

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

Instructor: Associate Professor Scott Savage

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Office hours: MW 11am to 12pm or by appointment

Class time and location: MW 1.30pm to 2.45pm, ECON 5

Class website: <https://learn.colorado.edu/>

Course Description

ECON 8747 introduces students to empirical methods used in studies of industrial organization (IO) and regulation. The course focuses on important questions in IO, and the use of econometrics for descriptive analysis, examining the predictions of IO theories, and estimating structural parameters. The course will be taught with formal lectures, the discussion of papers that emphasize relevant empirical issues and methods, and with problem sets in applied econometrics and IO.

Class requirements

The class meets Monday and Wednesday from 1.30pm to 2.45pm. Attendance is compulsory. You are required to keep up with weekly course readings and come to class prepared for lectures and the discussion of material with your peers.

Grading

The final grade will be based on four assessments: class preparation (25%); problem sets (25%); mid-term exam (25%); and final exam (25%).

Class preparation: We will discuss about a dozen papers during the semester. Please use the “Reading List” below to read the assigned papers each week and come to class prepared for discussion. To help you organize your thoughts, please prepare a 1 to 2 page summary of the paper and submit the summary to the instructor. Here, you will need to state the research question, explain why the question is important to IO (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 9 below). During the semester, several of your summaries will be randomly graded.

Problem sets: You are required to complete about one problem set every two weeks, for a total of five or six problem sets at the end of the semester. Typically, each problem set will require you to use STATA to implement an econometric procedure and interpret your findings.

Exams: There will be a mid-term exam on Monday, March 4 during class and a final exam on Monday, May 6, 7.30pm to 10pm in ECON 5. Both of these dates are subject to change at the discretion of the instructor.

There will be no make up for late submissions unless there is a 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. Feel free to form study groups to review and discuss lecture/reading material, but you must submit individual work for grading.

Proposed topics

Introduction to IO
Empirical IO
Data
Production and Costs
Demand
Conduct in Homogenous Product Markets
Conduct in Differentiated Product Markets
Mergers
Market Entry and Competition
Product Quality, Variety and Competition

Proposed topics are subject to change at the discretion of the instructor.

Reading list

The course will develop the empirical research skills you need to examine questions of interest in IO and regulation. Students are assumed to be familiar with IO theory and applied econometrics at the undergraduate level. The following references will permit you to refresh your knowledge where necessary throughout the course:

- Baum, C., Schaffer, M., and Stillman, S. 2003. "Instrumental Variables and GMM: Estimation and Testing." Boston College Working Paper No. 545 (available from <http://fmwww.bc.edu/ec-p/wp526-550.php>).
- Baum, C. 2006. An Introduction to Modern Econometrics Using Stata. Stata Press.
- Cabral, L. 2000. Introduction to Industrial Organization. The MIT Press, Cambridge, Massachusetts.
- Cameron, A. and Triveldi, P. 2005. Microeconometrics. Cambridge University Press.
- Greene, W. 1997. Econometric Analysis. Prentice Hall. Upper Saddle River, New Jersey.
- Pepall, L., Richards, D. and Norman, G. Industrial Organization: Contemporary Theory and Practice, 2nd or 3rd edition, Prentice Hall.
- Schmalensee, R. and Willig, R. (1989), Handbook of Industrial Organization, Volume II, Elsevier, New York.
- Tirole, J. 1988. The Theory of Industrial Organization. The MIT Press. Cambridge, Massachusetts.

The reading list below clearly includes more papers than we will cover in the course. You should use the list as a guide for reading outside of the class, ideas and future reference. Most papers are easily available from JSTOR, journal and author web sites. Please let me know if you have any trouble locating a paper.

Introduction to IO, Empirical IO and Data

- Aguirregabiria, V. 2012. Empirical Industrial Organization. Mimeo.
- Keane, M. (2010). "Structural vs. Atheoretic Approaches to Econometrics," *Journal of Econometrics*, 156, 3-20.
- Liran, E., and Levin, J. 2010. "Empirical Industrial Organization: A Progress Report." *Journal of Economic Perspectives*, 24(2), 145-62.
- McAlee, M., Pagan, A. and Volker, P. (1985), "What Will take the Con out of Econometrics," *American Economic Review*, 75(3), 293-307.
- 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 (<http://www.stanford.edu/~preiss/makeit.pdf>).
- Schmalensee, R. (1989), "Inter-Industry Studies of Structure and Performance," in Schmalensee and Willig (eds), *Handbook of Industrial Organization*, Volume II, Elsevier, New York, Chapter 16.

Production and Costs

- Akerberg, D., Caves, K., and Frazer, G. (2006), "Structural Identification of Production Functions," mimeo, UCLA (<http://www.econ.ucla.edu/ackerber/ACF20withtables.pdf>).
- Bloch, H., Coble-Neal, G., Madden, G. and Savage, S. (2001), "The Cost Structure of Australian Telecommunications," *Economic Record*, 77, 338-350.
- Christensen, L. and Greene, W. (1976), "Economies of Scale in U.S. Electric Power Generation," *Journal of Political Economy*, 84(4) 655-676.
- Griliches, Z. and Jacques, M. (1995). "Production Functions: The Search for Identification" (<http://papers.nber.org/papers/w5067.v5.pdf>).
- Evans, D. and Heckman, J. (1984), "A Test of Subadditivity of the Cost Function with an Application to the Bell System," *American Economic Review*, 74(4), 615-623.
- Levinsohn, J. and Petrin, A. (2003), "Estimation of Production Functions using Inputs to Control for Unobservables," *Review of Economic Studies*, 70(2), 317-342.
- Maher, M. (1999), "Access Costs and Entry in the Local Telecommunications Network: A Case for De-averaged Rates," *International Journal of Industrial Organization*, 17, 593-609.
- Olley, S. and Pakes, A. (1996), "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, 64(6), 1263-97.
- Palmer, K. (1992), "A Test for Cross Subsidies in Local Telephone Rates: Do Business Customers Subsidize Residential Customers," *Rand Journal of Economics*, 23, 415-431.

Thorton, R. and Thompson, P. (2001), "Learning and Experience from Others: An Exploration of Learning and Spillovers in Wartime Shipbuilding," *American Economic Review*, 91(5), 1350-1368.

Demand

Ackerberg, D., Riordan, M., Rosston, G. and Wimmer, B. (2009), "Low-Income Demand for Local Telephone Service: The Effects of Lifeline and Linkup" (http://www.econ.ucla.edu/ackerber/ARRWsubmit2_allfinal.pdf).

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.

Hausman, J. (1996), "Valuation of New Goods Under Perfect and Imperfect Competition," in Bresnahan and Gordon (eds), *The Economics of New Goods, Studies in Income and Wealth*, Volume 58, NBER, Chicago.

Hausman, J. (1999), "Cellular Telephone, New Products and the CPI," *Journal of Business and Economic Statistics*, 17(2), 188-94.

Hausman J., Rosston, G. and Pakes, A. (1997). "Valuing the Effect of Regulation on New Services in Telecommunications," *Brookings Papers on Economic Activity: Microeconomics*: 1-54.

Macher, J., Mayo, J., Ukhaneva, O., and Woroch, G. (2011), "Demand in a Portfolio-Choice Environment: The Evolution of Telecommunications," Mimeo. Available at: <http://www.bus.umich.edu/Academics/Departments/BE/pdf/J%20Mayo%20-%20Demand%20in%20a%20Portfolio%20Environment%20September%206.pdf>.

Petrin, A. and Train, K. (2010), "A Control Function Approach to Endogeneity in Consumer Choice Models," *Journal of Marketing Research*, 47(1), 3-13.

Revelt, D., and K. Train. 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. (2004), "United States Demand for Internet Access," *Review of Network Economics*, 2004, 3(3), 228-247.

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.

Train, K., McFadden, D. and Ben-Akiva, M. (1987), "The Demand for Local Telephone Service", *Rand Journal of Economics*, 18, 109-123.

Conduct in Homogenous Products Markets

Bresnahan, T. (1982), "The Oligopolistic Solution Concept is Identified," *Economics Letters*, 10, 87-92.

Bresnahan, T. (1989), "Empirical Studies of Industries with Market Power," *Handbook of Industrial Organization*, Volume II, Elsevier, New York, Chapter 17.

- 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," *Journal of Industrial Economics*, 51, 151-166.
- Corts, K. (1998), "Conduct Parameters and the Measure of Market Power," *Journal of Econometrics*, 88(2), 227-50.
- Ellison, G. (1994), "Theories of Cartel Stability and the Joint Executive Committee," *Rand Journal of Economics*, 25(1) 37-57.
- Evans, W. and Kessides, I. (1994), "Living by the Golden Rule": Multimarket Contact in U.S. Airline Industry," *Quarterly Journal of Economics*, 109(2), 341-366.
- 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.
- Gollop, F and Roberts, M. (1979), "Firm Interdependence in Oligopolistic Markets," *Journal of Econometrics*, 10, 313-331.
- Kahai, S., Kaserman, D. and Mayo, J. (1996), "Is the 'Dominant Firm' Dominant? An Empirical Analysis of AT&T's Market Power," *Journal of Law and Economics*, 39, 499-517.
- Knittle, C. and Kim, D., (2006), "Biases in Static Oligopoly Models?" *The Journal of Industrial Economics*, LIV(4).
- Madden, G. and Savage, S. (2000), "Market Structure, Competition and Pricing in United States International Telephone Services Markets," *Review of Economics and Statistics*, 2000, 82, 291-296.
- Porter, R. (1983), "A Study of Cartel Stability: The Joint Executive Committee, 1880-1886," *Rand Journal of Economics*, 14, 301-314.
- Sullivan, D. (1985) "Testing Hypotheses about Firm Behavior in the Cigarette Industry", *Journal of Political Economy*, 93, 586-598.
- Wolfram, C. (1999) "Measuring Duopoly Power in the British Electricity Spot Market" *American Economic Review*, 89, 805-826.

Conduct in Differentiated Products Markets

- Berry, S., Levinsohn, J. and Pakes, A. (1995), "Automobile Prices in Market Equilibrium," *Econometrica*, 63(July), 841-990.
- Borenstein. 1989. "Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry," *Rand Journal of Economics*, 2(3), 344-365.
- Bresnahan, T. (1987), "Competition and Collusion in the American Automobile Industry: The 1955 Price War," *Journal of Industrial Economics* 35(4): 457-482.
- Crawford, G. (2000), "The Impact of the 1992 Cable Act on Household Demand and Welfare," *Rand Journal of Economics*, 31(3), 422-449.
- Goldberg, P., (1995), "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," *Econometrica*, 63(July), 891-951.
- Mazzeo, M. 2002. "Competitive Outcomes in Product-Differentiated Oligopoly," *The Review of Economics and Statistics*, 84(4), 716-728.
- 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. (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.
- Prince, J., and Greenstein, S. (2011), "Does Service Bundling Reduce Churn?" (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1966221).
- Singh, V., and Zhu, T. 2008. "Pricing and Market Concentration in Oligopoly Markets," *Marketing Science*, 27(6), 1020-1035.

Mergers

- Berry, S., and Waldfogel, J. 2001. "Do Mergers Increase Product Variety? Evidence from Radio Broadcasting," *Quarterly Journal of Economics*, 116(3), 1009-1025.
- Gilbert, R., and Woroch, G. (2010), "Merger in a Bidding Market: Quantifying the Unilateral Effects," (<http://elsa.berkeley.edu/~woroch/merger.pdf>).
- Ivaldi, M., and Verboven, F. 2005. "Quantifying the Effects from Horizontal Mergers in European Competition Policy," *International Journal of Industrial Organization*, 23(9/10), 669-691.
- Nevo, A. (2000), "Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry," *RAND Journal of Economics*, 31(3), 395-421.
- Pinkse, J., and Slade, M. 2004. "Mergers, Brand Competition and the Price of a Pint," *European Economic Review*, 48(3), 617-643.
- Savage, S., Waldman, D., and Hiller, S. 2012, "Market Structure and Media Diversity," Mimeo. See me for most recent draft.
- Werden, G., and Froeb, L. (1994), "The Effects of Merger in Differentiated Products Industries: Logit Demand and Merger Policy," *Journal of Law, Economics and Organization*, 10(2), 407-426.

Market Entry and Competition

- Bergman, M. and Rudholm, N. (2003), "The Relative Importance of Actual and Potential Competition: Empirical Evidence from the Pharmaceuticals Market," *Journal of Industrial Economics*, 51(4), 455-466.
- Berry, S. (1992), "Estimation of a Model of Entry in the Airline Industry," *Econometrica*, 60(4), 889-918.
- 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. (1990), "Entry in Monopoly Markets," *Review of Economics Studies*: 531-53.
- Chen, Y., and Savage, S. (2011), "The Effects of Competition on the Price for Cable Modem Internet Access," *The Review of Economics and Statistics*, February, 93(1), 201-217.
- Ellison, G. and Ellison, S. (2007), "Strategic Entry Deterrence and the Behavior of Pharmaceuticals Incumbents Prior to Patent Expiration," (<http://econ-www.mit.edu/files/887>).

- Goolsbee, A., and Syverson, C. "How Do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines," *Quarterly Journal of Economics*, 123, 1611-1633.
- Greenstein, S. and Mazzeo, M. (2006), "Differentiated Entry into Competitive Telephony," *Journal of Industrial Economics*, LIV(3), 323-350.
- Mazzeo, M. 2002. "Product Choice and Oligopoly Market Structure," *Rand Journal of Economics*, 33(2), 221-242.
- Reiss, P. (1996), "Empirical Models of Discrete Strategic Choices," *American Economic Review*, 86(2), 421-426.
- Savage, S. and Wirth, M. (2005), "Price, Programming, and Potential Competition in US Cable Television Markets," *Journal of Regulatory Economics*, 27(1), 25-46.
- Schaumans, C., and Verboven, F. 2011. "Entry and Competition in Differentiated Products Markets," CEPR Discussion Paper No. DP8353. Available at SSRN: <http://ssrn.com/abstract=1815848>.
- Strassmann, D. (1990), "Potential Competition in the Deregulated Airlines," *The Review of Economics and Statistics*, 72(4), 696-702.
- 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. "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, Variety and Competition

- Alexander, P. 1997. "Product Variety and Market Structure: A New Measure and a Simple Test," *Journal of Economic Behavior and Organization*, 32, 207-214.
- Dick, A. 2007. "Market Size, Service Quality, and Competition in Banking," *Journal of Money, Credit and Banking*, 39(1), 49-81.
- Domberger, S., and Sherr, A. 1989. "The Impact of Competition on Pricing and Quality of Legal Services," *International Review of Law and Economics*, 9, 41-56.
- 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.
- Goolsbee, A. and Petrin, A. 2004. "The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV." *Econometrica*, 72(2), 351-81.
- Matsa, D. 2011. "Competition and Product Quality in the Supermarket Industry." *Quarterly Journal of Economics*, 126(3), 1539-1591.
- Mazzeo, M. 2003. "Competition and Service Quality in the US Airline Industry." *Review of Industrial Organization*, 22(4), 275-296.
- Molnar, G., and Savage, S. 2012. "Market Structure and Broadband Performance," Mimeo. See me for most recent draft.
- 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. 2010. "Do Incumbents Improve Service Quality in Response to Entry? Evidence from Airlines' On-Time Performance," Available at SSRN: <http://ssrn.com/abstract=1670203> or <http://dx.doi.org/10.2139/ssrn.1670203>

- Savage, S., Waldman, D., and Hiller, S. 2012, "Market Structure and Media Diversity," Mimeo. See me for most recent draft.
- Watson, R. 2009. "Product Variety and Competition in the Retail Market for Eyeglasses," *Journal of Industrial Economics*, LVII(2), 217-251.

Campus policies

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. See policies at <http://www.colorado.edu/policies/classbehavior.html> and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code.

The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of discrimination or harassment based upon race, color, national origin, sex, age, disability, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at <http://www.colorado.edu/odh>.

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-725-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at <http://www.colorado.edu/policies/honor.html> and at <http://www.colorado.edu/academics/honorcode/>.

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see

Temporary Injuries under Quick Links at [Disability Services website](#) and discuss your needs with your professor.

Campus policy regarding religious observances requires that faculty make every effort to reasonably and fairly deal with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please indicate by email, before the end of week two, if there is a conflict. See full details at http://www.colorado.edu/policies/fac_relig.html.

Guide to reading papers for class discussion

We will discuss about a dozen papers during the semester. Please prepare a 1 to 2 page summary for the designated paper that considers the following questions:

1. What is the research question and why is it interesting?
2. What IO theory is related to the research question, and what is the empirically testable implication of the theory?
3. Which market/industry is studied? Do you think the paper's results will generalize to other markets or industries?
4. How were the data obtained, e.g., are the data experimental or observational, are the data publicly available, are the data obtained from single or multiple sources?
5. Describe the dependent variable and the important independent variable(s) of interest. State the parameter of interest and describe how it relates to the theory in point 2 above.
6. How is the parameter 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 sample estimate of the important parameter of interest.
8. Are there any plausible alternative interpretations of the estimate of the important parameter of interest?
9. Do the findings from the study have public policy implications?
10. What you have learned from the paper in terms of IO and applied econometrics. What did you particularly like and/or dislike about the paper (VERY IMPORTANT: I am interested in your personal views)?