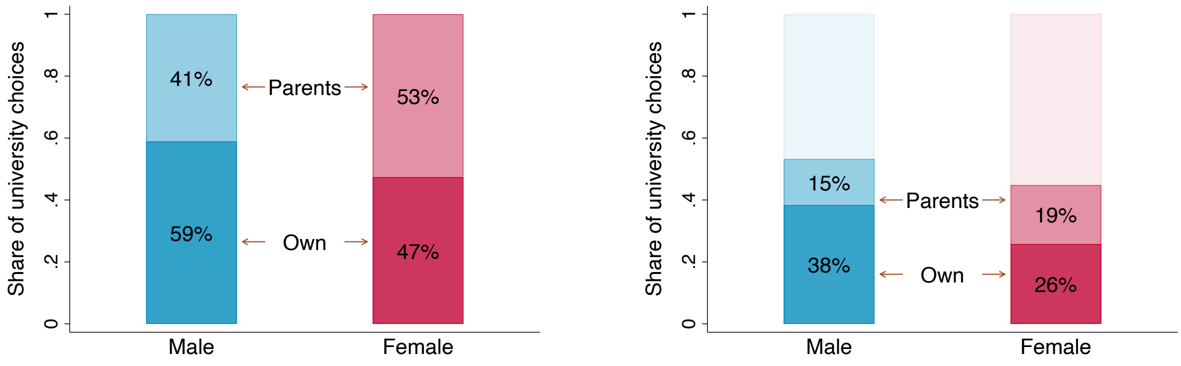
Similar patterns emerge when we extend this analysis to university preferences. The middle and bottom parts of Figure 5 present students' preferences and their perceptions of their parents' preferences for education and STEM universities, respectively. Male students show a much stronger preference for STEM universities than female students, while female students show a stronger preference for education universities. However, according to their own stated preferences, both male and female students favor STEM universities over education universities. When it comes to their perceptions of their parents' preferences, half of female students believe that their parents would prefer them to attend education universities over other universities; the share is much lower for male students, at 18%. These findings suggest that women's stronger inclination to include education universities on their ROLs could be a result of perceived parental preferences. We study this relationship next.

The relationship between perceived parental preferences and university applications. While our previous analysis reveals differences in perceived parental preferences for male and female students, these differences should not necessarily translate into different choices if students decides not to follow these preferences. Therefore, it is crucial to examine whether students actually follow their perceived parental preferences and whether there are gender differences in the degree of compliance. To investigate this, we link the data on students' actual choices with their survey responses regarding their own and their perceived parents' preferences. We focus our analysis on students whose own preferences differ from the perceived parents' preferences. For these students, university choices fall into three categories: university choices aligned with students' own preferences (but not with perceived parental preferences), university choices aligned with perceived parental preferences (but not with own preferences), and those aligned with neither their own nor their perceived parental preferences.

Figure 6 illustrates the share of university choices that are aligned with own preferences, with perceived parental preferences, or with neither. Panel (a) reports the relationship between choices regarding university proximity and these preferences. More than half of male students' choices (59%) follow their own preferences, even when these preferences are inconsistent with their perceived parental preferences, while only 47% of female students follow their own preferences when these are inconsistent with their parents' perceived preferences. A similar pattern emerges for university specialization. The share of female students' choices aligning with their own preferences is 12% lower than that of men (26% versus 38%). At the same time, the share of choices aligning with perceived parental preferences is 4% higher for women than for men (19% versus 15%). These findings indicate that female students are more susceptible to parental influence than male students.

Gender stereotypes. Students' university application decisions may be influenced by their stereotypical beliefs. To measure stereotypical beliefs, we presented students with four gender-stereotypical statements and asked them to rate, on a scale from 1 to 10, how much they and their parents agree

Figure 6: Alignment of student choices with own vs. perceived parental preferences by gender



(a) Proximity (b) Specialization

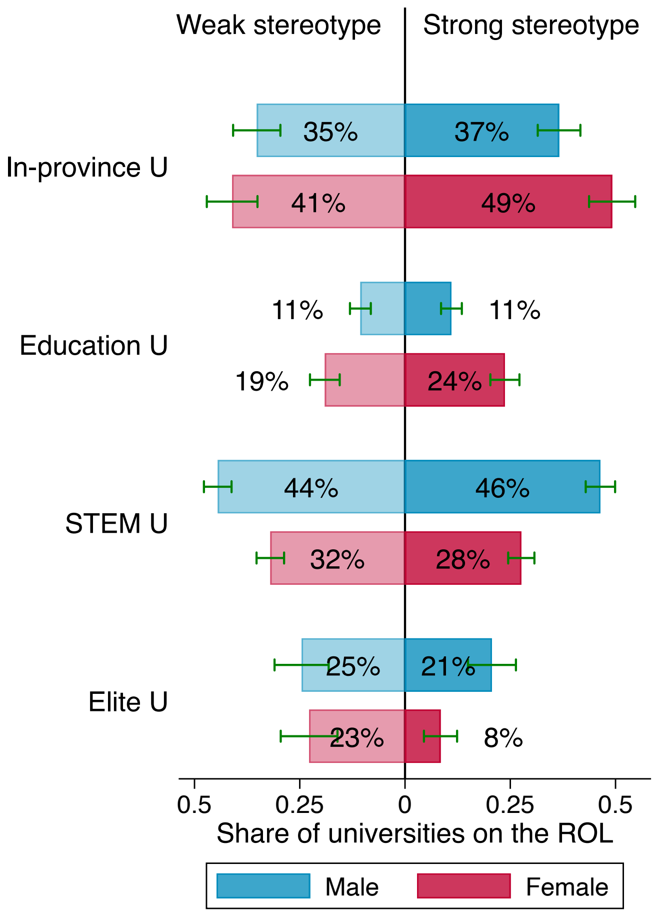
Notes: This figure reports students' university choices when their preferences are inconsistent with their perceived parental preferences. Panel (a) shows choices regarding university proximity, while Panel (b) shows choices in university specialization. Dark bars represent the share of choices on students' ROLs aligning with their own preferences, light bars show the share aligning with perceived parental preferences, and the lightest-colored bars indicate choices not aligning with either of the preferences. Results are presented separately for male and female students.

with each statement. Two statements address the proximity dimension of university choices ("Boys should explore the world" and "Girls should stay near family"), while two relate to university specializations ("There are gender differences in innate math ability" and "Boys excel in sciences, girls in humanities").

To quantify stereotype strength, we employ principal component analysis (PCA), selecting factors with eigenvalues greater than 1. One factor with an eigenvalue larger than 1 emerges for both students' own stereotype beliefs and their perceived parental beliefs. The generated factors show positive loadings on all four questions (Appendix Table A7), suggesting a general stereotype trait. We analyze the gender gap in elite university applications by comparing students with weak (below-median) and strong (above-median) stereotype beliefs.

Figure 7 illustrates how application patterns to in-province universities, education universities, STEM universities, and elite universities differ between male and female students conditional on their stereotype beliefs. The analysis indicates that gender differences in preferences for in-province and education universities—and consequently elite university applications—are primarily driven by students with strong stereotype beliefs. Female students with strong stereotype beliefs are significantly more likely to apply to in-province and education universities and significantly less likely to apply to STEM universities. Most importantly, among students with strong stereotype beliefs, we observe a substantial gender gap in elite university applications (21% for male students versus 8% for female students).

Figure 7: Stereotype belief strength and university choices



Notes: This figure reports the university choices of students categorized into two groups based on the strength of their stereotype beliefs: weak and strong. This is the first component derived from agreement with four stereotypical statements ("Boys should explore the world," "Girls should stay near family," "There are gender differences in innate math ability," and "Boys excel in STEM, girls in humanities.") using principal component analysis. "Weak" represents below median stereotype belief strength, while "Strong" represents above median strength. The length of each bar represents the share of choices for in-province universities, educational-career-focused universities, STEM universities, or elite universities.

Among students with weak stereotype beliefs, we find no significant gender difference in applications to in-province universities and smaller gender gaps in applications to both education and STEM universities. Moreover, the gender gap in elite university applications disappears in this subsample, with female students applying at a slightly lower rate (23%) than male students (25%). This pattern persists when we instead compare students based on their perceptions of parental stereotype beliefs (see Appendix Figure A2). Overall, the findings suggest that women's stronger preferences for proximity and specialization—and their lower application rates to elite universities—reflect the influence of parental and societal expectations rather than their own preferences.

5.3 Alternative explanations

In this section, we examine three sets of alternative explanations for the gender gap in elite university applications. First, we investigate preference-based explanations, including differences in risk preferences, preferences for majors, and competitiveness. Second, we analyze whether differences in strategic sophistication might explain the gap. Third, we test belief-based explanations by examining differences in perceived ability, expected performance, and perceived admission probability. Using the administrative and survey data, we show that none of these factors can explain the observed gender gap in elite university applications. For details of the analysis, see Appendix A3.

Risk taking in university applications. We find no evidence that gender differences in risk-taking explain the gap in elite university applications. Using historical admission cutoffs, we estimate the admission probability for each university in students' ROLs. The average admission probability is similar for male and female students (0.58 versus 0.59), and female students actually exhibit slightly more strategic behavior, taking more risks in their first three choices and fewer risks in their last three choices. The risk of being unmatched with any university in the highest tier a student is eligible for is also comparable (7.5% for male versus 6.8% for female students). While survey measures of risk aversion show that female students are more risk averse, consistent with previous literature, this difference does not predict their university application behavior. The limited role of risk preferences likely reflects a specific institutional feature—the deferred-acceptance algorithm is applied within each choice band, which reduces the importance of risk considerations in university choices.

Other preference-based explanations. We also examine whether the gender gap in elite university applications reflects other differences in preferences. One possibility is that female students face a stronger trade-off between university prestige and their preferred major, as the Chinese admission system assigns majors based on Gaokao rankings within each university. However, we find that female students are actually more likely than male students to choose the "Accept any major" option, both in their first choice (91% versus 89%) and across all choices on their rank-order lists (72% versus 68%), indicating a stronger preference for university quality over specific majors. Survey evidence using hypothetical choices between higher-quality universities with random majors and lower-quality universities with preferred majors confirms this pattern. Another possibility is that female students avoid elite universities due to their competitive environment. However, following the experimental design of Niederle and Vesterlund (2007), we find no gender difference in competitiveness after controlling for risk attitudes and confidence, consistent with previous findings in China (Zhang, 2019).

Strategic sophistication. We also find no evidence that differences in strategic sophistication can explain the gender gap in elite university applications. An optimal strategy under the parallel mechanism requires students to list universities in decreasing order of admission cutoffs. Using historical admission cutoffs, we find that female students are actually more strategically sophisticated than male students: They are more likely to implement this strategy in their rank-order lists (60.2% versus 58%). Survey evidence further supports this finding: Female students demonstrate a better understanding of the admission rules in a quiz testing their knowledge of the admissions system. Thus, lower strategic sophistication cannot explain why female students are less likely to apply to elite universities.

Belief-based explanations. To examine whether belief differences might explain the gender gap, we collected detailed survey data on students' beliefs about their abilities, academic performance, and admission chances at different universities. For a set of eight universities tailored to each student's academic level, we elicited their expected class ranking (out of 100 students) and perceived probability of admission. We also compared students' performance across multiple mock exams to assess whether Gaokao scores might systematically under- or overstate true ability for either gender.

Our analysis does not provide any evidence that the gender gap can be explained by differences in beliefs. Female students are not less confident about their academic performance at elite universities or about their chances of admission compared to equally qualified male students. In fact, women perform better in mock exams than men with the same Gaokao score, suggesting that, if anything, Gaokao scores might understate women's true ability. Neither gender anticipates discrimination at elite universities. Combined with our earlier findings on expected returns, these results indicate that the gender gap in elite university applications cannot be attributed to differences in beliefs about ability, performance, or returns to education.

6 Discussion and conclusions

We document a substantial gender gap in elite university applications in China's gender-blind university admissions system. Although the system is designed to offer equal treatment of equally qualified students, female students are significantly less likely to apply to elite universities than their male counterparts with the same qualifications. The gender gap in applications leads to a gender gap in elite university admissions, which translates into a widening gender gap in expected earnings trajectories. Furthermore, survey evidence indicates that men and women have similar beliefs regarding the returns to elite education. Thus, the gender gap in elite university applications is not the outcome of misperceptions.

By combining administrative and survey data, we investigate the mechanisms underlying this gender gap. Our findings indicate that it is not caused by gender differences in risk aversion, strategic sophistication, confidence, or competitiveness. Instead, it is primarily driven by the stronger tendency of women' to prioritize proximity to home and education-focused universities. Despite reporting similar personal preferences as men, female students perceive stronger parental pressure regarding university choices and are more likely to align their actual choices with these parental expectations rather than their own stated preferences. The gap is concentrated among students with strong gender stereotype beliefs and disappears among those with weak stereotype beliefs, suggesting that women's stronger tendencies for proximity and for a specialization in educational careers reflect external influences rather than inherent preferences.

The mechanisms we document are likely to extend beyond the specific region, country, and cultural context we study. Our results show that gendered educational choices arise from both parental influence and gender stereotype beliefs, and these forces operate across diverse cultural and institutional settings. While China's transparent, test-based admissions system provides an unusually clean setting in which to identify these mechanisms, the underlying processes are not dependent on this particular institutional arrangement. First, parental influence on children's major life decisions is a universal phenomenon, though its strength varies across cultures (Boneva and Rauh, 2018; Delavande and Zafar, 2019; Doepke et al., 2019; Tungodden and Willén, 2023). Second, gender stereotypes shape economic behaviors and educational choices globally (Reuben et al., 2014; Bordalo et al., 2019; Carlana, 2019b; Coffman et al., 2021; Barron et al., 2024). The mechanism through which stereotypes influence choices—by making certain options seem more or less appropriate based on gender—operates independently of specific institutional arrangements. Third, the persistence of these mechanisms likely extends beyond education into labor markets. The same forces that lead women to prioritize proximity and traditional fields in university selection may later influence job searches, salary negotiations, and career advancement decisions.

It is crucial to note that we have analyzed parental influences on students' application behavior based on the students' perceptions of their parents' preferences. These perceived preferences are arguably more important for their decisions than parents' actual preferences. Whether the perceptions are accurate or not is an open question. Recent studies on misperceptions about social norms suggest that people often underestimate others' support for women's rights, and correcting these misperceptions can potentially advance gender equality (Bursztyn et al., 2020; Bursztyn and Yang, 2022; Bursztyn et al., 2023). Understanding whether students accurately perceive their parents' preferences, and how potential misperceptions shape their educational choices, is an important avenue for future research.

It is also worth noting that, in line with the actual university admissions system, our main analysis uses Gaokao scores as the measure of qualification. However, a growing literature shows that women tend to underperform relative to men in high-stakes testing situations (Azmat et al., 2016; Iriberri and Rey-Biel, 2019; Cai et al., 2019; Schlosser et al., 2019; Arenas Jal and Calsamiglia, 2023; Arias et al., 2023; Akyol et al., 2024), suggesting that standardized test scores may not accurately reflect true ability across genders. Our data support this literature, as we find that female students generally perform better in four mock exams than male students with the same Gaokao score. When using mock exam performance as a measure of true ability, we find that the gender gap in elite university applications among equally qualified students increases by almost 50% compared to our current estimates, suggesting that our findings represent a lower bound on the gender gap in elite university applications among students of equal ability.

Our results highlight the limitations of gender-blind institutional design in achieving equal outcomes. While the Chinese university admissions system eliminates discrimination in the evaluation process, it does not operate in a vacuum. Even in this meritocratic setting, social influence and differing expectations shape men's and women's choices, leading to unequal outcomes, with long-term economic consequences. Thus, gender equality cannot be achieved by removing institutional barriers alone. It is essential to address the broader social context that shapes decision-making.

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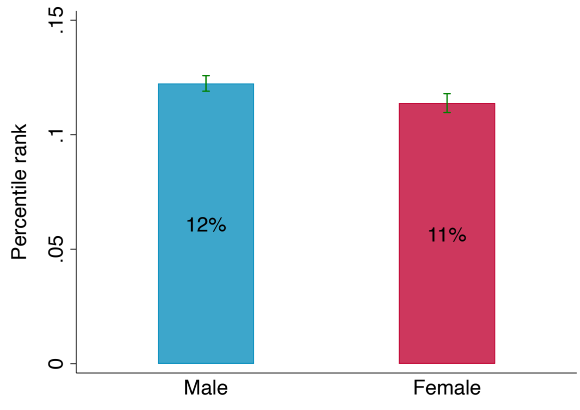
The Gender Gap in Gender-Blind University Admissions

Online Appendix

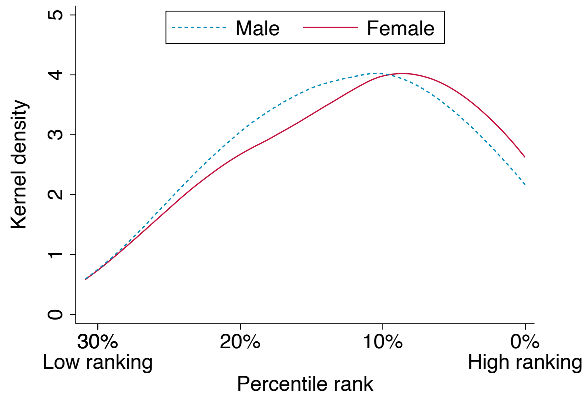
Online Appendices

A1 Additional figures and tables

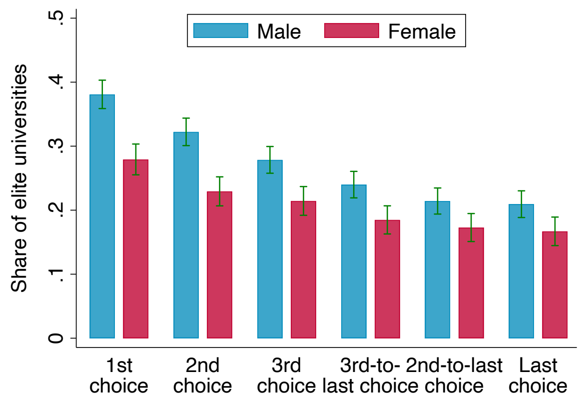
Figure A1: Gender differences in Gaokao performance and elite U applications: Tier-1 students



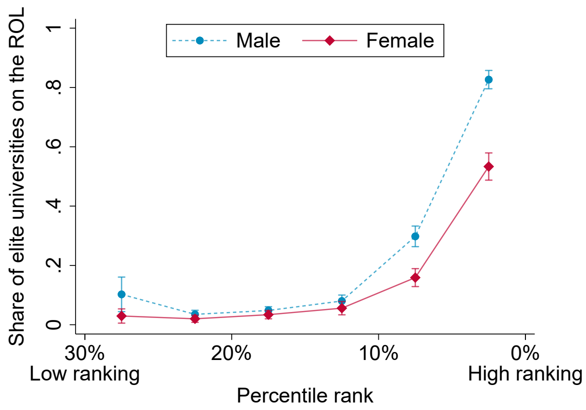
(a) Average Gaokao percentile rank



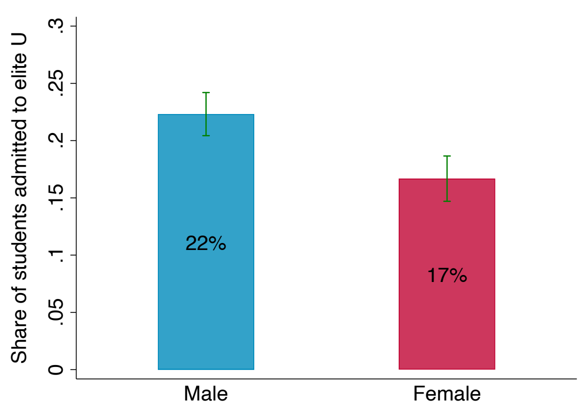
(b) Distributions of Gaokao percentile rank



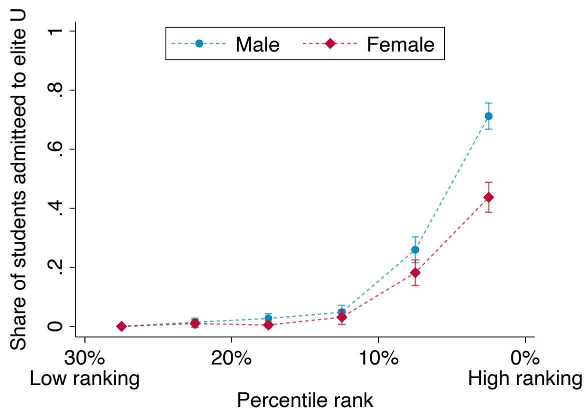
(c) Elite U application by rank-order list



(d) Elite U application by Gaokao percentile rank



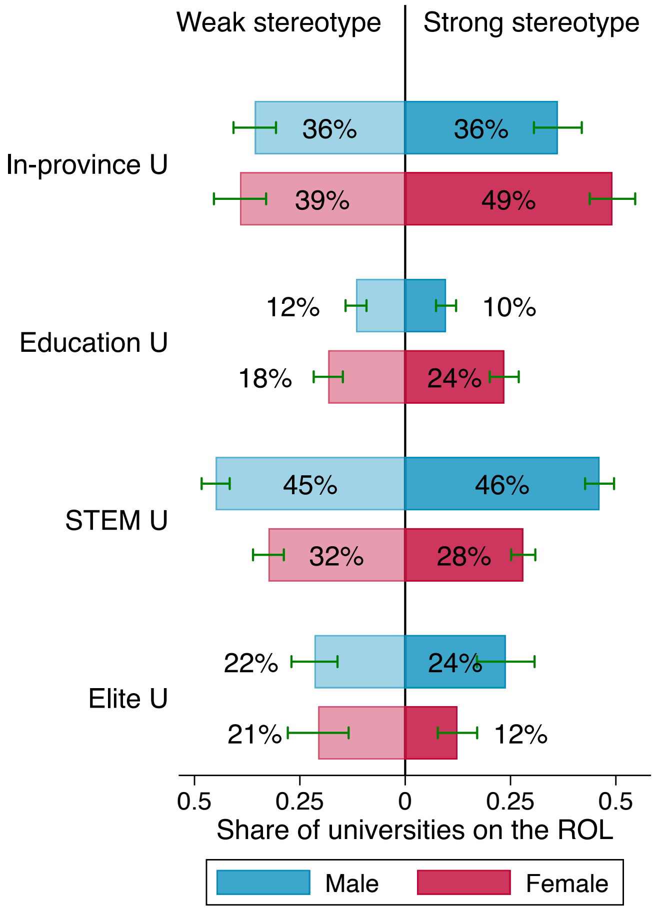
(e) Admission rate to elite universities



(f) Admission rate by Gaokao percentile rank

Notes: The figure reports gender differences in Gaokao performance and elite university applications among students who scored above the tier-1 cutoff in the Gaokao. Panel (a) shows the average Gaokao percentile rank for male and female students. Panel (b) shows the distribution of the Gaokao percentile rank for male and female students, with the percentile cut-off at the 30th percentile, because we only include students who scored above the tier-1 cutoff in our analysis. Panel (c) shows the average share of elite universities on male and female students' rank-order lists (ROLs) by application choice order. Panel (d) shows the share of elite universities in the ROLs by male and female students' Gaokao percentile ranks. Panel (e) shows the share of students admitted to elite universities by gender. Panel (f) shows the admission rate to elite universities by Gaokao percentile rank.

Figure A2: Parental stereotype belief strength and university choices



Notes: This figure reports the university choices of students categorized into two groups based on their perceived parental stereotype belief strength: weak and strong. The stereotype belief strength is the first component derived from students' understanding of their parents' agreement with four stereotypical statements ("Boys should explore the world," "Girls should stay near family," "There are gender differences in innate math ability," and "Boys excel in STEM, girls in humanities.") in the survey using principal component analysis. "Weak" represents below median stereotype belief strength, while "Strong" represents above median strength. The length of each bar represents the share of choices for in-province universities, educational-career-focused universities, STEM universities, or elite universities.

Table A1: Survey respondents versus the administrative sample

	Total			Male			Female		
	Admin (1)	Survey (2)	Difference (3)	Admin (4)	Survey (5)	Difference (6)	Admin (7)	Survey (8)	Difference (9)
STEM track	0.800	0.807	0.012	0.925	0.929	0.008	0.671	0.683	0.024
	(0.400)	(0.395)	(0.014)	(0.264)	(0.258)	(0.013)	(0.470)	(0.465)	(0.024)
Repeat exam taker	0.079	0.028	-0.097***	0.088	0.034	-0.103***	0.069	0.023	-0.091***
	(0.269)	(0.166)	(0.010)	(0.283)	(0.180)	(0.014)	(0.254)	(0.150)	(0.013)
Local Hukou	0.967	0.969	0.004	0.968	0.969	0.002	0.965	0.969	0.007
	(0.179)	(0.174)	(0.006)	(0.176)	(0.173)	(0.009)	(0.183)	(0.174)	(0.009)
Age	18.189	18.134	-0.107***	18.234	18.164	-0.133***	18.143	18.103	-0.078**
	(0.666)	(0.623)	(0.024)	(0.668)	(0.596)	(0.034)	(0.661)	(0.647)	(0.034)
Poverty status	0.075	0.095	0.038***	0.070	0.089	0.035***	0.079	0.101	0.042***
	(0.263)	(0.293)	(0.009)	(0.256)	(0.285)	(0.013)	(0.270)	(0.301)	(0.014)
Gaokao percentile rank	0.224	0.222	-0.003	0.221	0.220	-0.002	0.226	0.224	-0.004
	(0.159)	(0.156)	(0.006)	(0.156)	(0.152)	(0.008)	(0.162)	(0.159)	(0.008)
Observations	3,062	1,479		1,563	743		1,499	736	

Notes: The table reports the individual characteristics of the survey sample and the administrative sample. Since the survey was conducted from 2021 to 2023, this table only includes admin samples in these years. Columns (1), (4), and (7) show the administrative sample, Columns (2), (5), and (8) show the survey sample, and the remaining three columns show the differences between the two samples. Furthermore, the first three columns show the total sample, the middle three columns show only male participants, and the last three columns show only female participants. “Stem” is a binary indicator for students who chose a STEM track; “Repeat exam taker” defines students who have taken the entrance exam more than once; “Local Hukou” indicates students possessing a local residency permit (Hukou); “Poverty status” represents students with official poverty status; “Gaokao percentile rank” is a student’s percentile rank in Gaokao. *** p<0.01, ** p<0.05, * p<0.1.

Table A2: Gender differences in elite university applications by rank order

Dependent variable	Chosen university is elite			
	First choice	Second choice	Third choice	First three choice
	(1)	(2)	(3)	(4)
Female	-0.031***	-0.026***	-0.019***	-0.025***
	(0.007)	(0.007)	(0.007)	(0.006)
Gaokao ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓
Observations	7,698	7,636	7,473	22,807
R-squared	0.509	0.531	0.545	0.521
Mean DV	0.241	0.204	0.185	0.211
Std.Dev. DV	0.428	0.403	0.389	0.408

Notes: This table presents regression results analyzing the gender difference in listing elite universities by the rank order on the ROLs. Columns (1) to (3) show the gender difference in the first choice to the third choice on the ROL respectively. Column (4) shows the gender difference in the first three choices. The unit of observation is a student-choice. The dependent variable is binary, indicating whether the chosen university is elite or not. "Female" is an indicator variable equal to 1 for female students. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution, and the high-school track. Year FE are fixed effects for the year of Gaokao. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Standard errors, reported in parentheses, are clustered at the student level to accommodate multiple choices on the ROL per student for Column (4). *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Gender differences in elite university applications: Tier-1 students

Dependent variable	Chosen university is elite		Admitted university is elite	
	(1)	(2)	(3)	(4)
Female	-0.018**	-0.019**	-0.024**	-0.024**
	(0.008)	(0.008)	(0.010)	(0.010)
Gaokao ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓		
Demographic controls		✓		✓
Observations	20,731	20,731	3,187	3,187
R-squared	0.563	0.564	0.568	0.569
Mean DV	0.249	0.249	0.203	0.203
Std.Dev. DV	0.433	0.433	0.402	0.402

Notes: This table presents regression results analyzing the gender difference in listing elite universities among tier-1 eligible students (those who scored above the tier-1 admission cutoff). The unit of observation is a student-choice. The dependent variable is binary, indicating whether the chosen university is elite or not. "Female" is an indicator variable equal to 1 for female students. "STEM track" is an indicator variable equal to 1 for students on the STEM track in high school. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution and the high-school track. Rank-order FE are fixed effects for the order of the choice on the ROL. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Standard errors, reported in parentheses, are clustered at the student level to accommodate multiple choices on the ROL per student. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Gender differences in expected salaries

Dependent variable	1-year salaries			5-year salaries		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): Choice						
Female	-23.152	-24.929*	-13.524	-36.954*	-40.127*	-21.725
	(14.095)	(14.082)	(12.421)	(22.168)	(22.176)	(19.460)
Elite			895.289***			1,444.576***
			(33.273)			(52.565)
Gaokao ranking FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Rank-Order FE	✓	✓	✓	✓	✓	✓
Demographic controls		✓	✓		✓	✓
Observations	55,139	55,139	55,139	55,139	55,139	55,139
R-squared	0.393	0.394	0.430	0.400	0.400	0.437
Mean DV	4496	4496	4496	5941	5941	5941
Std.Dev. DV	1223	1223	1223	1961	1961	1961
Panel (b): Outcome						
Female	-110.553***	-114.947***	-104.482***	-174.836***	-180.988***	-164.265***
	(30.090)	(30.291)	(29.989)	(47.310)	(47.697)	(47.209)
Elite			615.278***			983.253***
			(98.409)			(151.934)
Gaokao ranking FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Demographic controls		✓	✓		✓	✓
Observations	4,600	4,600	4,600	4,600	4,600	4,600
R-squared	0.436	0.438	0.450	0.453	0.455	0.467
Mean DV	4503	4503	4503	5941	5941	5941
Std.Dev. DV	1283	1283	1283	2050	2050	2050

Notes: This table reports regression results examining gender differences in expected salaries for the universities chosen by students. The dependent variable is the expected salary 1 year after graduation (Columns 1–2) or 5 years after graduation (Columns 3–4), measured in Chinese yuan. "Female" is an indicator variable equal to 1 for female students. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution, and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE are fixed effects for the year of Gaokao. Rank-order FE are fixed effects for the order of the choice on the ROL. Standard errors, reported in parentheses, are clustered at the individual level. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Gender differences in perceived and estimated future salaries

Dependent variable	Estimated average salaries		Estimated own future salaries	
	(1)	(2)	(3)	(4)
Female	-11.541	-34.638	-378.933	-195.406
	(117.873)	(127.944)	(488.194)	(516.255)
Elite		697.549***		1,508.805***
		(87.892)		(347.321)
Female×Elite		37.600		-484.442
		(144.031)		(559.501)
Gaokao ranking FE	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓
Observations	3,504	3,504	3,504	3,504
R-squared	0.165	0.202	0.180	0.190
Mean DV	5,310	5,310	8,309	8,309
Std.Dev. DV	1,411	1,411	4,873	4,873

Notes: This table reports regression results for gender differences in salary expectations. "Estimated average salaries" represents students' estimates of average alumni salaries from different universities. "Estimated own future salaries" represents what students believe they would personally earn after graduating from these universities. "Elite" represents elite universities. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Standard errors, reported in parentheses, are clustered at the individual level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: University proximity, specialization, and the gender gap in expected salaries

Dependent variable	1-year salaries		5-year salaries	
	(1)	(2)	(3)	(4)
Female	-24.929*	19.934	-40.127*	23.164
	(14.082)	(14.699)	(22.176)	(23.059)
Driving distance		47.428**		53.209
		(24.168)		(37.930)
In-province share		-425.614***		-761.677***
		(28.424)		(44.773)
Education university share		110.822***		233.355***
		(31.860)		(50.211)
STEM university share		237.245***		352.374***
		(35.299)		(55.465)
Gaokao ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓
Observations	55,139	55,139	55,139	55,139
R-squared	0.394	0.404	0.400	0.412
Mean DV	4496	4496	5941	5941
Std.Dev. DV	1223	1223	1961	1961

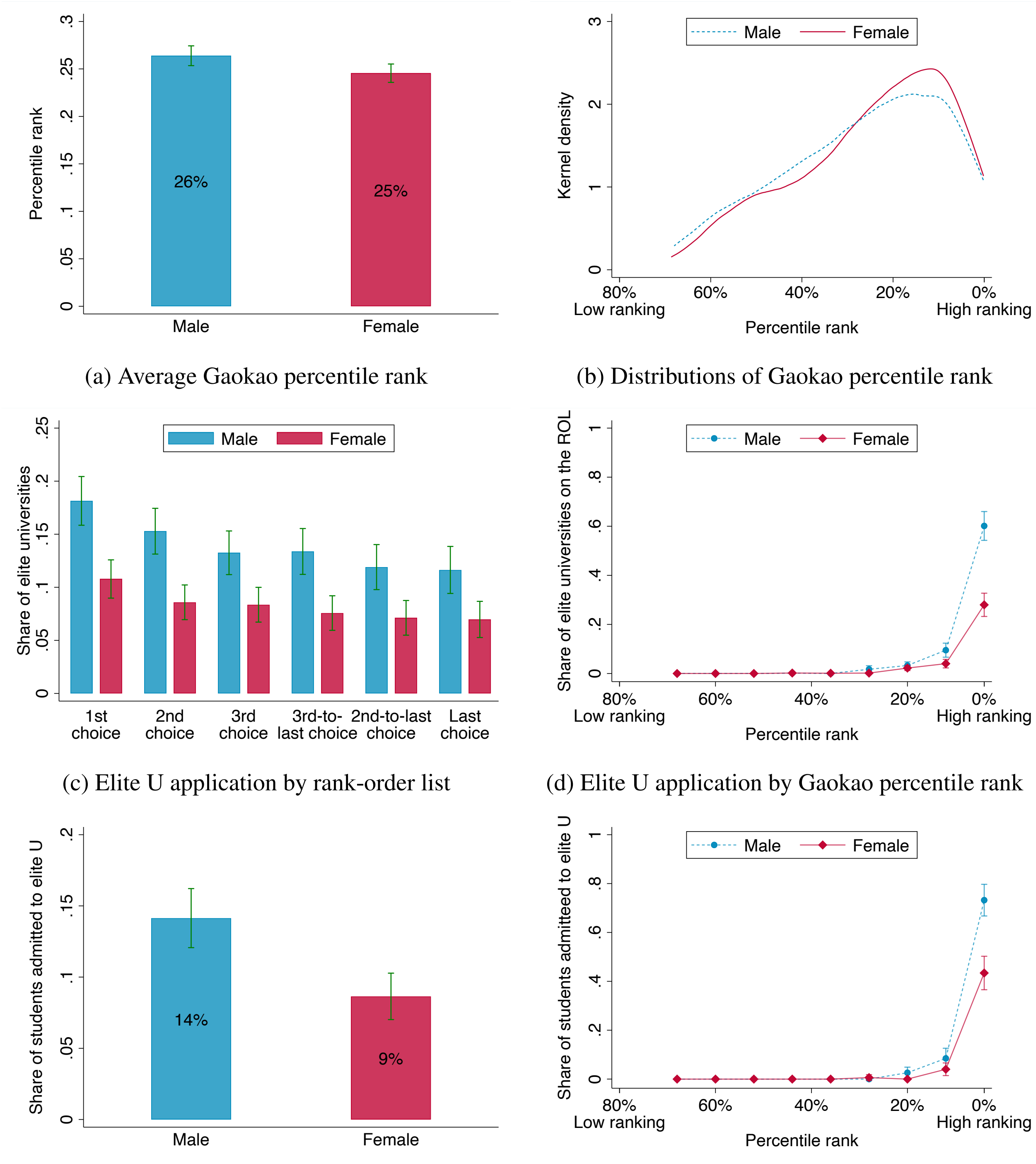
Notes: This table reports regression results examining how university proximity and specialization explain the gender gap in expected graduate earnings. The dependent variables are the average salaries of graduates from the universities on students' rank-order lists. "1-year salaries" represents the average salaries of 2017 graduates measured in 2018, while "5-year salaries" represents the average salaries of graduates measured five years after graduation. "Female" is an indicator for female students. "Driving distance" is the log-transformed average driving distance from home to the university on a student's ROL. "In-province share" represents the share of in-province universities on a student's ROL. "Education university share" and "STEM university share" are indicators for university specialization share. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and rank-order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Principal component analysis of gender stereotype beliefs

Variable	Factor 1
Panel (a): Self	
Boys should explore the world	0.2510
Girls should stay near family	0.4853
Gender differences in innate math ability	0.5933
Boys excel in STEM, girls in humanities	0.5912
Panel (b): Parents	
Boys should explore the world	0.2614
Girls should stay near family	0.4502
Gender differences in innate math ability	0.6009
Boys excel in STEM, girls in humanities	0.6066

Notes: This table reports the factor loadings from a principal component analysis of responses to gender stereotype statements. The top panel shows results for students' own beliefs (Self), while the bottom panel shows results for students' perceptions of their parents' beliefs (Parents). Factor loadings represent the correlation between each statement and the extracted principal component (Factor 1). Higher absolute values indicate a stronger relationship between the statement and the underlying stereotype construct.

Figure A3: Gender differences in Gaokao performance and elite university applications: Pre-COVID



(a) Average Gaokao percentile rank

(b) Distributions of Gaokao percentile rank

(c) Elite U application by rank-order list

(d) Elite U application by Gaokao percentile rank

(e) Admission rate to elite universities

(f) Admission rate by Gaokao percentile rank

Notes: The figure reports gender differences in Gaokao performance and elite university applications and admissions pre-COVID (2018–2019). Panel (a) shows the average Gaokao percentile rank for male and female students. Panel (b) shows the distribution of Gaokao percentile rank for male and female students, with the percentile cut-off at the 80th percentile because we only include students who scored above the tier-2 cutoff in our analysis. Panel (c) shows the average share of elite universities on male and female students' rank-order lists (ROLs) by application choice order. Panel (d) shows the share of elite universities in the ROLs by male and female students' Gaokao percentile ranks. Panel (e) shows the share of students admitted to elite universities by gender. Panel (f) shows the admission rate to elite universities by Gaokao percentile rank.

Table A8: Gender differences in elite university applications: Pre-COVID

Dependent variable	Chosen university is elite		Admitted university is elite	
	(1)	(2)	(3)	(4)
Female	-0.021***	-0.021***	-0.017*	-0.016*
	(0.006)	(0.006)	(0.009)	(0.009)
Gaokao ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓		
Demographic controls		✓		✓
Observations	18,140	18,140	2,234	2,234
R-squared	0.520	0.521	0.588	0.590
Mean DV	0.0768	0.0768	0.113	0.113
Std.Dev. DV	0.266	0.266	0.317	0.317

Notes: This table presents regression results analyzing the likelihood of listing elite universities on students' ROLs by gender, controlling for Gaokao performance pre-COVID (2018–2019). The unit of observation is a student-choice. The dependent variable is binary, indicating whether the chosen university is elite or not. "Female" is an indicator variable equal to 1 for female students. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution, and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and rank-order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: University proximity, specialization, and the gender gap in elite university applications Pre-COVID

Dependent variable	Chosen university is elite			
	(1)	(2)	(3)	(4)
Female	-0.021***	-0.019***	-0.026***	-0.024***
	(0.006)	(0.006)	(0.007)	(0.006)
Driving Distance		-0.013		-0.013
		(0.013)		(0.013)
In-province share		-0.043***		-0.045***
		(0.013)		(0.013)
Education university share			0.004	0.019
			(0.015)	(0.015)
STEM university share			-0.025	-0.017
			(0.017)	(0.017)
Gaokao Ranking FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓	✓	✓
Demographic controls	✓	✓	✓	✓
Observations	18,140	18,140	18,140	18,140
R-squared	0.521	0.522	0.521	0.523
Mean DV	0.0768	0.0768	0.0768	0.0768
Std.Dev. DV	0.266	0.266	0.266	0.266

Notes: This table reports regression results examining the factors explaining the gender gap in elite university applications pre-COVID (2018-2019). The dependent variable is a binary indicator for whether the chosen university is elite. "Female" is an indicator for female students. "Driving Distance" is the log-transformed average driving distance from home to the university on a student's ROL. "In-province share" represents the share of in-province universities on a student's ROL. "Education university share" and "STEM university share" are indicators for university specialization share. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and rank-order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A2 A simple model of preferences for proximity and elite university applications

In this section, we develop a simple model to illustrate how stronger preferences for proximity in the form of favoring in-province universities can affect the likelihood of applying to elite universities. We start with a conceptual framework, then provide a numerical example, and lastly conclude with a DAG representation to explain the issue of measurement error when controlling for proximity preferences.

A simple model of university choice. Consider a student making a series of choices between a set of universities (J), each characterized by its quality and location. Let the student derive utility from two key attributes of each university: quality and proximity. Specifically, we denote q_j as the quality of university j and s_j as the proximity indicator, where $s_j = 1$ if university j is in-province and $s_j = 0$ if it is out-of-province.

The utility that student i derives from applying to university j is given by:

$$U_{ij} = \alpha_i q_j + \beta_i s_j + \varepsilon_{ij}, \tag{A2.1}$$

where $\alpha_i > 0$ is the student's preference for quality, β_i captures the preference for in-province universities, and ε_{ij} is an idiosyncratic error term. We assume that $\beta_{\text{female}} > \beta_{\text{male}}$, implying that female students have a stronger preference for in-province universities compared to male students.

A university is defined as *Elite* if its quality exceeds a certain threshold $\bar{q}$. Thus, the student's utility is influenced by the trade-off between attending an elite, potentially out-of-province university, and attending a lower-quality but in-province university.

Each student i selects a set of K universities $S_i \subseteq J$ to maximize their total utility:

$$\max_{S_i} \sum_{j \in S_i} U_{ij} \tag{A2.2}$$

subject to:

$$|S_i| = K \tag{A2.3}$$

In-province preference and elite university applications. Our model aims to demonstrate that as the preference for in-province universities (β_i) increases, students are more likely to include lower-quality in-province universities in their choice set, potentially reducing the number of elite universities they apply to. To see this, consider student i's choice between two universities: university j, which is higher-quality and out-of-province ($s_j = 0$), and University k, which is lower-quality and in-province ($s_k = 1$). The utility difference between these universities for student i is:

$$\Delta U_{ijk} = U_{ij} - U_{ik} = \alpha_i(q_j - q_k) - \beta_i \tag{A2.4}$$

Student i will prefer the lower-quality, in-province university k over the higher-quality, out-of-province university j if:

$$\Delta U_{ijk} < 0 \implies (q_j - q_k) < \frac{\beta_i}{\alpha_i} \tag{A2.5}$$

This inequality implies that the student will choose the in-province university if the quality difference is less than the ratio of their in-province preference to their quality preference ($\frac{\beta_i}{\alpha_i}$). As β_i increases, the threshold $\frac{\beta_i}{\alpha_i}$ increases, meaning students become willing to accept larger quality differences in favor of in-province universities. Consequently, students are more likely to include lower-quality in-province universities on their ROLs.

Students with higher β_i (e.g., females, given our assumption that $\beta_{\text{female}} > \beta_{\text{male}}$) are thus more likely to apply to lower-quality in-province universities. This may lead to fewer applications to elite universities, particularly if elite universities are predominantly out-of-province or if the number of high-ranked in-province universities is limited.

Numerical Example. To understand the implications of our model more concretely, consider a simplified scenario with four universities. This example demonstrates how a student's preference for in-province universities can alter their university choices when the quality differences between universities are held constant. We examine two cases: one where the student has no preference for proximity ($\beta_i = 0$), and another where this preference is strong ($\beta_i = 5$).

Consider four universities labeled A, B, C, and D, each characterized by quality and proximity as follows: University A: Quality $q_A = 10$, in-province ($s_A = 1$); University B: Quality $q_B = 8$, out-of-province ($s_B = 0$); University C: Quality $q_C = 5$, in-province ($s_C = 1$); University D: Quality $q_D = 2$, out-of-province ($s_D = 0$).

We first consider the case when there is no preference for proximity. Given $\beta_i = 0$, the student's utility depends solely on university quality:

$$U_{iA} = 10, \quad U_{iB} = 8, \quad U_{iC} = 5, \quad U_{iD} = 2.$$

The student will choose universities A and B, as they provide the highest utility.

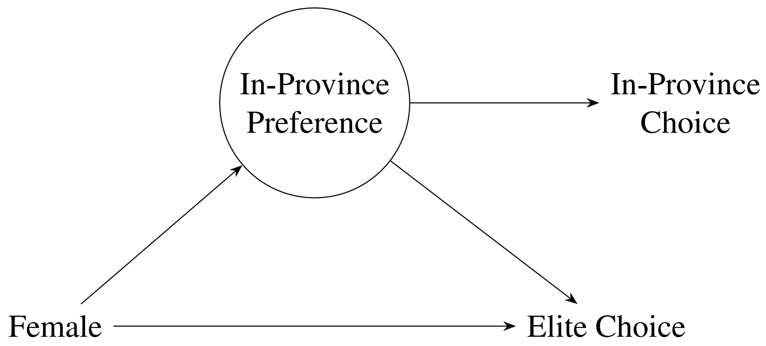
We then consider the case where there is a strong preference for proximity. Given $\beta_i = 5$, the utility for each university becomes:

$$U_{iA} = 10 + 5 = 15, \quad U_{iB} = 8, \quad U_{iC} = 5 + 5 = 10, \quad U_{iD} = 2.$$

In this case, the student will choose universities A and C, prioritizing in-province universities, even if it means choosing a lower-quality option over an out-of-province elite university. Thus, the stronger preference for proximity causes fewer applications to elite universities in this numerical example.

DAG Representation and measurement error. To better understand the relationship between the preference for in-province universities and elite university choice, we illustrate the connections using a directed acyclic graph (DAG).

Figure A4: DAG illustrating the effect of in-province preference on elite university applications



In this DAG, the variable *Female* affects *In-Province Preference*, which in turn affects both *In-Province Choice* and *Elite Choice*. Additionally, there is a direct effect of *Female* on *Elite Choice*.

Because *In-Province Preference* is not directly observable, we control for *In-Province Choice* in the regression, intending to capture the effect of in-province preference on elite university applications. However, this approach introduces a measurement error problem because *In-Province Choice* is an outcome of the underlying preference but does not fully capture it without error. Specifically, we observe the number of in-province universities listed on students' ROLs, which is influenced by the preference but still contains error in representing the true underlying preference. This error results in an underestimation of the strength of the in-province preference mechanism and an overestimation of the direct effect of gender on elite university applications, making the remaining *Female* coefficient an upper bound of the true direct effect.

A3 Alternative explanations for the gender gap in elite university applications

In this section, we explore three sets of alternative explanations for the gender gap in elite university applications. First, we examine preference-based explanations, including differences in risk preferences, major preferences, and competitiveness. Second, we investigate whether differences in strategic sophistication might explain why female students are less likely to apply to elite universities. Third, we test belief-based explanations, focusing on differences in perceived ability, expected performance, perceived admission chances, and anticipated returns to elite education.

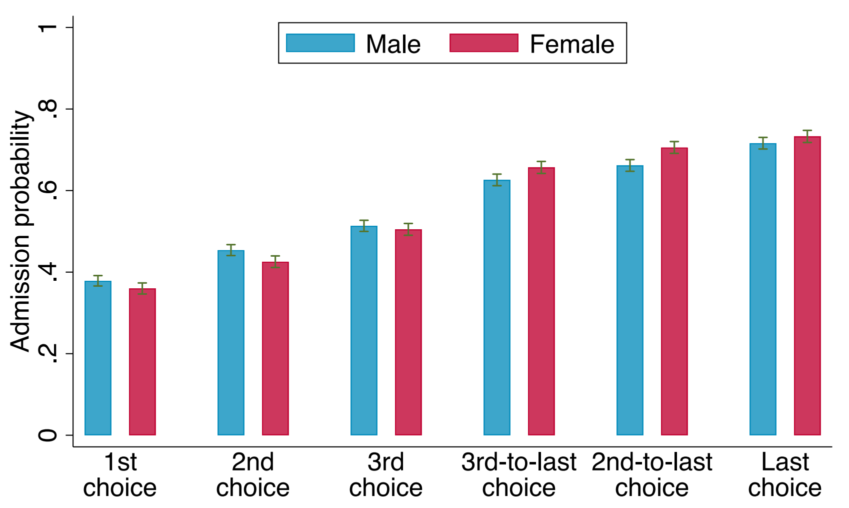
A3.1 Preference-Based explanations

Risk aversion. Since the number of choices is restricted when students submit their ROLs, truth-telling is not an equilibrium strategy for students (Chen and Kesten, 2017). Instead, they must decide how much risk to take. Research shows gender differences in risk-taking across various domains (Niederle and Vesterlund, 2007; Croson and Gneezy, 2009; Booth and Nolen, 2012). Thus, one possible explanation for the observed gender gap in university applications is that female students take less risk than male students when applying to universities.

We assess the risk associated with listing specific universities by estimating the admission probability. Students use a university's historical lowest admission scores (cutoffs) to evaluate their admission chances, as they know their Gaokao scores but not the current admission cutoffs. The cutoff of a university in the current year is determined later in the admission process by its supply (number of available seats) and demand (number of students who apply to it and their scores). However, the historical cutoffs provide information on how the two sides interact to determine the cutoff in the past years and can be used to infer the current cutoff. Following Wang et al. (2023), we compute the estimated admission probability (p_i) for each university i on a student's ROL. We construct a normal distribution of admission cutoffs for each university using data from 2018 to 2022, allowing us to estimate admission probabilities by comparing students' Gaokao scores to these distributions. The methodology for constructing these distributions is detailed in Appendix A4.

The average admission probability is 0.58 for male students and is slightly higher at 0.59 for female students. Figure A5 shows admission probabilities across students' choices. Students tend to

Figure A5: Admission probabilities by choice order on the ROL



Notes: This figure reports the average estimated admission probabilities for the first three and the last three choices on the ROL. The method for calculating the estimated admission probability is described in Appendix A4.

choose riskier options for higher-ranked choices and safer options for lower-ranked choices. Since the admission mechanism is deferred acceptance within a choice band, taking a risk among the top choices to aim for a high-quality university can be optimal (Chen and Kesten, 2017; Chen et al., 2020). Notably, female students do not take fewer risks than male students; if anything, they exhibit slightly more strategic behavior, taking more risks in their first three choices and fewer risks in their last three choices.

The similar admission probabilities for male and female students seem puzzling, given that females apply to lower-quality, nonelite universities. The answer lies in the high demand for the nonelite universities to which female students apply. When we regress university cutoff scores on gender, controlling for Gaokao rankings, we find no significant difference in the cutoffs between universities chosen by equally qualified male and female students (Table A10). This indicates that the lower-quality universities preferred by female students are in high demand, making them as competitive as some elite universities and raising their cutoffs. Consequently, female students' applications are as risky as those of male students, despite the difference in university quality.

The risk of being unmatched. Apart from the riskiness of applying to each university separately, we consider the overall risk profile, namely the risk of an off-tier match where a student qualifies for tier-1 (or tier-2) universities but ends up being admitted to a lower-tier or no university at all. To assess this risk, we calculate the off-tier matching probability for male and female students and show it in Table A11, where a lower probability suggests a safer ROL.

Table A10: Admission cutoffs of chosen universities by gender

Dependent variable	Last three years' average cutoff		Last year's cutoff	
	(1)	(2)	(3)	(4)
Female	0.255	0.194	-0.202	-0.248
	(0.357)	(0.361)	(0.389)	(0.393)
Gaokao ranking	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Rank-Order FE	✓	✓	✓	✓
Demographic controls		✓		✓
Observations	65,911	65,911	65,911	65,911
R-squared	0.898	0.898	0.878	0.878
Mean DV	513	513	512.3	512.3
Std.Dev. DV	61.96	61.96	62.53	62.53

Notes: This table reports regression results examining the relationship between gender and the admission cutoffs of the chosen universities on the ROLs. The dependent variable in Columns (1)–(3) is the average cutoff score of a chosen university over the last three years, while in Columns (4)–(6) it is the cutoff score from the previous year. "Female" is a binary indicator for female students. Gaokao ranking controls include a set of indicator variables for each percentile of the Gaokao score distribution and the high-school track. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and rank-order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

We derive the off-tier matching probability as the conditional probability of not being admitted to any university on a student's list in her highest qualified tier, denoted as $\text{offtier} = \prod(1 - p_i)$. The mean off-tier probabilities for men and women show no significant difference, with values of 8% for men and 7.3% for women, indicating similar risk profiles across genders.

Risk aversion measured in the survey. To further test whether gender differences in risk preference explain the gender gap in elite university applications, we elicited risk aversion in the second and third waves of the survey. Following Falk et al. (2018), we employ two measures: a direct self-assessment of risk-taking willingness and a quantitative measure derived from a series of hypothetical binary lottery choices using the "staircase procedure." We then compute a risk-aversion index combining the two measures. Male students are significantly more risk-tolerant than female students at the 1% level. However, we find no evidence that risk aversion measured in the survey can predict risk-taking in the ROL or elite university applications. One possible explanation is that deferred acceptance within the choice band limits the role risk aversion can play in determining students' university choices.

Taken together, we find no significant difference in the riskiness of female and male students'

Table A11: Gender difference in the probability of being unmatched

	Female (1)	Male (2)	Difference (3)
Off-tier match	0.068	0.075	-0.007
	(0.225)	(0.227)	(0.006)
Observations	3,178	3,262	6,440

Notes: This table reports the probability of being unmatched or matched off tier, referring to situations where a student's Gaokao score meets the admission cutoff for a tier-1 (or tier-2) university but the student is admitted to a lower-tier or no university. Admission probability to each university is estimated based on the students' Gaokao scores and universities' historical admission cutoffs. The calculation is detailed in Appendix A4. Columns (1) and (2) present the average probabilities for women and men, respectively, with Column (3) showing the difference between them.

ROLs. Thus, the gender gap in elite university applications is not an outcome of the gender difference in risk-taking.

Preferences for majors. If female students place a higher value on majors than male students, they could potentially sacrifice university quality in order to pursue a preferred major. They may face this trade-off because, in the Chinese admission system, universities rank admitted students by their Gaokao scores and assign high-ranked students to their preferred major first, while low-ranked students might be assigned to less popular majors (Hu et al., 2024). For this channel to explain our results, female students would need to care more about their majors than male students.

To investigate this possibility, we utilize the frequency of choosing "Accept any major" on a student's ROL as a measure of preference for university quality versus major quality. "Accept any major" is an option associated with each listed university. If a student agrees to this option for a listed university, it means they are giving the university permission to assign them to any major outside of their listed majors, which increases their chance of being accepted at that university at the cost of potentially being assigned to a less preferred major. We examine both the percentage of students choosing "Accept any major" in the first choices and across all choices on the ROLs (Table A12). Around 90% of all students choose "Accept any major" in their first choice, suggesting a strong preference for university quality over major choice. The share of female students making this choice is slightly higher than that of male students. Additionally, 70% of students choose "Accept any major" across all universities on their ROLs, again with a higher share among female students. This suggests that women are more likely to prioritize university quality over majors than men.

Table A12: The frequency of choosing “Accept any major” by gender

	Female	Male	Difference
	(1)	(2)	(3)
Share of “Accept any major” in Choice 1	0.943	0.924	0.018***
	(0.232)	(0.265)	(0.006)
Share of “Accept any major” across all choices	0.831	0.793	0.038***
	(0.375)	(0.405)	(0.010)
Observations	3,178	3,262	

Notes: This table reports the frequency of selecting “Accept any major” on a student’s ROL, which means allowing the chosen university to assign the student to any major if the student is not admitted to the five majors they listed under that university. Choosing this option increases the chance of being admitted to a certain university at the cost of potentially being assigned to an inferior major. The first row shows the percentage of choices selecting “Accept any major” in the first choices, while the second row shows the percentage of choices selecting “Accept any major” across all choices. *** p<0.01, ** p<0.05, * p<0.1.

As a second source of evidence, we asked students in the survey a multiple-price-list question with two options: (1) higher quality (as measured by a higher admission cutoff score) university A with a randomly assigned major; (2) lower quality university B with the autonomy to choose any major. We gradually raise the quality of university A relative to university B to elicit the point at which students switch from B to A. This allows us to measure students’ willingness to pay to secure their most preferred major at the cost of university quality. A larger quality gap between the two universities when switching demonstrates a stronger preference for majors. We find that, on average, women and men switch at the same point. This indicates that women do not care more about the quality of majors versus the quality of universities. In conclusion, we do not find support for the explanation that women sacrifice university quality in order to secure a preferred major.

Competitiveness. Male and female students might differ in their attitudes toward competition, and a distaste for competition could lead female students to avoid the more competitive elite universities. To examine this explanation, we follow the experimental design employed by Niederle and Vesterlund (2007) and elicited students’ competitiveness in the survey. The students first worked on a Raven’s progressive matrices test for a piece rate. Subsequently, we provided them with (hypothetical) opportunities to make selections between piece-rate payments and competitive tournaments. We also elicited their levels of confidence (both overestimation and overplacement) and their risk attitude. Competitiveness is measured by the choice between the piece rate and the tournament after controlling for risk attitude and confidence. The regression results in Appendix Table A13 show that, after controlling for confidence and risk preferences, there is no significant difference between women and men in terms of selecting the more competitive regime. This result suggests no gender difference in competitiveness in our sample, which is consistent with previous findings for China (Zhang, 2019).

Table A13: Gender differences in competitiveness

Dependent variable	Tournament (1)	Tournament (2)
Female	-0.044	-0.025
	(0.054)	(0.058)
Overestimation	0.008	0.007
	(0.014)	(0.014)
Overplacement	-0.010	-0.015
	(0.026)	(0.027)
Risk preference	✓	✓
Demographic controls		✓
Observations	438	438
R-squared	0.228	0.243
Mean DV	0.370	0.370
Std.Dev. DV	0.483	0.483

Notes: This table reports the regression results for the gender difference in competitiveness. The dependent variable "tournament" is equal to 1 when a student chooses the more competitive payment option of a tournament over a piece rate in a hypothetical question in the survey. The regression controls for confidence in the form of "Overestimation" (the difference between the predicted and actual number of correct answers in a quiz of Raven progressive matrices) and "Overplacement" (the difference between actual and predicted rankings in this quiz), and the risk preference. Standard errors, reported in parentheses, are clustered at the individual level. Demographic controls include age, poverty status, residence status, and repeat exam taker status. *** p<0.01, ** p<0.05, * p<0.1.

A3.2 Strategic sophistication

The "decrease" strategy. Next, we explore whether women apply to lower-quality universities due to lower levels of strategic sophistication. In the parallel mechanism, where the Gaokao score is the sole determinant of university priorities, an optimal strategy requires a "decrease" approach, meaning that the admission cutoff of a choice should be lower than that of the preceding choices (Chen et al., 2020; Wang et al., 2023). If a student is rejected by her top-choice university, the matching algorithm automatically moves to the next choice. A choice is wasted if its admission cutoff is higher than that of the preceding choice. Students cannot access a university with a higher cutoff after being rejected by a university with a lower cutoff; they will either be admitted to the preceding choice or be rejected by both universities. For instance, consider a student who ranks three universities, A, B, and C, in this order, with university B having a higher admission cutoff than university A. If the student's Gaokao score exceeds the cutoff of university A, she is admitted to university A. However, if her score is below university A's cutoff, it means that her score is also below university B's cutoff. In both cases, the student is not admitted to university B, and listing university B after university A is a strategic mistake.

In Table A14, we define two strategies: "Stepwise decrease," where the admission cutoff for choice t is higher than that of the subsequent choice $t+1$, and "Partial decrease," where the admission cutoff of the last choice is lower than that of the first choice. We use universities' admission cutoffs from the years preceding the student's Gaokao participation, as this is the information available to students submitting applications.

Table A14: Strategic sophistication

	Female (1)	Male (2)	Difference (3)
Panel (a): Last year's cutoff			
Stepwise decrease	0.602	0.580	0.022***
	(0.178)	(0.184)	(0.005)
Partial decrease	0.794	0.760	0.034***
	(0.405)	(0.427)	(0.011)
Panel (b): Average cutoff in the last three years			
Stepwise decrease	0.595	0.577	0.018***
	(0.173)	(0.169)	(0.004)
Partial decrease	0.817	0.774	0.043***
	(0.386)	(0.418)	(0.010)
Panel (c): Cutoffs in the last three years			
Stepwise decrease	0.771	0.758	0.013***
	(0.172)	(0.177)	(0.004)
Partial decrease	0.900	0.883	0.017**
	(0.300)	(0.322)	(0.008)

Notes: This table reports the share of male and female students implementing a "decrease" strategy in their choices. "Stepwise decrease" means that the cutoff of a choice is higher than that of the subsequent choice, whereas "Partial decrease" means that the cutoff of the first choice is higher than that of the last choice. Panel (a) considers the decreasing strategy based on the cutoff in the last year. Panel (b) uses the average cutoff in the last 3 years. Panel (c) considers the cutoff in each of the last 3 years; the decreasing strategy holds if the cutoff of choice $t+1$ is lower than the cutoff of choice t in at least one of the 3 years.

On average, around 60% of students' choice pairs satisfy the "stepwise decrease" property when using last year's cutoff or the average cutoff in the last three years to measure the university admission probability. This share increases to 77% with a more permissive measure, as shown in Panel (c) of Table A14. Here, a choice pair $(t, t+1)$ is "stepwise decrease" if the cutoff of choice t is higher than the cutoff of choice $t+1$ in at least one of the last three years. While both genders show comparable rates of "stepwise decrease," the rate among women is significantly higher, regardless of the cutoffs used. Women also adopted the "partial decrease" strategy more often than men. The two comparisons indicate that women adopt a more sophisticated strategy.

Understanding of the admissions system. To test whether differences in understanding the rules of the admission procedure can explain the gender difference in elite university applications, we included a quiz in the survey consisting of three questions to test students' understanding (see Appendix A5 for details). Table A15 shows that women's answers are more accurate than those of men, suggesting that female students have a better understanding of the matching rules.

Table A15: Understanding of admission rules: Correct rates by gender

	Female (1)	Male (2)	Difference (3)
Question1	0.526	0.470	0.056**
	(0.500)	(0.499)	(0.026)
Question2	0.580	0.541	0.039
	(0.494)	(0.499)	(0.026)
Question3	0.853	0.794	0.059***
	(0.354)	(0.405)	(0.020)

Notes: This table reports the share of correct answers to three questions testing understanding of university admission rules by gender. Question 1 tests students' knowledge of how deferred acceptance works. Question 2 tests their understanding of admission to majors within a university. Question 3 tests their understanding of the consequences of leaving a choice empty. See Appendix A5 for the details of the questions. Columns (1) and (2) show the proportion of correct answers for female and male students, respectively. Column (3) presents the difference between female and male correct response rates. Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

A3.3 Belief-based explanations

In the following analyses, we present our findings on various aspects of students' beliefs, all based on the customized list of eight universities.

Beliefs about ability. University admission outcomes are solely determined by applicants' Gaokao scores. This raises the question of whether Gaokao scores overstate the true ability of female students relative to male students. If female students have lower abilities than their male counterparts with the same Gaokao scores and are aware of it, then opting for nonelite universities could be a sensible move to avoid poor university performance and subsequent career consequences.

Table A16: Differences in performance between mock exams and Gaokao by gender

	Female (1)	Male (2)	Difference (3)
Mock score − Gaokao score	0.021 (0.550)	-0.023 (0.513)	0.044*** (0.015)
Observations	2,605	2,634	

Notes: This table reports the differences between mock exam scores and Gaokao scores by gender, where a positive value means better performance in the mock exam. Both the mock exam scores and the Gaokao scores are standardized by year and high-school academic track. There are four mock exams each year, and "Mock score" refers to the average of the four standardized scores. This table only includes samples of students who took the Gaokao between 2018 and 2022, as mock exam scores are not available for 2023. Column (3) shows the difference between female and male students in the difference between the two scores. *** p<0.01, ** p<0.05, * p<0.1.

However, the evidence suggests the opposite regarding the abilities of male and female students of the same Gaokao scores. In fact, Gaokao scores might understate women's true ability compared to that of men. Using scores in four mock exams, we can compare the average mock exam performance of male and female students with identical Gaokao scores. Typically, Chinese high schools administer four mock exams in the last six months before the Gaokao. The mock exams are designed by the official educational authorities to mimic the Gaokao in both schedule and format, thereby familiarizing students with the Gaokao procedures. We find that, on average, women perform better in these mock exams than male students of the same Gaokao scores (see Table A16), which is consistent with previous findings on gender differences in the Gaokao (Cai et al., 2019) and in other high-stakes testing environments (Azmat et al., 2016; Iriberri and Rey-Biel, 2019; Schlosser et al., 2019; Arenas Jal and Calsamiglia, 2023; Arias et al., 2023; Akyol et al., 2024). Assuming that the average score of four mock exams represents a more accurate measure of ability due to reduced measurement error, it implies that women have higher abilities than men with the same Gaokao score.

We reproduce the gender gap in elite university applications among male and female students of the same average mock exam score. The results reveal a 2.5% increase in the gender gap among students of the same ability when using the average mock exam score as the measure of ability versus the Gaokao score, a 56% increase in the gap observed under the latter (see Table A17). This finding indicates that the gender gap in elite university applications among the equally qualified male and female students we identified in our main analysis might be a lower bound.

Table A17: Gender differences in elite university applications: Gaokao versus mock exam scores

Dependent variable	Listing an elite university	
	(1)	(2)
Female	-0.017***	-0.025***
	(0.004)	(0.006)
Gaokao ranking FE	✓	
Standardized mock exam scores		✓
Year FE	✓	✓
Rank-Order FE	✓	✓
Demographic controls	✓	✓
Observations	47,418	47,418
R-squared	0.547	0.334
Mean DV	0.116	0.116
Std.Dev. DV	0.320	0.320

Notes: This table reports the gender gaps in elite university applications when using mock exam scores as the measure of qualifications versus Gaokao rankings. The dependent variable "Listing an Elite University" is equal to 1 when the chosen university on the ROL is an elite university. Column (1) shows the coefficients of female when controlling for Gaokao rankings as the measure of qualification, while Column (2) controls for standardized mock exam scores as the measure of qualification. This table only includes samples of students who took the Gaokao between 2018 and 2022, as mock exam scores are not available for 2023. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Year FE and rank-order FE represent fixed effects for the year of Gaokao and the order of choice on the ROL, respectively. Standard errors, clustered at the student level, are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Confidence regarding academic performance at university. We next test whether female students are less confident about their future academic performance at elite universities than equally qualified male students. If female students perceive themselves as less likely to enjoy future academic success at university than equally qualified male students, they might choose to apply to less elite universities.

We asked students to estimate where they would rank in a class of 100 students if they were admitted to each of the eight universities. On average, students estimate their performance to be slightly better than the median (44 out of 100). We do not observe a gender difference in confidence (male 44 versus female 45). Students do not predict a significantly lower performance at elite universities, and the no gender difference result also applies to elite universities. Therefore, we find no evidence supporting the hypothesis that female students choose not to attend elite universities due to concerns about their ability to perform well at elite universities.

Confidence in admission chances. Female students may be less likely to apply to elite universities if they underestimate their chances of admission, despite having chances that are objectively equal to males with the same Gaokao score (Hakimov et al., 2023). To test this alternative explanation, we asked students to estimate the unconditional probability of their score exceeding the admission cutoff of eight universities. On average, male students in our survey estimated their admission chances to the eight universities to be higher than their female counterparts (37% versus 33%), even though the two groups rank similarly in the Gaokao on average.

Table A18 presents the regression results on the gender difference in confidence in admission chances. Column (1) shows that although female students estimate a lower probability of admission than male students, this gender difference is not statistically significant. Column (2) further shows that female students' relative under-confidence in admission only applies to nonelite universities, with the confidence gap for elite universities being close to 0. These findings indicate that the gender difference in confidence regarding admission probabilities cannot explain female students' lower tendencies to apply to elite universities.

Discrimination at elite universities. Another possible concern that may deter female students from applying to more elite universities is the potential for increased gender-based discrimination at these prestigious universities. To investigate this possibility, we asked students about their expectations of differential treatment by gender across eight universities. We used a scale from 1 to 10, where a score of 5 represents no discrimination, scores below 5 indicate discrimination against male students, and scores above 5 indicate discrimination against female students. Nearly all students selected a score of 5 for all eight universities, indicating no anticipated discrimination at either elite or nonelite universities.

Table A18: Gender differences in perceived admission probability

Dependent variable	The perceived admission probability (1)	(2)
Female	-3.697*	-3.560*
	(1.930)	(2.136)
Elite		-20.707***
		(1.929)
Female$\times$Elite		0.212
		(2.730)
Gaokao ranking FE	✓	✓
Rank-Order FE	✓	✓
Demographic controls	✓	✓
Observations	3,504	3,504
R-squared	0.122	0.185
Mean DV	34.42	34.42
Std.Dev. DV	30.98	30.98

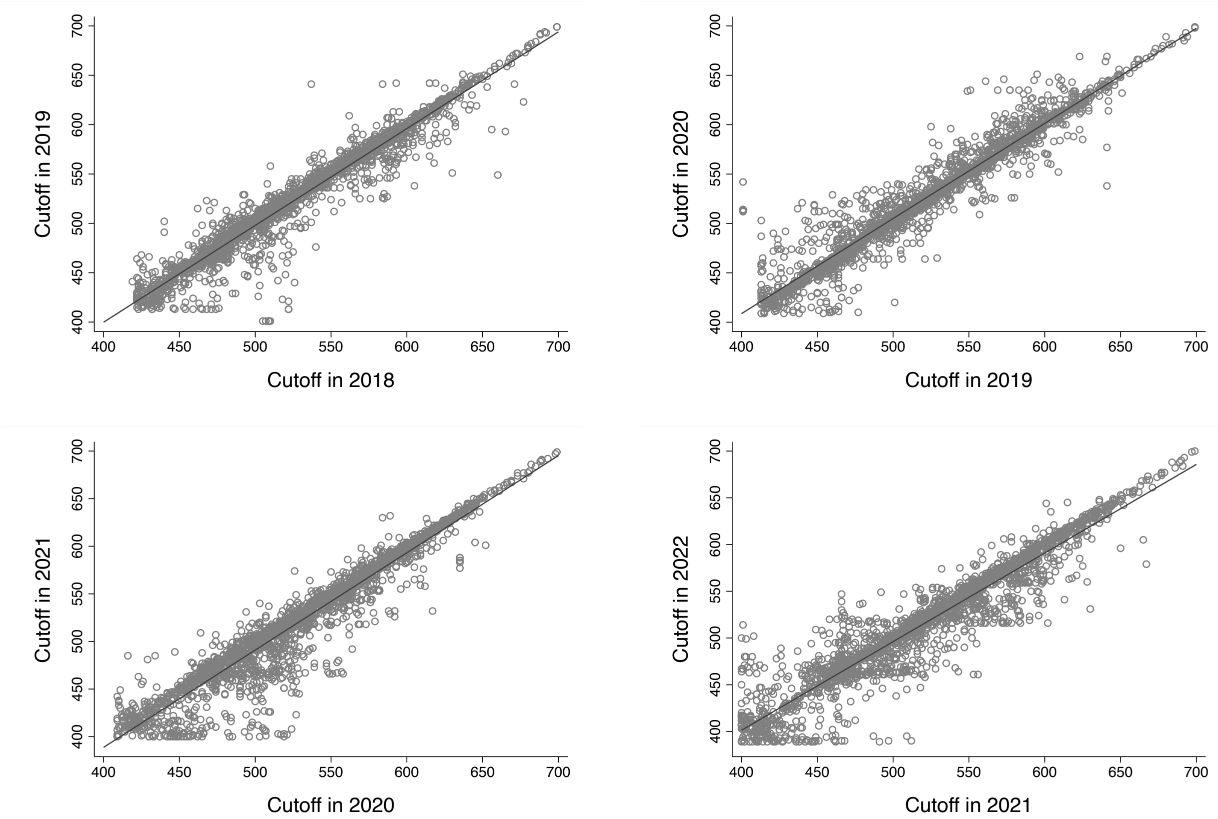
Notes: This table reports the regression results for gender differences in estimated admission probabilities. "Female" is an indicator for female students. "Elite" represents elite universities. Demographic controls include age, residence status, poverty status, and repeat exam taker status. Standard errors, reported in parentheses, are clustered at the individual level. *** p<0.01, ** p<0.05, * p<0.1.

A4 Estimation of admission probability

This section outlines our method for estimating a student's admission probability to a university, which serves as a measure of the riskiness of students' ROLs. We begin by examining the predictive power of historical admission cutoffs. We then model these cutoffs using normal distributions, estimate their parameters, and calculate admission probabilities for each student-university pair. Finally, we validate our estimates against actual admission outcomes.

To estimate admission probabilities, we rely on the predictive power of past admission cutoffs. This approach is valid only if previous years' cutoffs are reliable indicators of current cutoffs. Figure A6 demonstrates this relationship for all universities in our sample from 2018 to 2022. We plot each university's admission cutoff against its cutoff from the previous year. Because the average Gaokao scores fluctuate annually, we normalize all scores to their rank-preserving equivalents in 2021. This means we adjust scores from different years so that a score at a given percentile in any year corresponds to the score at the same percentile in 2021, ensuring comparability across years. The strong correlation (approximately 0.95) between consecutive years' adjusted cutoffs validates our use

Figure A6: Admission cutoffs across years



Notes: This figure reports the relationship between university admission cutoffs in consecutive years from 2018 to 2022. Each panel compares cutoffs for two adjacent years, with each dot representing a specific university. All cutoffs are converted to their 2021 rank-preserving equivalents to account for year-to-year fluctuations in overall Gaokao performance. The top-left panel compares 2019 to 2018 cutoffs, top-right 2020 to 2019, bottom-left 2021 to 2020, and bottom-right 2022 to 2021.

of historical data in predicting current admission thresholds.

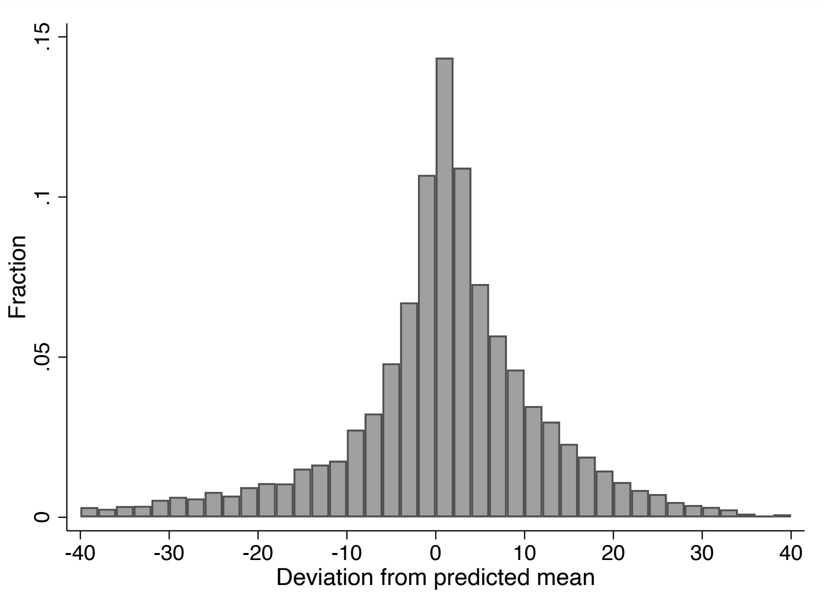
To model the admission cutoffs, we assume that the annual admission score cutoff c_{jt} for university j in year t follows a normal distribution:

$$c_{jt} \sim N(\mu_j, \sigma(\mu_j)).$$

We estimate μ_j by the average admission cutoff for university j during 2018-2021. To validate this normal distribution assumption, we examine the distribution of deviations between realized admission cutoffs and their predicted values in Figure A7. The resulting distribution is bell-shaped, centered around zero, with relatively thin tails, which supports our choice of a normal distribution to model the admission cutoffs.

Following Wang et al. (2023), we assume that the mean of $\ln(\sigma_j)$ is a fourth-order polynomial in

Figure A7: Distribution of realized cutoff minus predicted cutoff



Notes: This figure reports the distribution of deviations between realized admission cutoffs and their predicted values for all universities in our sample. The predicted cutoff for each university is calculated as the average of its admission cutoffs from 2018 to 2021, with all scores standardized to their 2021 rank-preserving equivalents. This standardization ensures comparability across years despite fluctuations in overall Gaokao performance. To focus on the typical variation, we exclude extreme outliers that deviate more than 40 points from the predicted mean.

terms of μ_j:

$$E\left[\ln(\sigma_j)\right] = \beta_0 + \sum_{k=1}^{4} \beta_k \mu_j^k$$

We estimate the model using maximum likelihood and then use the estimated $\hat{\beta}$ to predict σ_j as follows:

$$\hat{\sigma}_j \equiv exp(\hat{\beta}_0 + \sum_{k=1}^{4} \hat{\beta}_k \mu_j^k)$$

Upon obtaining the estimated distribution of admission scores for university j, the probability of a student i with Gaokao score s_i being admitted to university j equals:

$$\hat{p}_{ij} \equiv \Phi(\frac{s_i - \mu_j}{\hat{\sigma}_j})$$

where $\Phi(\cdot)$ is the CDF of the standard Gaussian.

To assess the validity of the estimated admission probabilities, we conduct a regression analysis using individual-level admission outcome data:

$$Admitted_{ij} = \alpha + \theta \hat{p}_{ij}$$

where $Admitted_{ij}$ is a binary variable for student i being admitted to the university listed as their jth choice, and p_{ij} is the estimated probability of the student being admitted to that university. If our estimated admission probabilities are valid, then $\theta = 1$.

The results in Table A19 show that our estimates provide a reasonable approximation of the actual admission probabilities. Columns (1)–(4) present the results of the regression where we regress the outcomes of admission to the first choices on the estimated admission probability. The estimated values for θ are approximately 0.85 and significantly different from zero. Columns (5)–(8) present the results of regressing admission to the second choice on the estimated probability using the subsample of students who are not admitted to their first choice. The estimated values for θ are again significantly different from zero, typically around 0.8. Thus, our model has explanatory power for the empirical patterns.

Table A19: Validity of estimated admission probabilities

Dependent variable	Perceived Probability							
	Admitted to first choice				Admitted to second choice			
	Full	Tier-1 and Tier-2	Tier-1	Tier-2	Full	Tier-1 and Tier-2	Tier-1	Tier-2
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel (a): full sample								
Estimated probability	0.824***	0.827***	0.818***	0.835***	0.804***	0.806***	0.818***	0.799***
	(0.010)	(0.011)	(0.017)	(0.014)	(0.010)	(0.011)	(0.016)	(0.014)
Observations	6,975	6,129	2,545	3,584	6,928	6,085	2,518	3,567
R-squared	0.493	0.496	0.467	0.514	0.487	0.487	0.503	0.477
Panel (b): STEM track								
Estimated probability	0.828***	0.832***	0.820***	0.842***	0.806***	0.809***	0.823***	0.801***
	(0.011)	(0.012)	(0.019)	(0.016)	(0.011)	(0.012)	(0.018)	(0.016)
Observations	5,732	4,992	2,230	2,762	5,682	4,942	2,205	2,737
R-squared	0.482	0.485	0.461	0.500	0.479	0.481	0.500	0.465
Panel (c): Non-STEM track								
Estimated probability	0.782***	0.778***	0.784***	0.783***	0.776***	0.770***	0.767***	0.773***
	(0.021)	(0.023)	(0.049)	(0.026)	(0.022)	(0.023)	(0.044)	(0.028)
Observations	1,243	1,137	315	822	1,246	1,143	313	830
R-squared	0.518	0.508	0.449	0.526	0.499	0.486	0.492	0.483

Notes: This table reports the empirical exercise that tests the validity of estimates on cutoff scores. Columns (1)–(4) present the results of the regression where we regress the outcome of being admitted to the first choices on the estimated probability of admission using the full sample, tier-1 students, and tier-2 students, respectively. Columns (5)–(8) present the results of the regression where we regress the outcome of being admitted to the second choices on the estimated probability using the subsample of students who are not admitted to their first choices, using the full sample, tier-1 students, and tier-2 students, respectively. The top panel is for the combined sample, and the middle and bottom panels are for STEM and non-STEM track students, respectively. *** p<0.01, ** p<0.05, * p<0.1.

A5 Quiz on admissions rules

Question 1: Assume that there are two universities, A and B, and consider the following two rank-order lists. Rank-order list 1: The first choice is university A, the second choice is university B; rank-order list 2: The first choice is university B, the second choice is university A. If your score does not meet the admission cutoff for university A, which list has a higher probability of you getting admitted to university B? [Single choice question]

○ Rank-order list 1 has a higher probability of admission to B

○ Rank-order list 2 two has a higher probability of admission to B

○ Both rank-order lists have the same probability

The correct answer is "Both rank-order lists have the same probability."

Question 2: Suppose a student's score exceeds the cutoff of their first-choice university, but all majors they applied for are already full, and they do not choose "Accept any major." Is the probability of this student being admitted to their second choice in the same tier zero? [Single choice question]

○ Yes, the probability of being admitted to the second choice is zero

○ No, second choice admission is not affected

The correct answer is "Yes, the probability of being admitted to the second choice is zero."

Question 3: Consider the following two rank-order lists. Rank-order list 1: The first choice is university A, the second choice is blank; rank-order list 2: The first choice is university A, the second choice is university B. Which list has a greater probability of being admitted to university A? [Single choice question]

○ Plan one

○ Plan two

○ Both plans have the same probability.

The correct answer is "Both plans have the same probability."