

## Economics 70361: Industrial Organization I

Fall 2013

Professor Jensen

**Office:** 921 Flanner

**Office Hours:** Monday and Wednesday, 2:00 – 3:30 pm and by appointment.

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**Classes:** Monday and Wednesday, 12:30 – 1:45 pm, 725 Flanner

### Recommended Texts:

*The Theory of Industrial Organization*, Jean Tirole.

*Oligopoly Pricing*, Xavier Vives (for those very mathematically inclined).

*International Handbook of Industrial Organization* (Volumes 1, 2, and 3). The first two volumes are dated, but still have some value – especially in providing overviews.

*Modern Industrial Organization*, Dennis Carlton and Jeffrey Perloff (an undergraduate text with an extremely thorough coverage of IO, easy to read).

*Industrial Market Structure and Economic Performance*, Frederic M. Scherer and David Ross (an oldie but goodie).

### Course Objectives:

This course has two objectives. One is to provide a survey of some of the theoretical models used to analyze the strategic interaction between firms in an industry in a variety of different environments, and to allow you to learn how to use these models in analyzing strategic firm behavior. The other is to survey recent theoretical and empirical advances in the literature on innovation by studying recently published papers, so as to develop an understanding of where future contributions might be made.

**Grading:** The course grade is based on:

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|---|-----|
| (i) Problem sets                              | 60% |
| (ii) Option of Paper or Presentation or Final | 40% |

On problem sets, I encourage you to work together. In fact, if you like, any combination of you can form a “team” and turn in one problem set with several names on it (in which case each participant receives the same grade on that problem set). From past experience I have found that

students are generally very good at minimizing the free rider problem without the need of any external assistance.

The other half will be your option:

- a. Take a final exam (similar to the problems sets).
- b. Present to the class an article on a topic in industrial organization of interest to you that has been published with the last 5 years and is approved by me. I am willing to allow a lot of latitude here so that you can find a paper that comes closest to your personal areas of interest.
- c. Write a paper that develops a model and outlines how to analyze it to derive some results of interest in industrial organization. This would probably need to be about 10 to 15 pages (double-spaced). If you decide to do this, you will need to get the topic approved by me. Generally I would expect you to take this option only if you were thinking of a second-year paper or dissertation in this area. The model can be either theoretical or empirical.

NOTE: Because I only recently learned I would be teaching this class, I have already arranged five trips out of town on either Monday or Wednesday. We will need to make these up, hopefully in free time on Monday and Wednesday also.

## Course Outline

- 0. Game Theory Topics and References (review)
  - A. Games in Strategic Form (Nash Equilibria)
    - 1. Tirole (11.1, 11.2)
    - 2. IHIO (5.2.1, 5.2.2, 5.2.3)
    - 3. Supplemental Readings:
      - “Non-Cooperative Games,” John Nash, *Annals of Mathematics* (1951)
      - Game Theory*, Roger B. Myerson (excellent, but demanding)
      - Game Theory*, Drew Fudenberg and Jean Tirole (ditto)
      - Game Theory*, James W. Friedman
      - Games and Information*, Eric Rasmusen
      - Thinking Strategically*, by Avinash Dixit and Barry Nalebuff (entertaining to read)
  - B. Games in Extensive Form (Subgame Perfect Equilibria)
    - 1. Tirole (11.3)
    - 2. IHIO (5.3.1, 5.3.2)
    - 3. Supplemental Readings:
      - “Reexamination of the Perfectness Concept for Equilibrium Points in Extensive Form Games,” Reinhard Selten, *International Journal of Game Theory* (1975)
      - Texts by Myerson, Fudenberg and Tirole, Friedman, and Rasmusen
  - C. Games with Incomplete Information (Bayesian and Perfect Bayesian Equilibria)
    - 1. Tirole (11.4, 11.5)
    - 2. IHIO (5.4.1, 5.4.2, 5.5.1, 5.5.2)
    - 3. Supplemental Readings:
      - “Games with Incomplete Information Played by Bayesian Players, I-III,” John Harsanyi, *Management Science* (1967-8)
      - Texts by Myerson, Friedman, Fudenberg and Tirole, and Rasmusen
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- I. Classic Models of Imperfect Competition
    - A. Price (Bertrand) Competition
      - 1. Tirole (5.1, 5.2, 5.3)
      - 2. IHIO (6.2.2)
      - 3. Vives (5.1, 5.2)
    - B. Quantity (Cournot) Competition
      - 1. Tirole (5.4)
      - 2. IHIO (6.2.1)
      - 3. Vives (4.1, 4.2)
  
  - II. Product Differentiation: Price Competition and Non-Price Competition
    - A. Monopolistic Competition
      - 1. Tirole (7.2)
      - 2. IHIO (4.3, 12.2)
    - B. Advertising and Informational Product Differentiation

1. Tirole (7.3)
  2. Supplemental Readings:
    - The Economics of Advertising*, Schmalensee
    - “A Model of Advertising and Product Quality,” Schmalensee, *Journal of Political Economy* (1978)
    - “Notes on Advertising, Economies of Scale, and Entry Barriers,” A. M. Spence, *Quarterly Journal of Economics* (1980)
- C. Vertical Product Differentiation
1. Tirole (7.5)
  2. IHIO (12.6)
  3. Supplemental Reading:
    - “Relaxing Price Competition Through Product Differentiation,” *Review of Economic Studies*, J. Shaked and J. Sutton (1982)
- D. Symmetric Monopolistic Competition
1. Tirole (7.5)
  2. “Avinash Dixit and Joseph Stiglitz, “Monopolistic Competition and Optimum Product Diversity,” *American Economic Review* (1977).
- III. Competition with Asymmetric Information, Reputation, and Strategic Behavior
- A. Sharing Cost Information
1. Tirole (9.1)
  2. Supplemental Readings:
    - “Information Transmission-Cournot and Bertrand Equilibria,” Gal-Or, *Review of Economic Studies* (1986)
    - “Exchange of Cost Information in Oligopoly,” Shapiro, *Review of Economic Studies* (1986)
    - “Sharing Cost Information: A Counterexample,” Jensen, *Economic Theory* (1993)
- B. Demand Uncertainty and Market Leadership
- C. Supplemental Reading: Vives (8)
- IV. Antitrust Policy and Mergers
- A. Mergers Laws, Enforcement, and Effects
1. Tirole (5.5)
  2. IHIO (36)
- B. Endogenous Mergers
- “The Limits of Monopolization Through Acquisition,” *Quarterly Journal of Economics*, M.I. Kamien and I. Zang (1990)
- V. Research and Development, Innovation, Patents, and Adoption of New Technology
- A. Innovation and R&D
1. Tirole (10.1, 10.3, 10.4)
  2. IHIO (14)
  3. Supplemental Readings:

- “Economic Welfare and the Allocation of Resources for Invention,” Arrow, in *The Rate and Direction of Inventive Activity*, ed. by R. Nelson (1962)
- “Real Effects of Academic Research,” Jaffe, *American Economic Review* (1989)
- “Geographic Localization of Knowledge Spillovers as Evidenced by Patent Citations,” Jaffe, Trajtenberg and Henderson, *Quarterly Journal of Economics* (1993)
- “Universities as a Source of Commercial Technology: A Detailed Analysis of University Patenting, 1965-1988,” Henderson, Jaffe and Trajtenberg, *Review of Economics and Statistics* (1998).
- “Star Scientists and Institutional Transformation: Patterns of Invention and Innovation in the Formation of the Biotechnology Industry,” Zucker and Darby, *Proceedings of the National Academy of Sciences* (1996)
- “Intellectual Capital and the Birth of U.S. Biotechnology Enterprises,” Zucker, Darby and Brewer, *American Economic Review* (1998)
- “Proofs and Prototypes for Sale: The Tale of University Licensing,” Jensen and Thursby, *American Economic Review* (2001)
- “When does start-up innovation spur the gale of creative destruction?” Gans, Hsu and Stern, *Rand Journal of Economics* (2002)
- “Who is Selling the Ivory Tower? Sources of Growth in University Licensing,” Thursby and Thursby, *Management Science* (2002).
- “The Disclosure and Licensing of University Inventions: The Best We Can Do with the S\*\*t We Get to Work With,” Jensen, Thursby and Thursby, *International Journal of Industrial Organization* (2003)
- “Licensing of University Innovations: The Role of a Technology Transfer Office,” Macho-Stadler, Perez-Castrillo, and Veugelers, *International Journal of Industrial Organization* (2007).
- “Startup Firms from Research in U. S. Universities,” Jensen, in Audretsch, D., S. Heblich, O. Falck, and A. Lederer (eds.), *Handbook of Research on Innovation and Entrepreneurship* (2010)

#### B. Patent Races.

1. Tirole (10.2)
2. IHIO (14.2)
3. Supplemental Reading:
  - “Patent Races, Product Standards, and International Competition,” Jensen and Thursby, *International Economic Review* (1996)
  - “Strategic Debt and Patent Races,” *International Journal of Industrial Organization*, 887-916, September, 2004 (with D. Showalter)

#### C. Adoption and Diffusion of New Technology

1. Tirole (10.5)
2. IHIO (14.5)
3. Supplemental Readings:
  - “Adoption and Diffusion of an Innovation of Uncertain Profitability,” Jensen, *Journal of Economic Theory* (1982)

- “Innovation Adoption and Diffusion When There Are Competing Innovations,” Jensen, *Journal of Economic Theory* (1983)
- “Entry, Exit, and Diffusion with Learning by Doing,” Jovanovic and Lach, *American Economic Review* (1989)
- “Innovation Adoption and Welfare Under Uncertainty,” Jensen, *Journal of Industrial Economics* (1992)
- “Strategic Timing of Adoption of New Technologies Under Uncertainty,” Stenbacka and Tombak, *International Journal of Industrial Organization* (1994)
- “Demand and Supply in New Markets: Diffusion with Bilateral Learning,” Vettas, *RAND Journal of Economics* (1998)
- “Monopolistic Competition and the Diffusion of New Technology,” Götz, *RAND Journal of Economics* (1999).
- “Strategic Timing of Adoption of New Technologies under Uncertainty: A Note,” *International Journal of Industrial Organization* (2000).
- D. Patent Licensing, Research Joint Ventures
1. Tirole (10.8)
  2. IHIO (14.4)
  3. Supplementary Readings:
    - “Technology Transfer under Asymmetric Information,” Gallini and Wright, *RAND Journal of Economics* (1990)
    - “Patent Licensing,” M. I. Kamien, in *The Handbook of Game Theory*, ed. by Aumann and Hart (1992)
    - “Dynamic Patent Licensing,” Jensen, *International Journal of Industrial Organization* (1992)
    - “Reputational Spillovers, Innovation, Licensing, and Entry,” Jensen, *International Journal of Industrial Organization* (1992)
    - “The Licensing of Patents under Asymmetric Information,” Beggs, *International Journal of Industrial Organization* (1992)
- Jaffe, A. (1986): Technological opportunity and spillovers of R&D: Evidence from firms’ patents, profits and market value, *American Economic Review* (1986).
- “Cooperative and Noncooperative R&D in Duopoly with Spillovers,” d’Aspremont and Jacquemin, *American Economic Review* (1998).
- “RJV and R&D Cartels,” Kamien, Muller, and Zang, *American Economic Review* (1992)
- “Modelling imperfectly appropriable R&D via spillovers, Amir, *International Journal Of Industrial Organization* (2000).
- “R&D cooperation and spillovers: Some empirical evidence from Belgium, Cassiman and Veugelers, *American Economic Review* (2003).
- “Innovation and learning: The two faces of R&D,” Cohen and Levinthal, *Economic Journal* (1989).
- “Meet me halfway: research joint ventures and absorptive capacity, Kamien and Zang, *International Journal of Industrial Organization* (2000).

## VI. Economics of Science

A. “The economics of science,” Stephan, *Journal of Economic Literature* (1996).

### B. Supplementary Readings

“The simple economics of research portfolios,” Dasgupta and Maskin, *Economic Journal* (1987).

“Toward a new economics of science,” Dasgupta and David, *Research Policy* (1994).

“Research productivity over the life cycle: evidence for American scientists,” Levin and Stephan, *American Economic Review* (1991).

“Do scientists pay to be scientists?” Stern, *Management Science* (2004).

“Academic freedom, private-sector focus, and the process of innovation,” Aghion, Dewatripont, and Stein, NBER working paper (2005).

“Disclosure or Secrecy? The Economics of Open Science,” Mukherjee and Stern, Northwestern University, mimeo (2005).