

DISSERTATION DEFENSE

Özgün Ekici

“Discrete Resource Allocation Problems: Market Design and Axiomatic Mechanism Design”

Friday, April 15, 2011
10:00 am
324 GSIA

Essay 1: Reclaim-proof Allocation of Indivisible Objects

This paper studies axioms defining a desirable allocation in indivisible object allocation problems. The existing axioms in the literature are conditions of *ex-ante* robustness (individual-rationality and group-rationality) and *ex-post* robustness (Pareto-efficiency) to blocking coalitions. We introduce an all-encompassing stringent axiom. An allocation is reclaim-proof if it is *interim* robust to blocking coalitions. Interim robustness to blocking coalitions has practical appeal in allocation problems in which the assignments are to be made in multiple rounds. Our main results unify and extend several disparate results in the literature. We show that an allocation is reclaim-proof if and only if it is induced by a YRMH-IGYT mechanism (introduced by Abdulkadiroğlu and Sönmez, *Journal of Economic Theory* 1999) and if and only if it is a Walrasian allocation.

Essay 2: Fair and Efficient Discrete Resource Allocation: A Market Approach

In a variety of cases, a set of indivisible objects must be allocated to a set of agents where each agent is entitled to receive exactly one object. Examples include the allocation of tasks to workers, spots at public schools to pupils, and kidneys to patients with renal failure. We consider the mixed ownership case of this problem (some objects are initially owned by some agents while the other objects are unowned) and introduce a market-based mechanism that is procedurally reminiscent of the Walrasian Mechanism from equal-division. Our mechanism is strategy-proof and procedurally fair, and it leads to Pareto-efficient allocations. We obtain that it is equivalent to a well-known priority-order based mechanism. The equivalence result in the classical paper by Abdulkadiroğlu and Sönmez (*Econometrica* 1998) follows as a corollary.

Essay 3: House Swapping

An increasingly more popular practice that allows vacationers to save from accommodation costs is house swapping. A vacationer is endowed with preferences over (house, guest) pairs where “house” stands for the house she is to receive for vacation, and “guest” stands for the person who is to receive her house. We show under additively separable preferences that in a house-swapping market a pairwise-stable allocation is not guaranteed to exist, and possibly no Pareto-efficient allocation may be attainable via only executing two-way swaps. If preferences are “guest-diseparable,” then there exists a core allocation. More restrictively, if preferences are “guest-dichotomous,” there exists a unique core allocation and the mechanism that selects it is strategy-proof.