Department of Economics
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ECON5190

Games and Strategic Behavior (MBA & MSc Econ)

Time: 9:00am-12:20pm Thursday

Location: LSK G001

Instructor: Wooyoung Lim

Office: LSK 6080

Office Hours: 1:30pm-2:30pm Thursday

Email: wooyoung@ust.hk

1 Course Objective

The course demonstrates how insights of game theory can be utilized by managers to address important decisions confronting the firm. The primary focus of the analysis is on understanding how other players form their strategies and expectations in order to identify one's own best response strategy. We will utilize game theoretic reasoning to analyze issues related to entry into new markets or exit from established businesses, changing the perceptions of competitors, the extent of product differentiation and proliferation that is implied by competition, and strategies aimed at alleviating price competition among firms.

This course introduces the basic concepts of game theory. The emphasis is on the unifying perspective that game theory offers to questions in economics, business, other disciplines, and everyday life. It will enable students to view social interactions as strategic games, to use game theoretic concepts to predict behavior in these interactions and to conceive of ways in which altering the game affects social outcomes.

2 Teaching Assistant

- Jeremy To (ecjeremy@ust.hk)

- Please contact John when you have any questions and/or concerns about your homework grading.

3 Prerequisite

For MSc(ECON); FT-MBA and MBA Exchange students only. ECON5110 or 5130 or an approval from the instructor.

4 Required Readings

1. Harvard Business School Cases: A case pack will be provided on Canvas.

2. Lecture Notes 1-8 on Canvas

5   Reference Books on Reserve in Library

1. Dixit, Avinash, Susan Skeath, and David H. Reiley Jr. (DSR) "Games of Strategy," W. W. Norton & Company, Forth Edition 2013.

6   Course Intended Learning Outcomes

Upon completion of this course, you will be able to:

1. Explain how other players form their strategies and expectations in order to identify one's own best response strategy.

2. Model social interactions as strategic games, use game theoretic concepts to predict behavior in these interactions and conceive of ways in which altering the game affects social outcomes.

3. Explain how managers can utilize insights of game theory to address important decisions confronting the firm.

4. Construct game theoretic reasoning to analyze issues related to entry into new markets or exit from established businesses, changing the perceptions of competitors, the extent of product differentiation and proliferation that is implied by competition, and strategies aimed at alleviating price competition among firms.

7   Course Requirement and Evaluation

- Evaluation will be based upon written assignments (20%), class participation (10%), presentation (30%), and a final exam (40%).

- If you miss **three** or more classes without permission, your final grade will be F.

- Assignments to be conducted in teams of minimum 2 and maximum 3 people. Late submission is not accepted in any circumstances.

- Group assignments:

  a. Each group will put together and present a case study. Each presentation should last **30 minutes**, with an additional **5 minutes** of class discussion led by the group. The 35 minutes requirement will be implemented **strictly**.

  b. Each group must discuss the case analysis with Wooyoung and get some feedback, at least 2 days prior to the presentation.

c. Each group will work jointly on, and submit a group solution to, the problem set (due date: Week 6)& case summary (due date: the week in which the case is presented) in the course. Each question will be graded on a check plus (20 points) / check (13 pts) / check minus (5 pts) scale. Each case summary should be 1 page length, and will be graded on "submitted" (10 pts) / "not" (0 pts).

- The final exam is scheduled on **May 30, 2019 (Thursday)**, 10:00AM - 12:00Noon (2 hours) in the room XXX (TAB). The final exam contains all the materials covered throughout the semester. In the case of absence at an exam due to medical reasons, the student is required to submit medical certificate issued by a registered medical practitioner. Appropriate documentation will be required for absences due to other reasons. Announcements, lecture slides, and supplementary materials (if any) will be updated onto the course website. If a student finds difficulties in the course and has any concern about the course, it is his/her benefit to contact me or the teaching assistant at the early stage.

- Office hours for the final exam will be held on May 28 (Tuesday) between 9:00AM-12:00Noon.

8 Course Outline (tentative, subject to change.)

Week1 (April 11): Introduction to Game Theory, Sequential-move Games

- Lecture Note 1: Elements of a Game, Thinking Strategically, Sequential-move Games (DSR Chapters 1,2,3).

  [Classroom Experiment] Guessing Game

Week2 (April 18): Simultaneous-move Games

- Lecture Note 2: Simultaneous-move Games (DSR Chapter 4)

  [Classroom Experiment] Centipede Game, Ultimatum Bargaining

  [Classroom Experiment] Pure-Coordination Game, Assurance Game

Week3 (April 25): Best-response Curve Analysis & Games with Incomplete Information

- Lecture Note 3: Best-response Curve Analysis (DSR Chapter 5, 6)
- Lecture Note 5: Games with Incomplete Information (DSR Chapter 9)

  [Classroom Experiment] Monty Hall Game

Week4 (May 2): Games with Incomplete Information

- Lecture Note 5: Games with Incomplete Information (DSR Chapter 9)

Week5 (May 9): Repeated Interactions

– Lecture Note 6: The Prisoners' Dilemma and Repeated Games (DSR Chapter 11)

Case 1. Selling Durable Goods [9-190-110]

Case 2. Judo and the Art of Entry [9-794-103]

Week6 (May 16): Case Presentation

Case 3. Product Proliferation and Preemption [9-190-117]

Case 4. Competition and Product Variety [9-190-100]

Case 5. Competition and Compatibility: Mix and Match [9-190-112]

Week7 (May 23): Behavioral Economics

– A Lecture on Behavioral Economics

Case 6. The Fog of Business [9-793-098]

Case 7. Signaling Costs [9-793-125]

Final Exam: May 30 (Thursday) 10:00am-12:00noon, Room XXX.

9 HBS Cases for Presentations and Some Key Words

- Selling Durable Goods: Backward Induction, Game Tree

- Judo Economics: Backward Induction, Game Tree

- Product Proliferation and Preemption: Backward Induction, Game Tree, Application to Law and Economics

- Competition and Product Variety: Simultaneous-Move Game, Best Response Analysis

- Competition and Compatibility: Simultaneous-Move Game, Best Response Analysis

- Fog of Business: Backward Induction, Game Tree, Asymmetric Information

- Signaling Costs: Backward Induction, Game Tree, Asymmetric Information

10 Schedule of Group Presentations

Week5 Group1 (Selling Durable Goods), Group2 (Judo Economics)

Week6 Group3 (Product Proliferation), Group4 (Competition and Product Variety), Group5 (Competition and Compatibility)

Week7 Group6 (Fog of Business), Group7 (Signaling Costs)

11   Learning Environment

Matured conduct in classroom is the requirement for this course. Distractive behaviors such as use of cell phone, instant messaging and chatting are not tolerated. Violation of this rule will result in significant deduction of points from student's grade. Please refer to following website for the guideline for good learning environment:
`http://www.ust.hk/vpaao/conduct/good_learning_experience.pps`.

12   Academic Integrity Policy

Honesty and Integrity is central value in HKUST. Please be aware of the importance and maintain high standard of honesty in the problem sets and examinations in this course. Familiarize yourself to the university rules and the HKUST academic honor code by visiting following website:
`http://www.ust.hk/vpaao/integrity/`.

A Guideline for Case Analysis

1. Selling Durable Goods

   (a) What is the pricing policy of the monopoly supplier of the durable good to maximize the profit?

   (b) What are the respective sales for January and July under the profit-maximizing pricing policy?

   (c) What if there are two identical suppliers competing each other? (Assume that two suppliers simultaneously choose the prices in January and July.)

2. Judo Economics

   (a) Suppose that: (i) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent?s or the entrant's product; and (ii) both incumbent and entrant have a $100 unit cost of serving buyers. Formulate a strategy for the entrant. How much money can the entrant make?

   (b) Now suppose that: (i) each buyer has a willingness-to-pay of $200 for one unit of the incumbent's product and $160 for one unit of the entrant's product; and (ii) the incumbent has a $100 unit cost and the entrant a $120 unit cost. Formulate a new strategy for the entrant. How much money can the entrant now make?

   (c) Finally, suppose that: (i) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent?s or the entrant's product; and (ii) the incumbent has a $120 unit cost and the entrant an $80 unit cost. Formulate a new strategy for the entrant. How much money can the entrant make this time?

3. Competition and Product Variety

   (a) Which product types will firms A and B choose to make? Try to provide an intuition for your answer.

   (b) Now suppose that firm A enters the market first and wishes to try to deter subsequent entry by firm B. Which product type should A decide to make?

   (c) Now assume that there is only one firm, A for instance, in the market. Which product type will A decide to make?

   (d) Suppose that the marginal psychic costs of the consumers rise. Which product types will the firms now choose? Will the resulting prices and profits be lower, higher, or the same as before?

4. Product Proliferation and Preemption

(a) Suppose that firm A is the only firm in the market and it anticipates no entrants in the future. How many products should A introduce and where should these be positioned?

(b) Suppose that a potential entrant, firm B, decides to enter the market with a single product. Given A's strategic choice above, should B enter and, if so, where should it position itself?

(c) Now suppose A were to introduce two products before B's entry into the market. By suitably positioning these products can A make B's entry unprofitable? Is it worthwhile for A to do so?

(d) Next suppose that firms can withdraw products from the market. How much does this affect your answer to question (c) above?

5. Competition and Compatibility: Mix and Match

(a) Would the firms prefer to make compatible or incompatible systems? Be prepared to defend your answer at an intuitive level.

6. The Fog of Business

(a) Should player E1 enter market 1?

(b) In answering 1 above, what assumptions are you making as to what E1 believes about the players' rationality, about what the players believe about one another's rationality, and so on?

(c) How does your answer change if there is a small probability that the incumbent is irrational (i.e. who always fights)? (Assume that whether or not the incumbent is rational or not is its private information.)

7. Signaling Costs

(a) Might player A want to signal its cost to player B?

(b) Is there a way for it to do so? In answering, pay particular attention to the question of the credibility of any signal that A might send B. (**Hint**: Note that if both firms are established in the market it is the firm with the lower unit cost that will dominate the market. It sets a price slightly lower than the unit cost of the higher cost producer.)