Empirical Industrial Organization*

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Course Description

This is a first Ph.D course in empirical industrial organization. The focus is on bringing everyone up to speed with the modern toolkit developed by empirical IO scholars over the past thirty years. This toolkit has been tremendously influential in understanding more traditional IO questions (mergers, collusion, contracting, etc.) but has recently become influential in other disciplines (healthcare, environmental economics, and education). The underlying themes are: most real-world markets are neither perfectly competitive, nor strict monopolies, but rather involve strategic interactions among firms and consumers; and when we observe equilibrium outcomes of these markets in data they are often characterized by simultaneity or endogeneity.

Because we have a limited amount of time, I will focus primarily on technique rather than questions.

How to do IO?

Our goal is to bring you up to speed with the research frontier in Industrial Organization. This cannot be accomplished with less than thirty hours of lectures. Most of your work is going to take place outside the classroom

Seminars and Workshops: My expectation is that you will all attend the IO seminar and the student workshops. Researchers do not immediately produce published papers, it is important to understand the process as well. It is important to understand both what works and what does not.

*I have borrowed materials from courses I have taken from Steve Berry, Phil Haile, and Ariel Pakes. Some lectures are based on lectures generously made available by Matt Shum, Kate Ho, and Julie Mortimer.
Problem Sets: The problem sets for this course are going to take some time. You cannot start them the night before they are due. There is no STATA command for understanding equilibrium interactions in imperfectly competitive markets. You can use whichever language you would like (R, Matlab, Python). For programming tasks it is usually valuable to work in pairs, so that you can help one another find mistakes, but you must produce your own work.

Reading: I read approximately one research paper every day. There is a large literature to catch up on. It is expected that you read all of the starred articles on the syllabus, but you should be reading papers (in varied levels of detail) all of the time. In the topics you are interested in, or are having trouble understanding, you should read additional articles.

Other Courses: Obviously you should take the rest of the IO sequence (Prof. Jovanovic’s course focuses on analytic models, and Prof. Lazarev’s course is more of a sequel to this course.) You should also take as much micro-theory and econometrics as you can (especially Prof. Vuong’s course).

Books IO Economists Own

These are some books that most IO economists own. There is no official textbook for this course.

- Tirole (1988). *Theory of Industrial Organization*. The book covers only theoretical work, and is over 30 years old so many newer results are missing. This is still the most important reference for the field.

- Cabral (2000). *Introduction to Industrial Organization* and Shy (1996) *Industrial Organization: Theory and Applications*. These are undergraduate books on IO theory. I will assume that you perfectly understand everything in these books, though this assumption is likely false (at least at the beginning of the semester).

- Whinston (2006). *Lectures on Antitrust*. This is a short book of Ph.D lectures on antitrust topics. The chapter on vertical issues is especially relevant.


- Davis and Garces (2009). *Quantitative Techniques for Competition and Antitrust Analysis*. This is a “cookbook” style book that covers the practice of antitrust.

- Anderson, de Palma, and Thisse (1992) *Discrete Choice Theory of Product Differentiation*. This links the theory of product differentiation to statistical models of consumer choice. The first few chapters are especially relevant, and the last few chapters include some ideas that still haven’t been fully incorporated into empirical work.

- Train (2009). *Discrete Choice Methods with Simulation*. This book summarizes the earlier statistical discrete choice literature most associated with the work of McFadden in the 1970’s and 1980’s’. It does so in great detail with many clear examples. (The focus is primarily on cases where endogeneity is not a major concern).
• Judd (1988). *Numerical Methods in Economics*. This is a classic text in computation for economics. Many of these techniques were developed with macroeconomics rather than industrial organization in mind, but this is still a valuable reference.

• Hayashi (2000) *Econometrics* and Pagan and Ullah (1999) *Nonparametric Econometrics* are good econometrics references and may be more applicable to IO examples than Wooldridge, etc..

**Course Policy**

You are expected to attend every lecture and it is expected that you have done the reading BEFORE the class.

**Grading Policy**

• 50% of your grade will be performance on homework.

• 20% of your grade will be performance on a referee report.

• 20% of your grade will be performance on your presentation.

• 10% of your grade will be participation in class.

**Academic Dishonesty Policy**

Don’t cheat. Most PhD IO courses give similar assignments. You may be able to find solutions online. Please don’t do that. It is helpful to work with a partner on debugging code, but my expectation is that assignments are 100% your own work (including computer code).

- Historical Empirical IO / Structure-Conduct-Performance

- Homogenous Products


- Pre-Endogeneity
  - Train (2009). Chapters 2-6 [http://eml.berkeley.edu/books/choice2.html](http://eml.berkeley.edu/books/choice2.html).

- Endogeneity

Week 03, 09/22: Estimation, Identification, and Instruments.

- Theoretical Identification Results
  - Berry and Haile (2015, Annual Review). *Identification in Differentiated Products Markets*
  - Fox and Gandhi (2015) *Nonparametric Identification and Estimation of Random Coefficients in Multinomial Choice Models*

- Estimation and Instruments
  - *Dube, Fox, Su (2013, Ecma). Improving the Numerical Performance of Static and Dynamic Aggregate Discrete Choice Random Coefficients Demand Estimation*
  - Gandhi and Houde (2015, WP). *Measuring Substitution Patterns in Differentiated Products Industries*

- Micro-Data

- Welfare and Assortment

- Apple-Cinnamon Cheerios War

Week 05, 10/06: Merger Analysis and Conduct [2 Lectures?]

- Mergers: Official Stuff
  - 2010 Horizontal Merger Guidelines [https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf](https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf)
  - HSR Guidelines. [https://www.ftc.gov/enforcement/premerger-notification-program/hsr-resources](https://www.ftc.gov/enforcement/premerger-notification-program/hsr-resources).

- Structural Equilibrium Approaches
  - Miller and Weinberg (2016) *The Market Power Effects of a Merger: Evidence from the U.S. Brewing Industry*

- Unilateral Effects/ Dis-equilibrium merger analysis

- Reduced form Merger Analysis
  - Taylor, Kreisle, and Zimmerman (2010, AER). *Comment on Hastings*.

- Conduct and Testing for Conduct
  - * Bresnahan (1982). *The Oligopoly Solution Concept is Identified*.

**Week 06, 10/13:** Single Agent Dynamics I: Rust (NFXP), CCPs.

- Markov Decision Problems

- Sufficient Statistics and Identification


**Week 07, 10/20:** Single Agent Dynamics II: Heterogeneity and Persistence.

- **Persistence**
  - Pakes (1986, Ecma). *Patents as Options*.

- **Heterogeneity**

**Week 08, 10/27:** Dynamic Demand: Durable and Storable Goods

- **Durable Goods**

- **Storable Goods**
  - Erdem and Keane (1996, Marketing Sci.). *Decision-making under uncertainty: Capturing dynamic brand choice processes in turbulent consumer goods markets*
  - Hendel and Nevo (2006, Rand). *Sales and Consumer Inventory*

• Learning and Experience Goods
  – Ackerberg (2001). Empirically Distinguishing Informative and Prestige Effects of Advertising

Week 10, 11/10: Switching Costs and Network Effects

• State Dependence and Switching Costs

• Network Effects

Week 11, 11/17: Two Period Models of Entry and Exit.

• Static Entry
  – * Bresnahan and Reiss (1991,JPE). Entry and Competition in Concentrated Markets
  – * Berry and Tamer Identification in Models of Oligopoly Entry

• Inequality Based Approaches
  – Ciliberto and Tamer Market Structure and Multiple Equilibria in the Airline Markets.
Week 12, 11/24: THANKSGIVING HOLIDAY - No Class


Week 14, 12/08: Partially Identified Models and Moment Inequalities.