Accessing Elite Universities and Its Effects on Students' Expectations: A Case Study of China's College Entrance Exam

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Abstract

Recent studies on return of higher education show that the investment on elite universities is substantial. Accessing elite universities could yield a sizable premium wage. However, no study was able to distinguish to what extent this premium wage is due to its human capital effects or its signaling effects. To potentially distinguish its signaling effect, we studied the short-term effects of enrolling into elite universities in China's higher education institutes by using a regression-discontinuity design (RDD). To achieve this goal, we used a randomly sampled with more than 14 thousand first-year students from 22 universities. We found that there was a substantial signaling effect in enrolling into elite universities. Accessing elite universities could significantly increase student expected monthly salary.

Introduction

Knowledge about returns on investments in education, which have been estimated since the late 1950s, are predominantly used in educational investment decisions (Psacharopoulos and Patrinos, 2004). In practice, the rate of return (RoR) estimate is often focusing on the causality between schooling and earnings (Card, 2001). Although it is generally understood in a sense of human capital investment, it is in fact difficult to distinguish the signaling effects from the human capital effects based on the earnings.

The goal of this study is to examine the short-term effects of enrolling into elite universities on student expectations about their future labor market performance in China's higher education. The short-term, in our case, indicates that there has not yet been any human capital accumulation right after students' enrolling into the elite (as opposed to non-elite) universities. However, the signal effects could play an immediate effect after the enrollment. In our study, we specifically focus on students' expected earnings, job-searching opportunities and other psychological outcomes.

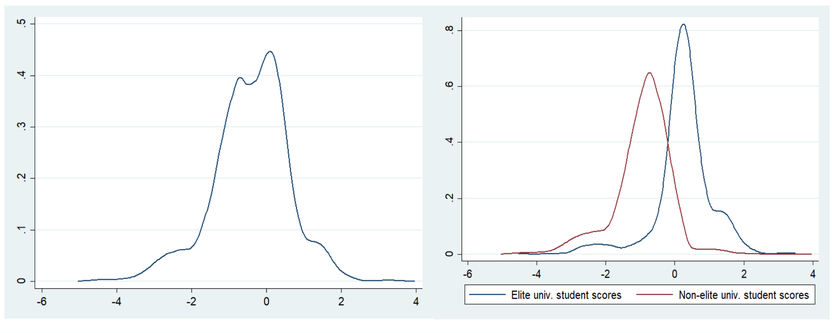
We believe this is the first study in China's higher education trying to estimate the signaling effects on education and earnings. We argue that, taking the signaling effect in educational investment into consideration, RoR estimation based on earnings might be misleading.

Sampling and Data Collection

To achieve the above goal, we conducted our study in Hunan province in China. Hunan province is located in central of China, with a per capita GDP 6300 USD, ranked 16th out of the 31 provinces or regions. We randomly selected 22 universities out of the four-year national registered universities, and in each major we randomly sampled 10% first-year students. The total was about 15 thousands first-year college students from 22 universities.

We conducted our survey at the end of October 2016, one month (right after their first-month military training) after the first-year students enrolled into the university. The data was collected with detailed students' socio-economic background, their college majors and CEE scores. Besides these, we also measured students' future expectations, their general self-efficacy, study adaptation and study motivations.

Figure 1. Distribution of student CEE scores around the cut-off (with and without defies).



Analytical Approach

Although the CEE score was the only criterion, it is possible that some students with scores below the cutoff get accepted with extra points from minor criteria such as talents in art and sports. It is also possible that some with scores above the cutoff do not go to elite universities since the final admission decision is also affected by competition and students' preference of majors and location (see Table 1). Hence, we have a fuzzy design with a discontinuity in elite university eligibility around the cutoff scores. However, in our first analysis we dropped those cross-overs, and performed the analysis as a sharp RDD design.

To examine the short-term effects of this high-stakes test on students' outcomes, we used parametric estimation to examine this causal relationship. Specifically, we run the following parametric estimation equation (1):

$$Y_{it} = a_0 + a_1 T_i + a_2 f(S_i) + a_3 X_i + \varepsilon_i \quad (1)$$

where Y_{it} is student outcomes we are interested. T_i is a dummy variable, indicating whether student enrolled into an elite-university, S_i is student CEE test score; X_i is a vector of students' individual, parents and family characteristics; ε_i is a robust-clustered error term.

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Table 1. Sample students distribution.

	Elite university		Non-elite university		Sub-total
	Science major	Art major	Science major	Art major	
Above CEE threshold	4170	878	312	206	5566
Below CEE threshold	1073	515	4795	2997	9380
Sub-total	6636		8310		14946

Results

First, from Figure 1 we find that the rating variable (CEE scores) is normally distributed over two different groups measured before treatment, and there is a large group of students with CEE scores around the cut-off point.

We fist conducted our graphic analysis, from Figure 2 we found that there exists a significant discontinuity between students who enrolled into an elite university versus students who enrolled into a non-elite university. For example, students who just enrolled into an elite university show a significant higher expected monthly salary than their peers who failed to enroll into an elite university. The same trend can also be observed from student expectation in doing a master or PhD study. However, when we examine the probability in finding a major-matched job, being enrolled an elite university in fact lessened student expectation in finding a major-matched job.

Figure 2. Relationship between CEE scores and selected student outcomes with linear regression fit around the cut-off.

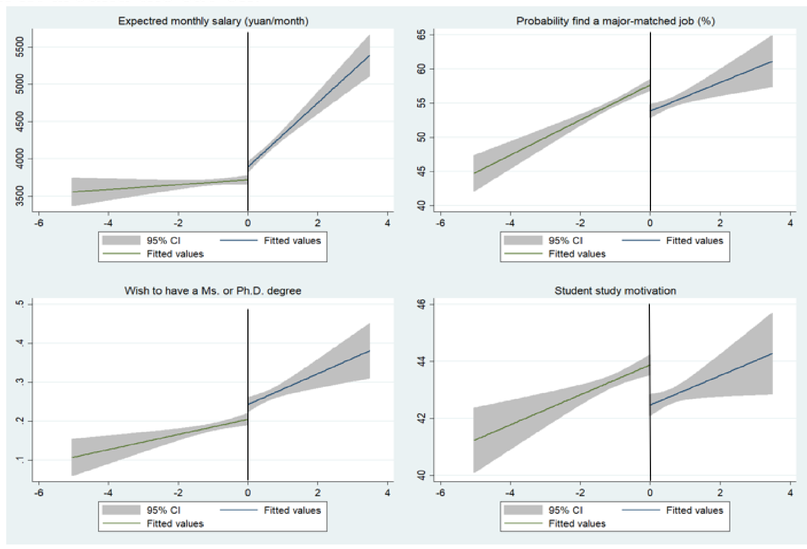

Table 2. Parametric estimate of the short-term effects of enrolling into an elite university on student outcomes.

Outcomes	Students' expected monthly salary		Students' probability to find a major-matched job after graduation		Student expected to have a Msc. Or Ph.D. degree, 1=yes		Students' study motivation	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment variable								
1. Student enrolled into the elite university, 1=yes	0.212***	0.258***	-0.103***	-0.203***	0.082***	0.049***	0.001	-0.130***
	(0.035)	(0.037)	(0.033)	(0.038)	(0.012)	(0.011)	(0.026)	(0.032)
2. Students' CEE scores (normalized)	0.016	0.022	0.109***	0.089***	0.015**	0.015**	0.052***	0.037**
	(0.019)	(0.019)	(0.018)	(0.018)	(0.007)	(0.006)	(0.015)	(0.015)
Students' individual characteristics		Yes		Yes		Yes		Yes
University dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.107***	-0.567**	0.073***	-0.485**	0.164***	0.368***	-0.044**	-0.942***
	(0.027)	(0.257)	(0.025)	(0.181)	(0.009)	(0.077)	(0.020)	(0.248)
Observations	12,839	11,981	12,839	11,981	12,839	11,981	12,839	11,981
R-Square	0.039	0.061	0.029	0.039	0.017	0.027	0.007	0.020

Note: Robust-clustered standard errors in the parentheses, *** p<0.01, ** p<0.05, * p<0.1;
Data source: Author's survey.

We further ran the parametric estimation with (and without) controlling student personal, parents and family socio-economic characteristics. In Table 2, we find that it indeed confirmed our findings from above. For example, student expected monthly salary was about 0.212 standard deviation higher than non-elite students near the cut-off point (Table 2, Column 1 and 2, Row 1). From the graphic analysis, we also can see that they are performing with a significant different slope, where elite university students are showing a significant increase of expected salary with their CEE scores. However, it is interesting to notice that being enrolled into an elite university discouraged students at the cut-off point with a lower expected rate to find a major-matched job (Table 2, Column 3 and 4, Row 1). The same trends were observed with student study motivation.

Discussion & Conclusions

Therefore, we conclude that: First, there might exist strong signal effects in accessing elite universities relative to non-elite universities. Second, this signal effect might be both positive and negative on student outcomes. It requires further exploration to understand the causal mechanisms to different outcomes. Third, a single country study could reveal the existence of signaling effects; however, it can hardly show how large this signal effects are relative to their human capital effects in higher education investment. Further studies are needed.

References

1. Angrist, J., and Lavy, V. (2009). The effects of high stakes high school achievement awards: evidence from a randomized trial. *The American Economic Review*. 99(4):1384-1414.
2. Jacob. R., Zhu, P., Somers, M.A., Bloom, H. (2012). *A Practical Guide to Regression Discontinuity*. MDRC.
3. Zhang, Y. (2016). *National College Entrance Exam in China: Perspectives on Education Quality and Equity*. Springer Briefs in Education. The Netherlands.