

UNIVERSITY of **HOUSTON**

Empirical Industrial Organization

Spring Semester 2013

1:00 pm – 2:30 pm, Monday-Wednesday, Agnes Arnold Hall, Room 204

Contact information

Instructor:

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Office hours: Monday, 3.15 pm – 4.15 pm.

Course Description

This course provides a graduate-level introduction to empirical industrial organization, both in terms of techniques and applications. We will discuss leading papers in the field of empirical IO covering the estimation of two broad classes of models and their applications:

1. Models of product differentiation.

We estimate demand systems of differentiated product markets, which gives us a framework to estimate own and cross price elasticities, estimate markups, measure market power, evaluate mergers, quantify the benefits of a new product, evaluate the effect of discontinuing a product, examine how information asymmetry (advertising) affects demand estimation and the resulting substitution patterns.

2. Single agent dynamic models, Dynamic games of imperfect competition.

We provide a framework to estimate discrete choice dynamic models. We start with the estimation of single agent dynamic models, such as the optimal investment model. Next, we study the estimation of multiplayer dynamic games. Our main focus is on models of firm entry and exit in oligopoly markets. We analyze industry pricing, industry performance, and optimal industry policy, and measure the welfare cost of government regulations.

We are going to study examples from a wide range of industries, including automobiles, ready to eat cereals, personal computers, direct broadcast satellites and cable TV, and digital camcorders. We will look at examples of dynamic games from Chilean retail industries, commercial aircraft markets, and the US Portland cement industry.

Prerequisites

Students are expected to have taken PhD level Microeconomic Theory and Econometrics classes. Students also need to have basic knowledge of dynamic optimization. Programming in STATA and MATLAB will be required to complete homework assignments.

Textbook and software

There is no specific textbook for this class. We will be using a combination of lecture notes and journal articles. The required articles are listed below in each section. The additional reading list provides background reading on the topics and serves as a reference to your lecture notes.

You will be required to use STATA and MATLAB software packages. Public versions of these are available in the department's graduate computer lab. Both are also available for purchase at a discounted price at the Cougarbyte website for registered students.

Students should familiarize themselves with the software packages in order to program the homework exercises. Although we will briefly discuss how to implement specific estimation methods in MATLAB, the class does not provide an introduction to basic computer programming.

Course Requirements

The class schedule below contains the main papers we are going to discuss during each class. Students are expected to complete the assigned readings before attending class. For each topic, I will provide an overview of the literature, and we will discuss the assigned paper in detail. Depending on the class, we may spend more time on the overview and less on the details. Students are required to fully understand the assigned papers regardless of how much time we spend on them in class. All of these papers will be part of the final exam.

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 readings in econometric theory where necessary. This class will be rather demanding.

There will be 2 homework assignments and a final exam. See below.

Assignments and Grading

The final grade is based on three homework exercises and a final exam.

There will be 2 intensive exercises where students will implement the estimators discussed in class. Because of the complexity of the assignments and because each student may need different amounts of time to complete the exercises, I do not enforce the due dates of individual assignments. I suggest starting each assignment as soon as it is posted and submitting it at the suggested deadlines in the class schedule below. The final due dates for all homework assignments is May 6, 11:59 pm.

The final exam will be posted in Blackboard after the last day of classes. You can access it any time until May 10. You will have 24 hours to complete the exam and upload your answers in Blackboard.

Each assignment is worth 33% of your final grade. To receive any grade other than "F" or "Incomplete", a student is required to submit all four assignments by May 6, 11:59 pm. There is no exception.

Class Website

All assignments and handouts will be posted on the class website in Blackboard. Go to <http://www.uh.edu/blackboard> and click the white "Blackboard Learn" button. Log in with your CougarNet ID and password. Please do not email me homework files, upload everything on Blackboard.

Tentative Course Schedule:

Class #	Date/Day			Topic	Problem Sets
Welcome to IO					
1	Jan	14	M	Reiss, P. C. and Wolak, F. A. (2003): "Structural Econometric Modeling: Rationales and Examples from Industrial Organization" in <i>Handbook of Econometrics</i> , North Holland, 2007.	
2		16	W	Keane, Michael P. (2010): "Structural vs. atheoretic approaches to econometrics," <i>Journal of Econometrics</i> , 156(1), 3-20. Rust, J. (2010): "Comments on: "Structural vs. atheoretic approaches to econometrics" by Michael Keane," <i>Journal of Econometrics</i> , 156(1), 21-24.	
I. Models of product differentiation					
3	Jan	21	M	<i>No class. Martin Luther King day.</i>	
4		23	W	Berry, S. (1994): "Estimating Discrete-Choice Models of Product Differentiation," <i>Rand Journal of Economics</i> , 25(2), 242-262.	
5-6	Jan	28, 30	M, W	Berry, S., J. Levinsohn, and A. Pakes (1995): "Automobile Prices in Market Equilibrium," <i>Econometrica</i> , 63(4), 841-890.	
7-8	Feb	4, 6	M, W	Nevo, A. (2001): "Measuring Market Power in the Ready-to-Eat Cereal Industry," <i>Econometrica</i> , 69, 307-342.	
9-10		11, 13	M, W	Nevo, A. (1998): "A Practitioner's Guide to Estimation of Random-Coefficients Logit Models of Demand," <i>Journal of Economics and Management Strategy</i> , 9(4), 513-548.	
11-12		18, 20	M, W	Petrin A. (2002): "Quantifying the Benefits of New Products: The Case of the Minivan", <i>Journal of Political Economy</i> , 110, 705-729.	
13		25	M	Berry S., J. Levinsohn, and A. Pakes (2004): "Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Cars Market," <i>Journal of Political Economy</i> , 112(1), 68-105.	
14		27	W	Petrin, A. and A. Goolsbee (2004), "The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV," <i>Econometrica</i> , 72(2), 351-381.	
15	March	4	M	Goeree M. (2009): "Limited Information and Advertising in the U.S. Personal Computer	

				Industry,” <i>Econometrica</i> , 76(5), 1017–1074.	
II. Dynamic models					
16		6	W	Overview of dynamic programming. Value function. Markov Perfect Equilibrium Concept.	
17		11	M	<i>No class. Spring Break.</i>	
18		13	W	<i>No class. Spring Break.</i>	
19		18	M	Rust, J. (1987): “Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher,” <i>Econometrica</i> 55(5), 999-1033.	PS 1 Due
20		20	W	Rust, J. (1994): “Structural Estimation of Markov Decision Processes,” in: Handbook of Econometrics, Vol. 4 Ch. 51, 3081-3143.	
21		25	M	Hotz, V. J. and R. A. Miller (1993): “Conditional Choice Probabilities and the Estimation of Dynamic Models,” <i>Review of Economic Studies</i> 60(3), 497-529.	
22		27	W	Aguirregabiria, V. and P. Mira (2007): “Sequential Estimation of Dynamic Discrete Games,” <i>Econometrica</i> , 75(1), 1-53.	
23-24	Apr	1, 3	M, W	Bajari, P., L. Benkard and J. Levin (2007): “Estimating Dynamic Models of Imperfect Competition,” <i>Econometrica</i> 75(5), 1331-70.	
25-26		8, 10	M, W	Benkard, L. (2004): “Dynamic Analysis of the Market for Wide-Bodied Commercial Aircraft,” <i>Review of Economic Studies</i> , 71, 581-611.	
27		15	M	S. P. Ryan (2012): “The Costs of Environmental Regulation in a Concentrated Industry,” <i>Econometrica</i> , 80(3), 1019–1061.	
28		17	W	Gowrisankaran, G. and M. Rysman (2012): “Dynamics of Consumer Demand for New Durable Goods, forthcoming: <i>Journal of Political Economy</i> .	
29		22	M	<i>No Class.</i>	
Closing					
30		24	W	Einav, L. and J. Levin (2010): “Industrial Organization: A Progress Report.” <i>Journal of Economic Perspectives</i> , 24(2), 145–162.	
31		29	M	Discussion of final exercise	PS 2 Due

Additional reading list:

Topic 0

- Blundell, R. (2010): “Comments on: Michael P. Keane ‘Structural vs. atheoretic approaches to econometrics’”, *Journal of Econometrics*, 156(1), 25-26.
- Heckman, J. and S. Urzua (2010): “Comparing IV with structural models: What simple IV can and cannot identify”. *Journal of Econometrics*, 156(1), 27-37.
- Angrist, J. D. and J.-S. Pischke (2010): “The Credibility Revolution in Empirical Economics: How Better Research Design Is Taking the Con out of Econometrics,” *Journal of Economic Perspectives*, 24(2), 3-30.
- Leamer, E. E. (2010): “Tantalus on the Road to Asymptopia,” *Journal of Economic Perspectives*, 24(2), 31-46.
- Keane M. P. (2010): “A Structural Perspective on the Experimentalist School”. *Journal of Economic Perspectives*, 24(2), 47-58.
- Sims, C. A. (2010): “But Economics Is Not an Experimental Science,” *Journal of Economic Perspectives*, 24(2), 59-68.
- Nevo, A. and M. D. Whinston (2010): “Taking the Dogma out of Econometrics: Structural Modeling and Credible Inference,” *Journal of Economic Perspectives*, 24(2), 69-82.
- Stock, J. H. (2010): “The Other Transformation in Econometric Practice: Robust Tools for Inference,” *Journal of Economic Perspectives*, 24(2), 83-94.

Models of product differentiation

- Akerberg, D. and M. Rysman (2005): “Unobservable Product Differentiation in Discrete Choice Models: Estimating Price Elasticities and Welfare Effects,” *RAND Journal of Economics*, 36(4), 771-788.
- Akerberg, D., L. Benkard, S. Berry and A. Pakes (2007): “Econometric Tools for Analyzing Market Outcomes”, in *The Handbook of Econometrics*, J. J. Heckman (ed.), Vol. 6, Part A, 4171–4276.
- Bajari, P. and L. Benkard (2005): “Demand Estimation With Heterogeneous Consumers and Unobserved Product Characteristics: A Hedonic Approach,” *Journal of Political Economy*, 113(6), 1239-1276.
- Bajari, P. and M. Kahn (2005): “Estimating Housing Demand with an Application to Explaining Racial Segregation in Cities”, *Journal of Business and Economic Statistics*, 23(1), 20-33.
- Bajari, P., J. Fox, K. Kim, and S. Ryan: “The Random Coefficient Logit Model is Identified”, *Journal of Econometrics*, forthcoming.
- Bayer P., F. Ferreira and R. McMillan (2007): “A Unified Framework for Measuring Preferences for Schools and Neighborhoods,” *Journal of Political Economy*, 115(4), 588-638.
- Berry, S. and A. Pakes, (2007): “The Pure Characteristics Demand Model,” *International Economic Review*, 48(4), 1193-1225.
- Bresnahan, T.F. “Empirical Studies with Market Power,” in *The Handbook of Econometrics*, J. J. Heckman (ed.), vol. 2, Chap. 17, 1011–1057.
- Brett, C., J. Pinkse and M. Slade (2001): “Spatial Price Competition: a Semiparametric Approach,” *Econometrica*, 70(3), 1111-1153.

Davis, P. (2006): "Spatial Competition in Retail Markets: Movie Theatres," *RAND Journal of Economics*, 37(4), 964-982.

Gandhi, A., K. Kim and A. Petrin (2011): "Identification in Discrete Choice Demand Models when Endogenous Variables Interact with the Error", NBER Working Paper No. 16894.

Hausman, J. (1996): "Valuation of New Goods Under Perfect and Imperfect Competition," in Bresnahan and Gordon (eds), *The Economics of New Goods*, Studies in Income and Wealth, NBER, Vol. 58, 207-248.

Hausman, J., G. Leonard and J. D. Zona (1987): "Competitive Analysis with Differentiated Products," *Annales d'Economie et de Statistique*, 34, 159-180.

Hendel, I. (1999): "Estimating Multiple Discrete Choice Models: An Application to Computerization Returns," *Review of Economic Studies*, 66, 423-446.

Leslie, P. (2004): "Price Discrimination in a Broadway Theatre", *RAND Journal of Economics*, 35(3), 520-541.

McCulloch, R. and P. Rossi (2000): "Bayesian Analysis of the Multinomial Probit Model" (with R. McCulloch), *Simulation Methods in Econometrics*, Cambridge University Press.

McManus, B. (2007): "Nonlinear Pricing in an Oligopoly Market: the Case of Specialty Coffee", *RAND Journal of Economics*, 38(2), 512-532.

Nevo, A. (2000): "Mergers with Differentiated Products: The Case of the Ready-to-Eat Cereal Industry," *RAND Journal of Economics*, 31(3), 395-421.

Petrin, A. and A. Goolsbee (2004), "The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV," *Econometrica*, 72(2), 351-381.

Petrin, A. and K. Kim (2012): "Control Function Corrections for Omitted Attributes in Differentiated Product Models," Minnesota Working Paper.

Rysman, M. (2004): "Competition between Networks: A Study of the Market for Yellow Pages," *Review of Economic Studies*, 71, 483-512.

Train, K. (2003): "Discrete Choice Methods with Simulation," Cambridge University Press, Chapters 2-6, 8, 10, 13.

Trajtenberg, M. (1989): "The Welfare Analysis of Product Innovation, with an Application to CT Scanners," *Journal of Political Economy*, 97, 444-479.

Single agent dynamic models, Dynamic games of imperfect competition

Akerberg, D. (2003): "Advertising, Learning, and Consumer Choice in Experience Good Markets: A Structural Empirical Examination," *International Economic Review* 44, 1007-1040.

Akerberg, D., L. Benkard, S. Berry, and A. Pakes (2007): "Econometric Tools for Analyzing Market Outcomes," in *Handbook of Econometrics*, (ed.) J. Heckman and E. Leamer, Volume 6A, North Holland.

Aguirregabiria, V. (1999): "The Dynamics of Markups and Inventories in Retailing Firms," *Review of Economic Studies*, 66, 275-308.

Aguirregabiria, V. and P. Mira (2002): "Swapping the Nested Fixed Point Algorithm: A Class of Estimators for Discrete Markov Decision Models," *Econometrica*, 70, 1519-1543.

Aguirregabiria, V. and P. Mira (2010): "Dynamic Discrete Choice Structural Models: A Survey," *Journal of Econometrics*, 156, 38-67.

Benkard, L. (2000): "Learning and Forgetting: The Dynamics of Aircraft Production," *American Economic Review*, 90, 1034-54.

Berry, S., M. Ovstrovsky and A. Pakes (2007): "Simple Estimators for the Parameters of Dynamic Discrete Games", *RAND Journal of Economics*, 38(2), 373–399.

Caruana, G., and L. Einav (2008): "Production Targets," *Rand Journal of Economics*, 39(4), 990–1017.

Doraszelski, Ulrich and P. Ariel (2007): "A Framework for Applied Dynamic Analysis in IO," in Armstrong, M. and R. Porter (eds.), *Handbook of Industrial Organization*, Volume 3, Chapter 30, 1889-1966, North-Holland, Amsterdam.

Viard, B. (2007): "Do Switching Costs Make Markets More or Less Competitive?: The Case of 800-Number Portability," *The RAND Journal of Economics*, 38(1), 146 – 163.

Ericson, R. and A. Pakes (1995): "Markov-Perfect Industry Dynamics: A Framework for Empirical Work," *Review of Economic Studies*, 62, 53-82.

Fershtman, C. and A. Pakes (2000): "A Dynamic Oligopoly with Collusion and Price Wars," *RAND Journal of Economics*, 31(2), 207-236.

Gavazza, A. (2011): "Leasing and Secondary Markets: Theory and Evidence from Commercial Aircraft," *Journal of Political Economy*, 119(2), 325-377.

Goettler, R and B. Gordon (2011): "Does AMD spur Intel to innovate more?," *Journal of Political Economy*, 119(6), 1141-1200.

Gowrisankaran, G., and R. J. Town (1997): "Dynamic Equilibrium in the Hospital Industry," *Journal of Economics and Management Strategy* 6, 1997, 45-74.

Hendel, I. and A. Nevo (2006): "Measuring the Implications of Sales and Consumer Stockpiling Behavior," *Econometrica*, 74(6), 1637-1673.

Hollifield, B., R. Miller and P. Sadas (2004): "An Empirical Analysis of Limit Order Markets", *Review of Economics Studies*, 71, 1027–1063.

Holmes, T. (2011): "The Diffusion of Wal-Mart and Economies of Density," *Econometrica*, 79(1), 253-302.

Hotz, J., R. Miller, S. Sanders and J. Smith (1994): "A Simulation Estimator for Dynamic Models of Discrete Choice," *Review of Economic Studies*, 61, 265-289.

Jofre-Bonet, M. and M. Pesendorfer (2003): "Estimation of a Dynamic Auction Game", *Econometrica*, 71(5), 1443-1489.

Keane, M. and K. Wolpin (1997): "The Career Decisions of Young Men", *Journal of Political Economy*, 105(3), 473-522.

Olley, G. and A. Pakes (1996): "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, 64, 1263-97.

Pakes, A. and P. McGuire (1994): "Computing Markov-Perfect Nash Equilibrium: Empirical Implications of a Dynamic Model," *RAND Journal of Economics*, 555-589.

Pakes, A. and P. McGuire (1995): "Empirical Implications of Alternative Models of Firm Dynamics," *Journal of Economic Theory*, 62, 53-82.

Pakes, A., M. Ostrovsky and S. Berry (2007): "Simple Estimators for the Parameters of Dynamic Discrete Games (with Entry/Exit Examples)," *Rand Journal of Economics*, 38(2), 373-399.

Ryan, S. and C. Tucker (2006): "Diversification and the Dynamics of Technology Adoption," *Quantitative Marketing and Economics*, forthcoming.

Schmidt-Dengler, P. (2006): "The Timing of New Technology Adoption: The Case of MRI," Manuscript, LSE.