Syllabus and Course Description

The aim of this course is to provide an overview of the state-of-the-art in empirical modeling in applied microeconomics. The focus is on building, estimating and interpreting output from models using microeconomic data, the primary activity of academics in most fields of economics with a substantive microeconomic component (marketing, industrial organization, international trade, etc.). Many of the techniques we'll cover are also used in non-academic settings, to evaluate mergers, to forecast demand for new products, to understand the structure of demand in order to set prices and to practice techniques like yield management.

Required Text: There is no required text for the course.

Grading: To be discussed in the first class.

Prerequisites: A solid grasp of both microeconomics and econometrics such as that provided by the first year Ph.D. core courses. Later topics require an elementary knowledge of game theory.

Class Preparation: Typically, we'll cover the material in several papers in a single class, but I'll tell you which one or two to focus on in preparation for class.

For Economics Generals: There will be at least one *optional* question from this course's material on the economics department I.O. General Exam. To help prepare you to answer that, I'll provide a couple of problem sets during the semester. These will be voluntary, but you should definitely hand them in to me if you plan on answering the questions on the general exams so I can provide feedback.

Production and Cost Function Estimation

Baumol, W. J., Panzar, J. C. and Willig, R. D. "Contestable Markets and The Theory of Industry Structure," Harcourt Brace Jovanovich, New York, 1982.

Benkard, L. "Learning and Forgetting: The Dynamics of Commercial Aircraft Production." Forthcoming, *American Economic Review, 2001*.

Christensen, L., Jorgenson, D. and Lau, L. "Transcendental Logarithmic Production Frontiers," *The Review of Economics and Statistics*, Vol. 55, No. 1, 1973.

Christensen, L., and W. Greene, "Economies of Scale in U.S. Electric Power Generation," *Journal of Political Economy*, 84:4, 1976, pp. 655-676.

Evans and Heckman, "Multiproduct Cost Function Estimates and Natural Monopoly Testes for the Bell System," in D. Evans (ed.) *Breaking up Bell*, New York, North Holland, 1983. 1

Greene, W. H. "Frontier Production Functions," in H. Pesaran and P. Smidth (eds.) *Handbook of Applied Econometrics: Microeconomics (Vol 2)*. Blackwell, 1997.

Lieberman, M., "The Learning Curve and Pricing in the Chemical Processing Industries," *RAND Journal of Economics*, 15, pp. 213-228, 1984.

Marschak, J. and Andrews, W. H. "Random Simultaneous Equations and the Theory of Production," *Econometrica*, Vol. 12, No. ¾, p143-205, 1944.

McElroy, " Additive General Error Models for Production, Cost, and Derived Demand or Share Systems," *Journal of Political Economy*, pp. 737-757, 1987.

Olley, S., and A. Pakes, "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, Vol. 64, No. 6, pp. 1263-1297, 1996.

---

1 See also:

Evans and Heckman, "A Test of Subadditivity of the Cost Function with an Application to the Bell System," *American Economic Review*, September 1984, pp.615-623.

Röller, L.-H., "Modeling Cost Structure: the Bell System Revisited," *Applied Economics*, 22, 1990, pp. 1661-1674.

Sueyoshi, T. and Anselmo, P. "The Evans and Heckman Subadditivity Test: Comment." *The American Economic Review*, Vol. 76, No. 4. (Sep., 1986), pp. 854-855.

Nerlove, M. "Returns to Scale in Electricity Supply," in *Measurement in Economics*, Christ, C. ed. Stanford University Press, Stanford, 1963.

Demand Systems

1. Continuous Choice Demand Models

Banks, J., Blundell R. and Lewbel, A. "Quadratic Engel Curves and Consumer Demand," *Review of Economics and Statistics*, 1997.

Banks, J., Blundell, R. and Lewbel, A. "Tax Reform and Welfare Measurement: Do We Need Demand System Estimation?" Economics Journal, 106, 1227-1241, 1996.

Brown and Walker, "The Random Utility Hypothesis and Inference in Demand Systems," *Econometrica*, 59, pp. 815-829, 1989.

Deaton, A. and Muelbauer, J. "An Almost Ideal Demand System," *American Economic Review*, Vol. 70, No. 3, 1980.

Christensen, L. R. , Jorgenson, D. W. and Lau, L. J. "Transcendental Logarithmic Utility Functions," American Economic Review, pp. 367-383, 1975.

Hausman, J. " Valuation of New Goods under Perfect and Imperfect Competition," in *The Economics of New Goods*, T. Bresnahan (ed.), 1996.

Ellison, S.F., Cockburn, I., Griliches, Z. and Hausman, J. "Characteristics of Demand for Pharmaceutical Products: An examination of four cephalosporins." *RAND*, Vol. 28, No. 3, 1997.

2. Discrete Choice Demand Models

Berry, S., Levinsohn, J., and Pakes, A. "Differentiated Products Demand Systems from a Combination of Micro and Macro data: The New Car Market." *NBER working paper*, #6481, 1997.

McFadden, "Conditional Logit Analysis of Qualitative Choice Behavior," in Frontiers in Econometrics, ed., by P. Zarembka. New York: Academic Press, 1973.

Hausman, J. and Wise, D. "A Conditional Probit Model for Qualitative Choice: Discrete

Decisions Recognizing Interdependence and Heterogeneous Preferences." *Econometrica*, Vol. 46, No. 2, 1978.

Goldberg, P., "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," *Econometrica*, 63:4, pp. 891-951, July 1995.

Berry, S., "Estimating Discrete Choice Models of Product Differentiation," *RAND Journal of Economics*, 25:2, pp. 242-262, 1994.

Boyd and Melman, "The Effect of Fuel Economy Standards on the U.S. Automotive Market: A Hedonic Demand Analysis." *Transportation Research*, 1980.

Bresnahan, Stern, and Trajtenberg, "Market Segmentation and the Sources of Rents from Innovation: Personal Computers in the Late 1980s," *Rand Journal of Economics*, Special Issue, 1997.

Davis, P. "Empirical Models of Demand for Differentiated Products." *European Economic Review (papers and proceedings,)* Vol. 44(4-6), 2000.

Hendel, I., "Estimating Multiple-Discrete Choice Models: An Application to Computerization Returns," *Review of Economic Studies*, pp. 423-446, April 1999.

3. Discrete/Continuous Choice Models.

Dubin and McFadden, D. "An Econometric Analysis of Residential Electrical Appliance Holdings and Consumption," *Econometrica*, March 1984, pp. 345-362.

4. Welfare Analysis

Small, K. and Rosen, H. "Applied Welfare Economics with Discrete Choice Models," *Econometrica*, 49(1), 1981.

Trajtenberg, M. "The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners," *Journal of Political Economy,* 97(2), 444-479.

Petrin, A. "Quantifying the Benefits of New Products: The Case of the Minivan," mimeo, University of Chicago, 1999.2

---

2 See also the literature on hedonic pricing

Epple, "Hedonic Prices and Implicit Markets: Estimating Demand and Supply Functions for Differentiated Products," *Journal of Political Economy,* 95:1, February 1987, pp. 59-80.

Harrison and Rubinfeld, "Hedonic Housing Prices and the Demand for Clean Air," *Journal of Environmental Economics and Management*, 5, pp. 81-102.

Kahn, S. And Lang, K. "Efficient Estimation of Structural Hedonic Systems." *International Economic Review*. Vol. 29, No. 1, February 1988.

Rosen, S. "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *Journal of Political Economy,* 82, February 1974, pp. 34-55.

Static Games of Perfect Information

Pricing Games

Berry, Levinsohn, and Pakes, "Automobile Prices in Market Equilibrium," Econometrica, July 1995, 841-890.

Bresnahan, T. "Competition and Collusion in the American Automobile Industry: The 1955 Price War," *Journal of Industrial Economics*, June 1987, pp. 457-482.

Hausman, J. Leonard, G. and Zona, J.D. "Competitive Analysis with Differentiated Products." *Annales D'Economie et de Statistique*, 1994.

Computation of Equilibria

Nagurney, A. "Network Economics: A Variational Inequality Approach." *Advances in Computational Economics*, Kluwer, 1993

Scarf, H. "The Computation of Economic Equilibria." *Cowles Foundation Monograph, 24*, 1973.

Identification and Testing

Bresnahan, T. "The Oligopolistic Solution Concept is Identified." Economics Letters, pp 87-92, 1982.

Graddy, K. "Testing for Imperfect Competition at the Fulton Fish Market." RAND, Spring 1995.

Hausman, J. and de Zona, L. "…Bathroom Tissue Paper," 2000.

Nevo, A. "Identification of the Oligopoly Solution Concept in a Differentiated Products Industry," *Economics Letters*, 59(3), 1998.

Conjectural Variations

Corts, K., "Conduct Parameters and the Measurement of Market Power," *Journal of Econometrics*, 88:2, 1999, pp. 227-250.

Genesove, D. and Mullins *"Testing Static Oligopoly Models: Conduct and Cost in The Sugar Industry 1890 - 1914."* RAND, Vol. 29, No. 2, 1998.

Gollop, F. and Roberts, M. "Firm Interdependence in Oligopolistic Markets." *Journal of Econometrics*, pp 313-331, 1979.

Entry Games

Berry, S. "Estimation of a Model of Entry in the Airline Industry," *Econometrica*, July 1992, 889-918.

Berry, S., and J. Waldfogel, "Free Entry and Social Inefficiency in Radio Broadcasting," *RAND Journal of Economics*, 30:3, 1999, pp. 397-420

Bresnahan, T., and P. Reiss, "Do Entry Conditions Vary Across Markets?" *Brookings Papers on Economic Activity,* 3, 1987, pp. 833-881.

Bresnahan, T., and P. Reiss, "Entry in Monopoly Markets," *Review of Economic Studies*, 57, 1990, pp. 531-553.

Bresnahan, T., and P. Reiss, "Empirical Models of Discrete Games," *Journal of Econometrics*, 48, 1991, pp. 57-81.

Bresnahan, T., and P. Reiss, "Entry and Competition in Concentrated Markets" *Journal of Political Economy*, 10, 1991, pp. 977-1009.

Bresnahan, T., and P. Reiss, "Measuring the Importance of Sunk Costs" *Annales d'Economie et de Statistique*, 34, 1994, pp. 181-217.

Davis, P. "Quantity Competition in the Presence of Indivisibilities and Heterogeneous Firms." MIT mimeo, 1999.

Mazzeo, M. "Product Choice and Oligopoly Market Structure." Northwestern mimeo, 1998.

Toivanen, O. and Waterson, M. "Market Structure and Entry: Where's the Beef?" Helsinki School of Economics, mimeo.

Games of Incomplete Information: Bayesian Nash Equilibrium

Bajari, P. "The Econometrics of Asymmetric Auctions," mimeo, Stanford.

Laffont, Ossard, and Vuong, "Econometrics of First-Price Auctions," *Econometrica*, 63:4, July 1995, pp. 953-980.

Hendricks, K. and Porter, R. "An Empirical Study of an Auction with Asymmetric Information," *American Economic Review*, December 1988, pp. 865-883.

Hendricks, K. and Porter, R. "Joint Bidding in Federal OCS Auctions," *American Economic Review*, 82:2, May 1992, pp. 506-511.

Seim, K. "Market Structure and Geographic Differentiation: The Video Retail Industry," manuscript, Yale University, 2000.

McAfee, R. and McMillan, J. "Multidimensional Incentive Compatibility and Mechanism Design," *Journal of Economic Theory*," 46(2), 335-54, 1988.

Paarsch, H. "Deriving an Estimate of the Optimal Reserve Price: An Application to British Columbian Timber Sales," *Journal of Econometrics*, pp 333-457, 1997.

Single Agent Dynamic Optimization Problems

Eckstein, Z., and K. Wolpin "The specification and estimation of dynamic stochastic discrete choice models", *Journal of Human Resources*, 24, 562-598, 1989.

Miller, R. A. "Estimating Models of Dynamic Optimization with Microeconomic Data", in H. Pesaran and P. Smidth (eds.) *Handbook of Applied Econometrics: Microeconomics (Vol 2)*. Blackwell, 1997.

Pakes, A. "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," *Econometrica*, 54:4, 1986, pp. 755-784.

Rust, J. "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher," *Econometrica*, 55:5, 1987, pp. 999-1033.

Rust, J. "Structural Estimation of Markov Decision Processes," in R. Engle and D. McFadden, eds., *Handbook of Econometrics*, Vol. 4, Elsevier.

Timmins, C. "Dynamic Efficiency Costs of Regulators' Preferences: Municipal Water Utilities in the Arid West." *Econometrica* (forthcoming) 2001.

Multiple Agent Dynamic Games

Benkard, L. "A Dynamic Analysis of the Market for Wide-bodied Commercial Aircraft,"

mimeo, Stanford.

Ericson, R. and Pakes, A., "Markov-Perfect Industry Dynamics: A Framework for Empirical Work." *Review of Economic Studies*, January 1995, 53-82.

Maskin, E. and Tirole, J. "A Theory of Dynamic Oligopoly I: Quantity Competition with Large Fixed Costs." *Econometrica*, 1988.

Maskin, E. and Tirole, J. "A Theory of Dynamic Oligopoly II: Price Comeptition, Kinked Demand Curves, and Edgeworth Cycles." *Econometrica*, 1988.

Maskin, E. and Tirole, J. "A Theory of Dynamic Oligopoly III: Quantity Competition with Large Fixed Costs." *Econometrica*, 1988.

Pakes, A. and Berry, S., *"Estimation from the First Order Conditions for Dynamic Controls."* Yale, mimeo, 2000.

Pakes, A. and Ericson, R. "Empirical Implications of Alternative Models of Firm Dynamics." *Journal of Economic Theory*, 1998, 1-45.

Pakes, A. and McGuire, P. "Computing Markov Perfect Nash Equilibrium: Numerical Implications of a Dynamic Differentiated Product Model." *RAND, pp 555-589, 1994*.