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The cost of attending an elite college

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HIGHLIGHTS

- We find that attending an elite college increases student's mental stress and reduces their self-esteem and confidence.
- We use a regression discontinuity design (RD) to deal with the identification.
- The potential mechanisms are from student's relatively worse academic performance and interactions with peers.

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ABSTRACT

While the benefits of attending an elite school have been well documented, few studies focus on the "cost" of attending an elite school. Using a regression discontinuity design strategy, we find that attending an elite college substantially increases the mental stress and reduces self-esteem and confidence for the marginal students whose test score is just qualified for admission.

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1. Introduction

Whether students can benefit from attending an elite school is one of the most important and controversial questions in education. The most challenging question is the causal reference that students are not randomly assigned to schools. In recent years, relying on the regression discontinuity design strategy with a school's minimum entrance examination criteria, a number of studies find evidences that attending an elite school (or elite classroom) improves students' test scores and long-term labor market outcomes (Jackson, 2010; Pop-Eleches and Urquiola, 2013; Card and Giuliano, 2016). Although the benefits of elite schooling has been well documented, few studies focus on the "cost" of attending an elite school.

To fill this gap, we exploit a college student survey in China that records students' non-cognitive outcomes such as mental stress and self-esteem, and use a regression discontinuity design with the elite college's entrance score to deal with the identification. We find evidence that attending an elite college reduces non-cognitive outcomes for the marginal students whose entrance scores are just above the minimum cutoff for admission. In particular, relative to the students who just miss scoring above the cutoff, those who succeed experience higher levels of mental stress and have lower levels of self-esteem and confidence.

2. Background and data

Universities in China recruit students based on their test scores on the college entrance examination (CEE), which is the largest national level examination. We focus on the two most elite colleges in China: Tsinghua University and Peking University. Typically, these two universities are students' first choices when they apply for college, and as a result, we have an opportunity to exploit the minimum criteria of these two universities as a cutoff for attending the elite college.[1]

We exploit the China Capital College Student Survey, which is conducted by the national survey research center at Renmin University in China in 2009. The survey covers 4771 college students from 15 colleges in Beijing, the capital city of China.

[1] Specifically, the admission score for Tsinghua University and Peking University are highest in each year, and in the analysis, we adopt the minimum one among these two as the cutoff for admission into an elite college.

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Our outcome variable is students' mental stress, self esteem and confidence. The questionnaire includes various noncognitive measurements (See Table A1 for the detailed questions). We group those measurements into two groups: (1) mental stress, and (2) self esteem and confidence, and we then follow Kling et al. (2007) to calculate the average effect size (AES) for each group, which is a weighted average of the z-scores of its component.[2] In addition, the questionnaire includes students' test scores on the college entrance examination (CEE) and students' background characteristics.

3. Estimation strategy

We estimate the effect of attending an elite college by using the following specifications:

$$Y_{ipyt} = \beta_0 + \beta_1 Pass_{ipyt} + \beta_2 S_{ipyt} + \beta_3 S_{ipyt} \cdot Pass_{ipyt} + X_{ipyt}{}'\beta_4 + \varepsilon_{ipyt} \quad (1)$$

$$D_{ipyt} = \alpha_0 + \alpha_1 Pass_{ipyt} + \alpha_2 S_{ipyt} + \alpha_3 S_{ipyt} \cdot Pass_{ipyt} + X_{ipyt}{}'\alpha_4 + \epsilon_{ipyt} \quad (2)$$

where S_{ipyt} is the normalized test score around the cutoff:

$$S_{ipyt} = \frac{(Score_{ipyt} - C_{pyt})}{(Standard\ deviation\ of\ Score_{ipyr})_{pyr}}.$$

Specification (1) is the reduced form and (2) is the first stage form. Y_{ipyt} is the outcome measure for student i in province p, year y and academic track t (science or art track). D_{ipyt} is the dummy variable indicating whether the student attends an elite college. $Score_{ipyt}$ is student's CEE test score. C_{pyt} is the minimum cutoff score for elite college in province p, year y and academic track t. $Pass_{ipyt}$ is the dummy variable which equals to one if the student surpasses the cutoff score in exam, i.e.: $S_{ipyt} \geq 0$. X_{ipyt} is a set of demographic variables including the dummies for gender, ethnic group and in rural area, and the number of siblings in family. ε_{ipyt} and ϵ_{ipyt} are standard errors. In particular, the effect of attending an elite college could be estimated as the ratio of the reduced-form estimates (β_1) and the first-stage estimates (α_1). We follow Imbens and Kalyanaraman (2011) to exploit the local linear regression with the optimal bandwidth. We cluster the standard errors by college-cohort level, to adjust for the potential correlations of students in the same cohort within the college.

4. Empirical results

4.1. Main results

In this section, we first report the estimates of the impact of passing the minimum cutoff score on the probability of being admitted by an elite college. We then report the estimates of the impact of attending an elite college on student's outcomes.

4.1.1. First-stage estimates

As shown in Fig. 1, students whose CEE scores are just above the minimum cutoff score are much more likely to be admitted into an elite college. Table 1 reports the corresponding first-stage local linear estimates of the effect of surpassing the minimum score on the probability of attending an elite college. Focusing on the more conservative estimates in column 2, students who score just above the cutoff are 40.8% more likely to attend an elite college than students who score just below the cutoff.

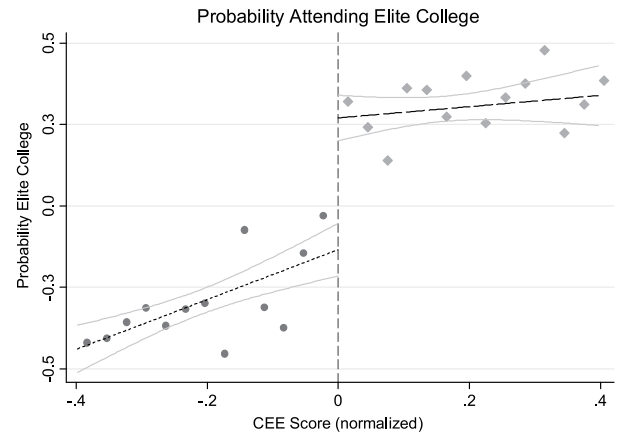

Fig. 1. Probability of attending elite college and CEE score. *Notes*: The figure plots the cell mean of the probability of attending elite college. The line is the fitted values from the local linear regression. The CEE score is normalized by year–province–track, to have a mean of zero and standard deviation of one.

Table 1
Surpassing the cutoff and attending an elite college.

	Dependent variable: attending elite college	
	(1)	(2)
Surpass cutoff	0.405***	0.408***
	(0.116)	(0.111)
Student controls	No	Yes
Observations	789	789
R-squared	0.408	0.419

Notes: The table reports local linear estimates. Student controls include dummies for gender, minority, from rural area and the number of siblings. Standard errors are clustered at college-cohort level.
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

4.1.2. Reduced from and IV estimates

Fig. 2 plots the non-cognitive outcomes by students' CEE test scores. Panel A is for mental stress (reversed), panel B is for self-esteem and confidence.[3] The discontinuities in the cutoff indicate that compared to their counterparts who just failed to be admitted into an elite college, the marginal students at elite colleges tend to have higher mental stress and lower levels of self-esteem and confidence. The corresponding local linear IV estimates are reported in Table 2 and the reduced form estimates are reported in Table A2.[4] Table 2 columns 1–2 report the effect of attending an elite college on student's mental stress, and columns 3–4 report the effect of self-esteem and confidence. In addition, we use all the 11 questions to construct an overall index for non-cognitive outcomes. As shown in Table 2, columns 5–6, it indicates that attending an elite college substantially reduces the non-cognitive outcomes by around 43.6% of a standard deviation for the marginal students whose test score is just qualified for the elite college.

4.2. Mechanisms

We have shown that attending an elite college increases student's mental stress and reduces their self esteem and confidence. We go a further step to shed light on the mechanism through which the elite college plays a role by exploiting the following survey

[2] Specifically, we define the average effect size (AES) of elite schooling on noncognitive category c as $AES_c = \frac{1}{n_c}\sum_{n=1}^{nc} e_{kc}/\sigma_{kc}$, where n_c is the number of outcomes in category c (e.g., 5 for the category of mental stress), e_{kc} is the estimated effect for outcome k of category c, and σ_{kc} is the standard deviation of the outcome variables.

[3] For ease of interpretation, the measure of mental stress has been reversed. As a result, higher values in panel A and panel B indicate improved outcomes.

[4] For ease of interpretation, the outcome variables are normalized to have a mean of zero and a standard deviation of one.

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