ECO 418/2404
EMPIRICAL APPLICATIONS OF ECONOMIC THEORY

University of Toronto. Department of Economics. Fall 2012

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Lecture: Wednesdays 10.10-12pm. SS 2120
Office hours: Wednesdays 12.10-1pm. Max Gluskin House, Room 308

COURSE DESPRIPTION

This course covers methods and applications in economic theory. This year we will focus on topics and econometric methods that are at the core of the new empirical industrial organization and empirical microeconomics. We have divided the course into two parts. The first part of the course will last eight weeks. 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 problems). The second part of the course will focus on the estimation of causal effects in empirical microeconomics: average treatment effect, local average treatment, and marginal treatment effect. Both parts will be taught by Professor Serrano

The course will emphasize the interactions between economic theory and empirical methods rather than focusing just on the statistical analysis. There will be no textbook, 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 10.10am-12pm. Room SS2120

COMPUTATION

Undergraduate, MA and PhD students must be familiar with statistical packages like Stata or SAS. Basic computer programming skills in MATLAB (or R, etc.) may be useful for MA and PhD students (or be prepared learn it during the semester).

There will be teaching assistant, who may provide an introduction to Stata and 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 program and/or 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 (45%), a term test (20%) and a final exam (35%). 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 functions / differentiated products. Instrumental variables and the role of simulation (3 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 (3 weeks)

4. Estimation of causal effects. Recent applications of ATE, LATE and MTE estimators in the economics of innovation and empirical microeconomics (3-4 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.

4. Estimation of Causal Effects: Applications in the Economics of Innovation and Empirical Microeconomics

• Azoulay, P., Graff Zivin, Joshua, Wang, Jialan (2010), "Superstar Extinction", *The Quarterly Journal of Economics*, May 2010,

• Doyle, Joseph J. Jr. (2008), "Child Protection and Adult Crime: Using Investigator Assignment to Estimate Causal Effects of Foster Care", *Journal of Political Economy*. 116(4). August 2008: 746-770.

• Galasso, A., Schankerman, M., and Serrano, C. (2012), "Trading and Enforcing Patent Rights", Working Paper, University of Toronto

• Williams, Heidi L. (2012), "Intellectual property rights and innovation: Evidence from the human genome," May 2012, Working Paper, MIT (http://economics.mit.edu/files/6803)