

SS 211A: ADVANCED ECONOMIC THEORY

Fall 2009

LEEAT YARIV

CLASS MEETINGS

Tuesdays and Thursdays, 1 – 2:30PM, in 315 Baxter.

PREREQUISITES

Basic knowledge of probability and game theory are necessary.

REQUIREMENTS

Formal requirements will be composed of:

- **Class Presentations:** When presenting a paper, make sure to spell out the question, identify why it is important, extract the essence of the argument, describe what the paper does, and then provide your judgment of the paper.
- **Individual Papers:** You should hand a ~5 page (1.5 line spaced, 11 pt font) proposal for a paper on **10.30**. This should outline a question, its context in the literature, why it is important, and the type of results you are looking for. You should hand an expanded 15 page version (1.5 line spaced, 11 pt font) by **12.11**. The expanded version should include preliminary results. If your project is theoretical in nature, you should sketch a model and provide some basic insights from the model. If it is empirical, you should describe precisely the data sources you will be using and empirical techniques you plan to utilize. Short (15 mins) class presentations of the paper will take place on **12.10**.

CONTACTING ME

Office: 301C Baxter Hall. Feel free to e-mail me at lyariv@hss.caltech.edu to schedule a time to talk about class material or about your research interests.

COURSE WEBSITE

<http://www.hss.caltech.edu/~lyariv/SS211A.htm>

OUTLINE

This class focuses on the formation and impact of social connections. To that effect, the class will bridge two fields of economic theory – matching and social networks. The goal of the class is to introduce students to the basic tools of formal modeling in these fields and suggest some interesting directions for future research.

In particular, we will discuss how connections between individuals get formed spontaneously (as in the economics job market, the marriage market, etc.) and through institutions (as in the medical residents matching program), and how different social structures affect behavior statically and dynamically. The interplay between the theoretical predictions and those observed in the field or in the lab will be explored throughout.

The following is a tentative road-map for the class. I am very open to spending more time on topics that students find exciting.

0. Introduction.

Matching

1. The Matching Problem

Stability and the Gale-Shapley algorithm, computing stable matches, testable implications of stability, and empirical/experimental exercises.

2. Matching in Centralized Markets

Designing mechanisms to implement stable or efficient outcomes and their applications to labor markets, schooling, etc.

3. Matching in Decentralized Markets

Search and matching, dynamic matching games.

Social Networks

4. Network Formation

Random linking, strategic linking, and similarity across connections.

5. Diffusion and Learning on Social Networks

How ideas and fashions get transmitted, learning processes accounting for social architecture.

6. Network Games

How the structure of a network and the location within a network affect behavior and outcomes, with empirical and experimental implications.

READING LIST

A. MATCHING MARKETS

Textbook:

Roth, Alvin E. and Marilda A. O. Sotomayor (1990), *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis*, Cambridge University Press.

A.1. The Marriage Problem and the Gale Shapley Algorithm

A.1.a. Basic Theory

Roth, Alvin E. and Marilda A. O. Sotomayor (1990), *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis*, Cambridge University Press, Chapter 2.

Gale, David and Lloyd Shapley (1962), "College Admissions and the Stability of Marriage," *American Mathematical Monthly*, **69**, 9-15.

A.1.b. Testability, Empirics, and Experiments

Echenique, Federico (2008), "What Matchings can be Stable ? The Testable Implications of Matching Theory," *Mathematics of Operations Research*, **33(3)**, 757-768.

Hortacsu, Ali, Guenter Hitsch, and Dan Ariely (2006), "What Makes You Click? Mate Preferences and Matching Outcomes in Online Dating," mimeo.

Katz, Gabriel, Federico Echenique, and Leeat Yariv (2009), "An Experimental Study of Decentralized Matching," mimeo.

A.2. The Structure and Computation of Stable Matchings

Roth, Alvin E. and Marilda A. O. Sotomayor (1990), *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis*, Cambridge University Press, Chapter 3.

Roth, Alvin E. Uriel G. Rothblum, John H. Vande Vate (1993), "Stable Matchings, Optimal Assignments, and Linear Programming," *Mathematics of Operations Research*, **18(4)**, 803-828.

A.3. Stability and Efficiency

Knoblauch, Vicki (2009), "Marriage Matching: A Conjecture by Donald Knuth," mimeo.

Pittel, Boris (1989), "The Average Number of Stable Matchings," *SIAM Journal of Discrete Mathematics*, **2(4)**, 530-549.

A.4. Beyond the Basic Marriage Model

A.4.a. Many to One Matching

Roth, Alvin E. and Marilda A. O. Sotomayor (1990), *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis*, Cambridge University Press, Chapter 5.

Kojima, Fuhito and Parag A. Pathak (2009), "Incentives and Stability in Large Two-Sided Matching Markets," *American Economic Review*, **99**, 608-627.

A.4.b. Matching with Transfers

Gabrielle Demange; David Gale (1985), "The Strategy Structure of Two-Sided Matching Markets," *Econometrica*, **53(4)**, 873-888.

Fox, Jeremy (2009), "Estimating Matching Games with Transfers," mimeo.

A.5. Mechanism Design Aspects of Matching

Roth, Alvin E. and Marilda A. O. Sotomayor (1990), *Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis*, Cambridge University Press, Chapter 4.

Roth, Alvin E. (2002), "The Economist as Engineer: Game Theory, Experimental Economics and Computation as Tools of Design Economics," *Econometrica*, **70(4)**, 1341-1378.

Featherstone, Clayton and Muriel Niederle (2009), "Ex ante Efficiency in School Choice Mechanisms: An Experimental Investigation," mimeo.

A.6. Dynamic Models of Decentralized Matching

A.6.a. Search and Matching

Burdett, Ken and Melvyn G. Coles (1997), "Marriage and Class," *The Quarterly Journal of Economics*, **112(1)**, 141-168.

Eeckhout, Jan (1999), "Bilateral Search and Vertical Heterogeneity," *International Economic Review*, **40(4)**, 869-887.

Rogerson, Richard, Robert Shimer, and Randall Wright (2005), "Search-Theoretic Models of the Labor Market: A Survey," *Journal of Economic Literature*, **43**, 959-988.

A.6.b. Dynamic Market Games

Niederle, Muriel and Leeat Yariv (2009), "Matching with Aligned Preferences," mimeo.

Pais, Joana (2009), "Incentives in Decentralized Random Matching Markets," *Games and Economic Behavior*, forthcoming.

B. SOCIAL NETWORKS

Textbook:

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press.

B.1. Background and Fundamentals of Network Analysis

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapters 1-3.

Newman, Mark E. J. (2003), "The Structure and Function of Complex Networks," *SIAM Review*, 45(2), 167-256.

Wasserman, Stanley and Katherine Faust (1994), *Social Network Analysis: Methods and Applications*, Cambridge University Press.

B.2. Network Formation Models

B.2.1. Random Graphs

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 4.

B.2.2. Growing Networks

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 5.

B.2.2. Strategic Formation of Networks and Homophily

Baccara, Mariagiovanna and Leeat Yariv (2009), "Similarity and Polarization in Groups," mimeo.

Currarini, Sergio, Matthew O. Jackson, and Paolo Pin (2009), "An Economic Model of Friendship: Homophily, Minorities and Segregation," *Econometrica*, forthcoming.

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 6.

Peski, Marcin (2008), "Complementarities, Group Formation, and Preferences for Similarity," mimeo.

McPherson, Miller, Lynn Smith-Lovin, and James M. Cook (2001), "Birds of a Feather: Homophily in Social Networks," *Annual Review of Sociology*, **27**, 415-444.

B.3. Diffusion through Social Networks

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 7.

Jackson, Matthew O. and Leeat Yariv (2009), "Diffusion, Strategic Interaction, and Social Structure," *Handbook of Social Economics* (Edited by Benhabib, Bisin, and Jackson), Elsevier.

B.4. Learning and Networks

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 8.

B.5. Decisions, Behavior, and Games on Networks

Jackson, Matthew O. (2008), *Social and Economic Networks*, Princeton University Press, Chapter 9.

Jackson, Matthew O. and Leeat Yariv (2009), "Diffusion, Strategic Interaction, and Social Structure," *Handbook of Social Economics* (Edited by Benhabib, Bisin, and Jackson), Elsevier.