

Essays on Market Design

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Certificate of original authorship

I, Hao Zhou, declare that this thesis is submitted in fulfillment of the requirements for the award of Doctor of Philosophy, in the Business School at the University of Technology Sydney. This thesis is wholly my own work unless otherwise indicated in the references or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution. This research was supported by the Australian Government Research Training Program.

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Abstract

This thesis consists of two independent essays. They are unified by the common theme of market design.

In the first essay, we consider a school choice program with the diversity constraints on the composition of the students by implementing affirmative actions. Students may belong to more than one disadvantaged types (e.g. a student may both belong to the “minority” and “financially distressed” group.) In addition, they may have (weak) preference orders over the channels through which they would possibly be enrolled (e.g. a student from a poor family may be granted a scholarship). We consider the case where the school tries to assign as many reserved seats as possible by sophisticatedly reshuffling the seats to the eligible students. We provide a choice rule that eliminates justified envy, satisfies the no swapping condition and is acceptant under this situation. We further show that the choice rule is bilaterally substitutable and thus the cumulative offering process can produce a stable outcome.

In the second essay, we establish the optimal auction when a seller can incentivize an existing buyer to refer a privately known potential buyer to compete for an object. We identify three optimal channels to provide referral incentives: discouraging non-referral, favoring referral, and providing informational rent for referral. While the first two channels always appear and are essential, the third one is supplementary and appears when the potential buyer is less likely to exist and stronger. We also provide conditions under which the optimal mechanism can be implemented by simple mechanisms. Finally, we show that the conventional resale mechanism is suboptimal.

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