

Economics 40701 – Topics in Matching and Market Design

Scott Duke Kominers

Logistics

Time. Fridays, 14:00–16:30± ϵ (beginning January 13, 2012)

Location. Rosenwald 329

Office Hours.

- Discussion Preparation – (Typically) Tuesdays, 15:30–16:30
- General Questions and Idea Vetting – (Typically) Tuesdays, 16:30–18:00
- Other, or Alternate – by appointment

Course Webpage.

- http://scottkom.com/courses/Topics-in-Matching-and-Market-Design_2011-2012/

Overview

Description. This course is a reading seminar on current research in the theory of market design. Recent papers will be discussed alongside their classical antecedents. The course will focus almost entirely on papers presenting novel market design problems and techniques. In addition to technical content, class discussion will pay special attention to issues of problem identification and formulation, so as to understand what comprises “interesting” work in market design.

Most papers under consideration will be theoretical, although some empirical/engineering work will be discussed. (See below for a preliminary list of topics.)

This course complements Economics 40603 (Market Design).

Prerequisites. Economics 40603 (Market Design), as well as many courses under the “Mathematical Economics” field designation, will provide useful context and technical background. Some understanding of algorithms, complexity, and combinatorics will be invaluable. However, *I do not believe in formal prerequisites*—these observations are made only for the purpose of guidance.

If you are interested in taking the course, and are concerned about the difficulty of the material, please get in touch with me early in (or before) winter quarter. I am inclined to reward individuals for taking risks and stretching themselves.

Requirements. Evaluation will be primarily based upon class participation and discussion. Each student will be responsible for leading at least one discussion session. (Discussion leadership roles will be assigned via a version of the deferred acceptance algorithm, with some priority given in reverse order of academic seniority.) In addition, students will periodically be required to supply comments in advance of discussion, as a commitment device to enforce reading.

A written “idea proposal” exercise will be required as well; details will be established by social choice mechanism (i.e. vote) at the first course meeting.

Topics

Introduction/Overview.

David Gale and Lloyd S. Shapley. College admissions and the stability of marriage. *American Mathematical Monthly*, 69:9–15, 1962.

Alvin E. Roth. Deferred acceptance algorithms: History, theory, practice, and open questions. *International Journal of Game Theory*, 36:537–569, 2008.

John William Hatfield and Scott Duke Kominers. Contract design and stability in matching markets. Harvard Business School Working Paper, 2011.

Matching with Regional Caps.

Yuichiro Kamada and Fuhito Kojima. Stability and strategy-proofness for matching with constraints: A problem in the Japanese medical matching and its solution. *American Economic Review Papers & Proceedings*, forthcoming.

Yuichiro Kamada and Fuhito Kojima. Improving efficiency in matching markets with regional caps: The case of the Japan Residency Matching Program. Stanford University Working Paper, 2011.

John William Hatfield and Paul Milgrom. Matching with contracts. *American Economic Review*, 95:913–935, 2005.

Cadet–Branch Matching.

Tayfun Sönmez and Tobias B. Switzer. Matching with (branch-of-choice) contracts at United States Military Academy. Boston College Working Paper, 2011.

Tayfun Sönmez. Bidding for army career specialties: Improving the ROTC branching mechanism. Boston College Working Paper, 2011.

John William Hatfield and Fuhito Kojima. Substitutes and stability for matching with contracts. *Journal of Economic Theory*, 145:1704–1723, 2010.

Substitutability and the Kelso–Crawford Legacy.

Alexander S. Kelso and Vincent P. Crawford. Job matching, coalition formation, and gross substitutes. *Econometrica*, 50:1483–1504, 1982.

John William Hatfield, Scott Duke Kominers, Alexandru Nichifor, Michael Ostrovsky, and Alexander Westkamp. Stability and competitive equilibrium in trading networks. Stanford Graduate School of Business Working Paper, 2011.

Satoru Fujishige and Zaifu Yang. A note on Kelso and Crawford's gross substitutes condition. *Mathematics of Operations Research*, 28:463–469, 2003.

Random Allocation Mechanisms.

Eric Budish, Yeon-Koo Che, Fuhito Kojima, and Paul Milgrom. Designing random allocation mechanisms: Theory and applications. Stanford University Working Paper, 2011.

Signaling in Matching Markets.

Peter Coles, Alexey Kushnir, and Muriel Niederle. Preference signaling in matching markets. Stanford University Working Paper, 2011.

Soohyung Lee, Muriel Niederle, Hye-Rim Kim, and Woo-Keum Kim. Propose with a rose? Signaling in Internet dating markets. Stanford University Working Paper, 2011.

Peter Coles, John Cawley, Phillip B. Levine, Muriel Niederle, Alvin E. Roth, and John J. Siegfried. The job market for new economists: A market design perspective. *Journal of Economic Perspectives*, 24:187–206, 2010.

Markets for Private Data.

- Arpita Ghosh and Aaron Roth. Selling privacy at auction. In *Proceedings of the 12th ACM conference on Electronic Commerce*, pages 199–208. ACM, 2011.
- Frank McSherry and Kunal Talwar. Mechanism design via differential privacy. In *Proceedings of the 48th Annual Symposium on Foundations of Computer Science*, pages 94–103. IEEE, 2007.
- Kobbi Nissim, Rann Smorodinsky, and Moshe Tennenholtz. Approximately optimal mechanism design via differential privacy. In *Proceedings of the 3rd Innovations in Theoretical Computer Science Conference*. ACM, forthcoming, 2012.
- Yiling Chen, Stephen Chong, Ian A. Kash, Tal Moran, and Salil Vadhan. Truthful mechanisms for agents that value privacy. Preprint, arXiv:1111.5472, 2011.

Large-Scale Kidney Exchange.

- Itai Ashlagi and Alvin E. Roth. Individual rationality and participation in large scale, multi-hospital kidney exchange. National Bureau of Economic Research Working Paper 16720, 2011.
- Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver. Kidney exchange. *Quarterly Journal of Economics*, 119:457–488, 2004.

Financial Intermediation in Networks.

- Itay P. Fainmesser. Intermediation in (un)observable financial networks. Brown University Working Paper, 2012.
- Ana Babus. Endogenous intermediation in over-the-counter markets. Imperial College London Working Paper, 2012.
- Douglas W. Diamond. Financial intermediation and delegated monitoring. *Review of Economic Studies*, 51:393–414, 1984.

“Hidden” Market Design.

- Sven Seuken, Kamal Jain, and David C. Parkes. Hidden market design. In *Proceedings of the 9th International Conference on Autonomous Agents and Multiagent Systems*.
- Sven Seuken, Kamal Jain, Desney Tan, and Mary Czerwinski. Hidden markets: UI design for a P2P backup application. In *Proceedings of the 28th International Conference on Human Factors in Computing Systems*, pages 315–324. ACM, 2010.

Large Markets.

- Fuhito Kojima and Parag A. Pathak. Incentives and stability in large two-sided matching markets. *American Economic Review*, 99:608–627, 2009.
- SangMok Lee. Incentive compatibility of large centralized matching markets. California Institute of Technology, 2011.
- Eduardo M. Azevedo, Alex White, and E. Glen Weyl. Walrasian equilibrium in large, quasilinear markets. University of Chicago Working Paper, 2012.

Market Design through History.

- Lars Boerner and Daniel Quint. Medieval matching markets. Free University Berlin School of Business & Economics Working Paper, 2010.
- Lars Boerner and John William Hatfield. The economics of debt clearing mechanisms. Free University Berlin School of Business & Economics Working Paper, 2010.

Land Assembly.

George J. Mailath and Andrew Postelwaite. Asymmetric information bargaining problems with many agents. *Review of Economic Studies*, 57:351–367, 1990.

Scott Duke Kominers and E. Glen Weyl. Holdout in the assembly of complements: A problem for market design. *American Economic Review Papers & Proceedings*, forthcoming.

Scott Duke Kominers and E. Glen Weyl. Concordance among holdouts. Harvard Institute of Economic Research Discussion Paper, 2011.

Jason Hartline. Lectures on frugal mechanism design. Northwestern University Notes, 2008.