ECON 7520: Empirical Industrial Organization

Fall 2015
M 6-8:30pm
Room: Uris 494

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This course is a graduate level introduction to empirical industrial organization, both in terms of techniques and applications. The emphasis is heavily weighted toward recent, cutting-edge research papers. Our aim is to provide the tools necessary to write a solid dissertation in empirical industrial organization, and our hope is that the techniques in this class will be useful to students from other fields as well.

The course has some difficult econometrics, and it is expected that students have a basic comfort level with estimation. It is also expected that students will do requisite background reading in econometric theory where necessary. There is no primary textbook for this class. We will be using a combination of lecture notes and journal articles. All of the articles below are easily accessible from the web.

The course will be graded on class-participation and seminar attendance (20%), assignments (30%), quizzes and midterms (50%). There will be two in-class midterms and some random short quizzes. I will send out a weekly announcement on papers to be discussed in class in the following week. You should read these papers ahead of time and answer questions in class. The home assignments consist of: A) estimating a BLP model using the same auto data that Berry, Levin, and Pakes used in their 1995 Econometrica paper (due on Friday Oct 9th); B) a 5-page research proposal (due on Friday Oct 30th); and C) estimating a dynamic model (due on Monday Nov 30th). MATLAB proficiency is necessary (but not sufficient) for assignments A and C. You are encouraged to work together as a group on these two assignments (write down the name of students in your group on your report), but you should work *independently* for assignment B. The research proposal is intended to help you get started with your second-year paper, which will hopefully become part of your thesis.

There will be seven IO seminars this semester:

- September 16th Panle Jia Barwick
- September 30th Chris Conlon (joint with Metrics and Public Finance)
- October 7th JF Houde (joint with Metrics and Public Finance)
- October 14th Nate Hendren (joint with Public Finance)
- October 21st Debi Mohapatra
- November 4th Gautam Gowrisankaran (joint with Environment)
- November 16th Aloysius Siow (joint with Labor)

Attendance is mandatory. You are required to select a seminar paper in advance and present a brief summary in class (20 minutes) in the week the paper is presented. Two of you will work together to present one paper. Note that Siow's talk will be on the noon of Monday Nov 16th. If his paper is available in advance, one of you can present his paper on Nov 9th. Otherwise, you can present your own research or a paper that is chosen by me.

I have invited several visiting professors this fall. Chris Conlon from Columbia will visit us from Sep 28th to Oct 2nd. JF Houde from Wharton will visit us from Sep 29th to Oct 9th. Steve Berry from Yale will visit us from Oct 22nd to Oct 24th. I encourage all of you to meet with them.

In addition, Steve will deliver a 4-hr master class on 'empirical models of differentiated products' on Thur Oct 22nd from 1 to 5:15pm. This is a rare opportunity (we are lucky to have him) and please make every effort to attend this master class.

The course website is at: https://piazza.com/cornell/fall2015/econ7520/home. Please sign up with piazza.com if you have not done so. Piazza.com has a great message board. Please use it (instead of emails) to post questions. Also feel free to answer them if you know the answer! I will monitor it frequently and try my best to answer questions in a timely manner.

We will meet on Monday evening from 6pm to 8:30pm, except for September 7th (Cornell holiday), September 21st (I am away), and Oct 12th (Fall break). We will have a make-up class on Wednesday, September 30th (6-8:30pm). Please let me know if you have a schedule conflict for September 30th.

Reading List

1 Demand

Required Readings

- Deaton, A., and Muellbauer, J. (1980), "An Almost Ideal Demand System," *American Economic Review*, 70, 312-336.
- Shubham Chaudhuri, Penny Goldberg, and Panle Jia (2006), "Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India", *American Economic Review*.
- S. Berry (1994), "Estimating Discrete-Choice Models of Product Differentiation," *RAND Journal of Economics*, 25 (2), pp. 242-262.
- S. Berry, J. Levinsohn, and A. Pakes (1995), "Automobile Prices in Market Equilibrium," *Econometrica*, 63, July, pp. 841-890.
- S Berry, J Levinsohn, A Pakes, (2004), "Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market," *Journal of Political Economy*, 112, 1, p. 68.
- Steven Berry and A. Pakes (2007), "The Pure Characteristics Demand Model," *International Economics Review* (See Ariel's website for the original working paper version).
- Myrto Kalouptsidi (2010), "From Market Shares to Consumer Types: Dyality in Differentiated Product Demand Estimation," *Journal of Applied Econometrics*.
- Jean-Pierre Dube, Jeremy Fox, and Che-Lin Su (2012), "Improving the Numerical Performance of BLP Static and Dynamic Discrete Choice Random Coefficients Demand Estimation," *Econometrica*, Vol. 80 (5), 2231-2267, September.

Additional Readings (alphabetical order)

- Atila Abdulkadiroglu, Nikhil Agarwal, and Parag Pathak (2014), "The Welfare Effects of Congestion in Uncoordinated Assignment: Evidence from NYC HS Match," MIT working paper.
- Dan Akerberg (2003), "Advertising, Learning and Consumer Choice in Experience Good Markets: A Structural Empirical Examination," *Internationl Economic Review*, Vol 44 (3). (This paper is one of the most under-appreciated papers and should have appeared in a much better journal)
- Pat Bajari, Lanier Benkard (2005), "Demand Estimation With Heterogeneous Consumers and Unobserved Product Characteristics: A Hedonic Approach," *Journal of Political Economy*, 113(6), 1239-1276. (A hedonic model with minor flaws)
- Steven Berry, Amit Gandhi and Philip Haile (2013), "Connected Substitutes and Invertibility of Demand", *Econometrica*, September.

- Steven Berry and Panle Jia (2010), "Tracing the Woes: An Empirical Analysis of the Airline Industry," *American Economic Journal: Microeconomics.*
- Burda, M., Harding, M. C., & Hausman, J. A. (2012), "A poisson mixture model of discrete choice," *Journal of Econometrics.*
- James Cardon and Igal Hendel (2001), "Asymmetric information in health insurance: evidence from the national medical expenditure survey" *Rand Journal of Economics*, Vol 32, No. 3, pp 408-427. (A mixture of discrete plan choice and continous health expenditure)
- Tat Chan (2006), "Estimating a Continuous Hedonic Choice Model with an Application to Demand for Soft Drinks," *Rand Journal of Economics,* Vol 37(2). (The title says it all)
- Dube, J.-P. (2004). Multiple discreteness and product differentiation: Demand for carbonated soft drinks. *Marketing Science*, 23, 66-81. (A discrete-continuous demand model.)
- J. Dubin amd D. McFadden (1984), "An Econometric Analysis of Residential Electric Appliance Holdings and Consumption," *Econometrica*, Vol 52., pp. 345-362. (One of the first few that combine discrete choices with continuous demand)
- Alon Eizenberg (2013), "Upstream Innovation and Product Variety in the United States Home PC Market," The Hebrew University of Jerusalem working paper.
- Sara Ellison, Iain Cockburn, Zvi Griliches, and Jerry Hausman (1997), "Characteristics of Demand for Pharmaceutical Products: An Exploration of Four Cephalosporins," *RAND Journal of Economics*, 28(3), 426-446. (A often-cited early application on pharma demand)
- Ying Fan (2013), "Ownership Consolidation and Product Characteristics: A Study of the US Daily Newspaper Market", American Economic Review, 103(5), August 2013, 1598-1628
- Matthew Gentzkow (2006), "Valuing New Goods in a Model with Complementarity: Online Newspapers." *American Economic Review.* (A model that analyzes complements)
- Michelle Goeree (2010), "Limited Information and Advertising in the U.S. Personal Computer Industry", *Econometrica.* (A model that analyzes the uncertainty of choice sets)
- Penny Goldberg (1995), "Product Differentiation and Oligopoly in International Markets: The Case of the U.S. Automobile Industry," *Econometrica*, Jul. 1995, pp. 891-951. (One of the early papers on nested logit demand)
- Austan Goolsbee and Amil Petrin (2004), "The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV," *Econometrica.*
- Hanemann, W. M. (1984). Discrete/continuous models of consumer demand. *Econometrica*, 52 (3), 541-561. (A discrete-continous demand model)
- Jerry Hausman (1997), "Valuing the Effect of Regulation on New Services in Telecommunications," *The Brookings Papers on Economic Activity: Microeconomics, pp 1-38.*
- Igal Hendel (1999), "Estimating Multiple-Discrete Choice Models: An Application to Computerization Returns," *The Review of Economic Studies*, Vol 66, No. 2., pp. 423-446.

- Chris Knittel and Konstantinos Metaxoglou (2008), "Estimation of Random Coefficient Demand Models: Challenges, Difficulties, and Warnings," forthcoming, *Review of Economics and Statistics.*

- Daniel McFadden and Kenneth Train (2000), "Mixed MNL Models for Discrete Response", *Journal of Applied Econometrics*, Vol. 15(5), pp. 447-470.

- Aviv Nevo (2000), "A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand," *Journal of Economics & Management Strategy*, 9(4), 513-548. Nevo's website also posts the related MATLAB code. Note: there is a (famous) minor error in the calculation of the Jacobian matrix that has been widely recognzied. It is possible that the current code posted on Nevo's website has already been corrected.

- Aviv Nevo (2001), "Measuring Market Power in the Ready-to-Eat Cereal Industry," *Econometrica*, 69(2), 307-342.

- Chris Nosko (2013), "Competition and Quality Choice in the CPU Market," Chicago working paper.

- A. Pakes (2003), "A Reconsideration of Hedonic Price Indexes with an Application to PC's," *American Economic Review*, December.

- Amil Petrin (2002), "Quantifying the Benefits of New Products: The Case of the Minivan," *Journal of Political Economy*, 110:705-729.

- Kenneth Train, (2003), "Discrete Choice Methods with Simulation", Cambridge University Press.

Methodological Readings: SMM

- Dan Ackerberg (2009), "A New Use of Importance Sampling to Reduce Computational Burden in Simulation Estimation," *Quantitative Marketing and Economics*, vol. 7(4), pages 343-376, December

- Paul Glasserman (2003), "Monte Carlo Methods in Financial Engineering," Springer-Verlag New York, Inc.

- D. McFadden (1989), "A Method of Simulated Moments for Estimation of Discrete Response Models Without Numerical Integration," *Econometrica*, Vol. 57(5), 995–1026.

- Ariel Pakes, and David Pollard (1989), "Simulation and the Asymptotics of Optimization Estimators," *Econometrica*, vol. 57(5), pp. 027-1057.

2 Entry and Static Games

Required Readings

- Timothy Bresnahan and Peter C. Reiss (1991), "Entry and Competition in Concentrated Markets", *Journal of Political Economy.*

- S. Berry (1992), "Estimation of a Model of Entry in the Airline Industry," *Econometrica*, 60, 889–917.

- M. Winston and N. Mankiw (1986), "Free Entry and Social Inefficiency," *Rand Journal of Economics,* 17, Spring, pp. 48-58.
- K. Saim (2006), "An Empirical Model of Firm Entry with Endogenous Product-Type Choices," *Rand Journal of Economics.*
- P. Jia (2008) "What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retail Industry," *Econometrica.*
- Thomas Holmes (2011), "The Diffusion of Wal-Mart and Economies of Density," Econometrica, Vol 79 (1), 253-302.

Additional Readings

- Steven Berry and Joel Waldfogel (1999), "Free Entry and Social Inefficiency in Radio Broadcasting," *Rand Journal of Economics.*
- Federico Ciliberto and Elie Tamer (2009), "Market Structure and Multiple Equilibria in the Airline Industry," *Econometrica.*
- Leemore S. Dafny (2005), "Games Hospitals Play: Entry Deterrence in Hospital Procedure Markets," *Journal of Economics and Management Strategy,* Vol 14 (3), pp513-542.
- Glenn Ellison and Sara Ellison (2011), "Strategic Entry Deterrence and the Behavior of Pharmaceutical Incumbents Prior to Patent Expiration," *American Economic Journal: Microeconomics, 3, Feb 2011, pp1-36*
- Austan Goolsbee and Chad Syverson (2008), "How do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines," *Quarterly Journal of Economics, Vol 123(4), pp1611-33*
- Chang-Tai Hsieh and Enrico Moretti (2003), "Can Free Entry Be Inefficient? Fixed Commissions and Social Waste in the Real Estate Industry," *Journal of Political Economy.*
- Katherine Ho: "Insurer-Provider Networks in the Medical Care Market", AER 2008.
- Joy Ishii: "Compatibility, Competition, and Investment in Network Industries: ATM Networks in the Banking Industry," 2008 Stanford working paper.
- Vrinda Kadiyali (1996), "Entry, Its Deterrence, and Its Accommodation: A Study of the U.S. Photographic Film Industry," *Rand Journal of Economics, Vol. 27 (3), pp 452-478*
- M. Mazzeo (2002), "Product Choice and Oligopoly Market Structure," *Rand Journal of Economics.*
- Fiona M. Scott Morton (1999), "Entry Decisions in the Generic Pharmaceutical Industry," Rand Journal of Economics, Vol 30(3), pp 421-440
- Robert Wilson (1992), "Strategic Models of Entry Deterrence," in R.J. Aumann, and S. Hart, eds., *Handbook of Game Theory with Economic Applications,* New York: Elsevier Science Publishers, Vol 1, Chp 10, pp 305-329

Methodological Readings

- Victor Chernozhukov, Elie Tamer, and Han Hong (2007),"Inference on Identified Parameter Sets in Econometric Models," *Econometrica*.
- Azeem Shaikh (2010), "Inference for the Identified Set in Partially Identified Econometric Models", *Econometrica*.
- Donald Topkis, "Supermodularity and Complementarity", 1998, Princeton University Press.

3 Dynamic Models

Required Readings

- John Rust: "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher", Econometrica, Vol. 55, No. 5 (Sep., 1987), pp. 999-1033
- R. Ericson and A. Pakes (1995), "Markov Perfect Industry Dynamics: A Framework for Empirical Work," *Review of Economic Studies*, Vol.62, pp 53-82.
- V. Joseph Hotz and Robert A. Miller, "Conditional Choice Probabilities and the Estimation of Dynamic Models," *Review of Economic Studies,* Vol. 60, No. 3 (Jul., 1993), pp. 497-529
- A. Pakes and P. McGuire (1994), "Computing Markov Perfect Nash Equilibrium: Numerical Implications of a Dynamic Differentiated Product Model," *RAND Journal of Economics*, pp. 555-589.
- P. Bajari, L. Benkard, and J. Levin (2007), "Estimating Dynamic Models of Imperfect Competition," *Econometrica*.
- V. Aguirregabiria and P. Mira (2007), "Sequential Estimation of Dynamic Discrete Games," *Econometrica*
- M. Pesendorfer and Philipp Schmidt-Dengler (2008), "Asymptotic Least Squares Estimators for Dynamic Games," *Review of Economic Studies*.
- A. Pakes, M. Ostrovsky, and S. Berry (2007), "Simple Estimators for the Parameters of Discrete Dynamic Games," *Rand Journal of Economics*, vol 38(2), Jun.

Methodological Readings

- V. Chernozhukov and H. Hong (2003), "An MCMC Approach to Classical Estimation," *Journal of Econometrics*, 115(2), pp. 293-346.

Additional References

- Lanier Benkard (2004), "Learning and Forgetting: The Dynamics of Aircraft Production," *American Economic Review*, 90 (4), 1034 - 1054.
- David Besanko and Ulrich Doraszelski (2004), "Capacity Dynamics and Endogenous Asymmetries in Firm Size," *RAND Journal of Economics*, 35 (1), 23 - 49.

- Thomas Covert (2014), "Experiential and Social Learning in Firms: The Case of Dydraulic Fracturing in the Bakken Shale," job market paper, Harvard University.
- Michael Dickstein (2013), "Efficient Provision of Experience Goods: Evidence from Antidepressant Choice", Stanford working paper.
- C. Fershtman and A. Pakes (2000), "A Dynamic Oligopoly with Collusion and Price Wars," *RAND Journal of Economics*, Vol. 31(2), pages 207-236, Summer.
- A. Gavazza (2011), "Leasing and Secondary Markets: Theory and Evidence from Commercial Aircraft," *Journal of Political Economy*, vol 119 (2), April.
- Ronald L. Goettler and Brett R. Gordon (2011), "Does AMD Spur Intel to Innovate More?" *Journal of Political Economy*, Vol. 119, No. 6, 1141-1200
- Gautam Gowrisankaran (1999), "A Dynamic Model of Endogenous Horizontal Mergers," *RAND Journal of Economics* 30, 56-83
- Gautam Gowrisankaran and Marc Rysman (2012), "Dynamics of Consumer Demand for New Durable Goods", *Journal of Political Economy*, 120, pp1173-1219.
- I. Hendel and A. Nevo (2006), "Measuring the Implications of Sales and Consumer Inventory Behavior," *Econometrica*, 74(6), pp1637-1673.
- Myrto Kalouptsidi (2014), "Time to Build and Fluctuations in Bulk Shipping," *American Economic Review, 104(2): 564-608*
- Thierry Magnac and David Thesmar, "Identifying Dynamic Discrete Decision Processes," *Econometrica*, 70(2), pp 801-816
- Eric Maski and Jean Tirole (1988), "A Theory of Dynamic Oligopoly. I: Overview and Quantity Competition with Large Fixed Costs," *Econometrica,* 56(3), pp549-569
- Eric Maski and Jean Tirole (1988), "A Theory of Dynamic Oligopoly. II: Price Competition, Kinked Demand Curves, and Edgeworth Cycles," *Econometrica,* 56(3), pp571-599
- Mitsuru Igami (2013), "Estimating the Innovator's Dilemma: Structural Analysis of Creative Destruction," Yale working paper.
- Ariel Pakes (1986), "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," Econometrica, Vol. 54, No. 4 (Jul., 1986), pp. 755-784
- S. Ryan (2012), "The Costs of Environmental Regulation in a Concentrated Industry," *Econometrica,* 80(3), p. 1019–1062.

4 Merger and Competition Policy

Required Readings

- "2010 United States Horizontal Merger Guidelines"
- "Antitrust Evaluation of Horizontal Mergers" by Joseph Farrell and Carl Shapiro
- Jonathan B. Baker and Timothy F. Bresnahan (1985), "The Gains from Merger or Collusion in Product-Differentiated Industries," *Journal of Industrial Economics*, vol 33(4), pp. 427-444

5 Advertising, Matching, Auctions, and Other Random Topics