ECO 2404
EMPIRICAL APPLICATIONS OF ECONOMIC THEORY

University of Toronto. Department of Economics. Spring 2012

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Office hours: Tue 4.10pm-5:00pm or by appointment
Lecture: Wed 9.10am-11.00am. Room GE100

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Office hours: Mon 2:00pm-3:00pm
Lecture: Wed 9.10am-11.00am. Room GE100

COURSE DESPRIPTION

This course covers methods and applications in economic theory. This year we will focus on topics and structural econometric methods that are at the core of the new empirical industrial organization. We have divided the course into two parts. The first part of the course will last six weeks and will be taught by Professor Serrano. This part will focus on the estimation of estimation of demand, the estimation of production functions, and the estimation of single agent finite horizon decision problem). The second part of the course will last six weeks and will be taught by Professor Junichi Suzuki. This second part will focus on the estimation of static games.

The course will emphasize the interactions between economic theory and empirical methods rather than focusing just on the statistical analysis. There will be no text book, the course will be based on published and working papers. We have organized the course in five parts (see main references below). We expect you to participate in the class discussion of these papers.

LECTURES

There will be two hours of lectures every week. Wed 9.10am-11.00am. Room GE100

COMPUTATION

Both MA and PhD students must be familiar with statistical packages like Stata or SAS as well as some basic computer programming (or be prepared learn it during the semester).

There will be teaching assistant who will provide an introduction to Matlab. The introduction will go over from topics such as how to start with Matlab to value function iteration.

If you plan to apply for a PhD and are interested in empirical work, then you should seriously consider learning a computational language as soon as possible.

EVALUATION

The final grade will be based on three problem sets (50%) and a final exam (50%). Students are strongly encouraged to collaborate on problem sets. However, students should write the final answer to the problem sets on their own, and submit them individually. Students must acknowledge the help of classmates and others by citing their names in the problem sets. Problem sets submitted within one 24h after the deadline will receive 50% of the points. Problem sets submitted 24h after the deadline or more will receive zero points.

CONTENTS OF THE COURSE

1. Estimation of demand and supply functions / differentiated products. Instrumental variables and the role of simulation (2 weeks)

2. Estimation of production functions. Simultaneity and endogenous firm exit (2 weeks)

3. Estimation of single agents' finite horizon decision problems and simulation methods (2 weeks)

4. Estimation of static games of complete information (3-4 weeks)

5. Estimation of static games of incomplete information (2-3 weeks)

References

Surveys

• [ABBA] D. Ackerberg, L. Benkard, S. Berry and A. Pakes, "Econometric Tools for analyzing Market Outcomes," forthcoming in *Handbook of Econometrics*, Volume 6. Available at http://www.stanford.edu/~lanierb/research/tools8l-6-8.pdf .

• [RW] Reiss, Peter, and Wolak, Frank (2006): "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," *Handbook of Econometrics*, volume 6, forthcoming. Available at http://www.stanford.edu/~preiss/makeit.pdf

1. Demand and Supply Estimation / Differentiated Products

1.1. Introduction: Empirical questions and econometric issues

• * [ABBA] Section 1
• * [RW]. Sections 5 to 7.
• Angrist, Josh, Graddy, Kathryn, and Imbens, Guido (2000): "The Interpretation of Instrumental Variables Estimators in Simultaneous Equations Models with an Application to the Demand for Fish," *Review of Economic Studies*, 67, 3, 499-527.
• Hausman, Jerry, G. Leonard, and J. Zona (1994): "Competitive Analysis with Differentiated Products," *Annales D'Economie et de Statistique*, 34, 159-180.

1.2. Models in characteristics space with heterogeneous agents

• Anderson, S., A. de Palma, and J.-F. Thisse (1992): "Discrete choice theory of product differentiation", Cambridge, MA. MIT Press. Chapter 7.
• Berry, S., (1994), "Estimating Discrete Choice Models of Product Differentiation", RAND, vol. 25, no. 2, pp. 242-262.

1.3. Simulation-based estimation

• Hajivassiliou, V. and P. Ruud (1994): "Classical Estimation Methods for LDV Models Using Simulation," in R. Engle and D. McFadden (eds.), Handbook of Econometrics, vol. 4. North-Holland.
• McFadden, D. and K. Train (2000): "Mixed MNL models for discrete response," *Journal of Applied Econometrics*, 15, 447-470.
• Nevo, Aviv (2000): "A Practitioners Guide to Estimation of Random Coefficients Logit Models of Demand," *Journal of Economics & Management Strategy*, 9(4), 513-548.
• Train, K. (2003): "Discrete Choice Methods with Simulation," Cambridge University Press.

1.4. Applications to static models with aggregate data

• Berry, S., J. Levinsohn, and A. Pakes (1995): "Automobile Prices in Market Equilibrium," *Econometrica*, 63(4), 841-890.
• Bresnahan, T. (1987): "Competition and Collusion in the American Auto Industry:

The 1955 Price War," *Journal of Industrial Economics*, 35, 457-482.
• Bresnahan, T., S. Stern and M. Trajtenberg (1997): "Market Segmentation and the Sources of Rents from Innovation: Personal Computers in the Late 1980s." *The Rand Journal of Economics*, 28, S17-S44.
• Nevo, A. (2001): "Measuring Market Power in the Ready-to-Eat Cereal Industry," *Econometrica*, 69(2).
• Petrin, A. and K. Train (2005). Control function corrections for omitted attributes in differentiated product models. wp, University of Chicago.

1.5. Applications to static models with consumer level data
• Allenby, G. and P. Rossi (1998): "Marketing models of consumer heterogeneity," Journal of Econometrics, 89(1).
• Berry, S., J. Levinsohn, and A. Pakes, (2003): "Differentiated Product Demand Systems From a Combination of Micro and Macro Data: The New Car Market", Harvard University working paper.

1.6. New goods
• Bresnahan, Timothy F. and Robert J. Gordon, eds., 1997, The Economics of New Goods, Chicago, Il: University of Chicago Press.
• Hausman, J. A. (1994). Valuation of new goods under perfect and imperfect competition. NBER wp 4970.
• Petrin, Amil. 2002. Quantifying the Benefits of New Products: The Case of Minivans, *Journal of Political Economy*, 110(4), 705-727.
• * Trajtenberg, Manuel (1989): "The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners," Journal of Political Economy, 97, 2, 444-79.

2. Production Function Estimation

2.1 Introduction
• [ABBA]. Section 2.
• Griliches, Zvi, and Jacques Mairesse (1995): "Production Functions: The Search for Identification," NBER Working Paper No. 5067. http://www.nber.org/papers/W5067
• Marschak, Jacob, and William Andrews (1944) "Random Simultaneous Equations and the Theory of Production," *Econometrica*, 12, 3/4, 143-205. See Also Marschak and Andrews, 1945, Errata, 13,1, 91.

2.2. Using lagged inputs as instruments
• Blundell, R. and S. Bond (1999): "GMM estimation with persistent panel data: An application to production functions," The Institute for Fiscal Studies. Working Paper Series No. W99/4. http://www.ifs.org.uk/wps/wp9904.pdf
• Bond, S., and M. Söderbom (2004): "Adjustment costs and the identification of Cobb Douglas production functions," Manuscript, Institute for Fiscal Studies, London.

2.3. Control function approach

• Ackerberg, D., K. Caves and G. Frazer (2003): "Structural Identification of Production Functions," manuscript.

• Levinsohn, J. and A. Petrin (2003): "Estimating production functions using inputs to control for unobservables," Review of Economic Studies, pp. 317-342. http://www.nber.org/papers/w7819.pdf

• * Olley, S., and A. Pakes (1996), "The dynamics of productivity in the telecommunications equipment industry", *Econometrica*, 64, 1263-97.

3. Estimation of Single Agent Decision Problems (finite horizon)

• Rust, J. (1987). "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher," *Econometrica*

• Pakes, A. and Schankerman (1986). "Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period." *The Economic Journal*, Vol. 96: No. 384, pp. 1052-1076.

• Pakes, A. (1986). "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks." *Econometrica*, Vol. 54, No. 4.

• Serrano, C. (2010), "The Market for Intellectual Property: Evidence from the Transfer of Patents", Working Paper, University of Toronto.

5. Static games of complete information

5.1 Introduction

• * [BR] Berry, S. and Reiss, P. (2006). "Empirical Models of Entry and Market Structure," in *Handbook of Industrial Organization*, Volume III, 1845-1886. Elsevier.

5.2 Homogenous Players

• * [BR] Section 1-2

• Bresnahan, T.F. and Reiss, P. (1990). "Entry in Monopoly Markets", *Review of Economic Studies*, 57: 531-553.

• Bresnahan, T.F. and Reiss, P. (1991b). "Entry and Competition in Concentrated Markets", *Journal of Political Economy*, 99(5): 977-1009.

5.3 Application: Free Entry and Efficiency

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

• Mankiw, N. G. and Whinston, M. D. (1986). "Free Entry and Social Inefficiency", ", RAND Journal of Economics, 17(1): 48-58.

5.4 Heterogenous Players

• * [BR] Section 3.1-3.3

• Bajari, P., Hong, H. and Ryan, S. (2010). "Identification and Estimation of a Discrete Game of Complete Information", *Econometrica*, 78 (5), 1529-1568.

• Bresnahan, T.F. and Reiss, P. (1991a). “Empirical Models of Discrete Game”, *Journal of Econometrics*, 48: 57-81.
• Berry, S. (1992). “Estimation of a Model of Entry in the Airline Industry”, *Econometrica*, 60 (4), 889-917.
• Ciliberto, F., and Tamer, E. (2009). “Market Structure and Multiple Equilibria in the Airline Industry”, *Econometrica*, 77(6): 1791-1828.
• Mazzeo, M. (2002) “Product Choice and Oligopoly Market Structure”. *Rand Journal of Economics* 33 (2), 1-22.
• Tamer (2003) “Incomplete Simultaneous Discrete Response Model with Multiple Equilibria”. *Review of Economic Studies* 70: 147-165.

6. Static games of incomplete information
•* [BR] Section 3.4
•* Bajari, P., Hong, H., Krainer, J. and Nekipelov, D. (2010). “Estimating Static Models of Strategic Interaction”, *Journal of Business and Economic Statistics*, 28 (4), 469-482.
•Datta, Sumon. (2011). “Does Reducing Spatial Differentiation Increase Product Differentiation? Effects of Zoning on Retail Entry and Format Variety”, Purdue University Working paper.
•Ellickson, P. and Misra, S. (2008). “Supermarket Pricing Strategies”, *Marketing Science*, 27(5): 811-828.
• Seim, K. (2010) “An Empirical Model of Firm Entry with Endogenous Product-Type Choices”. *Rand Journal of Economics* 37 (3), 619-640.
• Sweeting, A. (2009) “Coordination Games, Multiple Equilibria and the Timing of Radio Commericials”. *Rand Journal of Economics* 40 (4).