

## **Advanced Topics in Microeconomics**

Academic year 2023-2024

Ph.D. in Economics and Management

University of Padua

20 hours

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Market Design is an emerging field in economics that attempts to devise a practical scheme for allocating scarce resources to individuals who value them. Its applications involve many important real-life problems ranging from auctions, school choice, organ allocation. Mechanism design and matching theories underpin the field as a general methodological framework. The course shall provide a guide through these theories with specific focus on matching markets. It also discusses a few applications, along the way.

### **Programme**

#### **PART I MECHANISM DESIGN**

##### Lecture 1

- Collective Choice theory: an Introduction
- Social choice functions: the Gibbard-Satterthwaite theorem

##### Lecture 2

- Domain restrictions:
  - single-peaked preference domain and median voter theorem
  - Quasi-linear preference domain. Groves' scheme The Pivotal Mechanism and Vickrey Auctions

#### **PART II MARKET DESIGN: MATCHING THEORY**

##### Lecture 3

- Introduction to matching markets, stability notions

##### Lecture 4

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

##### Lecture 5

- Two-sided matching markets
  - Marriage markets
  - Deferred Acceptance Mechanism
  - Matching with Contracts

##### Lecture 6

- Matching Models with Incomplete Information

#### **PART III MARKET DESIGN: APPLICATIONS**

## Lecture 7

- School Choice and College Admission

## Lecture 8

- Kidney Allocations and Kidney Exchange Programs

**Mode of assessment:** HomeWorks (30%), Presentation in class (30%), Final Exam (40%)

## READINGS

### Part I

- S. Barberà, “Strategy-proof Social Choice”, in K. J. Arrow, A. K. Sen and K. Suzumura (eds.) *Handbook of Social Choice and Welfare*, Volume 2 . Netherlands: North-Holland, 731—831, 2010.
- M. O. Jackson. “Mechanism Theory”, in *Optimization and Operations Research*, edited by Ulrich Derigs, in the Encyclopedia of Life Support Systems, 2003.
- Moulin, H. (1980) “On Strategyproofness and Single-peakedness”, *Public Choice* 35(4), 437-455.

### Part II

- 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](http://www2.bc.edu/unver))
- Abdulkadiroglu, 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.
- 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

### Part III

#### 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.
- Furian L., A. Nicolò, C. Di Bella et al. Kidney exchange strategies: new aspects and applications with a focus on deceased donor-initiated chains, *Transplant International* 2020, 33, 10, 1177-1184
- Nicolò A, C. Rodriguez Alvarez (2012) Transplant Quality and Patients' Preferences in Paired Kidney Exchange (with C. Rodriguez), *Games and Economic Behavior*, vol. 74, 299-310. 2012.
- 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.
- Roth, Alvin E., Tayfun Sönmez, and M. Utku Ünver (2005b) "A Kidney Exchange Clearing-house in New England." *American Economic Review Papers and Proceedings*, 95(2): 376-380.
- Roth, Alvin E., Tayfun Sönmez, and M. Utku Ünver (2007) "Efficient Kidney Exchange: Coincidence of Wants in Markets with Compatibility-Based Preferences." *American Economic Review*, 97(3), 828-851.
- 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

