

EMPIRICAL METHODS IN INDUSTRIAL ORGANIZATION

Spring Quarter 2009

Professor Paul Ellickson

COURSE SUMMARY

The course focuses on recent developments in empirical industrial organization (IO). There is no text. The course will be a mixture of lecture notes and discussion of specific papers. With a focus on teaching *empirical* research skills, I assume you are familiar with the theory behind the economic models we will be studying. You should obtain a copy of the text by Tirole, *The Theory of Industrial Organization*, and use that to update yourself on models we cover that are unfamiliar to you. Carlton and Perloff's undergraduate book *Modern Industrial Organization* is also a good reference. For econometric issues you may want to consult Wooldridge's or Cameron and Trevidi's graduate econometrics texts.

Below is an outline of the topics we will cover.

COURSE REQUIREMENTS

The course requirements consist of the following components:

1. Each student will give 1-2 in-class presentations of a paper (these papers are specified in the outline below). There should be about one student presentation per week.
2. One or two referee reports for specified papers.
3. Empirical Project.

COURSE OUTLINE

Part 1 (January 14 - February 25)

Topic 1 Static Demand: Homogenous Goods (1 Week)

- T. Bresnahan (1982) "The Oligopoly Solution is Identified," *Economics Letters*, 10, 87-92.
- T. Bresnahan (1989) "Empirical Studies of Industries with Market Power," *Handbook of Industrial Organization*, Chapter 17.
- R. Porter (1983) "A Study of Cartel Stability: The Joint Executive Committee 1880–1886," *Bell Journal of Economics*, 14(2), 301–14.

Additional References: J.N. Rosse, “Estimating Cost Function Parameters Without Using Cost Data: Illustrated Methodology,” *Ema* (1970) O. Ashenfelter and D. Sullivan, “Nonparametric Tests of Market Structure: An Application to the Cigarette Industry,” *JIE* (1987) J. Baker and T. Bresnahan, “Estimating the Residual Demand Curve Facing a Single Firm,” *IJIO* (1988) J. Panzar and J. Rosse, “Testing for ‘Monopoly’ Equilibrium,” *JIE* (1987) R. Schmalensee, “Inter-industry Studies of Structure and Performance,” *HIO* (1989) D. Genesove and W. Mullin “Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry, 1890-1914,” *Rand* (1998) G. Ellison “Theories of Cartel Stability and the Joint Executive Committee,” *Rand* (1994) K. Corts “Conduct Parameters and the Measurement of Market Power,” *JofE* (1999) A. Rosen “Identification and Estimation of Firms’ Marginal Cost Functions with Incomplete Knowledge of Strategic Behavior” Working Paper (2006) P.Reiss and F. Wolak “Structural Econometric Modeling Rationales and Examples from Industrial Organization” *HIO* (2007)

Topic 2 Static Demand: Differentiated Products (2 Weeks)

- T. Bresnahan (1987) “Competition and Collusion in the American Auto Industry: The 1955 Price War,” *Journal of Industrial Economics*, 35, 457–82.
- S. Berry (1994) “Estimating Discrete Choice Models of Product Differentiation,” *Rand Journal of Economics*, 25(2), 242–62.
- A. Nevo (1998) “A Practitioner’s Guide to Estimation of Random-Coefficients Logit Models of Demand,” *Journal of Economics and Management Strategy*, 9(4), 513–48.
- A. Nevo (2000) “Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry,” *Rand Journal of Economics*, 31(3), 395–421.
- *Students* — T. Bresnahan, S. Stern and M. Trajtenberg (1997) “Market Segmentation and the Source of Rents from Innovation: Personal Computers in the Late 1980s,” *Rand Journal of Economics* (28), 17–44..

Additional References: D. McFadden “Conditional Logit Analysis of Qualitative Choice Behavior” *FE* (1974) T. Bresnahan “Departures from Marginal-Cost Pricing in the American Automobile Industry” *JoE* (1981) A. Caplin and B. Nalebuff “Aggregation and Imperfect Competition: On the Existence of Equilibrium” *Ema* (1991) S. Berry, J. Levinsohn, and A. Pakes “Automobile Prices in Market Equilibrium,” *Ema* (1995) A. Nevo “Measuring Market Power in the Ready-to-Eat Cereal Industry” *Ema* (2001) R. Feenstra and J. Levinsohn “Estimating Markups and Market Conduct with Multidimensional Attributes *REStud* (1995) ”J. Hausman, G. Leonard, and J. Zona, “Competitive Analysis with Differentiated Products,” *Annales D’Economie et de Statistique* April/June (1994) D. McFadden, “Econometric Analysis of Qualitative Response Models,” *HoE* (1984) N.S. Cardell “Variance Components Structures for the Extreme-Value and Logistic Distributions with Application to Models of Heterogeneity” *ET* (1999) P. Goldberg, "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," *Ema* (1995) I. Hendel, “Estimating Multiple Discrete Choice Models: An Application to Computerization Returns,” *ReStud* (1999) S. Berry, J. Levinsohn and A. Pakes, “Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market,” *JPE* (2004) M. Trajtenberg, “The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners,” *JPE* (1999) J. Hausman, “Cellular Telephone, New Products and the CPI,” *JBES* (1999) A. Nevo, “New Products, Quality Changes and Welfare Measures Computed from Estimated Demand Systems,” *ReStat* (2003) D. Akerberg, C.L. Benkard, S. Berry, and A. Pakes “Econometric Tools for Analyzing Market Outcomes” *Hem* (2007) K. Train *Discrete Choice Methods with Simulation* (2003)

J.P. Dubé, J. Fox, and C.L. Su (2008): “Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation” Working Paper

Topic 3 Differentiated Products: Applications (1 Week)

- M. Rysman (2004) “Competition Between Networks: A Study of the Market for Yellow Pages,” *Review of Economic Studies*, 71(2), 483-512.
- A. Petrin (2002) “Quantifying the Benefits of New Products: The Case of the Minivan,” *Journal of Political Economy*, 705-729.
- *Students* — J. Hausman (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, Vol. 58, Chicago: NBER. Including comment by Bresnahan (in the same volume) and reply to comment (and reply to reply).
- *Students* — P. Bayer and C. Timmins (2007) “Estimating Equilibrium Models of Sorting Across Locations,” *Economic Journal*, 117(518), 353-374

Additional References: See Topic 2.

Topic 4 Differentiated Products: Extensions (1.5 Weeks)

- *Students* — A. Petrin and K. Train (2009) “Control Function Corrections for Unobserved Factors in Differentiated Products” *Quantitative Marketing and Economics*
- *Students* — D. Akerberg and M. Rysman (2005) “Unobservable Product Differentiation in Discrete Choice Models: Estimating Price Elasticities and Welfare Effects,” *Rand Journal of Economics*, 771-788.
- P. Bajari and L. Benkard (2006) “Demand Estimation With Heterogenous Consumers and Unobserved Product Characteristics: A Hedonic Approach,” *Journal of Political Economy*
- S. Berry and A. Pakes (2007) “The Pure Characteristics Demand Model” *International Economic Review* 48(4), 1193-1225

Additional References: See Topic 2.

Topic 5 Dynamic Demand (1.5 Weeks)

- J. Carranza (2006) “Consumer Heterogeneity, Demand for Durable Goods and the Dynamics of Quality”
- I. Hendel and A. Nevo (2006) “Measuring the Implications of Sales and Consumer Stockpiling Behavior,” *Econometrica*, 74(6)
- *Students* — G. Gowrisankaran and M. Rysman (2006) “Dynamics of Consumer Demand for New Durable Goods”

Additional References: O. Melnikov (2001) “Demand for Differentiated Products: the Case of the U.S. Computer Printer Market” H. Nair “Intertemporal Price Discrimination with Forward-looking Consumers: Application to the US Market for Console Video-Games” QME (2007) P. Schiraldi (2007) “Automobile Replacement: A Dynamic Structural Approach” B. Gordon (2006) “Estimating a Dynamic Model of Demand for Durable Goods”

Topic 6 Production Function Estimation (1.5 Weeks)

- Z. Griliches and J. Mairesse (1995) “Production Functions: The Search for Identification,” NBER
- S. Olley and A. Pakes (1996) “The Dynamics of Productivity in the Telecommunications Equipment Industry,” *Econometrica*, 64(6), 1263-1298
- J. Levinsohn and A. Petrin (2003) “Estimating Production Functions Using Intermediate Inputs to Control for Unobservables,” *Review of Economic Studies*, 70, 317-41.
- *Students* — C. Syverson (2004) “Market Structure and Productivity: A Concrete Example” *Journal of Political Economy*, 112(6), 1181-1222.

Additional References: U. Doraszelski and J Jaumandreu “R&D and Productivity: The Knowledge Capital Model Revisited” (2006) Harvard. Z. Griliches and J. Hausman, “Errors in Variables in Panel Data” J of E (1986) T. Klette and Z. Griliches, “The Inconsistency of Common Scale Estimators When Output Prices Are Unobserved and Endogenous” JAE (1996) J. Panzar “Technological Determinants of Firm and Industry Structure” HIO (1989) F. Wolak “An Econometric Analysis of the Asymmetric Information, Regulator-Utility Interaction” *Annales d’Economie et de Statistique* (1994) L. Foster, J. Haltiwanger and C. Syverson “Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability?” AER R. Blundell and S. Bond "GMM Estimation with Persistent Panel Data: An Application to Production Functions" ER (2000) D. Akerberg, K. Caves and G. Frazer “Structural Estimation of Production Functions” D. Akerberg, C.L. Benkard, S. Berry, and A. Pakes “Econometric Tools for Analyzing Market Outcomes” HEM (2007)

Topic 7 Estimating Static Games of Complete Information (2.5 Weeks)

- T. Bresnahan and P. Reiss (1990) “Entry in Monopoly Markets” *Review of Economic Studies*, 57, pp. 531–553.
- T. Bresnahan and P. Reiss (1991) “Empirical Models of Discrete Games” *Journal of Econometrics*, 48, pp. 57-81.
- *Students* — S. Berry (1992) “Estimation of a Model of Entry in the Airline Industry” *Econometrica*, 60, pp. 889–917.
- *Students* — M. Mazzeo (2002) “Product Choice and Oligopoly Market Structure” *Rand Journal of Economics*, 33, pp. 221-242.
- P. Jia (2009) “What Happen’s When Wal-Mart Comes to Town? An Empirical Analysis of the Discount Retail Industry” *Econometrica*.
- F. Ciliberto and E. Tamer (2007) “Market Structure and Multiple Equilibria in Airline Markets” *Working Paper: Northwestern University*.

Additional References: Bresnahan, T. and P. Reiss “Entry and Competition in Concentrated Markets” JPE (1991) Bresnahan, T. and P. Reiss “Do Entry Conditions Vary Across Markets?” BPEA (1987) Bajari, P., H. Hong and S. Ryan “Identification and Estimation of Discrete Games of Complete Information” (2006) Pakes, A., J. Porter, K. Ho, and J. Ishii “Moment Inequalities and Their Application” (2006) Ellickson, P., S. Houghton, and C. Timmins “Estimating Network Economies in Retail Chains: A Revealed Preference Approach” (2007)

Topic 8 Estimating Static Games of Incomplete Information (1 Week)

- *Students* — K. Seim (2006) “An Empirical Model of Firm Entry with Endogenous Product-Type Choices” *Rand Journal of Economics*, 37, pp. 619-642.
- *Students* — P. Ellickson and S. Misra (2008) “Supermarket Pricing Strategies” *Marketing Science*
- *Students* — A. Sweeting (2007) “Coordination Games, Multiple Equilibria and The Timing of Radio Commercials” *Rand Journal of Economics*, 2009

Additional References: Rust, J. ‘Estimation of Dynamic Structural Models, Problems and Prospects: Discrete Decision Processes’ (1994) Einav, L. (2003) “Not All Rivals Look Alike: Estimating an Equilibrium Model of The Release Date Timing Game” EI (2008) Augereau, A., S. Greenstein and M. Rysman “Coordination vs. Differentiation in a Standards War: 56K Modems” RJE (2006) Bayer, P. and C. Timmins “Estimating Equilibrium Models of Sorting Across Locations” EJ (2006) Bajari, P., H. Hong, J. Krainer, D. Nekipelov “Estimating Static Models of Strategic Interaction” (2006) Gowrisankaran, G. and J. Krainer (2004) “The Welfare Consequences of ATM Surcharges: Evidence from a Structural Entry Model” (2004) Watson, R. “Product Variety and Competition in the Retail Market for Eyeglasses” (2005)

Topic 9 Computational Models of Dynamic Oligopoly (1.5 Weeks)

- R. Ericson and A. Pakes (1995) “Markov-Perfect Industry Dynamics: A Framework for Empirical Work” *Review of Economic Studies*, 62, pp. 53–82.
- A. Pakes and P. McGuire (1994) “Computing Markov-Perfect Nash Equilibria: Numerical Implications of a Dynamic Differentiated Product Model” *Rand Journal of Economics*, 25, pp. 555–588.
- U. Doraszelski and K. Judd (2007) “Avoiding the Curse of Dimensionality in Dynamic Stochastic Games”
- G. Weintraub, C.L. Benkard, and B. Van Roy (2008) “Computational Methods for Oblivious Equilibrium”

Additional References: Doraszelski, U., and A. Pakes “A Framework for Applied Dynamic Analysis in IO” HIO (2007) Doraszelski, U., and M. Satterthwaite “Foundations of Markov-Perfect Industry Dynamics: Existence, Purification, and Multiplicity” (2004) Besanko, D. and U. Doraszelski “Capacity Dynamics and Endogenous Asymmetries in Firm Size” RJE Gowrisankaran, G. “A Dynamic Model of Endogenous Horizontal Mergers” RJE Fershtman, C., and A. Pakes “A Dynamic Oligopoly with Collusion and Price Wars” RJE (2000) G. Weintraub, C.L. Benkard, and B. Van Roy: “Markov Perfect Industry Dynamics with Many Firms” Ema (2007)

Topic 10 Estimating Dynamic Games (2 Weeks)

- Aguirregabiria, V. and P. Mira (2007) “Sequential Estimation of Dynamic Discrete Games” *Econometrica*
- P. Bajari, L. Benkard and J. Levin (2007) “Estimating Dynamic Models of Imperfect Competition” *Econometrica*, 75, pp. 1331–1370.
- *Students* — A. Ching (2004) “A Dynamic Oligopoly Structural Model for the Prescription Drug Market After Patent Expiration”
- *Students* — S. Ryan (2006) “The Costs of Environmental Regulation in a Concentrated Industry”
- *Students* — A. Collard-Wexler (2006) “Demand Fluctuations and Plant Turnover in Ready-Mix Concrete” *Working Paper: NYU*.

Additional References: Jofre-Benet, M., and M. Pesendorfer “Estimation of a Dynamic Auction Game” Ema (2007) Pakes, A., M. Ostrovsky and S. Berry “Simple Estimators for the Parameters of Discrete Dynamic Games (with Entry/Exit Examples)” RJE (2007) Pesendorfer, M. and P. Schmidt-Dengler “Identification and Estimation of Dynamic Games” ReStud (2008) Benkard, L. “A Dynamic Analysis of the Market for Wide-Bodies Aircraft” ReStud (2006) Beresteanu, A. and P. Ellickson “The Dynamics of Retail Oligopoly” (2006) Macieira, J. “Extending the Frontier: A Structural Model of Investment and Technological Competition in the Supercomputer Industry” (2006) Dunne, T., M. Roberts, S. Klimek and Y. Xu “Entry and Exit in Geographic Markets” (2006) Sweeting, A. “The Costs of Product Repositioning: The Case of Format Switching in the Commercial Radio Industry” (2006) D. Akerberg, C.L. Benkard, S. Berry, and A. Pakes “Econometric Tools for Analyzing Market Outcomes” HEm (2007)