GAME THEORY & BUSINESS
FALL 2023

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Teaching Assistant: TBD

Review Sessions: 11-12.30 on Fridays

COURSE CONTENT

Companies (managers, individuals) often make decisions that affect the well-being of others. In turn, our payoff (compensation, well-being) is often affected by the choices made by others. In simpler terms, people often operate in situations of strategic interaction. Game Theory is the discipline that studies strategic interaction. The theory has two inter-related goals:

1. To advise parties involved in situations of strategic interaction on the best course of action.
2. To predict the outcome of strategic interaction.

This course is an introduction to Game Theory. Our goal is to learn the basic conceptual tools from Game Theory and identify some real-life business situations where these tools can be useful to a manager. The games presented and solved in class go to the essence (often in the simplest framework possible) of particular aspects of strategic interaction that arise in real-life situations. To understand the similarities between these simple games and the many situations that arise both in business and in our daily economic lives, the course provides applications of the theory to business and economics.

COURSE STRUCTURE

Classes will combine theory and applications. We will present the concepts required to analyze different forms of strategic interaction. For instance: What do you know when you have to make a decision? Do you observe the choices of your opponents? Do you interact with them repeatedly? Different answers to these questions call for different frames of analysis. We will then apply the theory to business and economic situations. For example, we will study price and quantity competition, endogenous barriers, formation and stability of cartels, and auctions.
READINGS


The fifth edition of the textbook is the latest, but the previous ones, especially the fourth (2015) and the third (2009) are quite similar.

Readings will be made available online, linked from the Canvas course website. These range from news articles to chapters of books. Readings are optional.


ASSIGNMENTS AND FINAL EXAM

There are going to be graded assignments. Students are encouraged to work in groups for the assignments, but the answers must be turned in individually. Assignments are due at the beginning of the class indicated in the course outline. They will be handed out about one week before the due date.

The final exam contains problems that are similar – in format and difficulty – to the assignments. The final lasts two hours.

GRADING POLICY AND CLASS PARTICIPATION

Grades in the course will be based on the three assignments, a final exam, and class participation:

- Final Exam: 50%
- Assignments: 30%
- Class Participation: 20%

Each student's participation will be evaluated with respect to the contribution that the student makes towards the entire class’ learning experience. The quality of contribution matters more than the frequency of speech.

CONTENT

The course is structured around five topics:
<table>
<thead>
<tr>
<th>Topic 1</th>
<th>Thinking about Games</th>
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<tbody>
<tr>
<td>What is Game Theory? Aspartame example, definition of game, plan of course</td>
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<tr>
<td>Dominance Solvability: game matrices, prisoners dilemma, dominant action, iterated deletion of dominated strategies, guessing game, location game, median voter theorem</td>
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<thead>
<tr>
<th>Topic 2</th>
<th>Nash Equilibrium</th>
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<tr>
<td>Nash Equilibrium: reaction function, definition</td>
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<td>Application to markets: Price and quantity oligopoly, mergers, meet-the competition clauses, changing the game, quantal response equilibrium</td>
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<tr>
<th>Topic 3</th>
<th>Nash Equilibrium When Things Are More Complicated</th>
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<tr>
<td>Multiple equilibria: coordination games, chicken game, risk dominance</td>
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<td>Mixed strategy equilibria: penalty game, general problem, finding mixed strategy equilibrium</td>
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<th>Topic 4</th>
<th>Bayesian Games</th>
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<td>Auctions: First price, second price, Private values, common values,</td>
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Bayesian games: General approach, trading games, and other examples

**Topic 5**  
**Sequential Games**

Subgame perfect equilibrium: game trees and backward induction: various examples, promises and threats, Boeing vs Airbus, Alcoa, entry deterrence, Phillips

Bargaining games

Dynamic Pricing: infinitely repeated games

Sequential games with asymmetric information: Perfect Bayesian equilibrium, labor signaling game, poker