Beyond the Scores: Understanding the Gender Gap in Access to Elite Universities in China

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Abstract

We have observed a longstanding phenomenon in China over the past two decades: the declining representation of women as they advance through the university hierarchy. Our analysis, based on administrative data from China's college entrance exams from 1999 to 2003, shows that even when Chinese girls achieve the same scores as their male counterparts, they are 2.2% less likely to attend elite universities. The trade-off is that they are also less likely to downgrade from their target universities. We highlight two factors explaining the gender gap. First, the list of elite universities (i.e., the Program 985) designated by the Chinese government disproportionately focuses on science and technology, which attracts more male students. We find strong evidence that girls are less likely to choose science and technology universities, even when accounting for their major choices within the school. Second, when confronted with high-stakes and high-risk decisions, such as

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choosing a university, girls tend to make more conservative choices. Supporting this explanation, we show that the gender gap in accessing elite universities is small under the post-exam submission mechanism, which has fewer information uncertainties than pre-exam submission.

1. Introduction

Despite significant advancements in higher education access for women in China and globally, a persistent gender gap remains at the top of the university hierarchy. The under-representation of women at elite universities is documented worldwide (Jacobs 1996; Bielby et al. 2014; Uchikoshi 2022). Attending elite universities is associated with a wide range of lifetime benefits, including more human capital investment (Hoxby 2009; Li et al. 2012), higher quality of peers (Lee and Brinton 1996; Zimmerman 2019), career advancement (Anelli 2020; Chetty et al. 2020), and wage premium (Li et al. 2012; Jia and Li 2021). Ge, Isaac, and Miller (2022) shows that the benefits of attending elite universities is particularly large for women.

Our study documents the patterns of the gender gap in accessing elite universities in China and explores potential explanations. The hierarchical university system in China first divides universities into batches, with the first batch representing those of higher quality.[1] Among the first-batch universities, there are two elite groups: the 985 program and the 211 program, with the former generally considered better.[2] Our study defines 985 universities as elite universities in China. The left panel of Figure 1 demonstrates a lower share of female students in higher-quality universities. While women constituted over 50% of students in technical colleges between 1999 and 2003, their representation fell to around 35% at top-tier 985 universities. This pattern persists today, as shown in the right panel of Figure 1.[3]

Graduating from an elite university is particularly important in China, as the labor market often discriminates against graduates from non-elite institutions. There is a specific term in Chinese for universities not included in either the Project 985 or Project 211 initiatives: "doubly not listed universities" (shuangfei). News reports and surveys reveal that 70% of respondents have encountered companies with restrictive bachelor's degree requirements, and 40% have encountered job postings explicitly preferring "985/211 university graduates."[4] Even some universities outside China refer to these school lists when admitting Chinese students.[5] In short, entering a 985 university

[1] Lower quality schools include the second-batch universities and the third-batch technical colleges.

[2] We will provide more information on this hierarchical system in Section 2.2.

[3] The right panel shows that while the proportion of women in Chinese universities has risen from 1999 to 2022 across all tiers, women still account for only about 40% at 985 universities.

[4] Source: Guangming Daily, "Help young people break free from the shadow of bachelor degree", accessed on March 11, 2024; Jiemian Global, " The 51job Survey shows: 70% of respondents have encountered bachelor degree restrictions", accessed on March 11, 2024.

[5] For instance, the University of Warwick explicitly has a university list that largely overlaps with the

matters a lot in China, and so does the gender gap in accessing these universities. Our study reveals that Chinese girls are 2.2% less likely to be admitted to elite universities (Project 985) even when they have the same scores as their male counterparts in the centralized admission examination. This disparity translates to a loss of 16,860 seats for female students at elite institutions from 1999 to 2003.

The gender gap in accessing elite universities can be broadly divided into three parts: differences in personal ability (e.g., test scores), schools' varying gender biases based on students' abilities,[6] and students' own school selection choices. A key feature of China's centralized admission system is that all students with the same score (within the same track in the same province) are technically considered equal. Therefore, any remaining gender gaps are due to differences in choices between male and female students (or their families).[7] This institutional feature eliminates the influence of the first two factors and allows us to focus on the third part. Using administrative data covering all students taking the national college entrance exam (the Gaokao) between 1999 and 2003, we find that, conditional on the Gaokao score,[8] women are still 2.2% less likely to attend elite universities (Project 985 in China). This decision has pros and cons. On the one hand, girls are less likely to attend elite universities. On the other hand, females are less likely to "downgrade" their university choices, a common scenario under the sequential mechanism where they might end up at a much worse institution if they marginally fail their first-choice school.

We next explore why female students are less likely to choose elite universities even when they achieve the same Gaokao score. First, we explore gender difference in factors highlighted by the existing literature such as the intention to retake the exam (Uchikoshi 2022; Kang et al. 2024), local preferences (Doğan and Yuret 2011), and major choices (Kahn and Ginther 2018; Franco and Hawkins 2023). While we find solid evidence of gender differences, these factors play a limited role in explaining the gender gap in

985 and 211 lists. https://warwick.ac.uk/study/international/admissions/entry-requirements/china

[6]For example, using data from Spain, Farré and Ortega (2023) find a clear pattern of gender balancing, which can result in female penalty in non-STEM majors.

[7]Our data does not allow us to determine whether the decision was made by students or their parents. However, our empirical analysis remains meaningful even if parents made the decision entirely. This is because parents' different choices or expectations for boys and girls are an important source of gender differences (Tungodden and Willén 2023).

[8]Figure 2 plots the distributions of test scores by gender. For the humanities track, the score distribution is about the same for males and females. Males achieve slightly higher scores in the science track. While men's better performance in the science track can explain part of the gender gap in accessing elite universities, our analysis focuses on the fact that even if women achieve the same score as their male counterparts, they are still less likely to choose elite universities.

accessing elite universities. Second, as a government-designated elite school list, the 985 program disproportionately includes science and technology-oriented universities, aligning with China's strategic plans and favoring male students, thereby exacerbating gender imbalances. When we separately define elite schools for STEM and for social science and humanities, we find that among Project 985 universities, 34 out of 39 are leading in STEM, while only 20 out of 39 are leading in social sciences and humanities. Girls show a comparable tendency to choose "humanities elite" schools as boys do for "science elite" schools. However, because Project 985 includes more science elite schools, girls display a lower tendency for 985 schools overall. Lastly, the Gaokao is a one-shot, high-risk examination. The sequential admission mechanism in the early 2000s increased this risk, as missing a first-choice school could result in falling to a lower-tier school. It is widely documented that women are more risk-averse and may opt for more conservative choices in high-stakes decisions (Croson and Gneezy 2009; Bertrand 2011; Dohmen et al. 2011). To test this hypothesis, we use policy variation in the timing of preference submission.[9] We find that the gender gap in 985 admissions is 2.5 percentage points smaller under the post-exam submission, which is less risky because students know their Gaokao performance beforehand, when compared with the pre-exam submission.

Although our study uses data from two decades ago, it still provides novel insights from the current perspective. First, as documented in Figure 1, the under-representation of female students in top-tier universities persisted until 2022, as did the concept of "985 universities." Second, people who took the Gaokao two decades ago are now in their late 30s, the peak of their careers (Fang and Qiu 2023). Our study shows how a gender gap in accessing elite universities two decades ago contributes to the current gender gap in labor market performance. Lastly, the unique setting of China demonstrates how government policy can affect the gender gap in unexpected ways. For example, our analysis shows that establishing a less risky mechanism, such as post-exam preference submission, encourages girls to choose elite universities. We also show how a government-initiated university project, like Project 985 in China, which emphasizes STEM over humanities, can unintentionally discourage girls from attending top universities. Many other countries have similar initiatives, such as Japan (Yonezawa 2003), South Korea (Byun, Jon, and Kim 2013), Germany (Menter, Lehmann, and Klarl 2018), and France (Boer et al. 2017).

Our study speaks to three strand literature. First, our research provides a more

[9]We visualize policies of submission timing across provinces and years at Appendix Table A1.

complete picture about the potential causes that lead to the gender gap in accessing elite university. The underrepresentation of females in top universities is observed world-wide, such as Japan (Uchikoshi 2022), China (Cai et al. 2019), and the United States (Jacobs 1996; Bielby et al. 2014). However, previous studies mostly focus on one-single explanation, such as academic performance disparities (Ors, Palomino, and Peyrache 2013; Cai et al. 2019; Saygin 2020) and risk attitudes (Saygin 2016; Uchikoshi 2022; Kang et al. 2024). Exploiting the centralized admission system in China, we first clearly disentangle the gap into the gender gap in Gaokao performance and the remaining gap conditional on the score. We explore the gender difference in a wide range of factors, including tendency to retake the exam, staying in home provinces, major preference, preference for certain types of universities, and risk attitudes.

Second, our study connects the gender gap in accessing elite colleges with preferences for STEM majors (or STEM-oriented universities). Extensive literature shows that females fall behind males in STEM fields starting from high school (Kahn and Ginther 2018; Delaney and Devereux 2019; Card and Payne 2021; McNally 2020).[10] The relationship between women's underrepresentation in STEM majors and in elite universities is under-studied. Bielby et al. (2014) shows that in the U.S., the most competitive universities award 82.4% of STEM bachelor's degrees. Our study shows that in China, the government-designated elite school list, which favors STEM-oriented universities, contributes to women's underrepresentation in top-tier universities (Project 985).

Third, this paper advances the understanding of how policies shape gender disparities in higher education. Previous studies have examined how educational institutions and policies impact gender inequality in higher education. They indicate that competitiveness (Buser, Niederle, and Oosterbeek 2014; Arenas and Calsamiglia 2022) and sequential mechanisms (Ma, Wu, and Zhong 2013; Wu and Zhong 2014) are less favorable to female students. We contribute to this literature by examining the consequences of two new policies. First, China's government-designated elite school list, which favors STEM-oriented universities, unexpectedly discourages female students from attending elite schools. Second, we show that adopting a post-exam submission policy, which reduces information uncertainty, can significantly alleviate the gender disparity in elite university admissions.

Two studies closely related to ours deserve further discussion. Using a subsample

[10] Possible explanations include gender differences in competitiveness (Buser, Niederle, and Oosterbeek 2014; Landaud, Ly, and Maurin 2020), confidence (Murphy and Weinhardt 2020), and attitudes (Zafar 2013).

of our data, Wu and Zhong (2020) finds that, conditional on the Gaokao score, females are more likely to be admitted but tend to be matched with less prestigious universities. While they focus on the mismatch between students and universities, we specifically examines the gender gap in accessing elite universities. Additionally, Wu and Zhong (2020) attribute this gap to risk attitudes, though without direct evidence. Our study thoroughly exploring potential explanations for the gender gap. Han et al. (2024), using data from a county in Henan province, also finds that equally qualified female students are less likely to be admitted to elite universities. In comparison, our data cover the entire population of Gaokao participants and allow us to explore a broader range of institutional variations.[11]

The remainder of this paper is organized as follows. Section 2 introduces the institutional background. Section Section 3 describes the data and empirical strategy. Section 4 presents evidence on the gender gap in elite university admissions. Section 5 explores explanations for this gap. Section 6 concludes.

2. Institutional Background

2.1. An Overview of the National College Entrance Exam in China

The National College Entrance Exam in China is a high-stakes and high-risk test that millions of high school graduates take every year to compete for college admission.[12] All colleges in China admit students based on their Gaokao test scores, and the scores are the sole criteria for college admission conditional on students' stated college preferences.[13] The Gaokao is arguably the most important examination for most Chinese people in their entire lives.

Students' journey to college admission in China consists of six phases: choosing a track, registering for the examination, taking the Gaokao, receiving the score, submitting the priority list, and receiving the admission outcome.[14] Track selection and

[11] Notably, the Henan province used in Han (2024) is special, as it has no 985 universities and only one 211 university.

[12] Nearly every high school graduate takes this exam. From 1999 to 2003, the number of test-takers increased from 2.3 million to 6.1 million. By 2023, the number of Gaokao registrations had reached 12.9 million.

[13] A small proportion of students are eligible for bonus scores, which are treated the same as the subject scores in the Gaokao. Students who demonstrate outstanding performance in specific subjects (such as winning awards in subject Olympic competition) or belong to some special groups (such as ethnic minorities) receive these bonus scores, usually ranging from 5 to 20 points.

[14] Note that the sequence of the three phases—taking the Gaokao, receiving the Gaokao score, and

priority list submission are crucial phases in our setting. We will discuss these two phases in greater detail below and provide information on the other phases in Appendix B.1. Note that the admission process is conducted separately for each track in each province. Therefore, in China, the Gaokao score comparisons are only meaningful within the province-track cell.

Most high school students in China choose a subject specialization in their second year, opting for either the science or humanities track. A few provinces (such as Guangdong and Henan) adopt a unified track policy instead of a split track policy.[15] All students take exams in Chinese, Mathematics, and English, with each exam being worth 150 points. For the split track, students in the science track are evaluated in physics, chemistry, and biology, while those in the humanities track are evaluated in history, politics, and geography. The exams for these specific tracks add up to an additional 300 points. For the unified track, students are tested on combined elective subjects.[16]

The preference submission mechanism has two important dimensions: submission timing and matching rules. Submission timing varies among provinces and years and can be categorized into three types: pre-exam submission, post-exam-pre-score submission (also known as estimated-score submission), and post-score submission. The later students submit their preference, the more information they have about their test score (Lien, Zheng, and Zhong 2017), thus reducing uncertainty. For ease of comparison, our discussion will focus on the differences between pre-exam and post-exam submission policies. The other dimension is the matching rule for universities and students. Between 1999 and 2003, the dominant mechanism was the sequential mechanism. During our sample period, only Hunan province adopted the parallel mechanism in 2003 as an experiment.[17] Because of limited policy variation, our study focuses solely on the sequential mechanism and does not compare it to parallel mechanisms. Interested readers can refer to Chen and Kesten (2017) and Bo et al. (2019) for information on how

submitting the priority list—varies among provinces and years, as shown in Appendix Table A1.

[15] A small share of students (about 6.4% of the Gaokao test takers in our data) opt for specialized tracks such as sports, music, and painting. We exclude these students from our analysis because their admission process differs significantly. This exclusion does not affect our main conclusions because these students rarely target 985 schools.

[16] In certain year of some provinces (such as Guangdong in 1999), students on the combined track can choose combinations such as physics and history, or chemistry and biology. In other years of some provinces (such as Guangdong from 2000 to 2003 and Henan from 2001 to 2003), students must take all six elective subjects as a combination in the exam.

[17] The parallel mechanism operates on a "score-first" basis, where universities admit students based solely on scores in descending order. An example comparing the sequential and parallel mechanisms is presented in Appendix B.2.

the change from the sequential to the parallel mechanism affects admission outcomes in China.

In the sequential mechanism, students list universities and majors in order of preference. Initially, universities admit top-scoring students who list them as their first choice until quotas are met. If slots remain, universities then consider those who list them as a second choice. This mechanism is highly risky for students targeting top universities. Since the number of applicants far exceeds the number of spots at elite universities, almost all admission quotas are filled in the first round. Consequently, if a student barely misses their first-choice university, they will have high chances of ending up at a significantly less desirable institution, resulting in substantial undermatching.[18]

2.2. University Hierarchy in China

As shown in Appendix Figure A1, university hierarchy divides students into four groups based on their Gaokao scores: the first, second, third, and technical batches. The first batch includes elite universities that admit only students with outstanding Gaokao scores.[19] Institutes in other batches are generally of significantly lower quality compared to first-batch universities. All elite universities in our study belong to the first batch.

Among the first-batch universities, two groups are considered of even higher quality: "Project 985" and "Project 211." These are strategic initiatives launched by the Chinese government to elevate the competitiveness of selected universities worldwide. The 985 universities are a subset of the 211 universities and are generally considered the best in China.[20] We define the universities in "Project 985" as elite universities. According to our data, students admitted to "Project 985" account for only 3.1% of students taking the Gaokao.[21]

[18] China adopted the sequential admission mechanism to manage a large volume of student-university matches efficiently, especially when advanced information technology was lacking back then. The sequential admission process was more viable because it allowed for simultaneous processing across schools and minimized the need for information exchange among them.

[19] Technically, there are two batches preceding the first batch: the zero batch and the early admission batch. The zero batch is reserved exclusively for the top-2 universities in China (Peking University and Tsinghua University), which typically have the highest admission scores and priority in admitting students. The early admission batch generally includes specialized programs like military, public security, and judicial studies. Only students not admitted in these two batches will proceed to the regular batches. Since our study focuses on access to elite universities, we included students admitted to Peking University and Tsinghua University and excluded those admitted in the early admission batch.

[20] For ease of expression, we use the term "211 universities" to represent those on the 211 list but not on the 985 list.

[21] For comparison, roughly 11% of students are admitted to first-batch universities.

2.3. University Types in China

College names in China often contain valuable information (Eble and Hu 2022), and many school names explicitly reveal their strong majors, creating certain stereotypes. For example, China University of Geosciences is known for geosciences, while Shanghai University of Finance and Economics excels in economics and business. This phenomenon originated in 1952, when China restructured its higher education system to mimic the Soviet's specialized model. The reform aimed to tailor universities to meet the specific needs of national development and industrialization, leading to the creation of institutions with specialized disciplines directly reflected in their names.

We can often identify the type of university from its name. Article 11 of the "Interim Provisions on the Establishment of Ordinary Higher Education Institutions," promulgated by the state council in 1986, supports this strategy. This article states that new institutions should be established based on factors such as student training objectives, categories of disciplines, size, leadership system, and location, with the institution's name reflecting these attributes. For instance, if a school name contains terms like "technology," "engineering," and "science," we define the school as "natural sciences and technology." Appendix Tables A2–A4 show the correspondence between keywords in school names and university types. We follow the official categories from the Ministry of Education, which classifies Chinese universities into 12 types based on their disciplinary focus.[22]

3. Data, Variables, and Empirical Strategy

3.1. Data

The main data come from an administrative dataset covering all Gaokao takers (more than 22 million) from 1999 to 2003.[23] Our data contain three sets of information. The first set includes individual information from examination registration, such as demographic variables (gender, ethnicity, place of residence, hukou status, etc.) and track choices (science or humanities). The second set covers students' Gaokao test scores by subject.

[22] In addition to comprehensive universities, the categories also included 11 types of specialized universities: natural sciences and technology, agriculture, forestry, medicine and pharmacy, teacher training, language and literature, finance and economics, political science and law, physical culture, art, and ethnic minorities.

[23] Observations from Hainan province in 2002 are missing from our dataset, presumably due to administrative reasons.

The third set involves admission outcomes, including the admitted university and major.

We supplement the administrative data with two hand-collected province-by-year datasets. The first dataset includes first-batch cutoff scores (varying by track). Since our main interest is the gender difference in attending elite universities, we focus on students whose scores are above the corresponding first-batch cutoff scores. The second dataset covers submission timing. We collected this information from various sources, including the internet, news reports, and consultations with local education bureaus.[24] We present the submission timing in Appendix Table A1.

3.2. Key Variables and Summary Statistic

Most of our variables are straightforward to interpret, such as track choices and the Gaokao scores. However, two variables require further clarification. The first is "elite university." In our study, this variable is assigned a value of 1 if a student gains admission to any Project 985 university, and 0 otherwise. As discussed in the background section, China has a hierarchical university system, so there is no clear or official cutoff for "elite" universities. Different studies might use different definitions of an elite university.[25] We chose the 985 universities because they are of top quality and well-recognized in the labor market. Another key variable is "downgrade," which is set to 1 if a student is not admitted to their first-choice institution in the first batch of admissions. As explained in the background, downgrading is a highly undesirable outcome because of the sequential mechanism during our sample period and often results in a settlement in a much less preferred institution (or even not admitted). In most cases, the two variables are mutually exclusive.[26]

We present the relationship between the Gaokao scores and the probabilities of enrolling in elite universities and downgrading in Figure 3. The left panel shows that, given the same score, females are consistently less likely to attend elite universities, and this discrepancy widens as scores increase. Conversely, females are less likely to experience downgrading, as shown in the right panel of Figure3. The gender gap

[24] Despite our best efforts, we were unable to find policies for certain years in some provinces.

[25] For example, Li and Qiu (2023) use the same definition of elite universities as our study (Project 985). Li et al. (2015) include both Project 985 and Project 211 universities. Jia and Li (2021) define elite universities more broadly as those that admit students in the first batch in all provinces.

[26] Under the sequential mechanism, only if there are slots remaining for elite universities after the first round of matching, students not listing those universities as their first choice would have a chance in the following rounds. This scenario rarely happens because the number of applicants usually far exceeds the number of spots in elite universities.

diminishes at the very top scores,[27] which occurs because students with sufficiently high scores can always secure their target schools. Appendix Figure A2 presents a breakdown by track (science, humanities, and unified) and finds that the gender discrepancy is most pronounced in the science and unified tracks and less evident in the humanities track.

Table 1 reports the summary statistics. The "Above Cutoff Database" includes only students who scored above the first-batch cutoff and serves as our main sample.[28] Among the main sample, 67.3% of females in split-track provinces are in the science track, compared to 88.2% of males. We find that more females (79.8% compared to 75.4%) are first-time test-takers, suggesting they are less likely to retake the test after experiencing a downgrade. Importantly, females downgrade less (34.8% compared to 37.7%) but are less likely to gain admission to elite universities (21.5% compared to 25%), implying a trade-off between attending elite universities and certainty of admission.

3.3. Empirical Strategy

Our baseline regression investigates the gender gap in admission outcomes after controlling for individual characteristics within the same score-province-year-track cluster. Specifically, we estimate the following model:

$$Y_{i,s,y,p,t} = \beta_0 + \beta_1 \text{Female}_i + \beta_2 \mathbf{X}_i + \lambda_{s,y,p,t} + \varepsilon_{i,y,p,t}, \tag{1}$$

where $Y_{i,s,y,p,t}$ represents the outcome of interest (such as accessing an elite university or downgrading) for a student i with a test score s, within a specific cell defined by the province p, year y, and academic track t. On the right-hand side, $\mathbf{X}_i$ represents the individual variables of student i, including hukou status, first-time test-taking, and ethnicity. We also incorporate score-province-track-year fixed effects ($\lambda_{s,y,p,t}$) to ensure that all students within the score-province-track-year cell are considered identical by admission authorities. Therefore, any remaining gender gaps are due to students' choices. Standard errors are clustered at the province-year-track level.

[27] Only 0.5% of students achieve a score 120 points above the first-batch cutoff score.

[28] As comparison, the "Attending Database" includes all students who participated in the Gaokao.

4. Gender Differences in Accessing Elite Universities

Table 2 shows the estimation results corresponding to equation (1). The first column in Panel A indicates that females are, on average, 2.2% less likely to attend elite universities when scores and individual variables are held constant. Examining the gender difference by track (columns (2)–(4)), we find that this pattern is mainly driven by the science and unified tracks, while the conditional gender gap reduces to just 0.5% in the humanities track. When we split our main sample into high-scoring and low-scoring groups,[29] the conditional gender gap increases to 4.8% in the high-scoring group versus 1.3% in the low-scoring group. The subsample gender gap is roughly proportional to the average 985 admission rate in each sample (53.7% versus 14.5%). Regarding downgrading, females have a 4.2% lower likelihood of downgrading. Unlike access to 985 universities, the gender gap in downgrading probabilities conditional on test scores varies only slightly when considering heterogeneity by track and high/low test scores, as shown in the right part of Table 2.

Heterogeneity

Figure 4 demonstrates how the conditional gender gap (coefficient β_1 in equation (1)) varies across different subsamples. Panel A focuses on elite universities, while Panel B focuses on downgrading. We investigate heterogeneity across various dimensions, including hukou status, recent graduates, province competitiveness,[30] and region. Since all coefficients for females are negative, Figure 4 takes the absolute values and compares them to the average elite 985 admission rate in each subsample. Panel A shows that the magnitude of the gender gap is roughly proportional to the average admission rate. For example, urban students have higher chances of being admitted to a 985 university, and the gender gap in accessing these universities is also greater among urban students. Panel A suggests that females' lower tendency to choose elite universities, conditional on the Gaokao performance, is a nationwide phenomenon and not limited to specific groups.

[29] The threshold is 50 points above the first-batch cutoff score.

[30] We use the admission rate to elite 985 universities as a measure of competition intensity. If a province's admission rate is below the national median, it is considered a more competitive province.

Robustness Check

We perform two sets of robustness checks regarding college expansion and bonus points. Here, we briefly summarize what we do and what we find and leave technical details in Appendix B.3. First, our sample period happens to coincide with the initiation of a college expansion in China. The number of students admitted to universities grows rapidly from 767 thousand in 1998 to 1.51 million in 2003 (Ministry of Education of PRC 2003). Previous studies show that college expansion can affect the gender gap in accessing universities (Li et al. 2015). In Appendix Table A5, we present the estimation results of equation (1) year by year. The coefficients stay stable across the time period. This stability arises because the magnitude of the expansion is limited at the top of universities hierarchy. As a result, college expansion is of limited impact if our research interest focusing on access the elite universities.

The second set of robustness checks involves bonus points. In principle, we should add the bonus points to the subject scores. However, coding these points is extremely complex due to the various ways they can be obtained and the differing policies by province and year. Therefore, we use the results without bonus points as the baseline and perform a robustness check by adding bonus points in a subsample of provinces where we can more confidently code them. Fortunately, only a small proportion (11%) of students are eligible for bonus points, and the gender gap is minimal.[31] We perform a robustness check in Appendix Table A6 by including the bonus scores into the subject scores and find almost identical coefficients as in Table 2.

5. What Accounts for the Gender Differences?

In the previous section, we found that females are less likely to attend elite universities in China even if they achieve the same scores as their male counterparts. The Chinese college admission system ensures that conditional on the Gaokao score, if females make the same choices in their preference submissions, there would be no gender gap in accessing elite universities by design. Therefore, in this section, we explore why females and males make different choices. We first discuss the gender differences in various aspects of preferences highlighted by the existing literature and show that they play a limited role in explaining the gender gap in accessing elite universities. Then, we present two likely explanations. First, China's government-designated elite school

[31] In our main sample, 11.2% of female students and 11.3% of male students receive bonus points. Among those with bonus points, the mean score is 12.0 for females and 12.4 for males.

list favors science and technology universities, which are relatively more attractive to males. Second, the gender difference in risk attitudes also plays a role.

5.1. Exam Retaking, College Location, and Major Choices

Past literature has identified several preferences that may drive gender disparity in admissions to elite universities: the propensity to retake exams (Uchikoshi 2022; Kang et al. 2024), local preferences (Doğan and Yuret 2011), major choices (Kahn and Ginther 2018; McNally 2020), and willingness to compromise on less-preferred majors for better universities (Franco and Hawkins 2023). In this subsection, we introduce how we construct these preferences from our data and evaluate their importance in explaining the gender difference in access to elite universities.

Retake Propensity

The Chinese Gaokao is held once a year. If a student is dissatisfied with their admission outcome, they can retake the exam the following year. Retaking the Gaokao is a tough decision that requires significant resources—time, money, and effort. Students more likely to retake usually have a higher tolerance for risk, making them more inclined to apply to highly competitive top-tier universities. By accessing students' personal identification numbers for a subsample, we can infer whether a student retakes the exam.

Because the retake decision next year is clearly a function of admission outcome this year (only students who are not satisfied would take the Gaokao again), we additionally control for whether students are admitted by a 985 university and whether they experience downgrading this year. The first column of Table 3 shows that females are about 1.3% less likely to retake the exam conditional on the Gaokao performance, consistent with the findings of Uchikoshi (2022) and Kang et al. (2024). However, controlling for the retake decision only marginally reduces the conditional gender gap from 2.2% to about 2.1% (column (2) of Table 4).[32]

[32]The number of observations dropped by 22.8% from column (1) to column (2) because constructing the retake variable requires data from two consecutive years. Consequently, last year's observations are automatically excluded when we control for this variable.

Local Preference

Geographic location is an important factor when choosing a university. A student may sacrifice school quality for proximity. If female students prefer local universities, this could limit their enrollment in distant elite universities and contribute to the gender gap. Therefore, we construct a dummy variable indicating whether a student enrolls in a local university within the same province. Column (2) of Table 3 shows that females are about 3.4% more likely to choose a local university within the same province. However, controlling for location choice increases the gender gap in accessing elite universities to about 3.0% (column (3) of Table 4).

Major Preference

Students often choose their majors along with schools, and major preferences can influence admission to elite universities. For example, women are less likely to choose elite universities that have more STEM majors (Bielby et al. 2014), as women tend to prefer humanities or business over STEM. As a result, women's weaker preference for STEM majors can lead to lower chances of being admitted to elite universities. Columns (3)–(5) of Table 3 confirm that, given the same Gaokao score, women are 12.8% less likely to choose STEM majors and about 2.6% and 7.3% more likely to choose business and humanities majors, respectively. However, controlling for major preferences only slightly reduces the gender gap to about 2.1% (column (4) of Table 4), suggesting that major choice alone cannot explain the gender gap in accessing elite universities.

Major–School Tradeoff

Students consider both majors and school–major combinations since each university has its strong and weak majors. To evaluate whether females prefer strong majors within universities, we compute within-school rankings of majors based on the median Gaokao scores of accepted students. We categorize the majors into the top 25%, middle 50%, and bottom 25% within the school. Columns (6)–(8) of Table 3 show that females do prefer strong majors within universities. However, including both major fixed effects and within-school major strength indicators accounts for only a small portion of the gender gap in accessing elite universities (column (5) of Table 4).

The last column of Table 4 includes all the above preferences as control variables in our baseline regression model. Controlling for these factors reduces the gender gap in accessing elite universities, conditional on the Gaokao performance, from about -2.2%

to -1.8% (about a 16% drop in magnitude). Therefore, other potential explanations need to be explored.

5.2. University Types

In this subsection, we discuss the institutional factors embedded in Project 985 that may unintentionally exaggerate gender differences in choosing 985 universities. China's designation of 985 universities disproportionately favors institutions specializing in science and technology majors. This systematic bias parallels findings in the Dutch educational system (Buser, Niederle, and Oosterbeek 2014). Such a focus exacerbates gender disparities, as women are generally less inclined to enroll in science and technology-oriented universities, regardless of their major choices. For example, no university specializing in economics and finance is listed among the 985 universities, although economics is an attractive major in many 985 universities and has high admission scores. Our data suggests that female students show a clear preference for economics and finance universities, making up 56% of their enrollment compared to 38% across all institutions. Nearly half of the 985 universities are science and technology universities.[33] However, the female share in science and technology universities barely exceeds 20%. In contrast, universities specializing in economics, finance, and education have a female share of nearly 60% but account for a tiny share of the 985 school list. Columns (9)–(11) of Table 3 show that, conditional on the Gaokao score, women are about 5.1% less likely to choose a STEM-oriented university and about 5.3% more likely to choose an education-oriented university that specialize in training teachers (also known as "normal" university or *shifan* in Chinese). Note that we control for the major fixed effects, indicating that, even within the same major, female students are less inclined to choose science and technology universities.

Figure 5 raises an important question: What would happen if the list of "elite" universities were more balanced between science-oriented and humanities-oriented schools? To explore this, we need an alternative list that ranks universities separately for their science and humanities majors. We chose the "Wu Shulian Ranking of the Chinese Universities" (hereafter WSL Ranking) in 2001, an influential and widely recognized unofficial ranking.[34] The WSL ranking includes separate sub-rankings for science and

[33]We classify the university types according to their names. For example, science and technology universities are those that contain the terms "science" and "technology" in their names. Appendix Tables A2 to A4 provide a complete correspondence between school names and school types.

[34]Another reason for choosing the WSL ranking is that it was initiated earlier and is closer to our period of study. Other influential rankings, such as the Alumni Association Rankings and the Ruanke Rankings,

humanities based on research capacity. Conducted by a Chinese higher education consulting organization, the 2001 edition primarily focused on student training and scientific research (Wu, Lv, and Guo 1999). We define universities that rank in the top 39 (the number of 985 universities) in science or humanities in the WSL ranking as science or humanities elite. The intersection of these two sets is defined as "dual elite," meaning these schools excel in both science and humanities majors. Appendix Table A7 shows whether schools in the 985 list are also considered science or humanities elite in the WSL ranking. This confirms that the 985 list favors science and technology universities. Most 985 universities (34 out of 39) ranked in the top 39 for science research capacity, but only half (20 out of 39) excelled in humanities research.

Table 5 uses the alternative definition of elite universities with WSL rankings and generates three important findings. First, the patterns in Panel A with WSL science elite as the outcome variable are similar to those in Table 2 with 985 schools as the outcome variable. This similarity reflects that the government's selection of 985 schools relies more on the schools' science research abilities than their humanities research. Second, Panel B shows that, conditional on the Gaokao score, females have a strong preference for universities strong in humanities, even if they choose the science track in the examination (column (3)). Third, assuming dual-elite schools have no clear tendency towards science or humanities majors and controlling for all types of preferences listed in the previous subsection, we find women are still 1.0% less likely to enroll in these dual-elite universities (column (2) of Panel C).[35] Additionally, the magnitude of this gap is consistent across different tracks (columns (4), (6), and (8)), suggesting inherent factors are at play. We explore risk attitudes as one possible inherent factor in the next subsection.

In summary, our study shows that the criteria for ranking universities may have an unintended consequence on the gender gap in accessing top universities. We find that current university rankings, which put higher weights on science majors, contribute to the fact that females have lower tendencies to choose elite universities, conditional on test scores. However, we are not arguing humanities majors should be weighted equally to science majors. Judging the quality of a university is a complex question and is beyond the scope of this paper.

only came out in 2015. To verify the credibility of the WSL rankings, we compared the top 39 universities in the three rankings in 2015 and found an overlap of 31 schools.

[35] In the even columns of Table 5, we control for all factors discussed in Section 5.1 except the retaking outcome, as this variable requires data from the following year. Including this variable would cause us to lose last year's observations. We verified that its inclusion does not affect our main findings.

5.3. Risk Attitudes

The Chinese Gaokao is a high-risk event, especially during our study period. The sequential mechanism made barely missing the first-choice school extremely undesirable, leading to significantly worse admission outcomes. Additionally, the Gaokao is held only once a year. If a student is unsatisfied with the admission outcome, they must wait until the next year to take Gaokao again. Previous studies consistently document that women make more conservative decisions in risky situations (Croson and Gneezy 2009; Bertrand 2011; Dohmen et al. 2011). This hypothesis aligns with our findings in Table 2, suggesting that women may avoid the most competitive elite universities to reduce the chances of being downgraded to a significantly worse school. However, Table 2 does not provide direct evidence of gender differences in risk attitudes, as the pattern may also be explained by other factors discussed in previous subsections. We present two pieces of additional evidence here. First, using survey data on college students, we show that female students are more likely to make safer choices. Second, exploring provincial heterogeneity in preference submission timing, we find that post-exam submission, where students have more information about their exam performance, is associated with a smaller gender gap in accessing elite universities.

Although directly measuring the risk attitudes of the Gaokao takers is not feasible, we follow Lu, Shi, and Zhong (2018) and use the 2011 wave of the Chinese College Students Survey (CCSS) to measure risk attitudes among college students.[36] The survey contains a question asking students to choose between two options: gaining 1000 RMB with certainty or gaining 2000 RMB with a 50% chance and nothing with a 50% chance. If a student strictly prefers the first option (the more certain choice), we code the risk preference variable as -1. We code the variable as 1 if the student strictly prefers the second option and as 0 if the student is indifferent between the two options.[37]

Appendix Table A8 find that females significantly prefer choices with more certainty, consistent with previous literature. Interestingly, the gender discrepancy is similar between science and humanities majors (column (2)) and between elite and non-elite universities (column (3)). This stability echoes our findings in Panel C of Table 5 and suggests that women's risk aversion is stable regardless of their track choices or abilities.

[36]The survey employs a stratified sampling method, capturing a balanced sample from "Project 985," "Project 211," and other less renowned institutions. With a sample size of 43,621 students across 36 universities, the dataset offers a robust and representative snapshot of China's academic landscape.

[37]The survey also contains another question that replaces "gaining" with "losing." While we also report the results on losing uncertainty, our discussion focuses on gaining uncertainties because losing uncertainty is confounded with loss aversion.

In the next step, we test to what extent gender differences in risk attitudes account for the gap in accessing elite universities. We take an indirect approach and test the following conjecture: The gender gap in accessing elite universities would be smaller in an environment with fewer uncertainties. The variation in preference submission timing at the province-by-year level provides such an opportunity (Appendix Table A1). Previous studies on the timing of preference submission reveal that post-exam submission removes score uncertainties, making it ex-post fair (Wu and Zhong 2014; Arslan, Song, and Wang 2024). Appendix Figure A3 visualizes the gender gap in probabilities of attending a 985 university at each score by submission timing.

We test whether reduced uncertainties help shrink the gap using the following econometric specification:

$$(2) \quad Y_{i,t,s,y} = \beta_0 + \beta_1 \text{Female}_i + \beta_2 \text{Post policy}_{p,y} \times \text{Female}_i + \beta_3 \mathbf{X}_i + \lambda_{s,y,p,t} + \varepsilon_{i,s,y,p,t}.$$

The variable Post policy$_{p,y}$ is set to 1 if province p adopts a post-exam submission policy in year y, and 0 otherwise. Note that province-by-year fixed effects are absorbed by the FEs at a more granular level ($\lambda_{s,y,p,t}$). The coefficient β_2 is of primary interest here.

Table 6 presents the estimation results. Column (1) of Panel A shows that under the pre-exam submission mechanism, women are 4.1% less likely to attend an elite 985 university, conditional on the Gaokao scores. This gap shrinks to 1.6% under the post-exam submission mechanism. Controlling for preferences discussed in Section 5.1 do not affect this finding, as shown in the even columns of Panel A of Table 6. Table 2 presents the tradeoff between listing an elite university as the first choice and a more conservative option of listing a less prestigious university to reduce the likelihood of downgrading. Does women's higher chance of attending elite universities come at the cost of a higher downgrade rate? Panel B of Table 6 suggests this is not the case. In summary, we find that an environment with fewer uncertainties favors women more than men.

5.4. Robustness Checks

Finally, we conduct several robustness checks and discuss other possible explanations for the gender disparity in accessing elite universities, which we find to be less important.

Bonus score

We perform a robustness check corresponding to Table 6 that incorporates bonus scores into the subject scores. Panel A of Appendix Table A9 presents these results, showing that the coefficients remain largely unchanged.

Heuristics in Self-evaluation

Using the same data as this study, Li and Qiu (2023) finds an interesting pattern of heuristics in self-evaluation. Specifically, if students score exact multiples of 10, they aim for better universities but are more likely to experience downgrading. Gender differences in overconfidence, as documented in Bengtsson, Persson, and Willenhag (2005) and Kamas and Preston (2012), could trigger differences in heuristics. For example, boys, in particular, feel better and are overly optimistic when they score multiples of 10. Additionally, the heuristics phenomenon only occurs when students know their test scores precisely when filing their priority list of schools and does not occur under the pre-exam submission policy. Therefore, a shift from pre-exam to post-exam submission may not only reduce information uncertainties but also invoke heuristics in self-evaluation. To evaluate whether the gender differences in heuristics affect our findings in Table 6, we additionally include the interaction between gender and the last digit dummies of the Gaokao scores, which play a central role in Li and Qiu (2023)'s study, as well as the triple interactions with the post-exam submission dummy. Panel B of Appendix Table A9 shows that accounting for heuristics actually makes the estimation of β_2 slightly larger (from 2.5% to 2.9%).

Pressure

Table 6 shows that post-exam submission encourages girls to choose elite universities. An alternative explanation might be that students feel more relaxed under the post-exam submission mechanism. Even if they perform poorly on the exam, they can still avoid downgrading by selecting a less prestigious university when submitting their school preferences. This option is not available under the pre-exam submission policy. Cai et al. (2019) demonstrates that females tend to underperform in high-pressure environments such as Gaokao. We argue that gender differences in response to pressure are unlikely to affect our findings for two reasons. First, our analysis controls for the Gaokao scores, accounting for the impact of pressure on test performance. Second, assuming that more difficult tests are associated with greater pressure, we conduct an indirect test on

how pressure affects the gender gap in accessing elite universities. We rank the median test scores of Chinese, Mathematics, and English for five years within each province in our sample period. The year with the highest (lowest, respectively) median score is assigned a difficulty level of 1 (5, respectively). Column (2) of Appendix Table A10 shows that females are more likely to experience downgrading when the test is more difficult, consistent with Cai et al. (2019). However, test difficulty contributes little to explaining the gender gap in accessing elite universities (column (1)).

Endogenous Choice of Post-exam Submission

Another confounding factor in our findings in Table 6 is the province's endogenous selection of submission timing. Specifically, if certain characteristics influence the choice of submission timing and the gender gap in accessing elite universities is smaller in regions with those characteristics, it could falsely appear that the gender gap is smaller under the post-exam submission policy. To address this issue, we include the interaction between the gender indicator and local characteristics and evaluate whether the coefficient β_2 in equation (2) changes with this inclusion. Our chosen variables include city-level characteristics (GDP per capita, the sex ratio at birth, and the rate of Gaokao participation, all in 2000) and the female proportion within high schools.[38]

Appendix Table A11 confirms that controlling for these additional interaction terms has limited impact on the estimation of β_2. Even when all interaction terms are included, the estimated coefficient changes only marginally from 2.5% to 2.8% (column (1) versus column (6)).

6. Conclusion

Understanding the gender gap in accessing elite universities is crucial for understanding the gap at the top of the social hierarchy and the glass ceiling women face in advancing their careers (Bertrand 2018). The gender gap in accessing elite universities can be

[38]All four variables have been demeaned to facilitate the interpretation of the coefficients. We use city-level GDP per capita from the China City Statistical Yearbook (2000) as a proxy for economic development. The city-level sex ratio at birth is calculated as a proxy for the strength of son preference, using a 1% sample of the 2000 population census to compute the ratio for children aged 0 to 4 in each city. To capture local preferences for tertiary education, we calculate the city-by-gender Gaokao participation rate. This rate is calculated by dividing the number of Gaokao participants in each city-year-gender group from our administrative Gaokao data by the eligible cohort size derived from census data. Lastly, due to data limitations, we can only calculate the female proportion among Gaokao participants within each high school as a proxy for potential gender attitudes.

broadly divided into three parts: a gap in personal ability (e.g., test scores), schools' differential gender views conditional on students' abilities, and students' own choice of schools. Our detailed, large-scale administrative data, combined with China's centralized admission system, help us to eliminate the first two factors because students with the same Gaokao score in a province-track cell are treated equally in the admission process. We find that, conditional on the Gaokao score, women are still 2.2% less likely to attend elite universities (Project 985 in China). This gap purely originates from the different choices between male and female students.

What factors explain this gap? After exploring many possible explanations, we identify two key factors. First, the Chinese government strategically includes a higher proportion of science and technology universities in Project 985. We find strong evidence that, given their Gaokao performance, female students tend to avoid science and technology universities and prefer universities strong in humanities or balanced between science and humanities majors. This preference, combined with a science-favored school list, contributes to women's lower representation in top universities in China. Second, the Gaokao is held once a year in China, and its score is the sole criterion for most students during the admission process. This makes the Gaokao, along with the preference-filing decision, a typical high-risk, high-stakes scenario. Previous studies consistently show that women make more conservative choices in risky situations. We further support this hypothesis with survey data from college students. We provide evidence that an environment with fewer uncertainties (e.g., post-exam submission instead of pre-exam submission) favors girls and encourages them to list an elite university as their first choice.

In summary, our study not only explains the gender gap in choosing elite universities but also suggests policies to reduce this gap. Our analysis indicates that a more balanced weight between science and humanities and an environment with more certainty can help reduce the gender gap in accessing elite universities.

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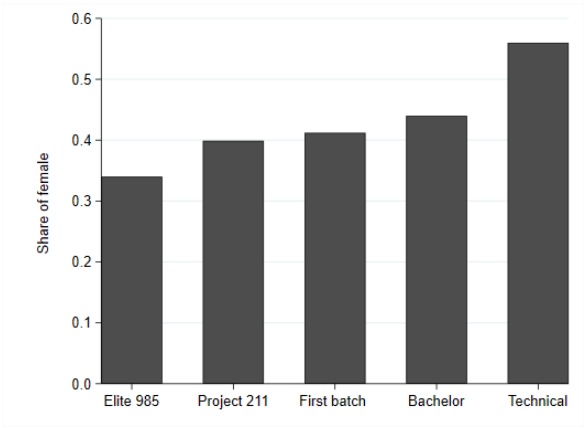
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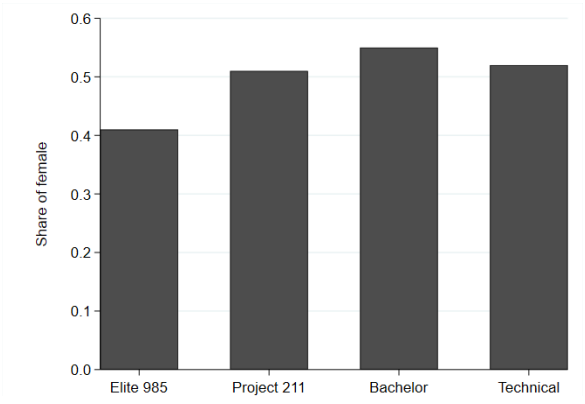
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FIGURE 1. Shares of Women in Universities of Difference Hierarchies

A. 1999–2003 (source: authors' administrative data)

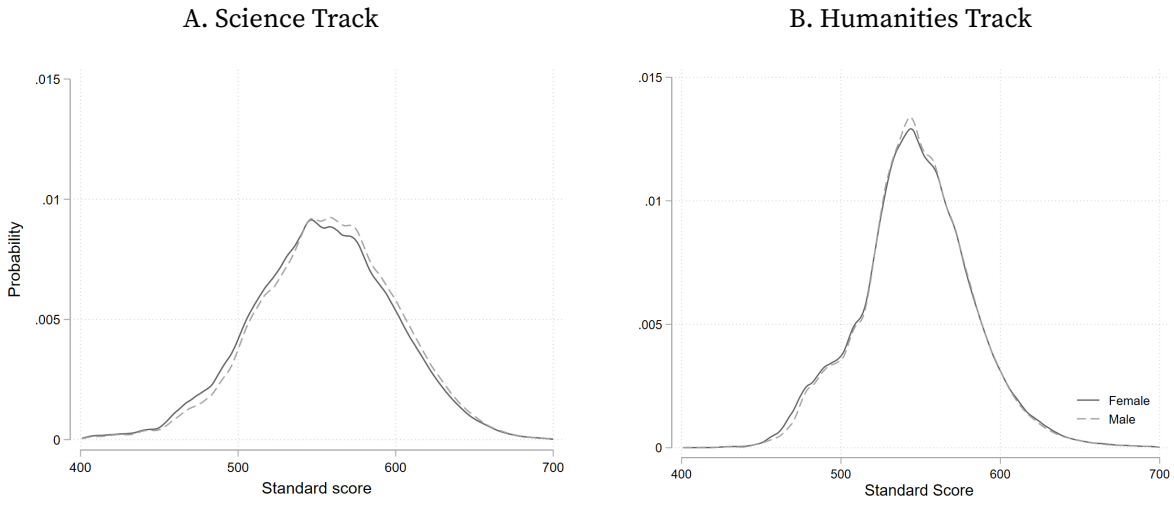


B. 2022 (source: Ministry of Education of the P.R. China)



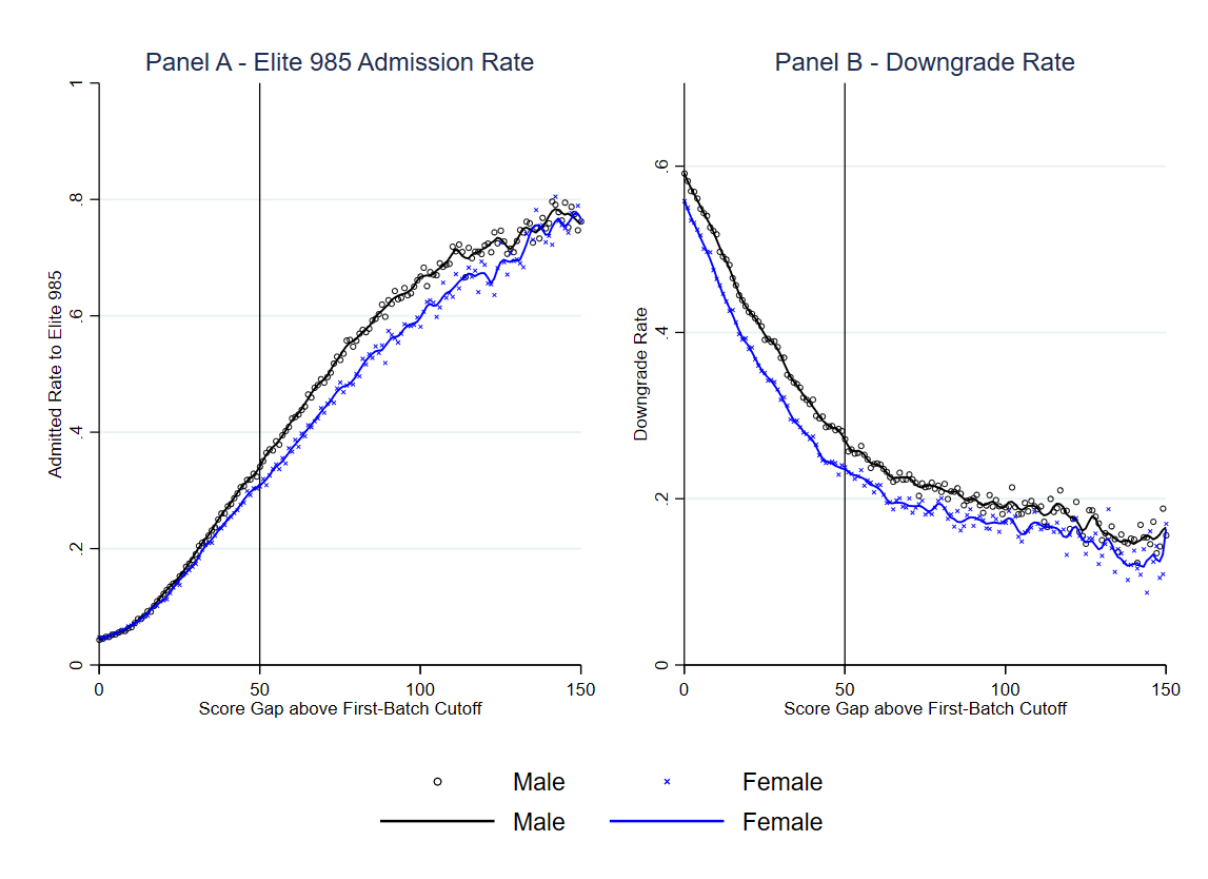
Notes: The university hierarchies in this graph are mutually exclusive. For example, Project 211 includes universities in the 211 project that do not belong to the 985 project.

FIGURE 2. Gender Differences in Probability Distribution of Test Scores



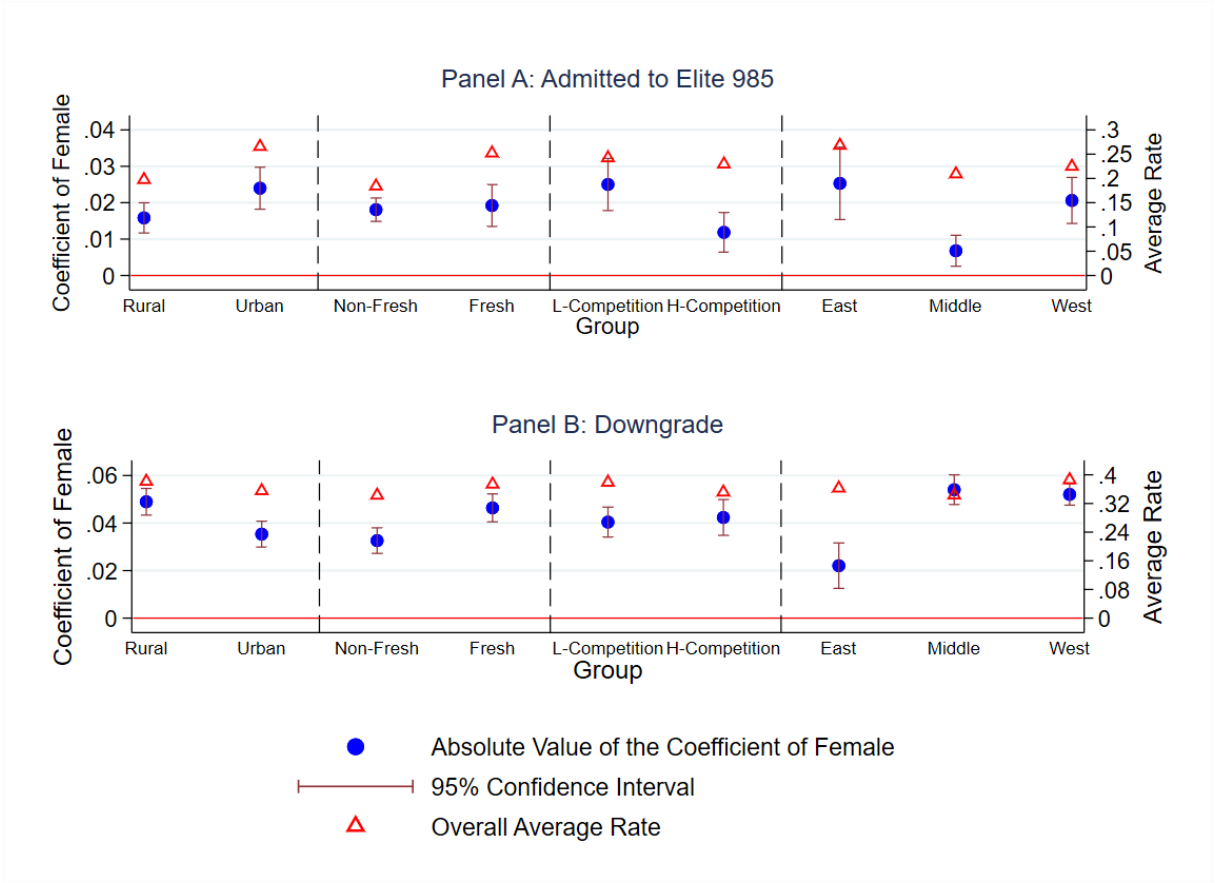
Notes: The scores presented in the chart represent standardized values rather than original raw scores. Due to variations in provincial grading systems, the maximum attainable scores can range from 660 to 900. To facilitate inter-provincial comparisons, all scores have been normalized to a scale with a maximum value of 750.

FIGURE 3. Gender Differences in Accessing Elite Universities and Experiencing Downgrade Conditional on Test Scores



Notes: Score gap equals the original total test score minus the corresponding first-batch cutoff. Downgrade means that the student is not admitted to their first-choice university in the first batch.

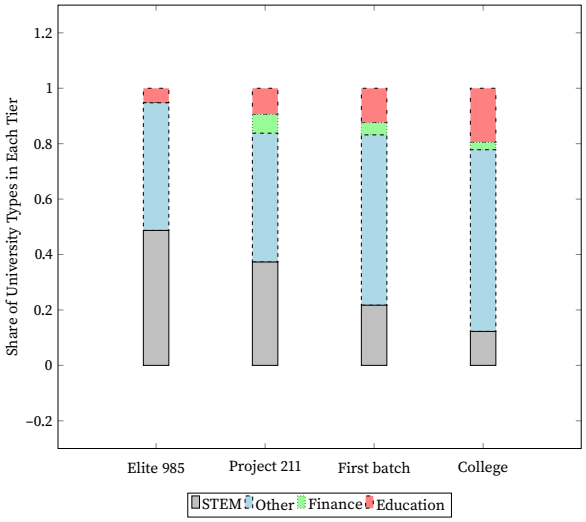
FIGURE 4. Absolute Value of Coefficients of the Heterogeneity Analysis



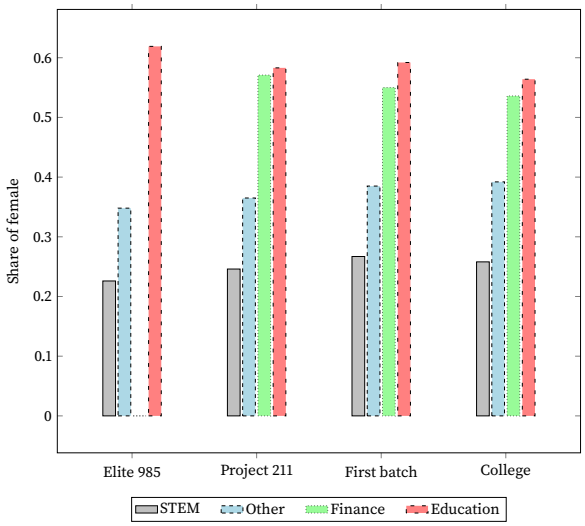
Note: All coefficients of female are negative.

FIGURE 5. The Over-representation of Science and Technology Universities in Top-Tier Universities

A. Share of Types of Universities in Different Hierarchies



B. Share of Females in Different Types of Universities



Notes: Our classification of university types is based on their names, reflecting their primary academic focus. This practice has origins in China's adoption of the Soviet model of specialized academic institutions.

TABLE 1. Summary Statistics

Data	Attending database		Above cutoff database					
Sample	All sample		All sample		Female		Male	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Participate year	2001.241	1.394	2001.214	1.354	2001.265	1.344	2001.185	1.358
Female	0.403	0.491	0.356	0.479	1	0	0	0
Unified track	0.149	0.356	0.124	0.330	0.120	0.325	0.127	0.332
Science if non-unified track	0.696	0.460	0.808	0.394	0.673	0.469	0.882	0.322
First-time test taker	0.743	0.437	0.771	0.420	0.798	0.401	0.754	0.430
Urban hukou	0.469	0.499	0.573	0.49 5	0.665	0.471	0.522	0.499
Test score	432.782	100.841	566.056	63.623	560.506	64.238	569.207	63.120
Bonus score	1.328	5.028	1.384	4.943	1.390	4.993	1.373	4.852
Admitted by any program	0.609	0.488	0.942	0.235	0.970	0.172	0.925	0.263
Above cutoff	0.115	0.319	1	0	1	0	1	0
Elite university	0.031	0.174	0.237	0.425	0.215	0.411	0.250	0.433
Downgrade	N/A	N/A	0.367	0.48	0.348	0.476	0.377	0.484
Observations	18,741,969		2,154,031		766,408		1,387,623	

Note: The attending data refer to the complete Gaokao sample of our administrative data from 1999 to 2003, and the above-cutoff database only contains students with scores above the first-batch cutoff. We excluded students who are not taking standard academic tracks (those students specialized in fields such as sports, music, and painting), which account for 6.4% of the attending database. We do not define the downgrade variable for the attending sample because this concept is only meaningful for students targeting good universities.

TABLE 2. Gender Differences in Accessing Elite Universities Conditional on the Gaokao Performance

Dependent Variable	Elite university				Downgrade			
Track	All	Science	Humanities	Unified	All	Science	Humanities	Unified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: All sample								
Female	-0.022***	-0.021***	-0.005***	-0.051***	-0.042***	-0.043***	-0.043***	-0.035***
	(0.003)	(0.002)	(0.002)	(0.013)	(0.003)	(0.003)	(0.003)	(0.009)
Mean of dependent variable	0.238	0.258	0.197	0.234	0.367	0.367	0.375	0.352
Observations	2,148,419	1,521,879	358,968	266,725	2,136,894	1,512,165	357,157	267,572
R-squared	0.315	0.288	0.316	0.326	0.180	0.179	0.200	0.158
Panel B: High scoring sample								
Female	-0.048***	-0.045***	-0.000	-0.114***	-0.031***	-0.032***	-0.034***	-0.014
	(0.005)	(0.005)	(0.004)	(0.025)	(0.003)	(0.004)	(0.004)	(0.009)
Mean of dependent variable	0.537	0.440	0.548	0.582	0.200	0.201	0.210	0.184
Observations	551,201	58,016	435,061	58,124	548,185	57,852	432,209	58,124
R-squared	0.234	0.233	0.281	0.164	0.179	0.172	0.242	0.165
Panel C: Low scoring sample								
Female	-0.013***	-0.011***	-0.005***	-0.035***	-0.046***	-0.047***	-0.045***	-0.041***
	(0.002)	(0.002)	(0.002)	(0.009)	(0.003)	(0.003)	(0.004)	(0.010)
Mean of dependent variable	0.145	0.151	0.136	0.127	0.417	0.420	0.416	0.404
Observations	1,597,218	300,952	1,086,818	209,448	1,588,709	299,305	1,079,956	209,448
R-squared	0.161	0.152	0.201	0.143	0.141	0.135	0.173	0.120
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓

Note: We split the sample into 'high scoring' and 'low-scoring' groups, using a criterion of 50 points above the cutoff score.
*/**/*** represents statistical significance at the 10%/5%/1% levels. We cluster the standard errors at the Province×Track×Year level.

TABLE 3. Evidence of Gender Difference in Preferences

Dependent variable	Retake	Local preference	Major Types: STEM	Major Types: Business	Major Types: Humanities	Major Ranking: Top Quartile	Major Ranking: Middle Quartiles	Major Ranking: Bottom Quartile	University Types: STEM	University Types: Finance	University Types: Education	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	
Panel A: All												
Female	-0.0127***	0.0341***	-0.1280***	0.0257***	0.0732***	0.0084***	-0.0140***	0.0055***	-0.0511***	0.0077***	0.0526***	
	(0.001)	(0.003)	(0.007)	(0.002)	(0.005)	(0.002)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	
Mean of dependent variable	0.439	0.466	0.562	0.065	0.085	0.283	0.597	0.120	0.332	0.049	0.085	
Observations	1,647,314	2,002,832	2,137,722	2,137,722	2,137,722	2,137,722	2,137,722	2,137,722	2,137,722	2,137,722	2,137,722	
R-squared	0.465	0.250	0.332	0.065	0.216	0.095	0.055	0.075	0.208	0.175	0.249	
Panel B: Science track												
Female	-0.0121***	0.0286***	-0.1374***	0.0389***	0.0399***	0.0111***	-0.0168***	0.0050***	-0.0612***	0.0096***	0.0523***	
	(0.002)	(0.003)	(0.006)	(0.001)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)	(0.002)	
Mean of dependent variable	0.428	0.438	0.710	0.046	0.024	0.309	0.591	0.100	0.393	0.040	0.172	
Observations	1,209,797	1,406,662	1,512,494	1,512,494	1,512,494	1,512,494	1,512,494	1,512,494	1,512,494	1,512,494	1,512,494	
R-squared	0.4394	0.245	0.094	0.038	0.042	0.084	0.0517	0.052	0.175	0.181	0.229	
Panel C: Humanities track												
Female	-0.0155***	0.0468***	0.0010**	-0.0335***	0.1398***	0.0047*	-0.0040	-0.0007	-0.0054***	0.0005	0.0487***	
	(0.003)	(0.003)	(0.001)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.001)	(0.001)	(0.002)	
Mean of dependent variable	0.399	0.500	0.011	0.153	0.334	0.209	0.586	0.205	0.120	0.104	0.064	
Observations	283,904	345,461	357,564	357,564	357,564	357,564	357,564	357,564	357,499	357,564	357,564	357,564
R-squared	0.433	0.269	0.038	0.061	0.086	0.140	0.080	0.106	0.086	0.164	0.275	
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Elite 985&Downgrade FE	✓	✓	✓	✓	✓	✓	✓	✓				
Major FE									✓	✓	✓	

Note: 1. The "retake" variable is constructed by matching students' personal identification codes across consecutive years; a match indicates a retake in the subsequent year. 2. The "local preference" variable is a binary indicator set to 1 if the student is admitted to a university within their home province. 3. The "top/middle/bottom quartile(s) major" variables are generated based on the within-school major ranking by median admission scores. Majors in the top 25%, middle 50%, and bottom 25% are categorized accordingly.
*/**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

TABLE 4. Evaluating the Importance of Various Preferences in Understanding the Gender Differences in Accessing Elite Universities

Dependent Variable	Elite university					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.0220***	-0.0206***	-0.0295***	-0.0212***	-0.0205***	-0.0184***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Mean of dependent variable	0.238	0.238	0.238	0.238	0.238	0.238
Observations	2,148,419	1,658,255	2,013 ,377	2,013,375	2,013,375	1,555,112
R-squared	0.315	0.312	0.331	0.347	0.352	0.352
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓
Retake FE		✓				✓
Local preference FE			✓			✓
Major FE				✓	✓	✓
Major Quartiles FE					✓	✓

Note: Major quartiles FE refers to that we control "top quartile major", "middle quartiles major", and "bottom quartile" simultaneously in our regression.
*/**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

TABLE 5. Gender Difference with Alternative Definitions of "Elite" University

Track	All	All	Science	Science	Humanities	Humanities	Unified	Unified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV of Panel A: Science Elite								
Female	-0.034***	-0.027***	-0.034***	-0.027***	-0.011***	-0.013***	-0.065***	-0.041***
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.012)	(0.005)
Mean of dependent variable	0.258	0.258	0.278	0.278	0.187	0.187	0.273	0.273
Observations	2,148,419	2,013,375	1,513,837	1,415,911	358,903	346,842	266,725	250,613
R-squared	0.255	0.296	0.255	0.300	0.219	0.243	0.258	0.303
DV of Panel B: Humanities Elite								
Female	0.045***	0.016***	0.043***	0.013***	0.022***	0.006**	0.088***	0.042***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.004)	(0.003)	(0.007)	(0.006)
Mean of dependent variable	0.222	0.222	0.195	0.195	0.322	0.322	0.272	0.272
Observations	2,148,419	2,013,375	1,513,837	1,415,911	358,903	346,842	266,725	250,613
R-squared	0.224	0.282	0.215	0.269	0.268	0.337	0.126	0.209
DV of Panel C: Dual Elite								
Female	0.004***	-0.010***	0.005***	-0.010***	-0.007***	-0.011***	0.012***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)
Mean of dependent variable	0.099	0.099	0.094	0.094	0.131	0.131	0.099	0.099
Observations	2,148,419	2,013,375	1,513,837	1,415,911	358,903	346,842	266,725	250,613
R-squared	0.308	0.343	0.314	0.350	0.296	0.327	0.284	0.343
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓
Major FE		✓		✓		✓		✓
Major Quartiles FE		✓		✓		✓		✓
Local preference FE		✓		✓		✓		✓

Note: In this table, we define elite universities separately for science and humanities. We use the Wu Shulian Chinese University Rankings, which provides separate research scores for natural sciences and humanities. Universities ranking in the top 39 for science or humanities are considered elite in their respective fields. Universities that rank in the top 39 for both are defined as dual elite.
*/**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

TABLE 6. How Gender Difference in Accessing Elite Universities Varies by Submission Timing

Track	All	All	Science	Science	Humanities	Humanities	Unified	Unified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DV of Panel A: Elite University								
Female	-0.041***	-0.037***	-0.029***	-0.023***	0.007	-0.001	-0.111***	-0.090***
	(0.008)	(0.008)	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.010)
Female × Post policy	0.025***	0.022***	0.011**	0.006	-0.013*	-0.009	0.086***	0.080***
	(0.009)	(0.008)	(0.005)	(0.006)	(0.008)	(0.007)	(0.010)	(0.010)
Mean of dependent variable	0.238	0.238	0.248	0.248	0.197	0.197	0.234	0.234
Observations	2,148,419	2,023,161	1,522,218	1,424,287	359,381	347,313	267,664	251,554
R-squared	0.315	0.353	0.316	0.355	0.288	0.332	0.328	0.376
DV of Panel B: Downgrade								
Female	-0.028***	-0.017**	-0.026**	-0.016*	-0.048***	-0.026***	-0.023	-0.021
	(0.008)	(0.007)	(0.010)	(0.009)	(0.009)	(0.008)	(0.019)	(0.018)
Female × Post policy	-0.018**	-0.006	-0.022**	-0.007	0.005	0.006	-0.018	0.007
	(0.008)	(0.007)	(0.011)	(0.009)	(0.009)	(0.008)	(0.019)	(0.019)
Mean of dependent variable	0.366	0.366	0.366	0.366	0.375	0.375	0.352	0.352
Observations	2,136,894	2,010,944	1,512,165	1,414,355	357,157	345,121	267,572	251,461
R-squared	0.179	0.202	0.178	0.200	0.200	0.219	0.158	0.201
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓
Major FE		✓		✓		✓		✓
Major Quartiles FE		✓		✓		✓		✓
Local preference FE		✓		✓		✓		✓

Note: */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Online Appendices of "Beyond the Scores: Understanding the Gender Gap in Access to Elite Universities in China"

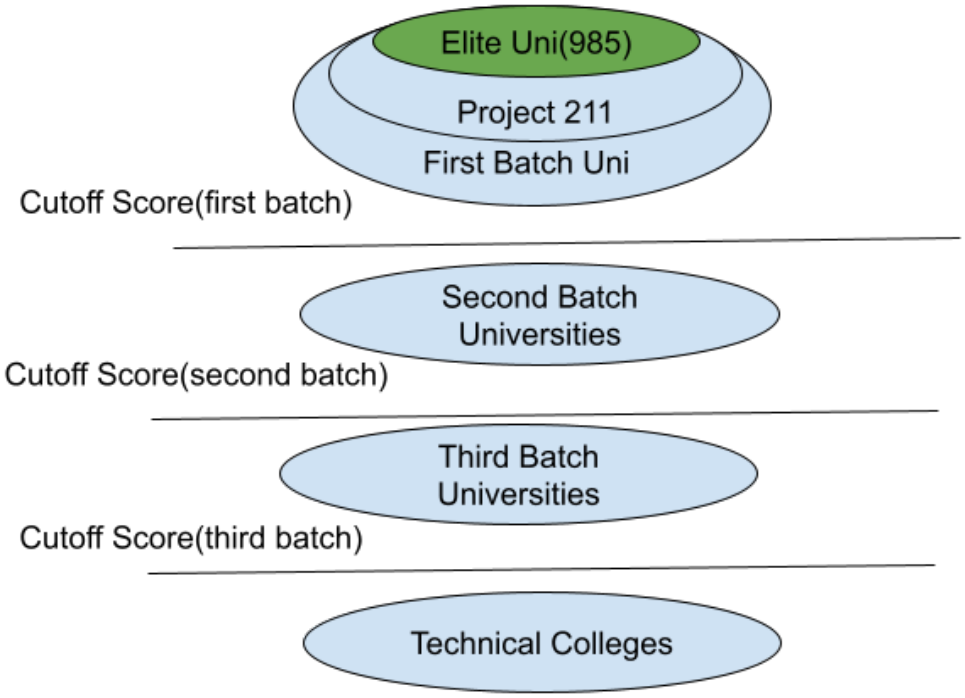
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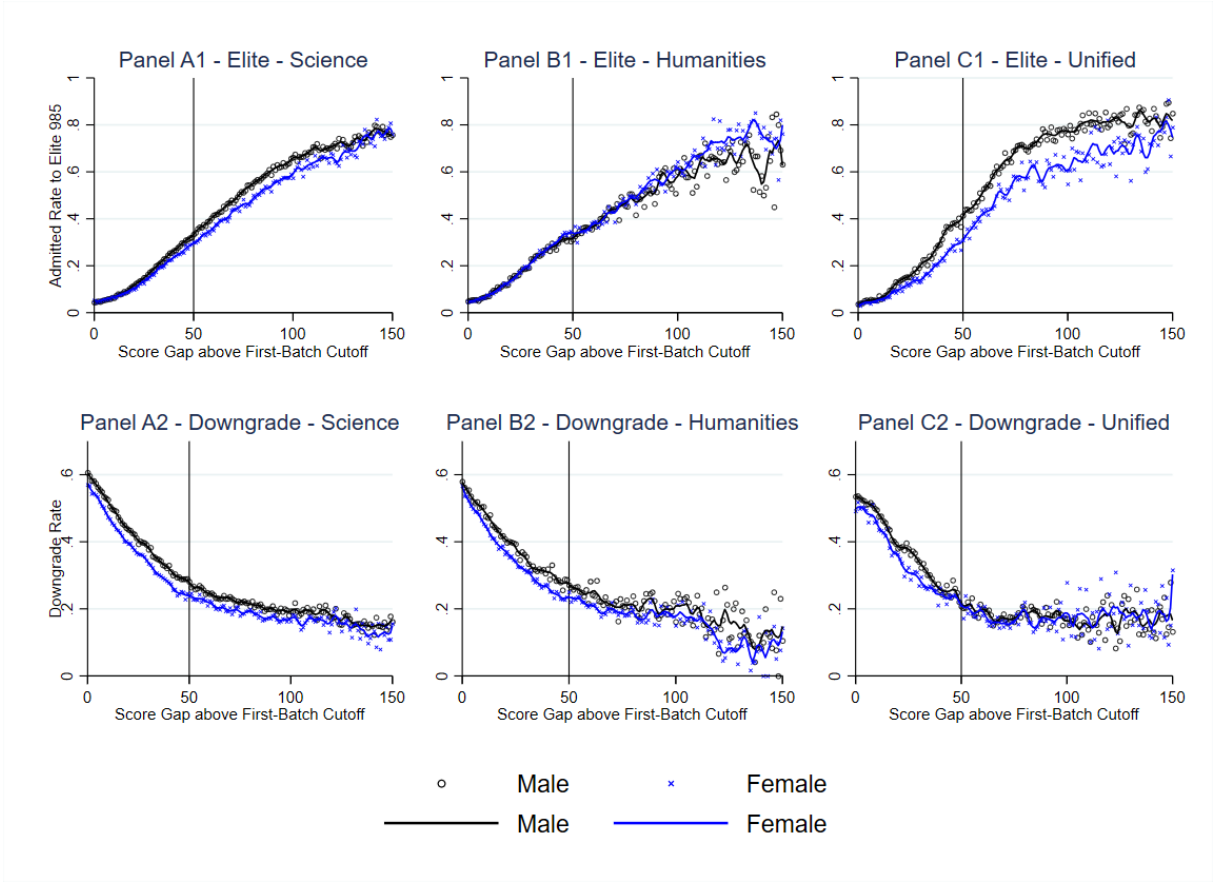
Appendix A. Additional Tables and Figures

Appendix Figure A1. An Illustration of the College Hierarchy System in China

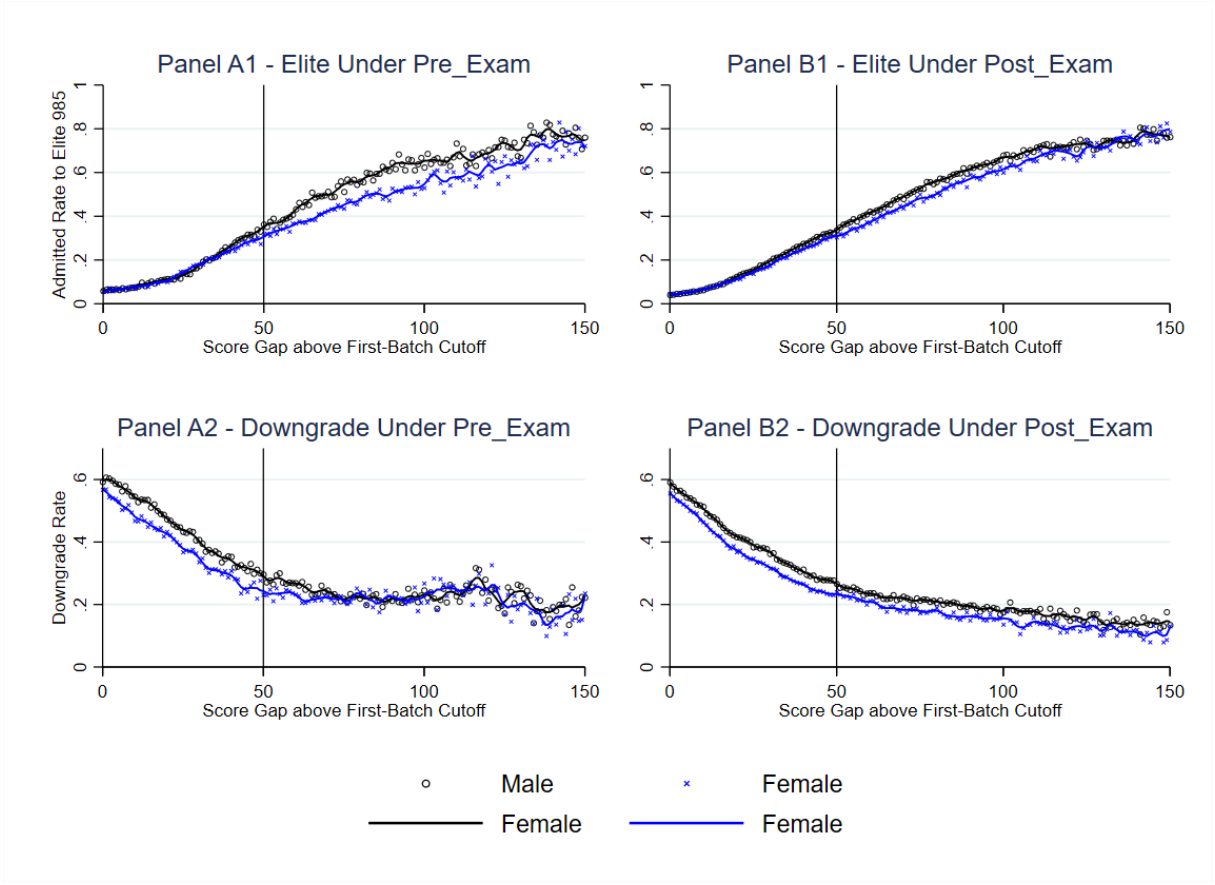


Notes: The cutoff scores are determined by the government and only students who score above can apply corresponding batch universities

Appendix Figure A2. Gender Differences in Accessing Elite Universities (by Exam Track)



Appendix Figure A3. Gender Differences in Accessing Elite Universities (by Submission Timing)



Appendix Table A1. Submission Timing Across Provinces and Years

Province	1999	2000	2001	2002	2003	Province	1999	2000	2001	2002	2003
Beijing	2	3	1	1	3	Hubei	2	2	2	2	2
Tianjin	2	2	2	2	2	Hunan	2	2	3	3	3
Hebei	3	3	3	3	3	Guangdong	3	1	1	1	1
Shanxi	2	2	2	2	2	Guangxi	2	2	2	2	2
Inner Mengu	2	2	2	2	3	Hainan	2	2	2	2	3
Liaoning	2	2	2	2	2	Chongqing	2	1	1	1	1
Jilin	2	3	1	1	2	Sichuan	2	2	2	1	2
Heilongjiang	1	2	2	2	2	Guizhou	1	1	1	1	2
Shanghai	1	1	1	1	1	Yunnan	NA	NA	2	2	NA
Jiangsu	2	1	1	2	3	Tibet	NA	NA	1	1	3
Zhejiang	3	3	3	3	3	Shaanxi	2	2	2	2	2
Anhui	2	2	2	2	2	Gansu	NA	NA	NA	NA	2
Fujian	2	2	2	2	2	Qinghai	3	3	3	3	3
Jiangxi	2	2	2	2	2	Ningxia	NA	NA	3	3	3
Shandong	2	2	2	3	2	Xinjiang	2	2	2	2	2
Henan	2	2	2	2	2						

Notes: 1 = pre-exam submission; 2 = post-exam-pre-score submission; 3 = post-score submission. We obtain the information from a variety of sources, including media reports, official documents from educational departments, and responses to inquiries made to educational authorities.

Appendix Table A2. University Type—Natural Science & Technology

NO.	Chinese Keywords	English Keywords
Type 1: Natural Science & Technology		
1	工业	Technology
2	建筑	Architecture
3	科技	Science and Technology
4	钢铁	Iron and Steel
5	电子	Electronic
6	航空航天	Aeronautics
7	化工	Chemical Technology
8	机械工业	Machinery Industry
9	建筑工程	Civil Engineering and Architecture
10	交通	Jiaotong (Transportation)
11	轻工业	Light Industry
12	石油化工	Petrochemical Technology
13	信息工程	Information Science and Technology
14	印刷	Graphic Communication
15	邮电	Posts and Telecommunications
16	铁道	Railway; Tiedao
17	矿业	Mining and Technology
18	地质	Geosciences
19	纺织	Textile
20	石油	Petroleum
21	海事	Maritime
22	船舶工业	Shipbuilding
23	电力	Electronic Power
24	水利	Water Resources
25	海洋	Ocean
26	远洋船员	Ocean Shipping Mariners
27	冶金	Metallurgy
28	重型机械	Heavy Machinery
29	测绘	Surveying and Mapping
30	机电	Mechanical & Electrical Engineering
31	服装	Fashion Technology
32	理工	Polytechnic

Appendix Table A3. University Type—Others

NO.	Chinese Keywords	English Keywords
Type 2: Agriculture		
1	农业	Agricultural
2	水产	Fisheries
3	农林	Agriculture and Forestry
4	粮食	Grain
5	农牧	Agricultural and Animal Husbandry
6	畜牧兽医	Animal & Veterinary Sciences
7	海洋	Ocean
Type 3: Forestry		
1	林业	Forestry
Type 4: Medicine & Pharmacy		
1	医科	Medical
2	医学部	Health Science Center
3	针灸骨伤	Acupuncture and Orthopaedics
4	中医药	Chinese Medicine
5	药科	Pharmaceutical
Type 5: Teacher Training		
1	师范	Normal
Type 6: Language & Literature		
1	外国语	Foreign Studies/ International Studies
2	广播	Broadcasting
3	语言	Language and Culture
4	政治学院	Political Studies
Type 7: Finance & Economics		
1	财经	Finance and Economics
2	工商	Technology and Business
3	物资	Wuzi (Material/Supplies)
4	商业	Business/Commerce
5	经济贸易	Economics and Business
6	海关	Customs
7	税务	Taxation
8	计量	Econometrics
9	金融	Finance
10	财经政法	Economics and Law
11	审计	Audit

Appendix Table A4. University Type—Others (Continuous)

NO.	Chinese Keywords	English Keywords
Type 8: Political Science & Law		
1	政法	Political Science and Law
2	国际关系	International Relations
3	人民武装警擦部队学院	People's Armed Police Force Academy
4	司法警官	Criminal Justice
5	警察	Police
Type 9: Physical Culture		
1	体育	Sport
Type 10: Art		
1	音乐	Music
2	美术	Fine Arts
3	陶瓷	Ceramic
4	戏剧	Theatre
Type 11: Ethnic Minorities		
1	民族	Ethnic Group

Appendix Table A5. Gender Differences in Accessing Elite Universities (By Year)

Year	1999	20000	2001	2002	2003
	(1)	(2)	(3)	(4)	(5)
DV of Panel A: Elite university					
Female	-0.022***	-0.019***	-0.014**	-0.024***	-0.027***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Mean of dependent variable	0.265	0.239	0.241	0.231	0.222
Observations	300,336	396,422	466,424	495,649	481,476
R-squared	0.335	0.342	0.284	0.301	0.325
DV of Panel B: Downgrade					
Female	-0.045***	-0.033***	-0.048***	-0.046***	-0.042***
	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)
Mean of dependent variable	0.348	0.383	0.397	0.398	0.300
Observations	290,903	394,338	466,424	495,649	481,476
R-squared	0.173	0.157	0.175	0.184	0.184
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓

Note: */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Appendix Table A6. Gender Differences in Accessing Elite Universities at a Granular Level (Adding Bonus Scores)

Dependent Variable	Elite university				Downgrade			
Track	All	Science	Humanities	Unified	All	Science	Humanities	Unified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: The subsample including bonus scores								
Female	-0.018***	-0.018***	-0.003	-0.041**	-0.042***	-0.042***	-0.042***	-0.043***
	(0.003)	(0.002)	(0.002)	(0.014)	(0.003)	(0.003)	(0.004)	(0.008)
Mean of dependent variable	0.235	0.248	0.197	0.211	0.363	0.368	0.381	0.363
Observations	1,769,069	1,240,855	303,765	224,449	1,766,985	1,239,055	303,481	224,449
R-squared	0.318	0.319	0.292	0.326	0.184	0.186	0.204	0.149
Panel B: The same sample but without bonus scores								
Female	-0.019***	-0.019***	-0.004*	-0.041**	-0.042***	-0.042***	-0.042***	-0.043***
	(0.003)	(0.002)	(0.002)	(0.014)	(0.003)	(0.004)	(0.003)	(0.008)
Mean of dependent variable	0.235	0.248	0.197	0.211	0.363	0.368	0.381	0.363
Observations	1,768,225	1,240,516	303,352	224,357	1,766,157	1,238,726	303,074	224,357
R-squared	0.316	0.318	0.291	0.327	0.184	0.185	0.205	0.152
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓

Note: */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Appendix Table A7. Elite University List

University	Project 985	Science Elite	Humanities Elite	Dual Elite
Beijing Institute of Technology	✓	✓		
Beijing Normal University	✓		✓	
Beijing University of Aeronautics and Astronautics	✓	✓		
Central South University	✓	✓		
China Agricultural University	✓	✓		
Chongqing University	✓	✓		
Dalian University of Technology	✓	✓		
East China Normal University	✓	✓	✓	✓
Fudan University	✓	✓	✓	✓
Harbin Institute of Technology	✓	✓		
Huazhong University of Science and Technology	✓	✓	✓	✓
Hunan University	✓			
Jilin University	✓	✓	✓	✓
Lanzhou University	✓	✓	✓	✓
Minzu University of China	✓		✓	
Nanjing University	✓	✓	✓	✓
Nankai University	✓	✓	✓	✓
National University of Defense Technology	✓	✓		
Northwest Agriculture and Forestry University	✓	✓		
Northeastern University	✓	✓		
Northwestern Polytechnical University	✓	✓		
Ocean University of China	✓			
Peking University	✓	✓	✓	✓
Renmin University of China	✓		✓	
Shanghai Jiaotong University	✓	✓	✓	✓
Shandong University	✓	✓	✓	✓
Sichuan University	✓	✓	✓	✓
South China University of Technology	✓	✓		
Southeast University	✓	✓		
Sun Yat-sen University	✓	✓	✓	✓
Tianjin University	✓	✓		
Tongji University	✓	✓		
Tsinghua University	✓	✓	✓	✓
University of Electronic Science and Technology of China	✓	✓		
University of Science and Technology of China	✓	✓		
Wuhan University	✓	✓	✓	✓
Xiamen University	✓	✓	✓	✓
Xi'an Jiaotong University	✓	✓	✓	✓
Zhejiang University	✓	✓	✓	✓

Note: Dual elite stands for universities that are both science elite and humanities elite.

Appendix Table A8. Evidence of Gender Difference in Risk Attitudes from Survey Data

Dependent Variable	Risk on Gain			Risk on Loss		
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.156***	-0.177***	-0.148***	-0.017	-0.010	-0.021
	(0.020)	(0.025)	(0.022)	(0.018)	(0.023)	(0.020)
Humanities		0.063			-0.119***	
		(0.044)			(0.040)	
Female × Humanities		-0.015			0.052	
		(0.055)			(0.050)	
Elite 985			-0.053			0.007
			(0.039)			(0.036)
Female × Elite 985			-0.061			0.036
			(0.059)			(0.054)
Mean of Dependent Variable	-0.105	-0.125	-0.173	0.227	0.165	0.246
Observations	7,564	6,887	7,564	7,541	6,867	7,541
R-squared	0.008	0.009	0.009	0.000	0.002	0.000

Note: Following Lu, Shi, and Zhong (2018), we use the 2011 wave of the Chinese College Students Survey to estimate the gender differences in risk attitudes among college students. A higher value represents a greater willingness to undertake risk on both gain and loss. We assign risk aversion, risk neutrality, and risk seeking with -1, 0, and 1, respectively. */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Appendix Table A9. Robustness Check for Gender Difference in Responds to a Policy Change in Submission Timing

Dependent Variable	Elite University							
Track	All	All	Science	Science	Humanities	Humanities	Unified	Unified
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Bonus Score								
Female	-0.042***	-0.037***	-0.030***	-0.023***	0.007	-0.001	-0.112***	-0.090***
	(0.008)	(0.008)	(0.004)	(0.005)	(0.007)	(0.007)	(0.007)	(0.010)
Female × Post policy	0.024***	0.021**	0.011**	0.006	-0.013*	-0.009	0.086***	0.079***
	(0.009)	(0.008)	(0.005)	(0.006)	(0.008)	(0.007)	(0.010)	(0.010)
Mean of dependent variable	0.238	0.238	0.248	0.248	0.197	0.197	0.234	0.234
Observations	2,148,419	2,013,375	1,521,879	1,415,911	358,968	346,842	266,725	250,613
R-squared	0.315	0.354	0.288	0.332	0.316	0.355	0.328	0.376
Panel B: Heuristics Effect								
Female	-0.045***	-0.041***	-0.034***	-0.029***	-0.001	-0.010	-0.107***	-0.086***
	(0.008)	(0.008)	(0.006)	(0.006)	(0.011)	(0.012)	(0.011)	(0.013)
Female × Post policy	0.029***	0.026***	0.016**	0.012*	-0.003	0.001	0.078***	0.070***
	(0.009)	(0.008)	(0.007)	(0.007)	(0.011)	(0.013)	(0.014)	(0.013)
Mean of dependent variable	0.366	0.366	0.366	0.366	0.375	0.375	0.352	0.352
Observations	2,136,894	2,010,944	1,512,165	1,414,355	357,157	345,121	267,572	251,461
R-squared	0.179	0.202	0.178	0.200	0.200	0.219	0.158	0.201
Last Digit Dummy × Female FE	✓	✓	✓	✓	✓	✓	✓	✓
Last Digit Dummy × Female× Post policy FE	✓	✓	✓	✓	✓	✓	✓	✓
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓	✓	✓
Major FE		✓		✓		✓		✓
Major Quartiles FE		✓		✓		✓		✓
Local preference FE		✓		✓		✓		✓

Note: */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Appendix Table A10. Examining the Correlation between Gender Differences and Test Difficulties

Dependent Variable	Elite university	Downgrade
	(1)	(2)
Panel A: Chinese difficulty effect		
Female	-0.0358***	-0.0434***
	(0.007)	(0.006)
Female	-0.0011	0.0037**
× Chinese difficulty	(0.002)	(0.002)
Observations	2,154,031	2,142,467
R-squared	0.038	0.059
Panel B: Math difficulty effect		
Female	-0.0240***	-0.0398***
	(0.007)	(0.007)
Female	-0.0019	0.0018
× Math difficulty	(0.002)	(0.002)
Observations	2,154,031	2,142,467
R-squared	0.040	0.062
Panel C: English difficulty effect		
Female	-0.0333***	-0.0320***
	(0.007)	(0.007)
Female	0.0009	-0.0006
× English difficulty	(0.002)	(0.002)
Observations	2,154,031	2,142,467
R-squared	0.040	0.062
Mean of dependent variable	0.238	0.366
Individual Control	✓	✓
Score×Year×Track×Province FE	✓	✓

Note: The difficulty variable is an ordered variable ranging from 1 (least difficult) to 5 (most difficult) and is constructed as follows. We compute the median score for each subject by track in each province every year. We then rank these median scores from 1999 to 2003 within each province-track cell, considering the year with the lower median score as more difficult.
*/**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Appendix Table A11. Examining the Potential Correlation between Preference Submission Timing and Local Characteristics

Dependent Variable	Elite university					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.041***	-0.042***	-0.041***	-0.048***	-0.042***	-0.047***
	(0.008)	(0.009)	(0.009)	(0.012)	(0.010)	(0.014)
Female × Post policy	0.025***	0.025***	0.025***	0.032**	0.023**	0.028*
	(0.009)	(0.009)	(0.009)	(0.013)	(0.010)	(0.014)
GDP2000		0.001***				0.001**
		(0.000)				(0.000)
Female × GDP per capita		-0.000				-0.000
		(0.000)				(0.000)
Sex ratio at birth(/100)			-0.007			-0.002
			(0.004)			(0.006)
Female × Sex ratio at birth(/100)			-0.004			0.002
			(0.006)			(0.007)
CEE participate rate				0.004		-0.001
				(0.004)		(0.005)
Female × CEE participate rate				0.011		0.008
				(0.008)		(0.008)
Female share (High school)					0.058***	0.037**
					(0.015)	(0.017)
Female × Female share (High school)					0.021	0.041*
					(0.021)	(0.024)
Observations	2,148,419	1,892,072	1,977,558	1,694,060	1,750,223	1,321,998
R-squared	0.315	0.318	0.317	0.319	0.309	0.314
Score×Year×Track×Prov FE	✓	✓	✓	✓	✓	✓
Individual Control	✓	✓	✓	✓	✓	✓

Note: */**/*** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are clustered at the Province×Track×Year level.

Appendix B. Additional Discussions

B.1. Further Details on A Student's Journey to College Admission in China

Registering for the Examination

In the final year of senior high school, students register for the examination through an online platform managed by educational authorities. They select their examination track and provide detailed personal information.

Taking the Gaokao

The Gaokao is typically held over three days in July, with exams scheduled as follows: Chinese (Day 1, morning), Mathematics (Day 1, afternoon), and English (Day 2, afternoon). The remaining time is allocated for elective subject examinations. All exams are in written format and are centrally graded at the provincial level.

Receiving the Gaokao Scores

Students usually learn their scores and relative rankings (within their province, year, and track) about two weeks after the exam. Shortly before the release of Gaokao scores, the government announces the cutoff scores for each batch (first, second, third, and technical). Students who meet or exceed these cutoff scores are eligible to apply to institutions in the corresponding batch.

Preference Priority List

The timing for submitting preference priority list depends on submission policies, which vary by province and year. According to provincial policy, students submit their preference priority lists either before the exam, after the exam but before the score release, or after the score release. Students can list several schools in order of preference within each batch. Within a school, they can also rank several majors, with an option for a major transfer. If a student chooses this option and does not get into any of their

targeted majors, they may be transferred to a major with a lower admission score (provided their overall score meets the school's admission requirements). Without this option, the student would be denied admission.

Receiving Admission Outcomes

Students admitted to first-batch universities typically receive their admission results around August. Subsequent rounds begin after the first batch admissions are completed. Students dissatisfied with their admission outcome have three options: accept the result and enroll in the less preferred institution, retake the Gaokao the following year, or enter the labor market directly (though few students choose this last option).

B.2. Comparing Sequential Mechanism and Parallel Mechanism

Consider a simplified matching scenario with three students. All universities have only one spot available. Each student can submit a preference list of up to three schools. Without loss of generality, we assume the students' scores are in the order of $A > B > C$, and the universities' quality follows the same order. Below are the students' priority lists:

(a) Student A: University A is rank 1^{st}, followed by University B, and then University C.

(b) Student B: Same as Student A.

(c) Student C: University B rank 1^{st}, followed by University C, leaving the last slot empty.

Sequential Mechanism

The sequential mechanism operates on a preference-first basis, where universities prioritize students with higher scores among those who have ranked them as their first choice.

- First round: All universities immediately admit the student with the highest score who lists them as their first choice. Thus, Student A is admitted to University A,

and Student C is admitted to University B. Unfortunately, Student B is not admitted because University A's spot has been filled.

- Second round: According to Student B's priority list, their application is sent to University B. However, they are denied because Student C has already taken the single spot at University B.
- Third round: Student B is ultimately enrolled in University C.

In this hypothetical case, although Student B has a higher score than Student C, he/she is admitted to a lower-ranked institution.

Parallel Mechanism

The parallel mechanism operates on a score-first basis, where universities prioritize admitting students with higher scores, regardless of the order in which these students ranked the university.

- First round: Student A applies to University A and is admitted.
- Second round: Student B applies to University A but is rejected because Student A has already taken the spot. Unlike in the sequential mechanism, Student B then applies to University B and is successfully admitted.
- Third round: Student C applies to University B but is rejected and eventually enrolls in University C, as opposed to University B under the sequential mechanism.

B.3. Robustness against College Expansion and Bonus Scores

College Expansion

The college expansion that occurred between 1999 and 2003 aligns with the timeframe of our data. It led to a dramatic increase in the number of available admission slots. The large-scale expansion began in 1999 with a 47.4% increase in enrollments and continued over the next three years. By 2003, annual college enrollment had grown to 482% of

the 1998 level. According to the maximally maintained inequality hypothesis (Raftery and Hout 1993), this expansion could reduce gender disparities if it favors previously disadvantaged groups, including women (Wu, Yan, and Zhang 2020).

Appendix Table A5 tests the robustness of our findings against the college expansion by running year-by-year regressions. The results show limited fluctuations in gender disparity. Why did the college expansion have minimal impact on our estimates? This is primarily because the expansion mainly occurred in vocational colleges, with only a modest increase in slots at elite universities. Appendix Figure B1 illustrates this point. The left panels show that enrollment numbers and admission rates rose steadily from 1999 to 2003 when considering all universities. However, as shown in the right panel, there was no significant increase in elite university enrollment, and the admission rate even declined slightly after 2001.

Bonus Scores

Bonus scores are additions to subject scores and should theoretically be added to the original Gaokao scores. These scores can be broadly categorized into two types: for exceptional achievements and for special considerations. The former includes points awarded for accomplishments such as placing in subject-specific competitions, receiving academic scholarships, or demonstrating athletic excellence. The latter primarily benefits specific groups, such as ethnic minorities or the children of public heroes.

We do not include bonus points in our baseline setting because of the complexity of coding them, as they depend on a combination of students' characteristics and local policies that vary by province and year. The omission of bonus scores could bias our estimation if systematic gender disparities exist in those scores. Therefore, we perform a robustness check using a subsample where we can more confidently code the bonus scores.[1]

Appendix Table A6 presents the results. Panel A shows the conditional gender gap

[1]We were unable to code the bonus scores for 24 out of 159 province-year cells, affecting 380,000 out of 2.2 million individual observations (17.7%).

with the addition of bonus scores using the specific subsample, while Panel B shows the corresponding gap without the bonus scores. The difference in coefficients between the two panels does not exceed 0.001. The bonus scores have a limited impact on our estimation primarily because they are not quantitatively significant. In our data, only about 3% of test-takers receive these additional points, most commonly in increments of 5, 10, or 15 points. The average bonus score is only 1.4 points compared to an average score of 566.0 points.

Appendix Figure B1. The Number of Admission and the Admission Rates during the Process of College Expansion from 1999 to 2003

