

**ECON 8757-001 INDUSTRIAL ORGANIZATION AND PUBLIC POLICY****Empirical Methods in Industrial Organization**

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Class time and location: TTH 9.30 to 10.45pm, ECON 5

**Course Description**

Industrial organization studies firm behavior in markets where the assumptions of perfect competition do not hold. The focus is on the firm's choice of price, quantity of output, product variety, quality and market entry, and how public policy is used to promote competitive outcomes and control market power.

This course introduces the fundamental methods required to do empirical research in industrial organization. The course will be taught with formal lectures, the discussion of papers that emphasize relevant empirical issues and methods, and with regular problem sets in applied econometrics and empirical industrial organization. Theoretical work will also be discussed to show how theories can be tested and how theoretical models can be developed into empirical models to estimate structural parameters.

By the end of the course, you will be able to use Stata/Mata to estimate a standard oligopoly model of price competition in a differentiated products market. Model estimates can be used to recover marginal costs, estimate market power, conduct horizontal and vertical merger analyses, test different pricing assumptions, and to examine the effects of technology change, regulations, subsidies, and tariffs, etc. on equilibrium prices, demand, and welfare.

**Class requirements and office hours**

The class meets Tuesday and Thursday from 9.30 to 10.45am. You are required to keep up with the weekly course readings and come to class prepared for lectures and the discussion of material with your classmates.

The spring term will begin on January 11 with fully remote instruction for the first two weeks of the semester. See Canvas for the Zoom link.

There will be no in-person office hours this semester. Virtual office hours will be held on Tuesday and Thursday from 2.15 to 3.45pm. Please email your carefully written questions and I will answer them by email and, if necessary, organize a Zoom call.

**Assessment**

Your grade will be based on the following assessments: class preparation (30 percent); class presentation (10 percent); problem sets (30 percent); and exams (30 percent).

*Class preparation:* We will discuss about ten papers during the semester. Please read the assigned paper each week and come to class prepared for discussion. To help you organize your thoughts, please prepare a summary of the paper of two pages or fewer and submit the summary for assessment. In your summary, you will need to state the research question, explain why the question is important to industrial organization (and economics in general), briefly explain the estimation approach and data, and outline what you think are the most interesting aspects of the paper. See page 8 below for specific guidance. I will collect all your summaries during the semester and grade six.

*Class presentation:* Each student will be required to present one of the ten papers mentioned above to the class and will lead the discussion.

*Problem sets:* You are required to complete one problem set about every two weeks for a total of seven during the semester. The lowest scoring problem set will be dropped from your final grade. Typically, each problem set will require you to use Stata/Mata to execute econometric procedures to address an industrial organization question. You will also have to interpret your findings and sometimes answer some theoretical and/or conceptual questions.

*Exams:* There will be one mid-term exam on Tuesday, March 1 during class. There will also be one take-home final exam to be completed during April 30 to May 4.

There will be no make up for late submissions unless there is an unusual circumstance that is discussed with the instructor. If you aware of any problems that may hinder your performance in the class, please discuss with me sooner than later. Please feel free to form study groups to review and discuss lecture/reading material, but you must submit your own individual work for grading. If you work with classmates on assignments, please list the names of these persons on the front page of your submitted work.

### **Proposed topics**

The proposed topics for this semester are:

- Introduction to Empirical Industrial Organization
- Consumer Demand
- Firm Conduct
- Market Entry and Competition
- Product Quality
- Economic and Policy Applications

### **Readings**

#### *General references*

The course will help you develop the empirical skills needed to research interesting questions in industrial organization and related fields, e.g., energy, trade, transport. I assume that you have the appropriate micro and econometrics skills to complete the

course. The following general references will help you refresh your knowledge and skills where necessary throughout the course.

- Cameron, A. and Trivedi, P. 2005. *Microeconometrics*. Cambridge University Press, Cambridge, MA.
- Greene, W. 2012. *Econometric Analysis*, 7<sup>th</sup> edition. Prentice Hall. Upper Saddle River, NJ.
- Tirole, J. 1988. *The Theory of Industrial Organization*. The MIT Press. Cambridge, MA.
- Wooldridge, J. 2002. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press. Cambridge, MA.
- Train, K. 2009. *Discrete Choice Methods with Simulation*. Cambridge University Press, New York.

### *Specific references*

This list includes many more papers than we will cover in the course. You should use the list as a guide for reading outside of the class, for ideas, and for future reference. Most papers are readily available from JSTOR, and the respective journal and author web sites. If you have any trouble locating a paper, I should be able to find a copy for you.

### Introduction to Empirical Industrial Organization

- Liran, E., and Levin, J. 2010. "Empirical Industrial Organization: A Progress Report." *Journal of Economic Perspectives*, 24(2), 145-62.
- Nevo, A., and Whinston, M. 2010. "Taking the Dogma Out of Econometrics: Structural Modeling and Credible Inference." *Journal of Economic Perspectives*, Spring, 69-82.
- Reiss, P., and Wolak, F. 2004. "Structural Econometric Modeling: Rationales and Examples from Industrial Organization." In Engle and McFadden (eds.), *Handbook of Econometrics*, Volume V, 1-5, North-Holland, Amsterdam.

### Consumer Demand

- Berry, S. 1994. "Estimating Discrete Choice Models of Product Differentiation." *Rand Journal of Economics*, 25, 242-262.
- Brownstone, D., and K. Train. 1999. "Forecasting New Product Penetration with Flexible Substitution Patterns." *Journal of Econometrics*, 89(1), 109-129.
- McFadden, D. 1974. "Conditional Logit Analysis of Qualitative Choice Behavior." In *Frontiers in Economics*. Edited by P. Zarembka. New York: Academic Press.
- Nevo, A.; Turner, J. and Williams, J., 2016. "Usage-Based Pricing and Demand for Residential Broadband." *Econometrica*, 84, 441-443.
- Revelt, D., and Train, K. 1998. "Mixed Logit with Repeated Choices: Households' Choices of Appliance Efficiency Level." *The Review of Economics and Statistics*, 80(4), 647-657.
- Rosston, G., Savage, S., and Waldman, D. 2010. "Household Demand for Broadband Internet in 2010." *The B.E. Journal of Economic and Policy Analysis (Advances)*, 10(1), 2010, Article 79.

Savage, S., and Waldman, D. 2008. "Learning and Fatigue During Choice Experiments: A Comparison of Online and Mail Survey Modes," *Journal of Applied Econometrics*, 23(3), 351-371.

### Firm Conduct

#### *Homogenous products*

- Bresnahan, T. 1982, "The Oligopolistic Solution Concept is Identified." *Economics Letters*, 10, 87-92.
- Chevalier, J., Kashyap, A., and Rossi, P. 2003. "Why Don't Prices Rise During Periods of Peak Demand? Evidence from Scanner Data." *American Economic Review*, 93(1), 15-37).
- Clay, K., and Troesken, W. 2003. "Further Tests of Static Oligopoly Models: Whiskey, 1882-1898." *The Journal of Industrial Economics*, 51(2), 151-166.
- Genesove, D., and Mullin, W. 1998. "Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry, 1890-1914." *Rand Journal of Economics*, 29(2), 355-77.
- Nevo, A. 1998. "Identification of the Oligopoly Solution in a Differentiated-Products Industry." *Economics Letters*, 59, 391-395.

#### *Differentiated products*

- Berry, S. 1994. "Estimating Discrete Choice Models of Product Differentiation." *Rand Journal of Economics*, 25, 242-262.
- Berry, S., Levinsohn, J., and Pakes, A. 1995. "Automobile Prices in Market Equilibrium." *Econometrica*, 63(July), 841-990.
- Mazzeo, M. 2002. "Competitive Outcomes in Product-Differentiated Oligopoly." *The Review of Economics and Statistics*, 84(4), 716-728.
- Miller, N., and Weinberg, M. 2017. "Understanding the Price Effects of the Miller-Coors Joint Venture." *Econometrica*, 85(6), 1763-1791.
- Nevo, A. 2000. "A Research Assistant's Guide to Random Coefficients Discrete Choice Models of Demand." *Journal of Economics and Management Strategy*, 9(4), 513-548.
- Nevo, A. 2000. "Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry." *RAND Journal of Economics*, 31(3), 395-421.
- Nevo, A. 2001. "Measuring Market Power in the Ready-to-Eat Cereal Industry." *Econometrica*, 69(2), 307-322.
- Petrin, A., and Goolsbee, A. 2004. "The Consumer Gains from Direct Broadcast Satellite and the Competition with Cable Television." *Econometrica*, 72(2), 351-381.
- Petrin, A., and Train, K. 2010. "A Control Function Approach to Endogeneity in Consumer Choice Models." *Journal of Marketing Research*, 47(1), 3-13.
- Shum, M. 2004. "Does Advertising Overcome Brand Loyalty? Evidence from the Breakfast-Cereals Market." *Journal of Economics and Management Strategy*, 13(2), 242-272.

### Market Entry and Competition

- Berry, S., and Waldfogel, J. 1999. "Free Entry and Social Inefficiency in Radio Broadcasting." *Rand Journal of Economics*, 30(3), 397-420.
- Bresnahan, T., and Reiss, P. 1991. "Entry and Competition in Concentrated Markets." *Journal of Political Economy*, 99(5), pp. 977-1009.
- Bresnahan, T., and Reiss, P. 1990. "Entry in Monopoly Markets." *Review of Economics Studies*, 57(4), 531-553.
- Manuszak, M., and Moul, C., 2008, "Prices and Endogenous Market Structure in Office Supply Superstores." *The Journal of Industrial Economics*, 56, 94-112.
- Mazzeo, M. 2002. "Product Choice and Oligopoly Market Structure." *Rand Journal of Economics*, 33(2), 221-242.
- Toivanen, O., and Waterson, M. 2005. "Market Structure and Entry: Where's the Beef?" *Rand Journal of Economics*, 36(3), 680-699.
- Xiao, M., and Orazem, P. 2011. "Does the Fourth Entrant Make Any Difference? Entry and Competition in the Early U.S. Broadband Market." *International Journal of Industrial Organization*, 29(5), 547-561.

### Product Quality

- Allenby, G., Brazell, J., Howell, J., and Rossi, P. 2014. "Valuation of Patented Product Features." *Journal of Law and Economics*, 57(3), 629-663.
- Berry, S., and Waldfogel, J. 2010. "Product Quality and Market Size." *The Journal of Industrial Economics*, 58(1), 1-31.
- Crawford, G. 2005. "The Discriminatory Incentives to Bundle in the Cable Television Industry. Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=829286](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=829286).
- Decarolis, F., M. Polyakova, and S. Ryan. 2020. "Subsidy Design in Privately-Provided Social Insurance: Lessons from Medicare Part D." *Journal of Political Economy*, 128(5), 1712-1752.
- D'Haultfoeuille, X., I. Durrmeyer, and P. Février. 2018. "Automobile Prices in Market Equilibrium with Unobserved Price Discrimination." *Review of Economic Studies*, 0, 1-26.
- Economides, N., Seim, K., and Viard, B. 2008. "Quantifying the Benefits of Entry into Local Phone Service." *RAND Journal of Economics*, 39(3), 699-730.
- Hiller, R. S., Savage, S., and Waldman, D. 2018. "Using Aggregate Market Data to Estimate Patent Damages: An Application to United States Smartphones 2010 to 2015." *International Journal of Industrial Organization*, 60, 1-31.
- Matsa, D. 2011. "Competition and Product Quality in the Supermarket Industry." *Quarterly Journal of Economics*, 126(3), 1539-1591.
- Miller, N., and M. Osborne. 2014. "Spatial Differentiation and Price Discrimination in the Cement Industry: Evidence from a Structural Model." *The RAND Journal of Economics*, 45, 221-247.
- Molnar, G., and Savage, S. 2017. "Market Structure and Broadband Performance." *The Journal of Industrial Economics*, 65(1), 73-104.

- Olivares, M., and Cachon, G. 2009. "Competing Retailers and Inventory: An Empirical Investigation of General Motors' Dealerships in Isolated U.S. Markets." *Management Science*, 55(9), 1586–1604.
- Prince, J., and Simon, D. 2015. "Do Incumbents Improve Service Quality in Response to Entry? Evidence from Airlines' On-Time Performance." *Management Science*, 61(2), 372-390.

### Economic and Policy Applications

- Bonnet, C., and P. Dubois. 2010. "Inference on Vertical Contracts between Manufacturers and Retailers Allowing for Nonlinear Pricing and Resale Price Maintenance." *RAND Journal of Economics*, 41(1), 139-164.
- Chu, Chenghuan S. 2010. "The Effect of Satellite Entry on Cable Television Prices and Product Quality." *RAND Journal of Economics*, 41(4), 730-764.
- Crawford, G. 2000. "The Impact of the 1992 Cable Act on Household Demand and Welfare." *RAND Journal of Economics*, 31(3), 422–49.
- Crawford, G., Lee, R., Whinston, M., and Yurukoglu, A. 2018. "The Welfare Effects of Vertical Integration in Television Markets." *Econometrica*, 86(3), 891-954.
- Crawford, G., Shcherbakov, O., and Shum, M. 2019. "Quality Overprovision in Cable Television Markets." *American Economic Review*, 109(3), 956-995.
- Fershtman, C., N. Gandal, and S. Markovich. 1999. "Estimating the Effect of Tax Reform in Differentiated Product Oligopolistic Markets." *Journal of Public Economics*, 74, 151-170.
- Hiller, R. S., and Savage, S. 2021. "Tariff Pass-Through and Welfare in the Tablet Computer Market," *The Journal of Industrial Economics*, 69(2), 369-409.
- Miravete, E., Seim, K., and Thurk, J. 2018. "One Markup to Rule Them All: Taxation by Liquor Pricing Regulation." Forthcoming in *American Economic Journal: Microeconomics*.
- Richards, T., Acharya, R., and Molina, I. 2009. "Retail and Wholesale Market Power in Organic Apples." *Agribusiness*, 27(1), 62-81.
- Villas-Boas, S. 2007. "Vertical Relationships Between Manufacturers and Retailers: Inference with Limited Data." *The Review of Economic Studies*, 74(2), 625-652.

### **Campus policies**

See the campus and department policies at:

<https://www.colorado.edu/economics/current-courses>.

See the required syllabus statements at:

<https://www.colorado.edu/academicaffairs/policies-customs-guidelines/required-syllabus-statements>.

**Guide for paper summary**

We will discuss about ten papers during the semester. Please prepare a one-to-two-page summary for the designated paper that considers the following questions:

1. What is the research question and why is it interesting?
2. What theory is related to the question and what is the empirically testable implication of the theory?
3. Which market/industry is studied? Do the results generalize to other industries?
4. How were the data obtained, e.g., experimental and/or observational, public availability, single vs. multiple data sources, etc.?
5. Describe the dependent variable and the important independent variable(s) of interest. State the parameter(s) of interest and describe how it relates to theory.
6. How is the parameter(s) of interest identified (i.e., how does the study use information from the sample data to estimate the population parameter of interest)? Can you think of alternative means of identification?
7. Interpret the estimated parameter(s) of interest.
8. Are there plausible alternative interpretations of the estimated parameter(s)?
9. Do the findings from the study have public policy implications?
10. What have you learned from the paper? What did you like and/or dislike about the paper (*this is especially important: I am interested in your personal views*)?