



Dartmouth College
Department of Economics
Winter 2009

Econ 35: Games and Economic Behavior

Section 1: Meets in the 10A slot, Tuesday and Thursday, 10:00–11:50 a.m., in Rockefeller Room 1. X-hour on Wednesday, 3:00–3:50 p.m.

Section 2: Meets in the 2A slot, Tuesday and Thursday, 2:00–3:50 p.m., in Rockefeller Room 1. X-hour on Wednesday, 4:15–5:05 p.m.

Professor: Christopher Snyder. Office hours: Wednesday 9:30–11:30 a.m. and 2:00–3:00 p.m.; Silsby 312A; telephone 646–0642; email chris.snyder@dartmouth.edu; webpage <http://www.dartmouth.edu/csnyder>.

Readings: There are two required books. The first is the textbook: Joel Watson (2008) *Strategy: An Introduction to Game Theory*, 2nd edition, published by Norton, available for purchase in the bookstore. The second is a book for reading outside of class during the first part of the term which will then be the subject of a paper later on in the term: Ken Binmore (2005) *Natural Justice*, published by Oxford University Press, available for purchase in the bookstore. Supplemental readings from the handful of journal articles on the reading list and other sources will be available as links on Blackboard.

Overview and Philosophy Game theory has become one of the central tools in modern economic theory, used widely in all subfields of economics, including development, labor, macroeconomics, finance, international trade, and industrial organization, and increasingly used in sociology, political science, and other social sciences. This course will provide you with the basic tools to help you pose and solve problems using game theory and to read articles that employ game theory in any of these subfields. See the course outline below for a list of the core topics that we will cover.

We will have mainly an applied focus, learning the theory by considering examples. We will not be able to avoid mathematics, however. Analyzing the applications will sometimes require involved calculations. We will also take a detour here and there to state important concepts and theorems using formal notation. In a few cases in which the arguments are not too involved, we will even prove a theorem or two to give you the flavor at least of some of the mathematics involved.

Many of the applications will be drawn from industrial organization because the course is part of the industrial organization sequence (Econ 25, 35, 45) and because industrial organization happens to be my main research interest. However, we will also cover applications from other subfields of economics including labor economics, development, law and economics, other social sciences, and indeed even parlor games and examples from movies. The book for outside reading, *Natural Justice*, applies game theory to philosophical issues.

We will spend much of our time solving problems but will also practice the proper way to speak and write about game theory. Besides solving problems that are handed to us, we will practice condensing practical situations into games, which we can then go on to solve.

Prerequisites Intermediate microeconomics (Econ 21), Calculus I (Math 3), and elementary probability and statistics (Econ 10 is sufficient preparation); or permission of instructor.

Course Requirements

- *Participation and attendance:* Students are expected to attend all classes and scheduled X-hours. To preserve precious class time, we will start promptly at the beginning of the period. Please show up on time to avoid disruptions. Students are expected to be prepared by looking at the assigned readings and completing the problem sets in advance of the relevant class and to participate enthusiastically in discussions. While attendance and participation do not figure into the raw score for the class, I will keep a log for each student and will use this log for students who will later ask for letters of recommendation and to determine letter grades for students whose raw scores fall on a cutoff. Students with perfect attendance will be eligible for a token reward (one extra credit point).
- *Problem sets:* About ten problem sets will be assigned. Student solutions will not be collected and graded. Instead, I will distribute detailed answers to the problem sets (which can be reviewed in class and in office hours if there are further questions).
- *Exams:* There will be four in-class quizzes and a final exam. Quizzes will not be comprehensive but will cover the class material, readings, and problem sets in the module leading

up to the quiz. The final exam will be comprehensive, including a number of questions covering the last module not covered by a previous quiz, several questions covering earlier material, and/or several questions asking for a synthesis of the course material. The final exam will be scheduled by the registrar for the “Economics Joint B” slot: March 16, 3:00 p.m. Let me know right away if you have a conflict for this time and we can begin making alternative arrangements.

- *Projects*: Students will be required to complete two projects. The first is a group project. Students will form study groups of from two to three students. Each study group will complete a project requiring them to download and use a free software package (Gambit) to solve for equilibrium in a number of games, one from a recent journal article, and turn in hardcopies of printouts of their results. Gambit is a sort of “game theory calculator” that you may find useful in the remainder of the term and for other course work. The second project is a sole-authored term paper of four pages due closer to the end of the term based on the outside reading of the *Natural Justice* book. Papers will be graded on the quality of the central ideas, on the rigor of the verbal and analytical arguments, and quality of writing style and grammar. Extensions on the projects’ deadlines will carry a penalty (automatic grade reduction) of a third of a grade point (so for example a movement from a B to a B-) per business day.
- *Classroom Experiments*: In selected classes, students will participate as subjects in classroom games to illustrate important principles or test how the theory applies in practice. Token extra credit of up to two points are available to provide economic incentives for participation in the games. For each game, a student score will be computed by matching each against all other students in the other section and taking the average of his or her payoff across these matches. An aggregate score for student i , x_i , will be computed by totaling scores across all games in the term. Letting \underline{x} be the lowest and \bar{x} be the highest aggregate score within a section, the extra credit reward is computed according to the formula

$$2 \left(\frac{x_i - \underline{x}}{\bar{x} - \underline{x}} \right).$$

According to this formula, the highest scorer in a section will earn 2% extra credit, the lowest 0%, and students in between in proportion to where they fall in the range. The scheme has been carefully designed so that you do not have direct incentives to harm your opponent in each game but just to maximize your own payoff, since you are matched against subjects from the other section with whom you do not compete in a tournament.

Grading

Quizzes	45%
Gambit project	5%
Term paper	15%
Final exam	35%
Classroom experiments	+2% extra credit
Perfect attendance	+1% extra credit

Academic Integrity Students are expected to abide by the honor code. The following are details on academic integrity as it relates to this class. Exams will be closed-book; collaboration on examinations is prohibited. Students may obtain help from others on problem sets and are indeed encouraged to work together on them in study groups. For group projects, collaboration within each group is of course permitted and encouraged, but collaboration across groups is not allowed. Students can discuss the broad ideas involved in the paper at a philosophical level with others but otherwise must work on it independently. If you have any questions about whether a certain action (including citation practices for the paper) please ask first before taking the action since ignorance of the code or of reasonable standards of integrity will not serve as an excuse.

X-Hour We will use the x-hour from time to time to make up for a class that has to be cancelled due to weather or the professor's professional activities, to conduct a review session, to conduct a classroom experiment, to give a quiz, or to catch up on material. Please keep the time free in your schedule. Some x-hours have already been marked down on the schedule below.

Blackboard Handouts and problem sets will be distributed in class. Where possible, they will also be made available afterwards on Blackboard.

Disabilities Students with learning, physical, or psychiatric disabilities enrolled in this course that may need disability-related classroom accommodations are encouraged to make an office appointment to see me before the end of the second week of the term. All discussions will remain confidential, although the Student Disability Services office may be consulted to discuss appropriate implementation of any accommodation requested.

Tentative Schedule for Course

Date	Content	Reading	Assignment
Jan. 6	Introduction, representing games	ch. 1–4	
Jan. 8	Uncertainty	ch. 5	PS 1 assigned
Jan. 13	Primitive equilibrium concepts	ch. 6–8	PS 2
Jan. 15	Nash equilibrium	ch. 9–10	PS 3
Jan. 20	Nash equilibrium, applications		
Jan. 21(x)	Quiz 1		
Jan. 22	Mixed strategies	ch. 10, Chiappori (2002)	PS 4, Gambit project assigned
Jan. 27	Subgame perfection	ch. 14–15	PS 5
Jan. 29	Topics in industrial organization	ch. 16	PS 6
Feb. 3	Topics in industrial organization		
Feb. 4(x)	Quiz 2		
Feb. 5	Repeated games	ch. 22–23	PS 7
Feb. 10	Repeated games		Gambit project due
Feb. 12	Incomplete information and signaling	ch. 24, 26, 28, 29; Friedman (1998)	PS 8
Feb. 17	Incomplete information and signaling		
Feb. 18(x)	Quiz 3		
Feb. 19	Incomplete information and signaling		
Feb. 24	Lemons and auctions	ch. 27, Lucking-Reiley (1999)	PS 9
Feb. 26	Lemons and auctions		Term paper due
Mar. 3	Bargaining games	ch. 18–19	PS 10
Mar. 4(x)	Quiz 4		
Mar. 5	Incentives in contracting	ch. 25, Brown (2007)	PS 11
Mar. 10	Finish remaining material		
Mar. 16	Final Exam 3:00 p.m.		

Articles

Anderson, S. and M. Engers. (2007) “Participation Games: Market Entry, Coordination, and the Beautiful Blonde,” *Journal of Economic Behavior and Organization* 63: 120–137. (Involved in Gambit project.)

Brown, J. (2007) “Quitters Never Win: The (Adverse) Incentive Effects of Competing with Superstars,” Northwestern University Kellogg School of Business mimeo.

Chiappori, P.-A., S. Levitt, and T. Groseclose. (2002) “Testing Mixed-Strategy Equilibria When Players Are Heterogeneous: The Case of Penalty Kicks in Soccer,” *American Economic Review* 92: 1138–1151.

Friedman, D. (1998) “Monty Hall’s Three Doors: Construction and Deconstruction of a Choice Anomaly,” *American Economic Review* 88: 933–946.

Lucking-Reiley, David. (1999) “Using Field Experiments to Test Equivalence between Auction Formats: Magic on the Internet,” *American Economic Review* 89: 1063–1080.