Games and Economic Behavior 108 (2018) 295–316

Contents lists available at ScienceDirect

Games and Economic Behavior

www.elsevier.com/locate/geb

Limited choice in college admissions: An experimental study

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ARTICLE INFO

Article history:
Received 30 August 2016
Available online 11 December 2017

JEL classification:
C78
D82
I23
C92

Keywords:
Matching
Simultaneous screening
Early decision
Experiments

ABSTRACT

This paper investigates a college admissions problem in which students' choice set is limited by colleges' strategic actions, such as early decision programs in the US or simultaneous entrance examinations in Asia, in order to prevent multiple applications. We call this action the conflicting strategy and conduct laboratory experiments to explore the problem. We argue that colleges' prestige and students' uncertainty about admissions outcomes are two important factors. Our model and experimental results demonstrate that when uncertainty is high and the prestige difference is low, a lower-ranked college can obtain more desired students through the conflicting strategy. Moreover, through this strategy, students with stronger preferences for a higher-ranked college have a higher chance to be accepted, which could result in an increase of students' aggregate welfare.

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1. Introduction

In college admissions, peer institutions compete for desired students by using various mechanisms. One sort is to limit students' choice set and then prevent multiple applications; this is often adopted by lower-ranked colleges. For example, in the US, lower-ranked (but still selective) colleges tend to use early decision programs such that students can apply to only one college in the early admissions process (Avery and Levin, 2010). Similarly, in many Asian countries, lower-ranked colleges conflict with the best college by setting the same entrance exam date so that students can take only one of those examinations, and the phenomenon is called the simultaneous screening problem in Chen and Kao (2014). The present paper theoretically and experimentally justifies this type of strategy used by lower-ranked colleges and identifies its effects on students.

In such situations, students' choices are limited, and a student essentially can be screened by only one college in the admissions process. We call this type of strategy, used by colleges to prevent students' multiple applications, the conflicting strategy. In the present paper, we develop a discrete model and use laboratory experiments to explore this limited choice problem. It is argued that colleges' prestige and students' uncertainty about admissions outcomes are two important factors in the problem. Our model uses students' uncertainty about their individual ranking to represent their uncertainty about the admissions outcomes, and shows the conditions for the two factors under which a lower-ranked college can obtain more

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https://doi.org/10.1016/j.geb.2017.12.002
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desired students through the conflicting strategy. Our experimental results support the findings from the model. Moreover, we theoretically and experimentally show that the conflicting strategy may improve students' welfare.

We highlight the effects of students' uncertainty about their individual ranking and colleges' prestige, as well as enrollment capacity. Four main predictions derived from the model are supported by our experiments. First, if a lower-ranked college (called B) uses the conflicting strategy to restrict students' choice set to one college, there are students who prefer a higher-ranked college (called A) to B but strategically apply to B when uncertainty is high enough. Second, when B's prestige is sufficiently high, B obtains additional desired students through the conflicting strategy, even if A's capacity is small. Third, B can obtain additional desired students via the conflicting strategy regardless of its prestige if A's capacity is adequate. Fourth, B's gains from the conflicting strategy are weakly decreasing as uncertainty diminishes.

Our results explain some recent events in the college admissions process. As Avery and Levin (2010) notice, some very top-ranked US universities had tried to eliminate early decision programs. In 2001, Yale's president, Richard C. Levin, proposed ending early decision programs among peer institutions and claimed that students did not benefit from this option. Presidents from Columbia University, the University of Pennsylvania, and Cornell University indicated willingness to discuss the issue, but thought early decision had more value than critics recognized.[1] According to the *US News and World Report* "America's Best Colleges 2001", Yale's ranking was slightly higher than the other three universities'. Our study may explain this event, in the sense that a lower-ranked (but selective) college gains from the conflicting strategy and hence has less incentive to eliminate early decision programs.

In addition, Avery et al. (2014) investigate the 1994 policy reform of college admissions in South Korea and find two stylized facts: (1) almost all elite colleges chose the same admissions date before the reform, and (2) afterwards, lower-ranked colleges tended to choose different admissions dates than that of the best one, Seoul National University (SNU). These facts can be explained by the changes in uncertainty addressed in our model. Specifically, after the reform, students receive some information about their caliber because they have to take a national examination in advance and the scores are released before the admissions process. According to our model, a lower-ranked college has a weaker incentive to conflict with SNU as the uncertainty diminishes. These two events respectively illustrate the importance of prestige and uncertainty on the decision of whether to use the conflicting strategy.

Moreover, since the conflicting strategy restricts students' choice set, it has been claimed that students' welfare would be reduced by the conflicting strategy, as Yale argued in 2001. However, our model shows that there exists another self-selection effect that could improve students' welfare. Specifically, the conflicting strategy screens out students with weaker preferences for a higher-ranked college, so students with stronger preferences for that college have a higher chance to be accepted. We call this the screening effect, and our model shows that this effect increases students' welfare.[2] Compared with the model, our experiments find that when students do not follow equilibrium strategies precisely, desired students suffer welfare losses while less desired students could gain more welfare than expected under the conflicting scenario. Another important finding is that revealing some information to students can help them find the equilibrium strategies, and hence help maintain the screening effect and the predicted welfare gains. Related policy implications are provided in Section 4.2.3.

In practice, applicants often exceed colleges' enrollment capacities, and colleges must determine the admission set from their application pools. This creates two levels of competition between colleges: (1) colleges compete for desired students *ex post* given an application pool, and (2) colleges constitute a restricted application pool *ex ante* with more desired students. The first is intuitive: given the application pools, colleges compete for students in the intersection of their pools. That is, a student may apply to multiple colleges, and competition occurs if at least two colleges want the student. In this situation, Chade et al. (2014) demonstrate that colleges set admission standards which play a role resembling that of a market-clearing price. Che and Koh (2016) argue that colleges may admit less-talented students who are unlikely to be admitted by other colleges as a strategy to increase their admission yield rates.

In this paper, we focus on the second level of college competition. That is, to reduce *ex post* competition, colleges may compete *ex ante* by using the conflicting strategy to attract desired students in restricted application pools where applicants' choice set is limited to one college. Avery and Levin (2010) develop a signaling model of students' enthusiasm about particular colleges to explain US early decision programs, while Lee (2009) and Kim (2010) respectively provide other explanations of avoiding the winner's curse (enrolling lemons) and obtaining efficient financial-aid allocation. Chen and Kao (2014, 2015) and Avery et al. (2014) respectively find that lower-ranked universities in Taiwan and South Korea may gain more desired students by setting the same entrance examination date as that of the best one. These cases have a common feature: students' choice set is limited to one of the competing colleges. In other words, colleges apply the conflicting strategy in practice, and this limited choice problem exists globally.

In the economic literature, there is little empirical research on this topic because of the complexity of decentralized college-admission processes and limited data (Avery et al., 2014). Only some stylized facts have been identified by surveys (Avery et al., 2003; Avery and Levin, 2010) or by using aggregate data (Avery et al., 2014; Kao and Lin, 2017). To our knowledge, Jensen and Wu (2010), Chapman and Dickert-Conlin (2012), and Chen and Kao (2015) are the only empirical studies testing colleges' gains from early admissions or the conflicting strategy. Nevertheless, those empirical findings are

[1] "Yale President Wants to End Early Decisions For Admissions," by Karen Arenson, New York Times, December 13, 2001.

[2] This is parallel to a centralized school choice model of Abdulkadiroğlu et al. (2011) in which through students' manipulations of their reported preferences, students' ex-ante welfare in the Boston mechanism may be improved, when compared to that in the deferred acceptance algorithm of Gale and Shapley (1962).

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