

A crash course on Matching Theory and Applications

Marco Bertoni - Antonio Nicolò

Lecture 1

Introduction to Matching Theory and Two-sided matching models

Readings

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.

Al Roth's webpage <http://web.stanford.edu/~alroth/alroth.html> discusses many topics in market design and is worth seeing.

Lecture 2

House Allocation and Exchange Models

Readings

Abdulkadiroğlu, Atila and Tayfun Sönmez (1999) "House Allocation with Existing Tenants." *Journal of Economic Theory*, 88, 233-260.

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)

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.

Lecture 3

Kidney Exchange Programs

Readings

Nikhil Agarwal, 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, N., 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.

Nicolò A, C. Rodriguez Alvarez (2017) Age-Based Preferences in Paired Kidney Exchange, *Games and Economic Behavior*, vol. 102, 508–524.

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 Clearinghouse 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.

Roth, Alvin E., Tayfun Sönmez, M. Utku Ünver, Francis L. Delmonico, and Susan L. Saidman (2006) "Utilizing List Exchange and Nondirected Donation through 'Chain' Paired Kidney Donations." *American Journal of Transplantation*, 6, 2694-2705.

Sönmez, T., M. Utku Ünver, and M. Bumin Yenmez, 2020. Incentivized Kidney Exchange, *American Economic Review* 110(7): 2198–2224.

Lecture 4 School Choice

Readings

Abdulkadiroğlu, Atila and Tayfun Sönmez (2003a) "School Choice: A Mechanism Design Approach." *American Economic Review*, 93, 729-747.

Atila Abdulkadiroğlu 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.

Ehlers, Lars & Hafalir, Isa E. & Yenmez, M. Bumin & Yildirim, Muhammed A., 2014. "School choice with controlled choice constraints: Hard bounds versus soft bounds," *Journal of Economic Theory*, 153, 648-683.

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

Roth, Alvin E. (1985) "The College Admissions Problem is not Equivalent to the Marriage Problem." *Journal of Economic Theory*, 36, 277-288.

Lecture 5 Hybrid Model and dynamic Matching Market

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. (2019): "Dynamically stable matching" arXiv preprint arXiv:1906.11391.

Nicolò, A., A. Sen, and S. Yadav (2019): "Matching with partners and projects," *Journal of Economic Theory*, 184, 104942.

Nicolò A. P. Salmaso, A Sen, and S. Yadav (2021). Stable and efficient task assignment to pairs, mimeo.

Lecture 6 and 7 Research Design meets Market Design - estimating school effectiveness using centralized assignment mechanisms with

1. GALE SHAPLEY with lottery tie breakers
Abdulkadiroğlu, A., Angrist, J. D., Narita, Y., & Pathak, P. A. (2017). Research design meets market design: Using centralized assignment for impact evaluation. *Econometrica*, 85(5), 1373-1432.

2. SERIAL DICTATORSHIP and the REGRESSION DISCONTINUITY DESIGN
Abdulkadroğlu, A., Angrist, J. D., Narita, Y., Pathak, P. A., & Zarate, R. A. (2017). Regression Discontinuity in Serial Dictatorship: Achievement Effects at Chicago's Exam Schools. *American Economic Review*, 107(5), 240-45.

3. MIXING THINGS UP

Abdulkadiroglu, A., Angrist, J. D., Narita, Y., & Pathak, P. A. (2019). Breaking ties: Regression discontinuity design meets market design.

Bertoni, M, Klein, T, Silva, O (2021). School types.

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