# ECON 8757-001 INDUSTRIAL ORGANIZATION AND PUBLIC POLICY

#### **Empirical Methods in Industrial Organization**

Instructor: Associate Professor Scott Savage Office: ECON 121 (north-west corner of ground floor in economics building) Address: Department of Economics, 256 UCB, Boulder, Colorado 80309-0256 Email: <u>scott.savage@colorado.edu</u> Phone: 303-735-1165 Fax: 303-492-8960 Web site: <u>http://www.colorado.edu/Economics/people/faculty/savage.html</u> Office hours: M 2-4pm, W 2-3pm, or by appointment Class time and location: MW 11am-12.15pm, ECON 5

# **Course Description**

Industrial Organization (IO) studies how firms interact with rivals, consumers, and policy makers when the assumptions of perfect competition do not typically hold. The primary focus is on the firm's choice of price, quantity of output, product variety and quality, and market entry, and how public policy is used to promote competitive outcomes and control market power. This course in *ECON 8747 Industrial Organization and Public Policy* introduces you to some of the empirical methods used to study IO questions. 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 academic papers that emphasize relevant empirical issues and methods, and with regular problem sets in applied econometrics and empirical IO.

### **Class requirements**

The class meets Monday and Wednesday from 11am to 12.15pm. 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 class mates.

### Assessment

Your final grade will be based on the following assessments: class preparation (35 percent); problem sets (35 percent); and exams (30 percent).

*Class preparation*: We will discuss about a dozen papers during the semester. I will nominate appropriate papers from the "Reading List" below as we proceed through the course. Please read the assigned paper each week and come to class prepared for discussion. To help you organize your thoughts, please prepare a one to two page summary of the paper (no more than two pages) and submit the summary to me for assessment. In your summary, 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 7 below for specific guidance). I will collect all of your summaries during the semester and randomly grade seven.

*Problem sets*: You are required to complete one problem set about every two weeks, for a total of seven sets for the entire semester. For example, problem set 1, available on Desire2Learn, is due on January 23, and problem set 2, also available on Desire2Learn, is due on February 18. Typically, each problem set will require you to use STATA to implement an econometric procedure to address an empirical IO question, to interpret your findings, and in some cases, answer a theoretical or conceptual question.

*Exams*: There will be an exam on Wednesday, March 4, and another on Wednesday, April 22.

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. Please feel free to form study groups to review and discuss lecture/reading material, but you must submit your own individual work for grading (<u>note</u>: if you work with a study group or individual class mates 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:

- 1. Introduction to IO
- 2. Empirical IO and Data
- 3. Production and Costs
- 4. Consumer Demand
- 5. Conduct in Homogenous Product Markets
- 6. Conduct in Differentiated Product Markets
- 7. Market Entry and Competition
- 8. Product Quality, Variety and Competition

# **Reading list**

### General references

The course will help you develop the empirical skills needed to research interesting questions in IO, and in other fields. I assume that you have the appropriate microeconomic theory and econometrics skills to complete the course. The following general references will help you refresh your knowledge and skills where necessary throughout the course.

Cabral, L. 2000. *Introduction to Industrial Organization*. The MIT Press, Cambridge, MA.

- Cameron, A. and Triveldi, P. 2009. *Microeconometrics Using Stata*. Stata Press, College Station, TX.
- Cameron, A. and Triveldi, P. 2005. *Microeconometrics*. Cambridge University Press, Cambridge, MA.

- Greene, W. 2012. *Econometric Analysis*, 7<sup>th</sup> edition (any previous addition will suffice). Prentice Hall. Upper Saddle River, NJ.
- Louviere, J., Hensher, D., and Swait, J. 2000. *Stated Choice Methods*. Cambridge University Press, New York.
- Pepall, L., Richards, D. and Norman, G. 2014. *Industrial Organization: Contemporary Theory and Practice*, 5<sup>th</sup> edition (any previous addition will suffice). John Wiley and Sons, Hoboken, NJ.
- 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, 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

The list of specific references 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, for ideas, and for future reference. Most papers are readily available from JSTOR, and the respective journal and author web sites. Please let me know if you have any trouble locating a paper, and I should be able to find a copy for you.

#### Empirical IO and Data

- 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.
- McAleer, 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

Ackerberg, D., Caves, K., and Frazer, G. 2006. "Structural Identification of Production Functions," mimeo, UCLA (<u>http://www.econ.ucla.edu/ackerber/ACF20withtables.pdf</u>).

- Griliches, Z., and Jacques, M. 1995. "Production Functions: The Search for Identification," NBER Working Paper 5067 (<u>http://www.nber.org/papers/w5067</u>).
- Levinsohn, J., and Petrin, A. 2003. "Estimation of Production Functions using Inputs to Control for Unobservables," *Review of Economic Studies*, 70(2), 317-342.
- Olley, S., and Pakes, A. 1996. "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, 64(6), 1263-97.
- Shin, R., and Ying, J., 1992. "Unnatural Monopolies in Local Telephone," *RAND Journal* of *Economics*, 23, 171-183.
- 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.

Consumer Demand

- Ackerberg, D., Riordan, M., Rosston, G., and Wimmer, B. 2014. "Estimating the Impact of Low-Income Universal Service Programs," *International Journal of Industrial Organization*, 37, 84-98.
- 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.
- Nevo, A.; Turner, J. and Williams, J., 2013. "Usage-Based Pricing and Demand for Residential Broadband," *NBER Economics of IT and Digitization Workshop* (<u>http://dx.doi.org/10.2139/ssrn.2330426</u>)
- 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.

Conduct in Homogenous Products Markets

- 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.
- Evans, W., and Kessides, I. 1994. "Living by the Golden Rule": Multimarket Contact in the 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.

Conduct in Differentiated Products Markets

- Berry, S., Levinsohn, J., and Pakes, A. 1995. "Automobile Prices in Market Equilibrium," *Econometrica*, 63(July), 841-990.
- Bresnahan, T. 1987. "Competition and Collusion in the American Automobile Industry: The 1955 Price War," *The Journal of Industrial Economics*, 35(4): 457-482.
- 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.
- Petrin, A., and Train, K. 2010. "A Control Function Approach to Endogeneity in Consumer Choice Models," *Journal of Marketing Research*, 47(1), 3-13.

# 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.
- Goolsbee, A., and Syverson, C. 2008. "How Do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines," *Quarterly Journal of Economics*, 123(4), 1611-1633.
- Manuszak, M., and Moul, C., 2008, "Prices and Endogenous Market Structure in Office Supply Superstores," *The Journal of Industrial Economics*, 56, pp. 94–112.
- Mazzeo, M. 2002. "Product Choice and Oligopoly Market Structure," *Rand Journal of Economics*, 33(2), 221-242.
- Singh, V., and Zhu, T. 2008. "Pricing and Market Concentration in Oligopoly Markets," *Marketing Science*, 27(6), 1020-1035.
- 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, Variety and Competition

- Berry, S., and Waldfogel, J. 2010. "Product Quality and Market Size," *The Journal of Industrial Economics*, 58(1), 1–31.
- 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.

- Matsa, D. 2011. "Competition and Product Quality in the Supermarket Industry." *Quarterly Journal of Economics*, 126(3), 1539-1591.
- Molnar, G., and Savage, S. 2014. "Market Structure and Broadband Performance," Mimeo, University of Colorado at Boulder (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. 2014. "Do Incumbents Improve Service Quality in Response to Entry? Evidence from Airlines' On-Time Performance," forthcoming, *Management Science*.
- Watson, R. 2009. "Product Variety and Competition in the Retail Market for Eyeglasses," *The Journal of Industrial Economics*, 57(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 <a href="http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\_code">http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student\_code.</a>

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 <u>http://www.colorado.edu/policies/honor.html</u> and at <u>http://www.colorado.edu/academics/honorcode/</u>.

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 <u>dsinfo@colorado.edu</u>. If you have a temporary medical condition or injury, see Temporary Injuries under Quick Links at <u>Disability Services website</u> 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 <a href="http://www.colorado.edu/policies/fac\_relig.html">http://www.colorado.edu/policies/fac\_relig.html</a>.

# Guide to reading papers for class discussion

We will discuss about a dozen 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 the theory in point 2 above.
- 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 sample estimate of the parameter(s) of interest.
- 8. Are there any plausible alternative interpretations of the estimate of the parameter(s) 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 (*this is very important: I am interested in your personal views*)?