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E62-522 (x3-6641)

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15.013 — INDUSTRIAL ECONOMICS FOR STRATEGIC DECISIONS

FALL 2013

(Version: 8/3/2013)

This subject is designed to provide a working knowledge of the analytical tools of industrial economics that bear most directly on the strategic decisions that firms must make. The kinds of decisions that will be of interest to us include: pricing and output; advertising; investment in new production capacity; the introduction of new products, brands, and quality variations; investments in R&D; and the use of patents. Throughout the course, our emphasis will be on industry structure, its relationship with the way firms interact strategically, and its implications for market power. The analysis of industry structure, strategic interactions among rival sellers, and strategies for entering an industry, or for deterring entry or controlling its impact, will be covered with a mix of theory and case material.

Students taking this course should have a good background in microeconomics — specifically, course 15.010 or its equivalent. In addition, some background in finance (course 15.401 or the equivalent) is strongly recommended.

No textbook will be assigned for this course. However, a set of readings and cases should be purchased from MIT Copytech, East Campus, which is now located in E34-146. Also, from time to time we will post additional readings on Stellar.

Grading in the course will be based on four different aspects of your performance:

- *Classroom participation* (28% of grade) — All students are expected to have read the assigned materials, to attend class, and to participate actively in class discussions.
- *Strategic oligopoly game* (15% of grade) — You and your teammate will be graded on your performance, measured by your cumulative profits, in this semester-long game. Your performance will be evaluated relative to the overall average performance of both sections of 15.013, not the performance of your industry.
- *Exercises* (32% of grade) — We will assign 9 written "exercises" over the course of the semester. *You are only required to turn in 8 of these exercises*. (If you do all 9, we will drop the lowest grade.) You may do these exercises individually or in groups of up to three students. To receive credit, exercises must be submitted *on time*, and as *hard copies*.
- *Final exam* (25% of grade) — This will be an in-class exam. (Closed-book, but you can bring an 8.5 x 11" sheet of paper with notes, formulas, etc. on both sides.)

Class Attendance: Students are expected to attend all classes, and to arrive in class promptly. Students are also expected to have done the required reading and be prepared to participate actively in class discussion. I will begin most classes by "cold calling" on two or three students.

Laptop Computers: Given the importance of classroom participation, we ask that you do *not* open your laptop computer during class. There are only two exceptions to this rule: (1) presentations and discussions of exercises, where spreadsheets or other results are on your computer; (2) students with special needs (e.g., handwriting difficulties), who get permission in advance to use their computers. The same rules apply to iPads, PDAs, smartphones, etc.

Group Work: *You are expected to participate fully in any exercise or other assignment that has your name on it. It is absolutely unacceptable to "rotate" assignments among members of a group, or to take credit for an assignment in which you were not substantially involved.* You may allocate the work needed to complete an assignment (e.g., one person does the internet research, another develops a spreadsheet model, etc.), *but every member of the group must be substantially involved in the assignment*.

DATES TO REMEMBER

Monday, September 9	Please submit via the template on Stellar a short (1- or 2-paragraph) "biography" describing your background and interests. Include a photograph, and the *phonetic spelling* of your name.
Wednesday, September 11	Exercise 1 is due. In addition, you should turn in a note on your choice of partner for the strategic oligopoly game.
Monday, September 23	Trial Play of Strategic Oligopoly Game. (Submit by 5:00pm.)
Monday, September 30	First real play of Strategic Oligopoly Game.
Monday, October 14	NO CLASS, Columbus Day. However, game play must be submitted by 5:00pm.
Monday, October 21	NO CLASS, SIP week. However, game play must still be submitted by 5:00pm.
Wednesday, October 24	NO CLASS, SIP week.
Monday, November 11	NO CLASS, Veterans Day. However, game play is due by 5:00pm.
Monday, December 2	Last play of Strategic Oligopoly Game.
Monday, December 9	FINAL EXAM (90 minutes, in-class).
Wednesday, December 11	Debriefing, and results of strategy game. Discussion of additional topics as time permits.

TENTATIVE OUTLINE

Sept 4 *Wed* Introduction: Sources and Uses of Market Power. Overview of the course. Market structure, market power and the value of the firm. Strategic decisions that affect market structure and market power. Competing *in* the market versus competing *for* the market.

Sept 9 *Mon* Intertemporal Production Constraints and Market Power. How the dynamics of cost affects pricing and market power. Production and pricing with a learning curve. The learning curve in the strategic oligopoly game. The production and pricing of depletable resources. Effects of uncertainty over future market conditions. The option value of oil reserves.

Read: R. Pindyck & D. Rubinfeld, *Microeconomics*, Section 15.8.
Lecture Notes on Intertemporal Production and Pricing, Sections 1 – 4.

Turn in brief biography and photo via Stellar/Google form.
Be prepared to answer questions on learning curve and oil well problem.

Sept 11 *Wed* Market Structure and Evolution. The evolution of a mature industry: Market structure and firm behavior in the beer industry. Market definition: What is the "beer market?" Introduction to attribute space and its use in market definition. Advertising and brand differentiation. How much to advertise? Competing through price versus advertising. Playing the game versus choosing the game.

Read: R. Pindyck & D. Rubinfeld, *Microeconomics*, Section 11.6.
Readings on beer (in course package and on Stellar).
Lecture Notes on Market Definition and Concentration.
"Which Brew for You?" *Consumer Reports*, August 2001.

Exercise 1 due.
Hand in choice of game partner.

Sept 16 *Mon* Market Structure and Evolution (continued). The evolution of an emerging industry: The Internet and electronic commerce. Brief overview of Internet structure. Connectivity ("peering") in the Internet backbone. The sunk cost vs. marginal cost dilemma for backbone providers. Platform-mediated networks and effects of network externalities: credit cards, eBay, Amazon. Internet music stores as two-sided platforms. The economics of iTunes.

Read: Notes on Internet Economics and Market Structure.
"Platform-Mediated Networks: Definitions and Core Concepts," pp.1-17. [HBS Case #9-807-049]

Sept 18 *Wed* Market Structure and Evolution (continued). Internet music stores and the market for music downloads. Buying music versus renting music. Market definition: downloads vs. "rentals" vs. CDs. Apple's iPods/iPhones and iTunes: pricing and compatibility decisions. Demand "stickiness" and market power. Setting prices in a new market.

Read: Apple Inc.: iPods and iTunes. [Ivey Case #9B05M046]
Readings on Internet music stores: in course package and Stellar.

Exercise 2 due.

Sept 23 *Mon* Market Structure and Evolution: Information and Industry Transformation. How does the greater availability of information affect industry structure? Can information technology transform entire industries? Will I.T. transform the medical industry? Asymmetric information in the medical industry. Analysis of WebMD. Predicting "the next big thing."

Read: "WebMD (A)." [HBS Case #9-701-007]
"WebMD (B)." [HBS Case #9-701-133]
Readings on WebMD: in course package and Stellar.

Trial play of Strategic Oligopoly Game. Submit by 5:00 pm.

Sept 25 *Wed* Vertical Structure. The implications of vertical structure for market power. Decisions involving buyers and suppliers. "Build versus buy" decisions. The use of territorial exclusivity — the soft drink industry. The economics of franchising. Company-owned outlets versus franchised outlets. The free rider problem in franchising. Franchising versus licensing.

Read: Lecture Notes on Vertical Structure, Sections 1, 3 and 4.
Pindyck & Rubinfeld, Review Section 11.4.

Sept 30 *Mon* Game Theory and Strategic Competition. Review of game-theoretic models of oligopolistic behavior, and development of tools and insights useful for strategic analysis. Rationalizable strategies. The war of attrition. The use of promises, binding commitments, threats, and retaliations. Competing via price versus quantity. Unraveling in the repeated Prisoners' Dilemma: Retail store pricing. How to respond to shifts in demand? The strategic use of inventories. Applications to Strategic Oligopoly Game.

Read: Lecture Notes on Game Theory, Sections 1—6. (Section 7 optional.)

Exercise 3 due.
First real play of Strategic Oligopoly Game. Submit by 5:00 pm.

Oct 2 *Wed* The Value and Use of Information. Decision making with asymmetric information, and the role of uncertainty. Does better information make a firm better off? Should you convey information to your competitors? Learning from nature and learning from others: oil, real estate, and R&D. Informational cascades and "wisdom after the fact." Rational versus irrational bubbles. The 2008-2009 credit freeze.

Read: A. Dixit and R. Pindyck, *Investment Under Uncertainty*, pp. 26-48.
Lecture Notes on Information and Strategic Timing of Investments.

Oct 7 *Mon* The Strategic Timing of Investments. Continued discussion of informational cascades. Bubbles in housing markets. Entry decisions: How will the incumbent respond? Rational (and irrational) responses to entry: the Polaroid-Kodak experience.

Read: Lecture Notes on Information and Strategic Timing of Investments.

Oct 9 *Wed* Entry Decisions under Uncertainty. Analyzing and predicting the behavior of new entrants. Learning from an entrant. The option to invest and the value of waiting. The disposable diaper industry. Diapers as an "experience good." Consumer-driven price discrimination. Should Kao invest early in premium diapers?

Read: "The Disposable Diaper Industry in 2003" [HBS Case #9-703-491]
"Kao Corporation." [HBS Case #9-591-012]

Exercise 4 due.

Oct 14 *Mon* NO CLASS. (Columbus Day.) *However, game play is due by 5:00 pm.*

Oct 16 *Wed* Entry Opportunities and Entry Deterrence. Opportunities for entry. Methods of discouraging potential entrants or inducing existing competitors to exit. Experience goods and first-mover advantage. Gillette's introduction of the Sensor and the Mach 3 razors. Markets for credence goods. First- versus second-mover advantage in pharmaceutical markets.

Read: Lecture Notes on Entry and Reaction to Entry.

Oct 21 *Mon* No Class. (SIP week.)
However, play of strategic oligopoly game is due by 5:00pm.

Oct 23 *Wed* No Class. *(*SIP week.)

Oct 28 *Mon* Strategic Competition in the Airline Industry. Market definition in the airline industry. Competitive practices in the long run and the short run. Capacity decisions and route structure. Pricing behavior and profitability. Entry, predation, and price wars. Discussion of American Airlines' Value Pricing.

Read: S. Borenstein, "Why Can't US Airlines Make Money?" *American Economic Review*, May 2011.
"American Airlines Value Pricing" (A) [HBS Case #9-594-001] and (B) [HBS Case #9-594-019].

Exercise 5 due.

Oct 30 *Wed* Bargaining and Contracting: The Commercial Aircraft Industry. Game-theoretic models of bargaining. The durable good monopolist problem. Introduction to the commercial aircraft industry. The cost structure of the Boeing 777. Sunk costs, variable costs, and long-run profitability.

Read: Lecture Notes on Game Theory, Section 8.
Readings on Commercial Aircraft Industry (course package and Stellar).

Nov 4 *Mon* Bargaining and Contracting: The Commercial Aircraft Industry (continued). Competition between Boeing and Airbus in the sale of commercial aircraft. Bargaining between aircraft manufacturers and airlines. Boeing-Airbus-Delta Airlines bargaining exercise in class.

Exercise 6 due.

Nov 6 *Wed* Deterrence via Bundling. The use of bundling to deter entry and gain market power. Pricing and bundling complementary goods. Product line pricing. Bundling and monopoly leveraging. Bundling in the computer software industry: Microsoft in operating systems and office suites. Bundles competing against bundles: medical equipment. Monopoly leveraging via tying.

Read: Pindyck & Rubinfeld, review Section 11.5.
Lecture Notes on Bundling and Brand Proliferation, Sections 1-2.

Nov 11 *Mon* NO CLASS. (Veterans Day.) *However, game play is due by 5:00 pm.*

Nov 13 *Wed* Deterrence via Brand Proliferation. Discussion of attribute space and its use in economic analysis. Local competition among brands in attribute space. Choosing the attributes for new brands. Brand proliferation, entry deterrence, and market power. Analysis of the breakfast cereal industry.

Read: Lecture Notes on Bundling and Brand Proliferation (complete).
"The Ready-to-Eat Breakfast Cereal Industry in 1994 (A)."
[HBS Case #9-795-191]

Exercise 7 due.

Nov 18 *Mon* Network Externalities and Market Structure. How network externalities can affect market structure and market power, and implications for pricing, advertising, and investment. Market "tipping" and consumer holdout: compact disks, digital audio tape, and DVDs. Connectivity and compatibility. Compatibility in applications software. Strategic pricing decisions: the "DOS-MAC" market. Pharmaceutical markets: product-specific versus brand-specific network externalities, and implications for R&D.

Read: S. Besen and J. Farrell, "Choosing How to Compete: Strategies and Tactics in Standardization," *Journal of Economic Perspectives*, Spring 1994.
Lecture Notes on Network Externalities, Sections 1-5.
"Philips' Compact Disk Introduction (A)." [HBS Case #9-792-035]

Nov 20 *Wed* Pricing Strategies. A tool-box for pricing decisions. Mark-up pricing in oligopolistic markets. Pricing new products. Product line pricing revisited. Pricing with network externalities: static and dynamic aspects. The DOS-MAC simulation. Pricing with capacity constraints: dynamic yield management. Buying and selling on the spot market versus long-term contracting. Pricing for two-sided platforms.

Read: Lecture Notes on Pricing

Nov 25 *Mon* Network Markets: Credit Cards. Credit card networks as two-sided platforms. Economics of the credit and bank card industry. "Chicken and egg problems" in the evolution of card networks. Acquirers, issuers, and the interchange rate. The development of debit cards. Competition among card networks. "Duality" and competition in card issuance. International network competition and the emergence of China's UnionPay.

Read: D. Evans and R. Schmalensee, *Paying with Plastic*, 2nd Edition, MIT Press, 2005, Chapters 1, 3 and 9.
Lecture Notes on Network Externalities, Section 6.

Exercise 8 due.

Nov 27 *Wed* Network Markets: Credit Cards (continued). Strategic aspects of card issuance. Pricing and profitability. Competition and market dynamics in card issuance. Discussion of Capital One Financial Corporation. The impact of electronic money, including "bitcoins."

Read: "Capital One Financial Corporation." [HBS Case # N9-700-124]

Dec 2 *Mon* R&D, Patenting, and Licensing. Implications of R&D and innovation for industry evolution and market structure. The race to innovate. Making the R&D investment decision: strategic and non-strategic aspects. Patents as options. Sleeping patents and the decision to adopt a new innovation. Licensing decisions. The use of licensing to gain market power.

Read: Lecture Notes on R&D and Patent Licensing.

Exercise 9 due.
Last play of Strategic Oligopoly Game. Submit by 5:00 pm.

Dec 4 *Wed* R&D, Patenting, and Licensing (continued). Continued discussion of R&D and patent licensing decisions. Licensing to raise prices vs. licensing to lower prices. Licensing to become the standard: Intel in computer processors. Complementary patents: cross-licensing versus the formation of "patent pools." IP blocks and Systems-on-a-Chip. Patent intermediaries.

Read: Lecture Notes on R&D and Patent Licensing.
"Economics of Patent Pools"
A. Hagiu and D. Yoffie, "The New Patent Intermediaries: Platforms, Defensive Aggregators, and Super-Aggregators," *Journal of Economic Perspectives*, Winter 2013.

Dec 9 *Mon* **FINAL EXAM**. (Closed-book, but you can bring an 8.5 x 11" sheet of paper with notes, formulas, etc. on both sides.)

Dec 11 *Wed* Wrap-Up Class. Results of strategic oligopoly game – meet your competitors! General discussion of topics related to course.