

Political Science 587 MWF 11:30-12:48 Caldwell Lab 220

Game Theory for Political Scientists

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More and more, political scientists are using game theory to analyze strategic interactions across many different political settings. Each of the four major subfields—American, Comparative, International relations, Theory—to differing degrees, has seen game theoretic concepts enter its vocabulary, and students entering the profession will need to understand the potential and limits of game theory.

Game theory is a set of mathematical tools used to study multi-player interdependent decision making (often called *strategic* decision making). Strategic decision-making is used in situations where the outcome depends on the actions of more than one actor, and hence each actor, in choosing his or her optimal course of action, must take into account the expected behavior of the other actors. Such situations arise in all areas of politics, from legislators considering what legislation to introduce and how to vote on it (keeping in mind how they expect other legislators to vote, and whether or not the president will veto it in the US case), to candidates for political office deciding which policy positions to choose (keeping in mind how they expect voters to vote based on their policy preferences), and nations deciding whether or not to attack other nations (keeping in mind how their own and the other side's allies will react). Because analyzing such situations can become extremely complicated, verbal reasoning can easily lead to mistakes and the use of mathematics becomes very helpful.

This course aims to give students an entry-level understanding of the basic concepts of game theory, and how these concepts have been applied to the study of political phenomena. Students should leave the course with a working knowledge of games of complete information and simple games of incomplete information, to the point where they can state a model correctly, solve it, and elucidate some of the theory's empirical implications.

Although game theory is not a method that is specific to political science—it was mostly developed in economics—this class will focus on a set of tools that are specific to political science institutions and are not mathematically demanding. The institutions we will be examining within this course are

legislatures, legislative committees, courts, and treaties, among others. Among the topics to be studied within these "institutional laboratories" are strategic voting, coalition formation, agenda setting, bargaining, and the provision of public goods. We will not use calculus or any fancy probability other than the notion of conditional probability. You should still expect a fair amount of algebra. I will explain all notations as we go along.

This course is designed to give you a firm grounding in the included topics specifically and positive political theory generally and to serve as a launching pad for further study.

This is primarily a methods course. I will focus my attention on providing you with the tools to analyze strategic situations in politics, broadly defined. The policy making examples we examine are meant to be illustrative, rather than providing the primary focus of the course. Therefore, the course is divided into sections along analytical methods lines, not substantive policy area or institutional lines.

Reading Materials:

The only required textbook is by Joseph E. Harrington, Jr. 2009 (or latest edition). *Games, Strategies, and Decision Making*. New York: Worth Publishers. The book is really nice for a game theory text because it is very explanatory and yet rigorous enough. It also has tons of examples, including many from political science, which is rare for a game theory text.

It is available at the OSU Bookstore.

Assignments:

The class grade has three differently weighted components: participation, problem sets and a final exam. Participation implies attendance and participation (12%) and four pop quizzes (8%). You are required to solve 4 problem sets (40%). Although each of you has to turn in your own answers to each problem set, I encourage you to work on the problem sets in groups of two or three maximum. (You can learn a lot by brainstorming an issue with a peer.) The final exam (40%), in contrast, will take place in class and will be exclusively your own work.

Class Format:

The class format is three sessions per week of 1 hour and 18 minutes. The Monday and Wednesday sections will mostly bear on substance while the Friday section will most often be a recitation section devoted to doing exercises

and solving problems. Attendance to all sessions is mandatory and a requirement to pass the class.

Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp).

Disability Services

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

Week 1: introduction

Harrington ch. 1 and 2

Week 2: Strict Dominance and Nash

Illustrations: Simple voting games, Hobbes’ state of nature as a prisoner’s dilemma
Readings: Harrington ch. 3 and 4
Distribution of the 1st problem set.

Week 3: More Nash, Mixed Strategies

1st problem set due at beginning of class Monday; correction of 1st problem set.
Illustrations: Civil unrest game, the median voter theorem, the troop deployment game, Nuclear deterrence
Readings: Harrington ch. 5, 6 (147-157), and 7

Week 4: Sequential Games

Illustrations: War as a commitment problem, Cuban missile crisis, Preemption and war of attrition,
Readings: Harrington ch.8
Distribution of the 2nd problem set.

Week 5: Imperfect and Private Information

2nd problem set due at beginning of class Monday; correction of 2nd problem set.
Illustrations: Terrorism, nuclear nonproliferation: Bush v. Saddam, elections as control mechanism, agenda control in the Senate, The Munich Agreement, Voting on Committees,
Readings: Harrington ch 9 and 10

Week 6: Perfect Bayes-Nash

Illustrations: War as a result of incomplete information, Brinkmanship,
Readings: Harrington, ch 11
Distribution of the 3rd problem set.

Week 7: Perfect Bayes-Nash

3rd problem set due at beginning of class Monday; correction of 3rd problem set.

Illustrations: Massive retaliation and Flexible response, Elections as selection mechanism,

Readings: Harrington ch. 12

Week 8: Repeated games

Illustrations: Social contract, the game of democratic stability, Trench warfare, pork-barrel spending, monitoring and the ABM Treaty

Readings: Harrington ch. 13 and 14

Distribution of the 4th problem set.

Week 9: Evolutionary Game Theory

4th problem set due at beginning of class Monday; correction of 4th problem set.

Illustrations: Hawk-Dove game, evolution of cooperation

Readings: Harrington ch. 16 and 17

Week 10: Review

No class on Monday Memorial Day.

Final Exam

Monday 6 June, same time, same room.