

UNITED STATES NAVAL ACADEMY

Spring 2004 SA475E Section 6001

Quantitative Economics Seminar: The Experimental Economics Seminar

Mathematics Professor:

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Economics Professor:

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Office hours: MW 2 and 3. I teach MWF periods 4, 5, and 6, so please make an appointment for any other time.

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Please **READ AND RETAIN** this policy statement.

SA475E is the capstone course for the Quantitative Economics major. In this seminar students are given the opportunity to work on independent research under the close supervision of both the Economics and Mathematics Department Faculty. The course instructors of this section have chosen experimental economics and game theory to be the topics of your seminar.

The focus of the course is your conducting and analyzing an economic experiment, or using a game theoretic model to analyze a multiperson decision situation. Your research will be documented in a paper and presented in a project briefing towards the end of the course. The project paper and briefing are the most important part of the course.

In the first six weeks the course instructors will take about 60% of the class time presenting material on the seminar topics, teaching you about experimental economics and game theory. About 40% of the class time will be devoted to having the students reporting on their progress in developing their project proposals. They will present ideas found in the literature, and describe topics/problems they think may provide a subject for the project portion of the course. Some time will be returned to the students to work on developing their project proposals.

During the remainder of the course you will be working on your research project. One of the seminar leaders will be assigned as your project advisor. You **must confer with your project advisor at least once a week** and on a less frequent basis you will be directed to brief the other seminar leader on your project.

I. The Course Research Project

In this seminar the students must choose to conduct their research in one of two overlapping areas: game theory or experimental economics.

Game theory is broadly interpreted as the study of multiperson decision problems. The disciplines most involved in game theory are economics, mathematics, and military science. Students working on a project using game theory will use concepts and skills acquired in other mathematics and economics

courses to formulate a matrix game model and estimate the payoff matrix for a scenario of their choice. For 2-person game models optimal min-max solutions must be found. Examples of areas using matrix games in analysis include ways to efficiently govern common pool resources; ways to efficiently provide public goods; oligopoly pricing decisions; coordination games; tactics in sports, and anti-submarine tactics.

Experimental economics involves the design of experiments using human subjects to support or refute the predictive powers of economic models and theories. Experiments have also been used to compare the behavior of economic decisions makers (subjects in an experiment) to a game theoretic solution (i.e. the Nash Equilibrium). For example, game theory indicates that the Nash Equilibrium solution to the voluntary contribution public goods game with is for a player to “free-ride”, thereby not contributing to the public good. Experimental economics allows economists to determine if this equilibrium is consistent with human behavior. Finally, economic experiments have also been designed to test the assumptions of consumer and producer behavior in economic models. Students working in this area will choose an economic model or game model and design an experiment using midshipmen playing the roles of the economic agents. The results of the experiment will be analyzed, usually by statistical methods, and compared with the results (or hypotheses) predicted by the theoretic model. In many cases the economic experiment will be a variation of an experiment reported in the literature.

II. The Course Research Paper

The major focus of this seminar is your research paper. During the first six weeks you are to search for a topic for your research paper. You will do a literature search and perhaps a web search for papers using game theory or reporting on economic experiments. Reports of your literature search are required.

Research papers focused on two-person games or military applications of game theory should either analyze some variation of a game analysis presented in a journal article or research report, or expand or create an example of the game model that is present in a paper. In either case the payoff matrix for an example of the game must be determined and its mathematical solution must be found.

Research papers focused on experimental economics must include: (1) a review of at least three articles dealing with the theory being investigated, (2) a presentation of the experimental procedures used and the research hypotheses, and (3) an analysis of the results of your experiment and how your experimental results fit with those reported in the literature.

Students will be assigned to one of the instructors as Project Advisor. The other faculty member will be a Reader. When working on the project the student must be in close contact with his or her primary advisor. This includes mandatory, weekly office visits to discuss progress on the project

III. Paper Format

The paper will start with title page, which will include your name, the date, the course and an abstract, which will be about half-a-page in length and single-spaced. The body of the paper will be divided into sections and double-spaced. The body should include a literature review with at least three pertinent articles from quality journals, approved research reports or books, a description of the game (either experimentally or theoretically), the results, and the conclusions. Papers should include figures and tables where appropriate. These figures and tables should be discussed in the paper and be able to “stand on their own” in clarity (which implies a title is necessary). Results from SPSS, MATLAB, or EXCEL should not merely be stapled to the back, but should be professionally redone as a figure or table to support your results. Your paper’s target audience is your classmates and future quantitative

economic majors. The data used in most cases will be put into an appendix; the paper may have several appendices.

There will be a section at the end of your paper listing references. Published material will be referenced following the style used in the *American Economic Review* or *The Chicago Manual of Style*. Reference to material to be found on the web should follow the following format: Author (if known). title or short description, hyperlink address, organization sponsoring the material, the date it was last updated (if given) and the date you located it. For example:
Roth, Alvin E. "Al Roth's game theory and experimental economics page,"
<http://www.economics.harvard.edu/~aroth/alroth.html>, Dept of Economics, Harvard University, last updated 10/22/03, located on 12/19/03.

IV. The Formal Presentation

Twenty minutes will be allotted for each presentation. All mathematics and economic majors, and the faculties of the two departments will be invited to attend. Except when answering questions, the blackboard will not be used. Overhead slides or computer presentations are recommended. Students are strongly encouraged to make several "dry runs" of their presentation. Other students in the seminar will be expected to attend the presentation and offer written comments; a form to be used for this purpose will be provided.

V. Milestones

- Draft Project proposal (can be delivered by email) – **6 February**.
- Final Project proposal – **20 February**.
- Experiments have been run – **12 March**.
- Completion of statistical analysis of experimental results – **26 March**.
- 1st draft of paper, which must include an abstract, an introduction, a literature review, and experimental design (if an experimental economics project is chosen) and an outline of unfinished parts of the paper – **2 April**.
- Project presentations – **12 April to 26 April**.
- Complete draft of project report due **19 April**.
- Final submission of project report **28 April**.

VI. Grading

Interim grades (6 and 12 week) are based on seminar participation, and short papers, and progress reports. Although the homework assignments and short papers will be graded, the grade received on these will affect the final grade only in borderline grades. The final course grade is driven primarily by the grade on the research paper and quality of the formal, oral presentation of the research paper.

VIII. Schedule

WEEK ONE:

F 1/9 An introduction to game theoretic models. Play the Campaign Game.

WEEK TWO:

M 1/12 An introduction to experimental economics. **Behavior Economics/Game Theory Experiments:** Play versions of the ultimatum game and the trust game.

W 1/14 Student groups will discuss the consistency of the results in class play of ultimatum game with the results reported in the Fehr et al article and the results in class play of the trust game with the results reported in the Anderhub et al article. Be prepared to discuss both articles!

- Readings (1) “The Economics of Fair Play,” Sigmund, Fehr, and Howak, *Scientific American*, January 2002.
 (2) “An Experimental Study of the Repeated Trust Game with Incomplete Information,” Vital Anderhub, Dirk Engelmann, and Werner Guth, *Journal of Economic Behavior and Organization*, Vol. 48, 2002, 197 – 216.

F 1/16 **Public Economic/Industrial Organization Experiments:** Students will play several versions of an auction game and discuss the articles by Dorsey and Razzolini and Dufwenberg and Gneezy. Be prepared to discuss both articles!

- Reading (1) “Explaining Overbidding in First Price Auctions Using Controlled Lotteries,” Robert Dorsey and Laura Razzolini, *Experimental Economics*, Vol. 6(2), 2003, 123 – 140.
 (2) “Information Disclosure in Auctions: An Experiment,” Martin Dufwenberg and Uri Gneezy, *Journal of Economic Behavior and Organization*, Vol. 48, 2002, 431 – 444.

WEEK THREE:

W 1/21 **Public Economic Experiments:** Students will play several versions of a public goods game and discuss the article by Isaac et al. Be prepared to discuss the article!

- Reading (1) “Group Size and the Voluntary Provision of Public Goods: Experimental Evidence Utilizing Large Groups,” R. Mark Isaac, James Walker, and Arlington Williams, *Journal of Public Economics*, Vol. 54, 1994, 1 – 36.

F 1/23 No class meeting. Students should search for a topic area and discuss ideas with at least one professors teaching the course.

WEEK FOUR:

M 1/26 Play a risk assessment game

W 1/28 **Industrial Organization Experiments:** Students will discuss paper by Millner and Davis. Be prepared to discuss the article!

- Reading (1) “Rebates, Matches, and Consumer Behavior,” by Ed Millner and Douglas Davis, working paper.

F 1/30 No class meeting. Students work on developing ideas for their own project and searching the literature

WEEK FIVE:

MW 2/2&4 No class meeting. Students work on developing ideas for their own project and searching the literature.

F 2/6 No class meeting. Students work on developing ideas for their own project. **By 1600 send an email to both instructors** proposing an area you want to develop for your course project. Your proposal must be longer than 200 words and reference at least one article in the literature.

WEEK SIX:

MW 2/9&11 Meeting of groups of students working in similar areas. You will be notified by email of your group assignment and its meeting time.

F 2/13 Be prepared to present your project proposal orally (about a 5 minute presentation). The instructors will provide guideline on writing a research proposal, planning your project and a style guide for you paper

WEEK SEVEN:

W 2/16 Meeting of groups of students working in similar areas.

F 2/20 Turn in your written proposal. This report will contain an outline of the issues to be studied, and the approach planned. Presentation of the rest of the oral project proposals.

WEEK Twelve:

M 3/29 Lecture on what is expected in abstract and introduction of project report.

F 4/2 Turn in 1st Draft of project report. (A copy only to your project advisor.)

WEEK Fourteen:

MWF 4/12&14&16 Presentation of oral project reports.

WEEK Fifteen:

M 4/19 Turn in complete draft of project report to both instructors.

MWF 4/19&21&23 Presentation of oral project reports

WEEK Sixteen:

M 4/26 Presentation of oral project reports.

W 4/28 Turn in project report to both instructors.

SA475e

1. **Syllabus and Course Policy Statement follow.**

2. **Changes for the future.**
 - a. **Require a complete draft more than a full week before the end of the semester..**
 - b. **Final draft due last day of classes.**
 - c. **Early during oral presentations devote part of a period to a review of requirements for the paper. Go over a generic outline.**
 - d. **Experiments should be run before Spring break.**
 - e. **Statistical analysis should be done before 1 April and presented to the project advisor.**
 - f. **Encourage experiments to:**
 - i. **Shed light on risk aversion**
 - ii. **Punishment in common pool game.**
 - iii. **Trust game**

3. **Need to clarify what goes into the introduction.**
 - a. **Gives context of the work (report).**
 - b. **Gives the reader a road map of the paper.**

4. **Need to clarify what goes into the abstract.**
 - a. **Should reflect the results**
 - b. **Avoid the future tense.**
 - c. **Should enable the reader to decide whether or not to read the paper.**

- 5.