

Contract Theory (Fall 2019)

Behrang Kamali

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Description

This is an advanced course on contract theory and market design, broadly defined.

Prerequisites: Microeconomics.

Course Material

The main textbook for moral hazard part of the course is:
[[Bolton and Dewatripont, 2005](#)]

The main textbook for matching theory part of the course is:
Roth, Alvin E. and Marilda A. O. Sotomayor (1990), Two-Sided Matching: A Study in Game-Theoretic Modeling and Analysis, Cambridge University Press.
However, most of the course will be taught using articles rather than the textbook.

Slides, exams, solutions and other material is *not* for distribution to those outside of the current class.

Grading

The final grade will depend on

- Three presentations (% 30), final exam (%10), one short research proposal (%60).

Instructor:

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Course Outline

Moral Hazard

1. Static Models

(a) Single Agent

- [Bolton and Dewatripont, 2005, Chapter 4, 6.2]
- [Mirrlees, 1999]
- [Hölmstrom, 1979]
- [Rogerson, 1985a]
- [Holmstrom and Milgrom, 1991]
- [Innes, 1990]
- [Grossman and Hart, 1983]

(b) Multiple Agents

- [Bolton and Dewatripont, 2005, Chapter 8]
- [Lazear and Rosen, 1981]
- [Green and Stokey, 1983]
- [Holmstrom, 1982]
- [Legros and Matthews, 1993]

2. Dynamic Models

- [Bolton and Dewatripont, 2005, Chapter 10]
- [Rogerson, 1985b]
- [Fudenberg et al., 1990]
- [Fudenberg and Tirole, 1990]
- [Hermalin and Katz, 1991]
- [Holmstrom and Milgrom, 1987]
- [Holmström, 1999]
- [Dewatripont et al., 1999]
- [Levin, 2003]

Adverse Selection*

1. Monotone Comparative Statics

- [Topkis, 1998]
- [Milgrom and Shannon, 1994]
- [Milgrom and Roberts, 1990]

2. Third-degree price discrimination

3. First-degree price discrimination

4. Second-degree price discrimination

- (a) Revelation and Taxation Principles
- (b) Two Types
- (c) Finitely Many Types
- (d) Continuum of Types

- [Mussa and Rosen, 1978]
- [Maskin and Riley, 1984]

Matching Theory

1. Basic Theory of Two-sided Matching

- (a) Matching with Non-transferable Utilities, Stability and the Gale-Shapley Algorithm
 - Roth-Sotomayor (chapter 2)
 - (*) Gale, David and Lloyd Shapley (1962), College Admissions and the Stability of Marriage, American Mathematical Monthly, 69, 9-15.
- (b) Many-to-one Matching
 - Roth-Sotomayor (chapter 5)
- (c) Properties of Stable Matchings
 - Roth-Sotomayor (chapter 3)
 - Adachi, Hiroyuki. "On a characterization of stable matchings." Economics Letters 68.1 (2000): 43-49.

(d) Matching with Transferable Utilities (Assignment Game)

- Roth-Sotomayor (chapter 8)
- Shapley, Lloyd S., and Martin Shubik. “The assignment game I: The core.” *International Journal of Game Theory* 1.1 (1971): 111-130.

2. Mechanism Design Aspects of Matching

(a) Stable Matching Mechanisms

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

(b) Strategic Issues

- Roth-Sotomayor (chapters 4 and 5)
- Gabrielle Demange; David Gale (1985), “The Strategy Structure of Two-Sided Matching Markets,” *Econometrica*, 53(4), 873-888.
- Roth, Alvin E., and John H. Vande Vate. “Incentives in two-sided matching with random stable mechanisms.” *Economic Theory* 1.1 (1991): 31-44.
- Kesten, Onur. “On two kinds of manipulation for school choice problems.” *Economic Theory* 51.3 (2012): 677-693.

(c) Unraveling

- Li, Hao, and Wing Suen. “Risk sharing, sorting, and early contracting.” *Journal of Political Economy* 108.5 (2000): 1058-1091.
- Du, Songzi, and Yair Livne. *Unraveling and Chaos in Matching Markets*. mimeo, 2011.
- Roth, Alvin E. “A natural experiment in the organization of entry-level labor markets: regional markets for new physicians and surgeons in the United Kingdom.” *The American economic review* (1991): 415-440.

3. Random Assignment Problems

- Shapley, Lloyd, and Herbert Scarf. “On cores and indivisibility.” *Journal of mathematical economics* 1.1 (1974): 23-37.
- Bogomolnaia, Anna, and Herv Moulin. “A new solution to the random assignment problem.” *Journal of Economic Theory* 100.2 (2001): 295-328.

- Budish, E., Che, Y. K., Kojima, F., & Milgrom, P. (2013). Designing random allocation mechanisms: Theory and applications. *The American Economic Review*, 103(2), 585-623.
- Pycia, Marek, and M. Utku Unver. "Incentive compatible allocation and exchange of discrete resources." Available at SSRN 1079505 (2014).

4. Applications

(a) National Resident Matching Program

- Roth, Alvin E. and Peranson, E. (1999). "The Redesign of the Matching Market for American Physicians: Some Engineering Aspects of Economic Design." *American Economic Review* (American Economic Association) 89 (4): 748-780
- (*) Roth, Alvin E. "The evolution of the labor market for medical interns and residents: a case study in game theory." *The Journal of Political Economy* (1984): 991-1016.

(b) Public School Choice Programs

- Atila Abdulkadiroglu and Tayfun Sonmez. "School Choice: A Mechanism Design Approach." *The American Economic Review*, Vol. 93, No. 3.
- Parag Pathak and Tayfun Sonmez, "School Admissions Reform in Chicago and England: Comparing Mechanisms by Their Vulnerability to Manipulation", *American Economic Review*, 103(1): 80-106, February 2013.

(c) Organ Donation Exchanges

- Roth, Alvin E., Tayfun Sonmez, and M. Utku Unver, "Efficient kidney exchange: Coincidence of wants in markets with compatibility-based preferences." *The American economic review* (2007): 828-851.

(d) Housing Allocation

- Atila Abdulkadiroglu and Tayfun Sonmez, "Random Serial Dictatorship and the Core from Random Endowments in House Allocation Problems.", *Econometrica*, May 1998.

Students' Presentations:

1. [Carroll, 2015]
2. [Holmström, 1999],
[Dewatripont et al., 1999]
3. [Levin, 2003]
4. [Legros and Newman, 2007]
5. [Adachi, 2000]

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- [Baker et al., 1994] Baker, G., Gibbons, R., and Murphy, K. J. (1994). Subjective performance measures in optimal incentive contracts. *The Quarterly Journal of Economics*, 109(4):1125–1156.
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- [Bertrand and Mullainathan, 2001] Bertrand, M. and Mullainathan, S. (2001). Are ceos rewarded for luck? the ones without principals are. *Quarterly Journal of Economics*, pages 901–932.
- [Bolton and Dewatripont, 2005] Bolton, P. and Dewatripont, M. (2005). *Contract theory*. MIT press.
- [Carroll, 2015] Carroll, G. (2015). Robustness and linear contracts. *The American Economic Review*, 105(2):536–563.
- [Chaigneau et al., 2014] Chaigneau, P., Edmans, A., and Gottlieb, D. (2014). The informativeness principle under limited liability. Technical report, National Bureau of Economic Research.

- [Dewatripont et al., 1999] Dewatripont, M., Jewitt, I., and Tirole, J. (1999). The economics of career concerns, part i: Comparing information structures. *The Review of Economic Studies*, 66(1):183–198.
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