Game Theory for Social Scientists

Date and Location

June 3-6, 2014, European University Institute, Villa Schifanoia, Sala Belvedere

Daily Schedule

10-12pm	Session 1
12-2pm	Lunch break
2-4pm	Session 2
4-5pm	Exercices

Mentor: Adrienne Héritier, Diego Gambetta
Organizer: Katharina Meissner
Guest Speaker: Oliver Westerwinter

Course Description

Strategic interdependence is ubiquitous in socio-political life. Individuals exchange goods, firms compete for market access, and states bargain over territory, voting shares in international organizations, and other goods they care about. In these and numerous other situations, actors must anticipate others' behavior to reach optimal decisions and maximize their utility. Game theory is a framework and set of techniques for understanding and analyzing such strategic interaction. Conflict, cooperation, coordination, bargaining, auctions, and communication are topics that can be investigated within this framework.

The course provides a systematic introduction to the fundamentals of game theory and their application to social science problems. It develops the basic concepts and results of game theory, including simultaneous and sequential move games as well as complete and incomplete information games. Applications will be drawn from legislative bargaining, agenda manipulation, electoral competition, and international conflict.

The emphasis of the course is on the theoretical aspects of strategic behavior and the application of game theoretic concepts and models to questions of interest for political scientists. The primary objective is to enable students to understand research that uses

game theoretic models. The course also provides students with the skills required to start analyzing strategic situations on their own.

Refresher: Sets and Probability Theory

A (re-)introduction to the basic concepts of set theory and probability theory will be an integral part of the course. Sets and probabilities are central elements of game theory and therefore essential for mastering its underlying logic and solving models.

Requirements

In order to obtain full credits for this course, participants have to attend all lectures and in-class exercises and actively participate in the discussions and exercises. Participants who seek full credits will also have to submit the solution of a problem set (take-home exam) that builds on and further extends the in-class exercises.

Schedule

The course consists of a total of 20 hours over four days. 16 hours will be devoted to lectures that cover the main materials. Four hours of in-class exercises will complement the lectures. The course covers the following topics:

Day 1

- General introduction to Game Theory
- Refresher: set theory and probability theory
- Decision-theoretic foundations

Day 2

- The ingredients of games
- Normal form games

Day 3

- Extensive form games

Day 4

- Games with incomplete information

Readings

The course will be primarily taught from slides and supplementary materials. The slides will cover the entire material in considerable detail and can therefore be used as lecture notes.

Participants who wish to engage with the material prior to the course can in principle consult any standard introduction to game theory. Please note that notation may vary considerably across texts. The course will be based on the following two textbooks:

Osborne, Martin J. 2004. *An Introduction to Game Theory*. New York: Oxford University Press.

Mccarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. Cambridge: Cambridge University Press.

Alternatives include:

Fudenberg, Drew and Jean Tirole. 1991. *Game Theory*. Cambridge: MIT Press.
Myerson, Roger B. 1991. *Game Theory. Analysis of Conflict*. Cambridge: Harvard University Press.

Those interested in the promises and limits of forma models may consult Granato, Lo and Wong (2010) and Morton (1999, chapter 1). Further reading material is available upon request and will be provided throughout the course.

Day 1

Lake, David A. and Robert Powell, eds. 1999. *Strategic Choice and International Relations*. Princeton: Princeton University Press. Chapter 1.

Moore, Wil H. and David A. Siegel. 2013. *A Mathematical Course for Political and Social Science*. Princeton: Princeton University Press. Chapters 1.2-1.3, Chapters 9.1 and 9.2, Chapters 10.1, 10.4, 10.5 and 10.7.

Mccarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. Cambridge: Cambridge University Press. Chapters 2-3.

Granato, Jim, Melody Lo and M.C. Sunny Wong. 2010. “A Framework for Unifying Formal and Empirical Analysis”. *American Journal of Political Science* 54: 783-797.

Morton, Rebecca B. 1999*. Methods and Models. A Guide to the Empirical Analysis of Formal Models in Political Science.* New York: Cambridge University Press. Chapter 1.

Day 2

Osborne, Martin J. 2004. *An Introduction to Game Theory*. New York: Oxford University Press. Chapters 2 and 4.

Mccarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. Cambridge: Cambridge University Press. Chapter 5.

Day 3

Osborne, Martin J. 2004*. An Introduction to Game Theory*. New York: Oxford University Press. Chapter 5.

Mccarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. Cambridge: Cambridge University Press. Chapter 7.

Day 4

Osborne, Martin J. 2004. *An Introduction to Game Theory*. New York: Oxford University Press. Chapter 10.

Mccarty, Nolan and Adam Meirowitz. 2007. *Political Game Theory: An Introduction*. Cambridge: Cambridge University Press. Chapter 8.