

UNIVERSITY OF HAWAII AT MANOA  
DEPARTMENT OF ECONOMICS

Econ 686  
Strategic behavior and Experimental Economics  
Fall Semester, 2004

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## Strategic Behavior and Experimental Economics

### Course Preliminaries

The course is research oriented and has three main purposes. The first is to review basic concepts and methods of game theory and their economic applications. The second is to critically assess game theoretic predictions in the light of people's actual behavior in the economic laboratory. Some of the recent developments in experimental economics will be surveyed. The third is to introduce the students in the course to the methods of conducting laboratory research.

The course will include seminar type meetings and laboratory sessions. Students are required to actively participate in both class discussions and laboratory sessions. The assessment will consist of the following:

1. **(10% of the grade) Problem sets.** There will be two or three problems sets covering basic concepts of game theory.
2. **(40% of the grade) An original research proposal** in experimental economics, which will be due in the last week of classes. The proposal should contain the statement of research problem, summary of the relevant existing literature, description of experimental design, and discussion of how one intends to analyze experimental results. (Students with the best proposals will be encouraged to proceed with their research projects.)
3. **(50% of the grade) Final exam** An equal weight will be given to game theory and experimental economics parts.

You are encouraged to discuss any problems and research ideas with me and with each other, but your assignments should be independent. Each student is also expected to present in class several research papers in experimental economics on the topics we cover. All students are expected to actively participate in class discussions.

Given the research orientation, the amount of reading for the course will be substantial. The three texts for the course are

\*Gibbons, R., 1992, *A Primer in Game theory*.

\* Davis, Douglas, and Charles Holt, 1993, *Experimental Economics*, Princeton University Press.

\* Kagel, John, and Alvin Roth (eds.), 1995, *Handbook of Experimental Economics*, Princeton University Press.

Gibbons is the main textbook for a review of game theory. You are also encouraged to refer to the standard graduate micro textbooks by Mas-Colell, Whinston and Green, Varian, and Kreps, and to

Fudenberg and Tirole, 1992, *Game theory*.

Davis and Holt is the main experimental economics textbook. Kagel and Roth is supplementary; it provides excellent surveys of state-of-the-art research in the key areas of experimental economics.

All these books are put on reserve in the Sinclare library.

In addition, students will be required to read, present and discuss journal articles in experimental economics. Four excellent review articles are:

Smith, Vernon, 1994, "Economics in the Laboratory," *Journal of Economic Perspectives*: 8(1), pp. 113-131.

Camerer, Colin, 1997, "Progress in Behavioral Game Theory," *Journal of Economic Perspectives*: 11(4), pp. 167-188.

Selten, Reinhard, 1998, "Features of Experimentally Observed Bounded Rationality," *European Economic Review*: 11(4), pp. 167-188.

Goeree, Jacob, and Charles Holt, 2001, "Ten Little Treasures of Game Theory and Ten Intuitive Contradictions," *The American Economic Review*: 91(5), pp. 1402-1422.

## Tentative Course Syllabus

The following syllabus and reading list may change during the course of the semester, depending on your preferences and on our progress. Any changes will be announced in class. I expect you to read most of the papers on the reading list.

### Part I: Review of Game Theory

#### BASIC ELEMENTS

**Topic 1** Introduction to game theory: background and motivation; noncooperative foundations; examples of games.

**Topic 2** Formal structure of games: actions, strategies, payoffs; normal and extensive form; information; common knowledge; equilibrium.

READING:

\*Gibbons, Sections 1.1A, 2.4A

MWG, Ch.7; FT 3-6, 77-90, 541-48; Kreps 11

#### STATIC GAMES OF COMPLETE INFORMATION

**Topic 3** Dominant strategies; iterated dominance; Nash equilibrium; focal points; Cournot and Bertrand games; mixed strategies.

READING:

\*Gibbons, Sections 1.1B, 1.1C, 1.2, 1.3A

MWG 8.A-8.D, 8.Appendix A; FT 3-53, 351-356; Kreps 12.2, 12.4-12.6

#### DYNAMIC GAMES OF COMPLETE INFORMATION

**Topic 4** Games of Complete and Perfect information: backward induction; subgame perfect Nash equilibrium; Stackelberg game.

READING:

\*Gibbons, Section 2.1

MWG 9.A-9.B; FT 67-77; 90-100; Kreps 12.3

**Topic 5** Games of Complete but Imperfect information: simultaneous move; sequential move; information sets; applications.

READING:

\*Gibbons, Sections 2.2, 2.4

**Topic 6** Repeated Games: finite and infinite games; cooperation; trigger strategies; folk theorems; applications

READING:

\*Gibbons, Section 2.3

MWG 9.B pp. 279-82; 12.Appendix A, 12.D; FT 110-113, 145-160; Kreps 14.1-14.2, 14.4

## **STATIC GAMES OF INCOMPLETE INFORMATION**

**Topic 7** Types; beliefs; Bayesian updating; Bayes-Nash equilibrium; applications

READING:

\*Gibbons, Sections 3.1, 3.2, 3.3

MWG 8.E; FT 207-226

## Part II: Experimental Economics

### METHODOLOGY

**Topic 1** Introduction to experimental economics; methodology

READING:

\*Davis and Holt, Chapter 1.

Smith, Vernon, 1994, "Economics in the Laboratory," *Journal of Economic Perspectives*: 8(1), pp. 113-131.

Smith, Vernon, 1982, "Microeconomic Systems as an Experimental Science," *American Economic Review*: 72(5), pp. 923-955.

### GAMES

**Topic 2** Oligopoly or Public goods experiment; discussion

**Topic 3** Non-cooperative equilibrium and prisoners' dilemma; cooperation and repeated interactions

READING:

\*Davis and Holt, Sections 2.1, 2.5.

Selten, Reinhart, and Roelf Stoecker, 1986, "End behavior in sequences of finite prisoners' dilemma supergames," *Journal of Economic Behavior and Organization*: 7, pp. 47-70.

Selten, Reinhart, Michael Mitzkewitz, and Gerald Uhlich, 1997, "Duopoly Strategies Programmed by Experienced Players," *Econometrica*: 65(3), pp. 517-555.

READING ON LEARNING IN REPEATED OLIGOPOLY:

Huck, Steffen, Hans-Theo Normann and Jorg Oechssler, 1999, "Learning in Cournot Oligopoly – An Experiment," *The Economic Journal*: 109 (March), pp. C80-C95.

Rassenti, Stephen, Stanley Reynolds, Vernon Smith, and Ferenc Szidarovszky, 2000, "Adaptation and Convergence of Behavior in repeated Experimental Cournot Games," *Journal of Economic Behavior and Organization*: 41(2), pp. 117-146.

READING ON COOPERATION IN EXPERIMENTS:

Andreoni, James, 1995, "Warm Glow versus Cold Prickle: The Effect of Positive and Negative Framing on Cooperation in Experiments," *Quarterly Journal of Economics*: 110 (1), pp. 1-21.

Andreoni, James, 1995, "Cooperation in Public Goods Experiments: Kindness or Confusion?," *American Economic Review*: 85 (4), pp. 891-904.

## Topic 4

- Coordination games and mixed strategies
- Extensive forms and backward induction; centipede game.
- Depth of reasoning; unraveling in guessing game.
- Discussion: features of bounded rationality.

### READING:

\*Davis and Holt, Section 2.5, 2.6.

\*Selten, Reinhart, 1998, "Features of Experimentally Observed Bounded Rationality," *European Economic Review*: 11(4), pp. 167-188.

Camerer, Colin, 1997, "Progress in Behavioral Game Theory," *Journal of Economic Perspectives*: 11(4), pp. 167-188.

### READING ON COORDINATION GAMES:

Cooper, R., D. DeJong, R. Forsyth, and T. Ross, 1989, "Communication in the battle of the sexes game: some experimental results," *Rand Journal of Economics*: 20(4), pp. 568-587.

Van Huyck, John, Raymond Battalio, and Richard Beil, 1990, "Tacit Coordination Games, Strategic Uncertainty and Coordination Failure," *American Economic Review*: 80(1), pp. 234-248.

Van Huyck, John, Raymond Battalio, and Richard Beil, 1991, "Strategic Uncertainty, Equilibrium Selection and Coordination Failure in Average Opinion Games," *Quarterly Journal of Economics*: 106(3), pp. 885-911.

Bornstein, Gary, Uzi Gneezy, and Rosemarie Nagel, 1999, "The Effect of Intergroup Competition on Group Coordination: An Experimental Study," mimeo.

### READING ON MIXED STRATEGIES:

Ochs, Jack, 1995, "Games with unique, Mixed Strategy Equilibria: an Experimental Study," *Games and Economic Behavior*: 10, pp. 202-217.

Walker, Mark, and John Wooders, 2001, "Minimax Play at Wimbledon," *American Economic Review*: 91(5), pp. 1521-1538.

### READING ON BACKWARDS INDUCTION AND DEPTH OF REASONING:

McKelvey, R., and T. Palfrey, 1992, "An experimental study of the centipede game," *Econometrica*: 60(4), pp. 803-836.

Fey, M., McKelvey, R., and T. Palfrey, 1996, "Experiments on the constant-sum centipede game," *International Journal of Game Theory*: 25, pp. 269-287.

Nagel, Rosemarie, 1995, "Unraveling in guessing game: an Experimental study," *The American Economic Review*: 85(5), pp. 1313-1326.

Smith, V., G. Suchanek, and A. Williams, 1988, "Bubbles, crashes, and endogenous expectations in experimental spot asset market," *Econometrica*: 56(5), pp. 1119-1151.

Lei, Vivian, Charles Noussair, and Charles Plott, 2001, Non-Speculative Bubbles in Experimental Asset Markets: Lack of Common Knowledge of Rationality vs. Actual Irrationality, *Econometrica*: 69(4), pp. 831-859.

### **Topic 5** Ultimatum bargaining.

#### READING:

\*Davis and Holt, Section 5.1, 5.4.

Thaler, Richard, 1988, "Anomalities: The Ultimatum Game," *Journal of Economic Perspectives*: 2(4), pp. 195-206.

Forsythe, R., J.L. Horowitz, N.E. Savin, and M. Sefton, 1994, "Fairness in Simple Bargaining Experiments," *Games and Economic Behavior*: 6, pp. 347-369.

Cameron, Lisa, 1999, "Raising Stakes in the Ultimatum Game: Experimental Evidence from Indonesia," *Economic Inquiry*: 37(1), pp. 47-59.

### **Topic 6** Reconciling theory and experiments: introspection, learning and bounded rationality

#### READING:

\*Goeree, Jacob, and Charles Holt, 2001, "Ten Little Treasures of Game Theory and Ten Intuitive Contradictions," *The American Economic Review*: 91(5), pp. 1402-1422.

## **MARKETS**

### **Topic 7** Laboratory session: double auction

### **Topic 8** Double auction and posted offer markets

#### READING:

\*Davis and Holt, Chapters 3, 4.

Smith, Vernon, 1964, "An Experimental study of competitive market behavior," *Journal of Political Economy*: pp. 111-137.

Ketcham, Jon, V. Smith, and A. Williams, 1984, "An Comparison of Posted Offer and Double Auction Pricing Institution," *Review of Economic Studies*: pp. 595-614.

Plott, Charles, and Smith, Vernon, 1978, "An Experimental Examination of Two Exchange Institutions," *Review of Economic Studies*: 45, pp. 133-153.

**Topic 9** Applications to issues in industrial organization.

READING:

Grether, David, and C. Plott, 1984, "The Effects of Market Practices in Oligopolistic Markets: an Experimental Investigation of the Ethyl Case," *Economic Inquiry*: 22, pp. 479-507.

Cason, Timothy, and Lata Gangadharan, 1998, "An Experimental Study of Electronic Bulletin Board Trading for Emission Permits," *Journal of Regulatory Economics*: 14, pp. 55-73.

## AUCTIONS

**Topic 10** Private value auctions. Common value auctions. Winner's curse.

**Topic 11** Ascending and sealed bid auctions. Collusion.

READING:

\*Davis and Holt, Chapter 5.6-5.10.

Cox, James, Smith, Vernon, and J. Walker, 1988, "Theory and Individual Behavior of First-Price Auctions," *Journal of Risk and Uncertainty*: 1, pp. 61-99.

Kagel, J., and D. Levin, 1986, "The Winner's Curse and public information in common value auctions," *American Economic Review*: 76: pp. 894-920.

Lind, Barry, and C. Plott, 1991, "The Winner's Curse: Experiments with Buyers and Sellers," *American Economic Review*: 81: pp. 335-346.

Levin, Dan, Kagel, J., and J.-F. Richard, 1996, "Revenue Effects and Information Processing in English Common Value Auctions," *American Economic Review*: 86(3): pp. 442-460.

Lucking-Reiley, David, 1999, "Using Field Experiments to Test Equivalence Between Auction Formats: Magic on the Internet," *American Economic Review*: 89(5), pp. 1063-1080.

Milgrom, P., 1998, "Game theory and spectrum auctions," *European Economic Review*: 42: pp. 771-778.

Cramton, P., 1998, "Ascending auctions," *European Economic Review*: 42: pp. 745-756.

## OVERVIEW

**Topic 12** Overview. Theory and experimental evidence.