

# Strategic Behavior in Multi-unit Assignment Problems: Theory and Evidence from Course Allocations

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Extended abstract - description of preliminary results

At Harvard Business School, like at many other professional schools around the country, students' learning experience requires limits on the number of students in a class. This creates an interesting allocation problem for school administrations: students need a seat in several classes, and classes have limited capacity. In addressing this problem, all schools have some efficiency and fairness objectives in mind.

In practice, this is a very hard problem. There is no known allocation mechanism that is ex-post efficient, strategyproof and minimally fair (in a way make more precise in the paper). The defining features of a course allocation problem are that students require more than one course and that there are no monetary transfers. In this paper, we identify precisely the nature of the incentive problem in two classes of course allocation mechanisms that contain all known mechanisms used in practice: draft mechanisms (draft mechanisms assign courses to students according to a random order over students) and point bidding mechanisms (where students' bids determine their priority for a course). In both classes of mechanisms (and except for dictatorships), students have an incentive to "overreport" their preferences for popular courses and this incentive does not vanish "when the market grows large." In other words, preference manipulation (and ex-post inefficiency) can be seen as unavoidable in the course allocation problem and it is useful to understand what drives preference manipulation and how it affects outcomes. To do so we study a specific mechanism, the one used at Harvard Business School to allocate second year classes. We argue that students in the HBS mechanism will tend to overrate popular courses and underrate unpopular courses, and that this will result in increased congestion. We confirm these predictions in data for the academic year 2005-06. Moreover, we show that strategic behavior in the HBS mechanism hurts students overall. This result suggests that there might be a trade-off between the HBS mechanism that is "fair" but inefficient and random serial dictatorship that is unfair but efficient. Based on our data we simulate the outcome from random serial dictatorship. The results indicate that, despite the negative effect of strategic behavior in the HBS mechanism, the HBS mechanism is still preferable to RSD on a number of measures.