Game Theory for Political Scientists - Trinity Term 2009

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Class Meeting: Tuesday, 2-3pm
Class Location: Meeting Room (L-6b), Nuffield College
Office Hours: By appointment

Textbook

[Primary Text] An Introduction to Game Theory by Martin J. Osbourne, Oxford University Press 2004 (abbreviated 'Os' below)

[Supplementary Text] Political Game Theory: An Introduction by Nolan McCarty and Adam Meirowitz. Cambridge University Press 2007 (abbreviated 'Mc&M' below)

Course Description

Game theory provides a rigorous framework from which to analyze strategic interactions in many settings relevant to political scientists. Recently, game-theoretic language and approaches have entered each of the sub-fields, to differing degrees. Students wishing to engage in political science topics utilizing game theory will need to understand the methods, advantages, and limitations of such analyses. This course provides undergraduate students with an introduction to game theory, with special attention payed to applications (established as well as potential) to political science. No background in game theory is expected, though a comfort and familiarity with mathematical notation and analysis and is assumed.
As the aim of the course is primarily to provide mythological exposure and training, the course is largely problem-based. Where appropriate, canonical models in a variety of political science subfields will be presented.

Course Outline

- Week 1: Normal form games I. Perfect information – representation and use; Pure strategies and payoffs; Dominance
  - Reading: Chapter 1 + pgs. 13-20 + pgs. 45-50 of Os
- Week 2: Normal form game II. Equilibrium concept – Nash equilibiria. Finite and infinite games; Best-response functions. Illustration: electoral competition [Os 3.3 and/or Mc&M pg 100-107] and voting [2.9.3 Os]
  - Reading: pgs.21-45 and 70-73 of Os
  - Exercises: 48.1, 49.1 and 49.2 of Os

- Week 3: Mixed strategies.
  - Readings 4.1-4.5 + 4.9 of Os and Mc&M pgs. 109-113
  - Exercises: 114.1 114.2 114.3 in Os [bonus: 117.2]
- Week 4: Extensive form games I: Backwards induction and sub-game perfect equilibria.
  - Reading: Chapter 5 of Os
  - Essay: What good is "equilibria" *as a concept* in studying social phenomena? How valuable is this concept in game theory? In particular, compare Nash equilibria and sub-game perfect equilibria.
- Week 5: Extensive form games II: Examples – legislative rules (open/ closed); Baron-Ferejohn model
  - Reading: Os 7.1 and 7.3
  - Essay on pgs.186-192 (section 7.5) in Mc&M (i.e. demonstrate via the presentation that you understand the Romer-Rosenthal model of agenda control, the presidential veto and veto with override models in section 7.5 of Mc&M)
- Week 6: Coalitional Games and the Uncovered set.
  - Reading: Chapter 8 of Os
  - Exercises: 245.2 247.1 and 262.1 Os
- Week 7: Games with Imperfect Information I: Bayesian games – motivating examples
  - Reading: Sections 9.1-9.3, 9.5, and 9.7 of Os
  - Exercises: 307.1 of Os
- Week 8: Games with Imperfect Information II: Examples and applications
  - Readings: 10.1-10.3 pgs.313-322 of Os
  - Essay: Identify a question in political science that could be (fruitfully) investigated using any of the tools covered in the course. Further, formulate the query and establish (1) why game theory is an appropriate methodology with which to investigate the question and (2) how one would model the and (3) what types of results such a procedure would/ could yield (you do not have to write and solve the model, just state the types of results you would be interested in that would from from the model)

Evaluation
Students will be evaluated based on their performance on problems sets and in-class participation. Pedagogically, I am firm believer that in the final analysis the student is ultimately responsible for his/her education and that tutors can only help facilitate students learn. In this spirit, evaluation will be holistic.