STRATEGIC DECISION MAKING AND GAME THEORY

ECO 525

Fall 2019

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Class Meetings: Thu. 5:45-9 (101); Mon. 5:45-9 (102)

Office hours: One hour prior to class, and by appointment. I will also answer e-mail messages as quickly as possible.

Course Goals and Description

Game Theory provides a framework to analyze strategic interactions of multiple decision-makers. The goal of this course is to introduce the game-theoretic way of thinking and show its usefulness in understanding a variety of strategic scenarios arising in business, economics, as well as many other fields and everyday life. Game Theory was initially developed as a branch of applied math, and therefore its tools are analytical in nature. As such the basic building blocks of the course will draw on analytics and some formal models. The class will introduce and discuss these analytical tools in a way that is both accessible and thought-provoking without using an excessive amount of mathematics. In

addition to discussing the basic frameworks, we will stress the power of game theory in making decisions. To accomplish this we will rely heavily on two applied components: (a) presentation and discussion of an assortment of topics and applications, and (b) participation in a variety of experiments that mimic games discussed in class and other real-life situations. In the end, the goal is that you walk away from this class with an enhanced ability to think about strategic problems and make decisions in a more disciplined way.

Text and Materials

-Games for Business and Economics, 2nd. ed., Roy Gardner, Wiley, 2003 (1st. ed. is fine too). Selected chapters available from *Vital Source* at:

https://www.vitalsource.com/textbooks?term=9781119262336

-The Art of Strategy, Avinash Dixit and Barry Nalebuff, Norton, 2008.

https://www.amazon.com/Art-Strategy-Theorists-Success-Business/dp/0393337170/

-Mind Your Decisions, a fantastic Game Theory Blog by Presh Talwalkar:

http://mindyourdecisions.com/blog/

A collection of early entries from this blog is in Talwalkar's *The Joy of Game Theory*, available for $5 as an eBook from amazon.com:

https://www.amazon.com/Joy-Game-Theory-Introduction-Strategic/dp/1500497444/

I will provide a document that maps the chapters from this book to the course topics on D2L.

-Lecture Slides and Various Readings, posted prior to every class on D2L.

Grading

Class Participation/Presentation (1/3) – Individual

We will discuss many articles throughout the term. I expect all students to read these articles and be prepared to contribute to the discussions. How much the class benefits from these discussions will be directly proportional to how prepared everyone is and how willing students are to engage in productive exchanges. For each discussion topic, we will have leaders whose role will be to prepare a discussion-friendly outline, and incite a fruitful exchange of ideas among class participants. I will contact discussion leaders prior to each presentation with some tips about structure and objectives, and also to suggest possible additional sources to enhance the discussions. Depending on the topic, discussion leaders may need to coordinate with one another, but each person will be evaluated individually.

Journals (2/9) – Group

Each week I will assign short journal assignments related to the class material. You will work in groups of three, and the idea is to have a fruitful discussion among partners. I hope this is reflected in your product!
The space limit for each journal is three double (or single and half) spaced pages. Journals, in pdf (preferred), or MS Word form, are due in the D2L Submissions Box prior to class on the following week. One entry uploaded per group, please.

Experiments (1/9) – Individual

We will conduct experiments regularly throughout the term. Each experiment will allow you to earn both participation and performance points (payoffs) that will count toward your grade. I will calculate your overall experimental score based on the addition of all of the payoffs you amass during the term. To mitigate the impact of randomness, I will drop the two lowest payoffs for each student.

Final Paper (1/3) – Group

You will -in groups of three once again- work on a final group project which will be due (in pdf-preferred or MS Word form) in the D2L Submissions Box at the end of the business day on the date we will agree upon at the beginning of the term. The topic of the final paper is open-ended, but the goal is clear: You need to demonstrate that you can use the game-theoretic framework to analyze a problem of your choice. Throughout the term, we will introduce a number of techniques and tools to analyze and make decisions in strategic situations. In the process, you will realize that Game Theory is a very rich and versatile framework. I expect your paper to ultimately showcase your ability to apply the framework (and the specific tools you select) to a topic that

is interesting to you. Topics chosen in the past have varied widely; from the analysis of strategic behavior in an industry or firm, to political campaigns and voting, to credible threats and promises in motion pictures, to contestant behavior in game shows, to strategic analysis of historical events, to negotiation analysis to divide an inheritance, to collective action to mitigate climate change, to tactical analysis in sports and other games. The tools you choose to analyze your topic may or may not be mathematical. This will depend on your preference and on whether the math helps you make your point or not. What I am looking for is an insightful application of the game-theoretic way of thinking, and the relevance and fit of the specific tools you ultimately choose in your analysis. I will also consider the originality of the topic you select. Although there is no hard guideline on length, I expect something around the 12-15 page mark.

Notes

-I will not accept assignments past the due dates, and I will not give make-ups for missed experiments.

-Free-Rider Clause: If your group partnership is not working out, you must let me know ASAP, and I will break the group up. You will subsequently complete all group assignments individually.

-Use of electronics for non-class purposes is prohibited (you will get a 15 minute break).

-DePaul *Academic Integrity Policies and Procedures* apply.

- Please do not ask for “extra credit” assignments.

-If any details (procedural, administrative, or other) are unclear, please ask!

Course Outline

Introduction

Harrington (2009), Introduction to Strategic Reasoning; Dixit and Nalebuff (D&N), Introduction and Chapter 1; Atsmon (2017), Courtney et al. (2009)

Simultaneous Moves

Two-Person Games

Gardner [G], Ch. 3; D&N, Ch. 4; Stag Hunt and the Internet (Talwalkar, 2008; Case, 2016), Coke vs. Pepsi (Greenwald and Kahn, 2005, Bhasin, 2013).

Mixed Strategies

G. Ch. 4; D&N Ch. 5; Tennis and Soccer (D&N, 1991 and 2008; Walker and Wooders, 1998; Palacios-Huerta, 2003); Randomization (Wetzel, 1998).

N-Person Games

G. Ch. 5; Climate Change (Broome, 2008; Manzi, 2008); Social Dilemmas (Glance and Huberman, 1994).

Sequential Moves

Sequential Games and Credibility

G. Ch. 7; D&N Ch. 2, 6-7; Cuban Missile Crisis (Brams, 1985); Ultimatums (Thaler, 1988; Sanfey et al., 2003); Centipedes (Palacios-Huerta & Volij, 2009).

Repeated Games

G. Ch. 8; D&N Ch. 3 & 9; Corporate Culture (Kreps, 1990); Computer Tournaments (Axelrod, 1984).

Evolutionary Games and Learning

G. Ch. 9; Seeing Around Corners (Rauch, 2002); Cheating (Frank, 1988); Evolution of Cooperation (Nowak, 2006).

Signaling Games

G. Ch. 10; D&N Ch.8; Gifts (Camerer, 1988; Ward-Broniarczyk, 2016; Gupta, 2019).

Auctions

Rasmusen (2006-parts); D&N, Ch. 10; The Winner's Curse (Thaler, 1992); The Bidder's Curse (Lee and Malmendier, 2007).