Application of Game Theory in Managing Decision Making
BIND 2035

Professor Esther Gal-Or

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The course demonstrates how insights of game theory can be utilized by managers to address important decisions confronting the firm. The interaction of a business firm with its competitors, customers and suppliers can be formalized as a game situation. The task of the manager is to identify what are the rules that govern the game, whether he/she can modify those rules to the company's advantage, what are the optimal reactions of the company to the expected behavior of competitors, and how is the behavior of competitors, suppliers or consumers determined. 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, investment in research and development, the extent of product differentiation and proliferation that is implied by competition, and strategies aimed at alleviating price competition among firms.

Required Readings: Harvard Business School Cases

Reference Books on Reserve in Library:

1) Dixit, Avinash and Barry Nalebuff (A&N), "Thinking Strategically," W.W. Norton & Company, First Edition, 1991.

2) Brandenburger, Adam and Barry Nalebuff (B&N), "Coopetition," Doubleday/Currency, 1996.

Students' Evaluation: Evaluation will be based upon written cases.

Prerequisites:
BENC 2401 - Economic Analysis and Managerial Decision - Firms and Markets

List of Topics and Harvard Business School Cases

Week 1 **Review of Basic Concepts in Game Theory**

Cases:
1) Games of Strategy: An Introduction
2) Reaction Functions and Equilibrium
3) Repeated Games: An Introduction
4) The Right Game: Use Game Theory to Shape Strategy

Week 2 **Entry Barriers and Entry and Exit Decisions** (A&N Chapters 2, 3, 6; B&N Chapters 3, 5)

Cases:
1) Entry Barriers (A): Deep Pockets
2) Entry Barriers (B): Advertising
3) Judo and the Art of Entry
4) Exit from Declining Industries

Week 3 **Investment in Research and Development** (B&N Chapters 4, 5)

Cases:
1) The Photolithography Industry
2) Leaders and Challengers (A), (B)

Week 4 **Choice of Product Mix** (B&N Chapters 4, 5)

Cases:
1) Competition and Product Variety
2) Product Proliferation and Preemption - The Breakfast Cereal Industry: The 1972 Antitrust Complaint
3) Competition and Compatibility: Mix and Match

Week 5 **Special Issues in Pricing** (A&N Chapters 4, 6, 9; B&N Chapter 6)

Cases:
1) The Free-rider Problem: Airline Frequent-flyer Programs
2) Delivered Pricing and Most-Favored-Nation Clauses) FTC vs. Ethyl Corporation, DuPont, and Others.
3) Pricing Durable Goods) Xerox and Leasing in the Copier Industry
4) Bundling) The Polaroid-TWA Proposition

Week 6 **Changing Perceptions of Competitors** (B&N Chapter 7)

Cases:
1) Bitter Competition: The Holland Sweetener Company versus Nutrasweet (A)
2) The Fog of Business
3) Signaling Costs

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Entry and Exit Decisions
Assignment Number 1

Entry Barriers (A): Deep Pockets

1. As a potential entrant into the industry how do you assess the possible reaction of the incumbent firm to your entry? Do you expect to be accommodated?

Entry Barriers (B): Advertising

1. In the absence of a law limiting the use of advertizing, how many firms do you expect to see in the market and how much will they spend on advertizing?
2. Suppose there is currently a sole incumbent firm in the industry. Should it lobby for the proposed law limiting the use of advertizing?

Judo Economics

1. Suppose that: (a) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent's or the entrant's product; and (b) 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?
2. Now suppose that: (a) 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 (b) 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?
3. Finally, suppose that: (a) each buyer has a willingness-to-pay of $200 for one unit of either the incumbent's or the entrant's product; and (b) 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?

Exit from Declining Industries

1. Which firm seems to be in a strategically stronger position to survive? Why?
2. Would one of the firms wish to buy out the other? Which one and at what price?
3. How would your answers to questions 1 and 2 change if firms were subject to tighter financial constraints?

9-187-159	Games of Strategy: An Introduction
9-191-111	Reaction Functions and Equilibrium
9-190-139	Repeated Games: An Introduction
95402	The Right Game: Use Game Theory to Shape Strategy (Reprint)
9-190-101	Entry Barriers (A): Deep Pockets
9-190-102	Entry Barriers (B): Advertising
9-794-103	Judo Economics
9-187-166	Exit From Declining Industries
9-190-107	The Photolithography Industry
9-793-101	Leaders and Challengers (A)
9-793-109	Leaders and Challengers (B)
9-190-100	Competition and Product Variety
9-190-116	The Breakfast Cereal Industry: The 1972 Antitrust Complaint
9-190-117	Product Proliferation and Preemption
9-190-112	Competition and Compatibility: Mix and Match
9-794-106	The Free-rider Problem: Airline Frequent-flyer Programs
9-191-129	Delivered Pricing and Most-Favored-Nation Clauses
9-187-130	FTC vs. Ethyl Corporation, Du Pont, and Others
9-190-110	Pricing Durable Goods
9-190-129	Xerox and Leasing in the Copier Industry
9-191-177	Bundling
9-191-190	The Polaroid-TWA Promotion
9-794-079	Bitter Competition: The Holland Sweetener Company versus NutraSweet (A)
9-793-098	The Fog of Business
9-793-125	Signalling Costs