

Advanced Topics in Microeconomics

Academic year 2025-2026

Matching Markets

Ph.D. in Economics and Management

University of Padua

20 hours

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In many situations, for legal or ethical reasons, scarce resources are allocated without using prices, and alternative instruments to match demand and supply as to maximize welfare should be implemented. Real-life applications are abundant, including organ allocation for transplant patients, teacher assignments in public schools, access to public universities, refugee settlement, and more. Matching theory provides the analytical framework to study these problems. This course develops a comprehensive theoretical foundation for understanding such markets and explores several real-world applications, such as college admissions, public school enrolments, organ transplantation systems.

Programme

MARKET DESIGN: MATCHING THEORY

Part 1 (Nicolò)

Lecture 1

- Introduction to matching markets, stability notions

Lecture 2

- One-sided matching models:
 - Housing markets and the Top Trading Cycle Mechanism
 - Housing markets with existing tenants

Lecture 3

- Two-sided matching markets
 - Marriage markets
 - Deference Acceptance Mechanism

Lecture 4

- Matching with Contracts

Lecture 5

- Application: School Choice and College Admission

Lecture 6

- Application: Kidney Exchanges

Part 2 (Saulle)

Lecture 7

- Dynamic One-sided Matching Models

Lecture 8

- Dynamic Two-sided Matching Models

Lecture 9

- Matching with Externalities

Lecture 10

- Students' presentation

ASSESSMENT

Homeworks 40%

Student presentation in class 40%

Final Exam (1,5 hours) 20%

READINGS

Matching Markets Classical Papers

- Alvin E. Roth (2002) "The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics" *Econometrica* 70, 1341-1378.
- Alvin E Roth,. "What have we learned from market design?" Hahn Lecture, *Economic Journal*, 118 (March), 2008, 285–310.
- 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 1,2,4,5)
- Roth, Alvin E. (1982b) "The Economics of Matching: Stability and Incentives." *Mathematics of Operations Research* 7, 617-628.
- Gale, David and Lloyd Shapley (1962) "College Admissions and the Stability of Marriage." *American Mathematical Monthly*, 69, 9-15.
- Hatfield, John W., and Paul R. Milgrom. 2005. "Matching with Contracts." *American Economic Review*, 95(4): 913–935.
- Tayfun Sonmez and M. Utku Unver (2011) *Matching, Allocation, and Exchange of Discrete Resources*, J. Benhabib, A. Bisin, and M. Jackson (eds.), *Handbook of Social Economics*, Vol. 1A. The Netherlands: North-Holland, 781-852 (a copy of the working paper version is available on Utku's web-site: www2.bc.edu/unver)
- Abdulkadirođlu, Atila and Tayfun Sönmez (1999) "House Allocation with Existing Tenants." *Journal of Economic Theory*, 88, 233-260.
- Shapley, Lloyd and Herbert Scarf (1974) "On Cores and Indivisibility." *Journal of Mathematical Economics*. 1, 23-28.
- Shapley, Lloyd and Martin Shubik (1972) "The Assignment Game I: The Core." *International Journal of Game Theory*, 1, 111-130.

Dynamic Models of Matching

- Utku U. (2010)- *Dynamic Kidney Exchange Mechanisms*, *Review of Economic Studies* 77, 372–414.

- Baccara, M., S. Lee, and L. Yariv (2020): “Optimal dynamic matching,” *Theoretical Economics*, 15, 1221–1278.
- Doval, L. (2022): “Dynamically Stable Matching” *Theoretical Economics*, 17, 2, 687-724.
- Nicolò, A., Salmaso P and R. Saulle. (2023): “Dynamic One-Sided Matching”, mimeo
- Nicolò, A., Salmaso P and R. Saulle. (2024): “Rationalizable Conjectures in Dynamic Matching”, mimeo
- Nicolò, A., Salmaso P and R. Saulle. (2025): “Rationalizable conjectures in matching with externalities”, mimeo

Kidney Exchange Programs

- Agarwal Nikhil, Itai Ashlagi, Eduardo Azevedo, Andersson, T., J. Kratz (2020). Pairwise Kidney Exchange over the Blood Group Barrier, *Review of Economic Studies*, 87, 1091–1133.
- Agarwal, Nikhil, Itai Ashlagi, Eduardo Azevedo, 2019. Market Failure in Kidney Exchange, *American Economic Review* 2019, 109(11): 4026–4070.
- Roth, Alvin E., Tayfun Sönmez and M. Utku Ünver. 2004. "Kidney Exchange." *Quarterly Journal of Economics*, 119(2), 457-88.
- Roth, Alvin E., Tayfun Sönmez, and M. Utku Ünver (2005a) "Pairwise Kidney Exchange." *Journal of Economic Theory*, 125, 151-188.
- Sönmez, T., M. Utku Ünver, and M. Bumin Yenmez, 2020. Incentivized Kidney Exchange, *American Economic Review* 110(7): 2198–2224.

School Choice and College Admission

- Abizada, Azar. 2016. “Stability and Incentives for College Admissions with Budget Constraints.” *Theoretical Economics*, 11(2): 735–756.
- Abdulkadiroglu, Atila and Tayfun Sönmez (2003a) "School Choice: A Mechanism Design Approach." *American Economic Review*, 93, 729-747.
- Abdulkadiroglu Atila 2011 “School Choice” in *Handbook of Market Design*, edited by Zvika Neeman, Muriel Niederle, Alvin E. Roth and Nir Vulkan.
- Balinski, Michel and Tayfun Sönmez (1999) "A Tale of Two Mechanisms: Student Placement.” *Journal of Economic Theory*, 84, 73-94.
- Calsamiglia, C., Guillaume Haeringer and Flip Klijn. 2010, Constrained School Choice: An Experimental Study, *American Economic Review*. 100, 41860-1874.
- Biró Peter, Avinatan Hassidim Assaf Romm Ran I. Shorrer Sándor Sóvágó (2022) “The Large Core of College Admission Markets: Theory and Evidence”, mimeo