ECO 2404
EMPIRICAL APPLICATIONS OF ECONOMIC THEORY

University of Toronto. Department of Economics. Spring 2014

Prof. Eduardo Souza-Rodrigues
Department of Economics
Office: 150 St. George St., Room 264

Lectures: Mon 11.00am-1.00pm. Room AB 114
Office hours: Tue 2:00pm-3:00pm

COURSE DESCRIPTION

The course covers methods and applications in economic theory. The focus is on structural econometric methods that are at the core of the Empirical Industrial Organization. I will emphasize the interactions between economic theory and empirical methods rather than focusing just on the statistical analysis.

I have divided the course in three parts. The first part covers estimation of demand functions and static oligopoly models. The second part focus on the estimation of production functions and the use of control function methods. The third part studies static two period models using revealed preference approach. It normally leads to moment inequalities and to partial identification. We also will see some of the econometrics problems related to the moment inequalities estimators.

COMPUTATION

Both MA and PhD students must be familiar with MATLAB and statistical packages like STATA, R or SAS as well as some basic computer programming (or be prepared to learn it during the semester). There will be teaching assistant who will provide an introduction to MATLAB. 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 one problem set (50%) and a final project (50%). I will give you some problems along the semester relating to each part of the course and you can return the solutions of all problems by the end of the semester. I will focus on computer based questions. You are strongly encouraged to collaborate with other students. However, you should write the final answers on your own, and submit them individually. You also must acknowledge the help of classmates and others by citing their names in the problem set.

The final project can be either a research proposal or a referee report. You can select the paper of your preference for the referee report, but the paper must relate to the topics given in class. Problem set and final project submitted within one 24h after the deadline will receive 50% of the points. If they are submitted 24h after the deadline or more will receive zero points.

CONTENTS OF THE COURSE

1. Introduction to Structural Models - Early Models in IO
2. Estimation Method: GMM
3. Estimation of demand of differentiated products.
4. Estimation of demand and supply of differentiated products: Nash Equilibrium
5. Estimation of demand and supply of differentiated products: Computational Issues
6. Nonparametric Identification of Simultaneous Equations
7. Applications
8. Estimation of Production Functions: Simultaneity and endogenous firm exit
9. Production Function : 2-Step Estimator/Control Function
10. Extensions to Production Function Estimators
11. Two Period Empirical Models: Moment Inequalities
12. Applications of Moment Inequalities: Revealed Preference Methods

References

1. **Introduction to Structural Models - Early Models in IO**
    - * Reiss, Peter, and Wolak, Frank (2006): "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," *Handbook of Econometrics*, volume 6, Sections 1-4 and 6. Available at http://www.stanford.edu/~preiss/makeit.pdf
    - * Notes for Grad IO
    - Nevo, A. "Taking the Dogma Out of Economics"
    - Bresnahan, T. (1981): "Departures from Marginal-Cost Pricing in the American Automobile Industry: Estimates for 1977-1978," Journal of Econometrics, 17, 201-227.
    - Bresnahan, T. (1982): "The Oligopoly Solution Concept is Identified," Economics Letters, 10, 87-92.
    - Porter, R.H. (1983). "A study of cartel stability: The Joint Executive Committee, 1880–1886". Bell Journal of Economics 14 (2), 301–314.

2. **Estimation Method: GMM**
    - Pakes, A. and D. Pollard (1989). "Simulation and the Asymptotics of Optimization Estimators" *Econometrica,* Vol. 57, No. 5, pp. 1027-1057.

3. **Estimation of demand of differentiated products.**
    - * [ABBA] Ackerberg, L. Benkard, S. Berry and A. Pakes (2007). "Econometric Tools for analyzing Market Outcomes," *Handbook of Econometrics*, Volume 6, Chapt 63. Section 1. Available at http://www.stanford.edu/~lanierb/research/tools8l-6-8.pdf
    - Berry, S. (1994). "Estimating Discrete Choice Models of Product Differentiation," Rand Journal of Economics, 242-262.

4. **Estimation of demand and supply functions: Nash Equilibrium**
    - * Berry, S., J. Levinsohn, and A. Pakes (1995), "Automobile Prices in Market Equilibrium," Econometrica, 63, 841-890.

- Berry, S., J. Levinsohn, and A. Pakes (2004). "Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market," Journal of Political Economy, 112, 68—105.
- Berry, S. and A. Pakes (2007), "The Pure Characteristics Demand Model," International Economic Review, Vol. 48, 1193-1225.
- Berry, S.T., O.B. Linton and A. Pakes (2004). "Limit theorems for estimating the parameters of differentiated product demand systems." Review of Economic Studies, Vol. 71, 613-654.
- Nevo, A. (2001). "Measuring Market Power in the Ready-to-Eat Breakfast Cereal Industry," Econometrica, 69, 307-342

5. Estimation of demand and supply of differentiated products: Computational Issues

- * Knittel, C. R. and K. Metaxoglou (2013) "Estimation of Random Coefficient Demand Models: Challenges, Difficulties and Warnings," forthcoming in *The Review of Economics and Statistics.*
- Dube, J.-P., J. Fox, and C.-L. Su (2011): "Improving the Numerical Performance of BLP Static Coefficients Demand Estimation," Discussion paper, University of Chicago.
- Nevo, A. (2000). "A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand," Journal of Economics and Management Strategy, 9, 513-548.
- Su, C. and K. Judd (2011). "Constrained Optimization Approaches to Estimation of Structural Models," Econometrica.
- Skrainka, B. (2011): "A Large Scale Study of the Small Sample Performance of Random Coefficient Models of Demand," Working Paper
- Judd, K. (1998) *Numerical Methods in Economics*, MIT Press.
- Train, K. (2003): "Discrete Choice Methods with Simulation," Cambridge University Press. Chapters 1-7.

6. Nonparametric Identification of Simultaneous Equations

- * Berry, S. and P. Haile (2013). "Identification in Differentiated Products Markets using Market Level Data," working paper.

- Berry, S. and P. Haile (2009). "Nonparametric Identification of Multinomial Choice Demand Models with Heterogeneneous Consumers," working paper.
- Berry, S., A. Gandhi, and P. Haile (2013). "Connected Substitutes and Invertibility of Demand," Econometrica, 81, 2087-2111.
- Chernozhukov, V., and C. Hansen (2005): "An IV Model of Quantile Treatment Effects," Econometrica, 73(1), 245-261.
- Matzkin, R. L. (2007). "Nonparametric Identification." In Handbook of Econometrics, vol. 6, edited by J.J. Heckman and E. Leamer. Amsterdam: Elsevier.
- Matzkin, R. L. (2008). "Identification in Nonparametric Simultaneous Equations," Econometrica, 76, 945ñ978.
- Matzkin, R. L. (2010): "Estimation of Nonparametric Models with Simultaneity," Discussion paper, UCLA.
- Newey, W. K., and J. L. Powell (2003). "Instrumental Variable Estimation in Non-parametric Models," Econometrica, 71(5), 1565-1578.

7. Applications

- **Merger Analysis:**
  - * Fan, Y. (2010). "Ownership Consolidation and Product Quality: A Study of the U.S. Daily Newspaper Market," working paper.
  - Nevo, A. (2000). "Mergers with Differentiated Products: The Case of the Ready-to-Eat Breakfast Cereal Industry," Rand Journal of Economics, 31, 395-421.
- **New Product:**
  - Petrin, A. (2001). "Quantifying the Benefits of New Products: The Case of the Minivan," Journal of Political Economy.
  - Eizenberg, A. (2008): "Upstream Innovation and Product Variety in the United States Home PC Market," Discussion paper, Yale University.
- **Advertising:**
  - Goeree, M. (2008). "Limited Information and Advertising in the U.S. Personal Computer Industry," Econometrica.
- **Environmental Policy:**
  - Goldberg, P. (1998). "The Effects of the Corporate Average Fuel Economy

Standards in the Automobile Industry," *Journal of Industrial Economics*, pp. 1–33.

- **Vertical Contracting**:
  - Villas-Boas, S. B. (2007). "Vertical Relationships between Manufacturers and Retailers: Inference with Limited Data," *Review of Economic Studies*, 74, 625–652.
- **Media Bias:**
  - Gentzkow, M., and J. Shapiro (2009): "What Drives Media Slant? Evidence from U.S. Newspapers," *Econometrica*.
- **Asymmetric Information and Insurance:**
  - Cardon, J., and I. Hendel (2001): "Asymmetric Information in Health Care and Health Insurance Markets" Evidence from the National Medical Expenditure Survery," *RAND Journal of Economics*, 32, 408–427.
  - Bundorf, K., J. Levin, and N. Mahoney (2010): "Pricing and Welfare in Health Plan Choice," Discussion paper, Stanford University.
  - Lustig, J. (2008): "The Welfare Effects of Adverse Selection in Privatized Medicare," Discussion paper, Boston University.
- **Trade:**
  - Goldberg, P. K. (1995): "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," *Econometrica*, 63(4), 891–951.
  - Goldberg, P., and F. Verboven (2001): "The Evolution of Price Dispersion in the European Car Market," *The Review of Economics Studies*, 68(4), 811–848.
- **Residential Sorting:**
  - Bayer, P., F. Ferreira, and R. McMillan (2007): "A Unified Framework for Measuring Preferences for Schools and Neighborhoods," *Journal of Political Economy*, 115(5), 588–638
- **School Choice:**
  - Hastings, J., T. Kane, and D. Staiger (2007): "Preferences and Heterogeneous Treatment Effects in a Public School Choice Lottery," Discussion paper, Yale University.

8. **Estimation of Production Functions: Simultaneity and Endogenous firm exit**
   - * [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.
   - 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.

9. **Production Function : 2-Step Estimator/Control Function**
   - * Olley, S., and A. Pakes (1996), "The dynamics of productivity in the telecommunications equipment industry", *Econometrica*, 64, 1263-97.
   - * 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

10. **Extensions to Production Function Estimators**
   - * Ackerberg, D., K. Caves and G. Frazer (2003): "Structural Identification of Production Functions," manuscript.
   - De Loecker, J. (Forthcoming). Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity, Econometrica.
   - Gandhi, A., S. Navarro and D. Rivers (2013), "On the Identification of Production Functions: How Heterogeneous is Productivity?"

Working Paper.

11. Two Period Empirical Models: Moment Inequalities

- * Pakes, A. (2010): "Alternative Models for Moment Inequalities". Econometrica, 78, 1783-1822

12. Applications of Moment Inequalities: Revealed Preference Methods

- * Ho, K. (2009). "Insurer-Provider Networks in the Medical Care Market," American Economic Review, 99 (1), 393-430.
- Andrews & Soares (2010) Andrews, D., and G. Soares, 2010; "Inference for Parameters Defined by Moment Inequalities Using Generalized Moment Selection Procedures," Econometrica, pp 119-157.
- Chernozhukov, V., H. Hong and E Tamer, 2007;" Estimation and Confidence Regions for Parameter Sets in Econometric Models," Econometrica, Vol. 75 (5), pp. 1243-1284
- Morales, E., G. Sheu, and A, Zahler (2011). "Gravity and Extended Gravity: Estimating a Structural Model of Export Entry," Working Paper