Economics 187

Game Theory and Applications to Economics

Fall 2003

Professor: Roberto Serrano

Office Hours: Tuesday 2:00 p.m. - 4:00 p.m.

Teaching Assistant: Ioannis Garos

Office hours:

1. Description of the course: Game theory studies the decision making of rational agents in situations of conflict. We shall concentrate on non-cooperative games, including static and dynamic games under complete and incomplete information. We shall emphasize the economic applications of the theory.

2. Prerequisites: Economics 111 or 113, and a statistics course (Economics 162 or 163, or Math 161, or Applied Math 165). Your willingness to work hard is essential for a good understanding of the subject.

3. Textbook: the textbook is R. Gibbons, *Game Theory for Applied Economists*, Princeton University Press, 1992.

4. Grading policy: the grade of the course will be divided into 40% for homework assignments (ten assignments at 4% each), 20% for the midterm exam (on October 21), and 40% for the final exam (on December 18).

0. Introduction

0.1. What is game theory? Non-cooperative games versus cooperative games.

0.2. A brief history of game theory.

1. Static Games of Complete Information

1.1. Basic theory, normal form games and Nash equilibrium: normal form representation of games, iterative elimination of strictly dominated strategies, Nash equilibrium.

1.2. Applications: Cournot duopoly, Bertrand duopoly, final offer arbitration, the commuter's paradox.

1.3. Mixed strategies and existence of equilibrium.

2. Dynamic Games of Complete Information

2.1. Dynamic games of complete and perfect information: backwards induction, Stackelberg duopoly, wages and employment in a unionized firm, sequential bargaining.

2.2. Games of complete but imperfect information: extensive form representation of games, subgame perfect equilibrium, bank runs, tariffs and imperfect international competition, tournaments.

2.3. Repeated games: two-stage repeated games, infinitely repeated games, collusion between Cournot duopolists, efficiency wages, time consistent monetary policy.

3. Static Games of Incomplete Information

3.1. Static Bayesian games and Bayesian equilibrium: Cournot competition under asymmetric information, normal form representation of static Bayesian games, Bayesian equilibrium.

3.2. Applications: auctions and double auctions.

4. Dynamic Games of Incomplete Information

4.1. Perfect Bayesian equilibrium.

4.2. Applications: signaling games, the market for "lemons," reputation in the finitely repeated prisoners' dilemma.