

Economics 2150: Market Design
Syllabus
Fall, 2021

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Office Hours: Wednesdays at 4-5pm and by appointment

Class meetings: W at 1pm-3:20pm, 8 Fones Alley 016

Course Description

This is a theoretical course in market design, specifically studying the theory and applications of matching. It is designed for students interested in market and mechanism design, and may also be of interest to students interested in utilizing applied theory in their research. The course will begin with an overview of matching markets, but will quickly move to recent advances and open research topics.

Prerequisite

ECON 2060

(Optional) Textbook

Two-Sided Matching by Roth and Sotomayor (1990), Cambridge University Press

Requirements and Grading

Students are expected to write a final paper and actively participate in class. The final paper is expected to be your own research idea, and the suggested length is 10-15 pages. Participation includes regular attendance, contributing to class discussions, presenting one to two published papers to your classmates (I will distribute a list of papers to choose from during the first week of class) and presenting your own research. The final paper will make up 60% of the final grade. Presentations and class discussions will make up the remaining 40% of the grade. Late assignments will not be accepted for credit.

Expected Time Commitments

In addition to in-class lectures, students will be expected to do extensive out of class reading, preparation of presentations for class, and preparation of their own research projects. They should expect to spend a good deal of time outside of class on these activities. A rough accounting of time required for the course is as follows: Lectures: 3 hours per week for 13 weeks (39 total hours). Reading, and class preparation: 10 hours per week for 13 weeks

(130 hours total). Preparation of research project: 25 hours. Total 194 hours.

Course Outline

- **9/15: Introduction and Theory**
 - *Gale, David and Lloyd Shapley (1962), "College Admissions and the Stability of Marriage" American Mathematical Monthly, 69, 9-15.
 - *Roth, Alvin E. "Deferred Acceptance Algorithms: History, Theory, Practice, and Open Questions," International Journal of Game Theory 36, 537-569.
 - *Alvin E. Roth and Marilda Sotomayor (1990) Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis, Econometric Society Monograph Series, Cambridge University Press. Chapters 1-5
 - *Kagel, John H. and A.E. Roth, "The dynamics of reorganization in matching markets: A laboratory experiment motivated by a natural experiment," Quarterly Journal of Economics, February, 2000, 201-235.
 - Roth, A.E. "A Natural Experiment in the Organization of Entry Level Labor Markets: Regional Markets for New Physicians and Surgeons in the U.K.", American Economic Review, vol. 81, June 1991, 415-440.
 - Tayfun Sonmez, "Manipulation via Capacities in Two-Sided Matching Markets," Journal of Economic Theory, 1997, 77, 197-204.
 - Tayfun Sonmez, "Can Pre-arranged Matches be Avoided in Two-Sided Matching Markets?" Journal of Economic Theory, 1999.
- **9/22: NRMP design and large markets**
 - *Roth, A.E. and X. Xing "Jumping the Gun: Imperfections and Institutions Related to the Timing of Market Transactions," American Economic Review, 84, September, 1994, 992-1044.
 - *Alvin E. Roth and Elliott Peranson (1999) "The Redesign of the Matching Market for American Physicians: Some Engineering Aspects of Economic Design," American Economic Review, 89 (4) September, 748-780
 - Roth, Alvin E. "The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools of Design Economics," Econometrica, 70, 4, July 2002, 1341- 1378.
 - *Roth, A.E. and X. Xing "Turnaround Time and Bottlenecks in Market Clearing: Decentralized Matching in the Market for Clinical Psychologists, Journal of Political Economy, 105, April 1997, 284-329.
 - *Immorlica, N. and Mahdian, M. (2005), "Marriage, Honesty, and Stability," SODA 2005, pp. 53-62.
 - Kojima, F., Parag A. Pathak, and Alvin E. Roth (2013) "Matching with Couples: Stability and Incentives", Quarterly Journal of Economics.
 - SangMok Lee, (2014) Incentive Compatibility of Large Centralized Matching Markets
 - Itai Ashlagi, Yash Kanoria, and Jacob Leshno (2013) [Unblanaced Random Matching Markets: the Stark Effect of Competition](#), Journal of Political Economy
 - Itai Ashlagi, Mark Braverman, and Avinatan Hassidim, [Stability in Large](#)

[Matching Markets with Complementarities](#), forthcoming, Operations Research.

- Yeon-Koo Che, Jinwoo Kim, and Fuhito Kojima, Stable Matching in Large Economies (2015), mimeo (R&R Econometrica)
- **9/29: One-sided matching (housing and kidneys)**
 - Ma, J., "Strategy-Proofness and the Strict Core in a Market with Indivisibilities" International Journal of Game Theory, 1994, 75-83.
 - Herve Moulin (1995), Cooperative Microeconomics: A Game-Theoretic Introduction. Princeton University Press, Chapter 3
 - Alvin E. Roth and Andrew Postlewaite (1977) "Weak versus strong domination in a market with indivisible goods," Journal of Mathematical Economics 4, 131-137.
 - Alvin E. Roth (1982) "Incentive compatibility in a market with indivisibilities" Economics Letters 9, 127-132.
 - *Lloyd Shapley and Herbert Scarf (1974) "On cores and indivisibility," Journal of Mathematical Economics 1, 23-28.
 - Lars-Gunnar Svensson (1999) "Strategyproof Allocation of Indivisible Goods," Social Choice and Welfare 16, 557-567.
 - *Tayfun Sonmez and Utku Ünver, Matching, Allocation, and Exchange of Discrete Resources, Jess Benhabib, Alberto Bisin, and Matthew Jackson (eds.) Handbook of Social Economics, Elsevier, forthcoming. 9 Oct 24: Kidney Exchange
 - Hatfield, J. W. (2005), "Pairwise Kidney Exchange: Comment," Journal of Economic Theory.
 - *Alvin E. Roth, Tayfun Sönmez and M. Utku Ünver (2003) "Kidney Exchange" Quarterly Journal of Economics
 - *Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver (2005) "Pairwise Kidney Exchange," Journal of Economic Theory.
 - Alvin E. Roth, Tayfun Sönmez, and M. Utku Ünver (2005) . A Kidney Exchange Clearinghouse in New England. American Economic Review Papers and Proceedings, 95(2): 376-380
 - *Alvin E. Roth, Tayfun Sonmez and Utku Ünver (2007), "Efficient Kidney Exchange: Coincidence of Wants in Markets with Compatibility-Based Preferences," American Economic Review, 97(3): 828-851. 10 - 11 Oct 26 & 31 : School Choice
 - Abdulkadiroğlu, Atila, Yeon-Koo Che, and Yosuke Yasuda (2008), "Expanding 'Choice' in School Choice," working paper.
 - Abdulkadiroğlu, Atila, Parag A. Pathak, Alvin E. Roth, and Tayfun Sönmez (2005), "The Boston Public School Match," American Economic Review, Papers and Proceedings, 368- 371.
 - Abdulkadiroğlu, Atila, Parag A. Pathak, Alvin E. Roth, and Tayfun Sönmez (2006), "Changing the Boston School Choice Mechanism," working paper.
 - Abdulkadiroğlu, Atila, Parag A. Pathak, and Alvin E. Roth (forthcoming), "Strategy-proofness versus Efficiency in Matching with Indifferences: Redesigning the NYC High School Match," American Economic Review.
 - *Abdulkadiroğlu, Atila, and Tayfun Sönmez (2003), "School Choice: A Mechanism Design Approach," American Economic Review, 93: 729-747.

- Chen, Yan, and Tayfun Sönmez, (2006), "School Choice: An Experimental Study," *Journal of Economic Theory*, 127: 2002-231.
 - Erdil, Ayttek, and Haluk Ergin, (2008), "What's the Matter with Tie-Breaking? Improving Efficiency in School Choice," *American Economic Review*, 98: 669-689.
 - Ergin, Haluk and Tayfun Sönmez (2006), "Games of School Choice Under the Boston Mechanism," *Journal of Public Economics*, 90: 215-237.
 - Featherstone, Clayton and Muriel Niederle, "Manipulation in School Choice Mechanisms", December 2008.
 - Pais, Joana and Ágnes Pintér, (2008), "School Choice and Information: An experimental study on matching mechanisms", *Games and Economic Behavior*, 64, 303-328.
 - Pathak, Parag, and Tayfun Sönmez, "Leveling the Playing Field: Sincere and Sophisticated Players in the Boston Mechanism," forthcoming, *American Economic Review*.
 - Pathak, Parag, and Tayfun Sönmez, (2008), Comparing Mechanisms by their Vulnerability to Manipulation, working paper, June 2008.
- **10/6: NO CLASS**

Paper outline/first draft due 10/9 at 5PM EST

- **10/13: Guest Lecture by Peter Hull, Special time 9AM EST**
- **10/20: Matching with wages/contracts**
 - Niederle, Muriel, and Alvin E. Roth, "Relationship Between Wages and Presence of a Match in Medical Fellowships", *JAMA, Journal of the American Medical Association*, vol. 290, No. 9, September 3, 2003, 1153- 1154.
 - *Bulow, Jeremy and Jonathan Levin, "Matching and Price Competition," *American Economic Review*, 96(3), June 2006.
 - Kamecke, Ulrich, "Wage Formation in a Centralized Matching Market," *International Economic Review*, 39, 1, February, 1998, 33-53.
 - * Niederle, Muriel and Alvin E. Roth, "Unraveling reduces the scope of an entry level labor market: Gastroenterology with and without a centralized match," *Journal of Political Economy*, 1. 111, no. 6, December 2003, 1342- 1352.
 - Niederle, Muriel, and Alvin E. Roth (2004), "The Gastroenterology fellowship match: how it failed, and why it could succeed once again", *Gastroenterology* 127, August 2004, 658-666.
 - Niederle, Muriel, and Alvin E. Roth, "The Gastroenterology Fellowship Market: Should there be a Match?", *American Economic Review Papers & Proceedings*.
 - *Kelso, Alexander S. ,Jr. and Vincent P. Crawford (1982), "Job Matching, Coalition Formation, and Gross Substitutes", *Econometrica*, 50, pp 1483- 1504.
 - * John William Hatfield and Paul Milgrom, *Matching with Contracts*, *American Economic Review* 95(4), 2005, 913-935.
 - Ostrovsky, Michael, *Stability in Supply Chain Networks*, *American Economic Review*, v.98(3), June 2008, pp. 897-923.

- John William Hatfield and Fuhito Kojima, [Substitutes and Stability for Matching with Contracts](#), *Journal of Economic Theory*, 2010
 - *Federico Echenique, ["Contracts vs. Salaries in Matching," American Economic Review](#), Volume 102, Issue 1, February 2012, pages 594-601.
 - Niederle, Muriel, "Competitive Wages in a Match with Ordered Contracts", *American Economic Review*, vol. 97, No.5, December 2007, 1957 - 1969.
 - *Stephen Nei and Bobak Pakzad-Hurson, *Strategic Disaggregation in Matching Markets*, *mimeo*.
- **10/27: Matching with interdependent values**
 - [*Two-Sided Matching with Interdependent Values](#) Archishman Chakraborty, Alessandro Citanna and Michael Ostrovsky, *Journal of Economic Theory*.
 - P [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220) Jehiel [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220), B [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220) Moldovanu [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220) [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220) [HYPERLINK "http://www.jstor.org/stable/2692220"](http://www.jstor.org/stable/2692220) [Efficient design with interdependent valuations](http://www.jstor.org/stable/2692220) *Econometrica*
 - Tadashi Hashimoto, *The Generalized Random Priority Mechanism with Budgets*, 2018, *Journal of Economic Theory*
 - Yeon-Koo Che, Jinwoo Kim, and Fuhito Kojima, "Efficient Assignment under Interdependent Values", forthcoming, *Journal of Economic Theory*.
 - *Liu, Q., G. Mailath, A. Postlewaite, and L. Samuelson 2014. "Stable Matching with Incomplete Information," *Econometrica*.
 - Sushil Bikchandani, *Stability with one-sided incomplete information*, 2017, *Journal of Economic Theory*
 - *Bobak Pakzad-Hurson, *Crowdsourcing and Optimal Market Design*, 2019, *mimeo*.
- **11/3: Interdependent values, continued**
 - **11/10: Stability vs. Efficiency and acyclicity**
 - *Haluk Ergin (2002) "Efficient Resource Allocation on the Basis of Priorities," *Econometrica*, 70, 2489–2498.
 - *Kesten, Onur, "On Two Competing Mechanisms for Priority Based Allocation Problems," *Journal of Economic Theory* 127, 2006; 155-171.
 - Fuhito Kojima, [Efficient Resource Allocation under Multi-unit Demand](#) (2013), *Games and Economic Behavior*
 - Taro Kumano, *Efficient Resource Allocation Under Acceptant Substitutable Priorities*, 2009, *mimo*.
 - *Bobak Pakzad-Hurson, *Stable and Efficient Resource Allocation with Contracts*, 2014, *mimeo*.
 - **11/17: Stability vs. Efficiency and acyclicity, continued**
 - **11/24: No Class, Thanksgiving**
 - **12/1: Student Presentations**

- **12/8: Student Presentations**

Paper due 12/10 at 5PM EST