Empirical Industrial Organization

Renmin University of China

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Class Hours: Tuesday 6 -8:30pm
Class Location: Mingxin 0101
Credit Hours: 3/51

Course Description

This course is designed to cover advanced topics in Industrial Economics / Industrial Organization, with emphasis of **combining data, economic models, and appropriate identification strategies and econometric techniques** to answer empirical questions in economics. The goal of this course is to equip students with economic theory and quantitative skills necessary to conduct original research on economic issues in the industry / market of interest. Toward this end, classes will involve lectures by the instructor, student presentations, and class discussion. We will focus on investigating oligopoly pricing behaviors in various markets both theoretically and empirically. In particular, we will study

- How does the market structure / design affect strategic interactions among market participants, and eventually market performance and market structure;
- How do we evaluate the market / policy performance under various market structures / designs.

Prerequisites:

Graduate-level coursework on microeconomics and econometrics is required, preferable with some knowledge on game theory. If you have not taken these courses, please obtain consent of the instructor to enroll.

Course Material

This course is mainly based on the reading of research papers. Other useful resources are

IO (and Game) Theory

- **Tirole, J. (1988)**: The Theory of Industrial Organization. MIT Press.
- **Vives, X. (2009)**: Oligopoly Pricing: Old Ideas and New Tools. MIT Press.
- **Belleflamme, P., Peitz, M. (2016)**: Industrial Organization Markets and Strategies. Cambridge University Press.
- **Mas-Colell, Whinston, and Green (1997)**, Microeconomic Theory, Oxford University Press.

IO Applications and Empirics

- **Aguirregabiria, V. (2019)**: Empirical Industrial Organization: Models, Methods, and Applications.
- **Laffont, J.-J., Tirole, J., 2000**: Competition in Telecommunications.
- Viscusi, W. K., J. Harrington, Joseph E., and D. E. M. Sappington (2018): Economics of Regulation and Antitrust. MIT Press.

Auction Theory and Empirics

- Krishna.V (2010): Auction Theory, 2nd ed. Academic Press
- Paarsch, H.J., Hong, H. (2006). An Introduction to the Structural Econometrics of Auction Data. MIT Press.

Evaluation

The final evaluation will base on the class participation, including discussion (20%) and presentations (30%) and a replication of classical papers (30% for the submitted code and 20% for the summarized draft).

Presentation and Replication

Depending on the size of final enrollment and class schedule, each student will be assigned $1-2$ research papers to present. Each presentation should last for 60 minutes including questions. The presentation should

- summarize the paper;
- identify the paper's contributions;
- discuss weaknesses of the paper;
- make suggestions for further research;
- **(for one paper) replicate the key finding of the paper** (will be specifically required by the instructor).

Lecture outline and Reading List

The topics of the course and some related readings are listed below. I will announce required readings one week before each lecture. Some topics may be adjusted over the course to account for time constraints and class interests.

Lecture 1: Introduction to (New) Empirical Industrial Organization

Required Reading: Bresnahan (1989); Reiss and Wolak (2007), Chapter 1 of Aguirregabiria (2019)

- Economic questions and data in EIO;
- Examples of structural models in EIO;
- Skills required to conduct EIO researches

Lecture 2: Review of Game Theory

Required Reading: Part II in MWG (Game Theory, Chapters 7, 8 and 9)

- Dominant strategies and rationalizable strategies;
- Nash Equilibrium (NE) in static games of complete information;
- Bayesian Nash Equilibrium (BNE) in static games of incomplete information;
- Subgame Perfect Nash Equilibrium (SPNE) in dynamic games of complete information
- **(Optional)** Perfect Bayesian Equilibrium (PBE) in dynamic games of incomplete information

Lecture 3&4: Classical Oligopoly Theory

Required Reading: Chapter 5 of Tirole (1988) and Chapters 4, 5 and 7 of Vives (2009)
Useful Reading: Kreps and Scheinkman (1983); Klemperer and Meyer (1989)

- Bertand competition and its variants with asymmetric costs, capacity constraint, uncertain costs; DRS (IRS) technology;
- Capacity-then-Bertrand Competition;
- Commitment and Stackelberg Model;
- **(Optional)** Supply Function Equilibrium (SFE)

Lecture 5&6: Empirical Static Oligopoly Models with Complete Information

Read Chapter 4 of Aguirregabiria (2019) and Bresnahan (1982) to understand the identification of static oligopoly models with complete information. Then read Genesove and Mullin (1998) for testing conducts in U.S. suger industry, and Wolfram (1999); Sweeting (2007) for measuring market power in British electricity market.

- Identification of marginal cost and/or market conduct (or structure or ownership) for markets with
  - homogeneous products;

  - differentiated products;
  - multiproduct;
- Estimation using IV and GMM

Required Reading:

- Chapter 4 of Aguirregabiria (2019)
- Bresnahan (1982)
- Genesove and Mullin (1998)
- Wolfram (1999); Sweeting (2007)

Useful Reading:

- Wilson (2002); Cramton (2017)

Lecture 7&8: Empirical Models of Static Oligopoly Models with Incomplete Information

Read Chapters 2 and 3 of Krishna (2010) for some basic knowledge of auction theory and Laffont and Vuong (1996); Guerre, Perrigne, and Vuong (2000) for identification of auction models. Then read Wolak (2003) for identification and estimation of cost functions using bidding data, and Hortaçsu and Puller (2008) for identification of forward positions using bidding data and observed costs.

- Standard auctions and bidding strategies;
- Revenue Equivalence Theorem and optimal auction;
- Identification of standard auctions in symmetric IPV paradigm

Required Reading:

- Wolak (2003)
- Hortaçsu and Puller (2008)

Lecture 9&10: Empirical Models of Two-Stage Oligopoly Models

Read Allaz and Vila (1993); Bushnell (2007). Wolak (2007)

Lecture 11&12: Multiunit Auctions: Uniform or Discriminatory

Read Wolfram (1998)

Useful Topics for Student Presentation

Topic 1: Automobile Industry in China

Topic 2: Shipbuilding Industry in China

Topic 3: Airline Competition

Topic 4: Retail Gasoline Industry

Topic 5: Automobile Lottery v.s. Auction in China

Topic 6: Renewable Policy Analysis

Topic 7: Forward Contracting and Vertical Integration

References

Aguirregabiria, V. (2019): *Empirical Industrial Organization: Models, Methods, and Applications*.

Allaz, B., and J. L. Vila (1993): "Cournot Competition, Forward Markets and Efficiency," *Journal of Economic Theory*, 59(1), 1–16.

Bresnahan, T. F. (1982): "The Oligopoly Solution Concept Is Identified," *Economics Letters*, 10(1-2), 87–92.

——— (1989): "Empirical Studies of Industries with Market Power," *Handbook of Industrial Organization*, 2(89), 1011–1057.

Bushnell, J. (2007): "Oligopoly equilibria in electricity contract markets," *Journal of Regulatory Economics*, 32(3), 225–245.

Cramton, P. (2017): "Electricity Market Design," *Oxford Review of Economic Policy*, 33(4), 589–612.

Genesove, D., and W. P. Mullin (1998): "Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry, 1890-1914," *RAND Journal of Economics*, 29(2), 355–377.

Guerre, E., I. Perrigne, and Q. Vuong (2000): "Optimal Nonparametric Estimation of First-price Auctions," *Econometrica*, 68(3), 525–574.

Hortaçsu, A., and S. L. Puller (2008): "Understanding Strategic Bidding in Multi-Unit Auctions: A Case Study of the Texas Electricity Spot Market," *RAND Journal of Economics*, 39(1), 86–114.

Klemperer, P. D., and M. A. Meyer (1989): "Supply Function Equilibria in Oligopoly under Uncertainty," *Econometrica*, 57(6), 1243–1277.

Kreps, D. M., and J. A. Scheinkman (1983): "Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes," *Bell Journal of Economics*, 14(2), 326–337.

Krishna, V. (2010): *Auction Theory*. Academic Press, 2 edn.

Laffont, J.-j., and Q. Vuong (1996): "Structural Analysis of Auction Data," *American Economic Review*, 86(2), 414–420.

Reiss, P. C., and F. A. Wolak (2007): "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," in *Handbook of Econometrics*, vol. 6, pp. 4277–4415.

Sweeting, A. (2007): "Market Power in the England and Wales Wholesale Electricity Market 1995-2000," *Economic Journal*, 117(520), 654–685.

Tirole, J. (1988): *The Theory of Industrial Organization*. The MIT Press.

Vives, X. (2009): *Oligopoly Pricing: Old Ideas and New Tools*. MIT Press.

Wilson, R. (2002): "Architecture of Power Markets," *Econometrica*, 70(4), 1299–1340.

Wolak, F. A. (2003): "Measuring Unilateral Market Power in Wholesale Electricity Markets: The California Market, 1998-2000," *American Economic Review*, 93(2), 425–430.

Wolak, F. A. (2007): "Quantifying the Supply-Side Benefits from Forward Contracting in Wholesale Electricity Markets," *Journal of Applied Econometrics*, 22(7), 1179–1209.

Wolfram, C. D. (1998): "Strategic Bidding in a Multiunit Auction: An Empirical Analysis of Bids to Supply Electricity in England and Wales," *RAND Journal of Economics*, 29(4), 703–725.

Wolfram, C. D. (1999): "Measuring Duopoly Power in the British Electricity Spot Market," *American Economic Review*, 89(4), 805–826.