Theoretical Foundations of EITM
Empirical Implications of Theoretical Models Summer Institute 2022, Oslo

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June 27 – June 29, 2022

Course details:
Monday, June 27, 9:30 a.m. - noon, 1:30 p.m. - 4:00 p.m.
Tuesday, June 28, 9:30 a.m. - noon, 1:30 p.m. - 5:00 p.m.
Wednesday, June 29, 9:30 a.m. - noon

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One of the center goals of the EITM program is to promote theoretically informed empirical research. Game theory is a primary tool for building rigorous theories because politics most often involve strategic interactions, which lend themselves to game-theoretic analysis. For example, challengers in a parliamentary or congressional race will consider the incumbents' response to such a challenge when deciding whether to run for candidacy or not. Likewise, rebel groups will consider the ability and willingness of an autocrat to fight a rebellion when challenging him. At the same time, standard introductions to game theory often imply that such theories generate only point predictions, unsuitable for testing.

In the theoretical foundations seminar we first review basic ingredients of game-theoretic models. We then look at important varieties of rational choice models, specifically non-cooperative game theory and spatial voting models, in a form that emphasizes the techniques by which these models can be used to generate testable implications through comparative statics analysis and the analysis of parameter variations across a population.

Prerequisites and required reading: I assume that you are familiar with school level maths that is set theory, calculus, basics of matrix algebra, and probability theory. I also assume that you know basics of game theory. In any case, you should make yourself familiar with the topics covered in the first two sessions by having a look at what I refer to as **required reading**. Below I list a number of textbooks in game theory that can be used for that purpose. As all these books cover the main topics in some depth, it does not matter which book you catch and use. You should read these materials prior to arriving at the summer institute. In sessions 4 to 6 we do stuff that is not well covered in textbooks. For each session I list just one piece of required reading that introduces the methods we discuss in class. I do not expect you to master these topics in advance. We will talk about these more advanced methods in class in some detail. But have a look at the reading before so that we can use time in class most effectively.

For an overview what EITM is about:

- Bräuninger, Thomas, and Tilko Swalve. 2020. Notes and Advice for EITM Research Projects. In: Luigi Curini and Robert Franzese, The SAGE Handbook of Research Methods in Political Science and International Relations, London: Sage http://www.tbraeuninger.de/publications/

Literature (pick at least one):

- McCarty, Nolan/Adam Meirowitz. 2007. *Political Game Theory.* Cambridge: Cambridge University Press.
  Comprehensive introduction into game theory for political scientists using a consistent framework of concepts and notations. Many political science examples. Still my favorite. Much of my notation in class will rely on theirs.

- Tadelis, Steven. 2013. *Game Theory: An Introduction.* Princeton: Princeton University Press.
  Excellent introduction written by an economist. Many examples address economic questions but this does no harm.

- Morrow, James. 1994. Game Theory for Political Scientists. Princeton, NJ: Princeton University Press.
  Good to read. Good balance between maths and text albeit a little bit outdated.

- Osborne, Martin J. 2003. An Introduction to Game Theory. Oxford: Oxford University Press.
  See comment on Tadelis.

- Dixit, Avinash K., Susan Skeath, and David H. Reiley. 2009. *Games of Strategy.* 3. ed. New York: Norton.
  This is an easy to read albeit somewhat lengthy introduction.

- Gibbons, Robert. 1992. Game Theory for Applied Economists. Princeton: Princeton University Press.
  See comment on Dixit.

Course outline:
We meet for three morning and two afternoon sessions.

Session 1: Normal Form Games and Comparative Statics

Normal-form games, best response strategies, Nash equilibrium, comparative statics, mixed strategies, continuous strategies, refinements

Required reading: McCarty/Meirowitz ch. 2, Tadelis ch. 3-6, Morrow ch. 4, or Osborne ch. 2

Session 2: Sequential Games with Perfect Information

Sequential games, subgames, information sets, subgame perfect equilibrium

Required reading: McCarty/Meirowitz ch. 7, Tadelis ch. 7-9, Morrow ch. 3&5, or Osborne ch. 5

Session 3: Sequential Games with Imperfect Information

Bayes' rule, weak consistency, Bayesian perfect equilibrium, signaling games, pooling and separating equilibria, cheap talk, delegation

Required reading: McCarty/Meirowitz ch. 8, Tadelis ch. 15&16, Morrow ch. 6&8, or Osborne ch. 10

Session 4: Random Utility Models and Structural Estimation

Structural and reduced-form estimation, statistical discrete choice models, strategic and non-strategic models, quantal response equilibrium

Required reading: Curtis S. Signorino. 2003. Structure and Uncertainty in Discrete Choice Models. Political Analysis 11(4): 316-344.

Session 5: Comparative Statics and Monotone Comparative Statics

Mathematical foundations for comparative statics, implicit differentiation

Required reading: Sydsaeter, Kurt/Peter Hammond. 2008. Essential Mathematics for Economic Analysis. Harlow: Prentice Hall, ch. 7.1, 12.1-12.3.

Single-crossing condition, supermodularity, monotone comparative statics

Required reading: Ashworth, Scott/Ethan Bueno de Mesquita. 2005. Monotone Comparative Statics for Models of Politics. American Journal of Political Science 50(1):214-231.