ECON 558: MATCHING AND ASSIGNMENT (FALL, 2020)

- Instructor: SangMok Lee
- Class time: Mon/Wed, 2:30 - 3:50 pm.
- COVID-19 Related Policy
  (1) Remote classes by Zoom. Class materials are posted on Canvas.
  (2) Synchronous. Students are expected to join the lectures. The lectures will be recorded only when some students can’t attend due to any health-related issues (please, let me know beforehand).

1. Summary

This course introduces you to formal modeling in two-sided matching and assignment problems and suggests some interesting future research directions. We will discuss decentralized matching markets (e.g., the marriage market), matching markets through institutions (e.g., medical match and school choice problem), matching with transferable utilities (e.g., labor markets), and assignment problems (e.g., housing allocation). We study existing or new market institutions, understand their properties and think about whether they can be reengineered or improved.


2. Requirements

The grade will be determined by assignments, one exam, and an individual paper:

(1) Two homework assignments.
(2) One open-book exam: Nov 25, in-class time.
(3) Individual papers by Dec 23.

Option 1: A ~15 page research paper: This should outline a question, its context in the literature, why it is important, and some preliminary results. If your project is theoretical, you should sketch a model and provide some basic insights. If it is empirical, you should precisely describe the data sources you will be using and the empirical techniques you plan to utilize.

Option 2: Two referee reports on working papers: Each report should be 2-3 pages (1.5 line spaced, 11 pt fonts). The reports should start with a summary of the articles. You should describe your main 3-4 points in detail and conclude the report with more minor comments. A good referee report not only clearly
states the shortcomings of the work but also lays out constructive, detailed, and realistic suggestions for improvement.

3. Textbook

(1) A self-contained note will be distributed from time to time during class.
(2) Roth, Alvin E., and Marilda A. O. Sotomayor (1990), Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis, Cambridge University Press.

The first two-thirds of the semester covers classics, and the topics are listed below. We will study recent working papers for the rest of the semester.

4. Topics


(1) Matching with Non-transferable Utilities, Stability and the Gale-Shapley algorithm:
Roth-Sotomayor (chapter 2)
(2) Many-to-one Matching:
Roth-Sotomayor (chapter 5)
(3) Matching with Transferable Utilities (a.k.a. Assignment Game)
Roth-Sotomayor (chapter 8)

4.2. The Structure of The Set of Stable Matchings.

(1) The Structure and Computation of Stable Matchings
Roth-Sotomayor (chapter 3)
(2) Lattice, Tarski’s Fixed Point Theorem

(3) Linear Programming Approach


Teo, Chung-Piaw, and Jay Sethuraman. ”LP based approach to optimal stable matchings.” (1997).


(4) The Structure of Stable Matchings with Transferable Utilities

Roth-Sotomayor (chapter 8)


4.3. Mechanism Design Aspects of Matching.

(1) Stable Matching Mechanisms


(2) Strategic Issues

Roth-Sotomayor (chapters 4 and 5)


(3) Unraveling


(4) Application I: National Resident Matching Program

(5) Application II: Public School Choice Programs

(6) Applications III: Others.
   Sonmez and Switzer (2013) on Cadet/Branch Matching (see the next topic)

4.4. Matching with Contracts.

(1) Tarksi-approach

(2) Embedding
4.5. Random Assignment Problems and Applications.

(1) Theory
  Pycia, Marek, and M. Utku Unver. ”Incentive compatible allocation and exchange of discrete resources.” Available at SSRN 1079505 (2014).

(2) Applications: Housing Allocation, Kidney Exchange.

(3) Pseudo-market Mechanism


(1) Large Two-sided Matching


Menzel (2014) and Peski (2015) (see the topic of empirical analysis)

(2) Large Assignment Problems


Liu, Qingmin, and Marek Pycia. "Ordinal efficiency, fairness, and incentives in large markets." mimeo.


4.7. Matching in Related Fields.

(1) Empirical Analysis: Classic


Hortacsu, Ali, Guenter Hitsch, and Dan Ariely (2010), What Makes You Click? Mate Preferences and Matching Outcomes in Online Dating, American Economic Review.


(2) Lab Experiments


(3) Macro/Labor Econ: Search and Matching


4.8. Other Topics.

(1) Affirmative Actions


SangMok Lee and Leeat Yariv, “On the Efficiency of Stable Matchings in Large Markets”, 2018

(3) Dynamic Matching


(4) Pre-matching Decision Making


Hatfield, John William, Fuhito Kojima, and Yusuke Narita. ”Promoting school competition through school choice: A market design approach.” Available at SSRN 1984876 (2012).

(5) Information Acquisition in Matching


Serial dictatorship: The unique optimal allocation rule when information is endogenous, Sophie Bade, 2015, Theoretical Economics.

(6) And More Developments in Theory


Nguyen, Thanh, and Rakesh Vohra. ”Near feasible stable matchings with complementarities.” (2018). American Economic Review (Complementarities, Peer effects, Couples in NRMP, etc.)

(7) More Recent Papers in Empirical Analysis


Marcin Peski, Large roommate problem with non-transferrable random utility, mimeo, September 2015.


