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**Economics 8757-001**  
Graduate Empirical Industrial Organization  
TTH, 2:00-3:15  
ECON 5  
Office Hours: TH 1:00-2:00

### Course Description:

This course is the empirical portion of the Graduate Industrial Organization sequence. The goal of the course is to expose you to modern empirical tools that have helped economists understand market structures, market power and the strategic behaviors of firms and consumers. The focus is to prepare you for your researches. You should leave the class with a box of toolkits that you may revisit often in the future. Despite being an "empirical" course, you should be constantly thinking how theory and empirical works complement each other- how theory can be empirically tested and how theoretical model can be adopted into empirical models, in order to estimate theoretically important parameters.

**Course Requirements:** For this course, you are expected to

- Read the papers assigned for each class meeting
- Prepare a 1-page summary of an assigned paper for each class meeting
- Participate in the class discussions of papers
- Turn in a Computational, databased problem set
- Take an in-class written final exam

You will be evaluated based on the quality of the required work for the course. You may work in groups of 2-3 on the homework assignment; however, you must write your own answers and list all group members on the first page. The one-page summaries must be written independently. You should describe the objectives, contributions, and key ideas of the paper. Typically this should be done with words. Occasionally a key equation will be helpful to convey an essential idea, but resist the temptation to substitute notation and equations for insights about what the mathematics represents.

### Course Topics and Readings:

#### 1. Demand Estimation

Working (1927). What do Statistical Demand Curves Show? *Quarterly Journal of Economics*, 41, pp. 212-35.

\*Bresnahan (1987). Competition and Collusion in the American Automobile Industry: The 1955 Price War. *Journal of Industrial Economics*. 35(4), pp. 457-482.

\*Deaton and Muellbauer (1980). An Almost Ideal Demand System. *American Economic Review*. 70(3), pp. 312-326.

\*Hausman, Leonard, and Zona (1994). Competitive Analysis with Differentiated Products. *Annales d'Economie et de Statistique*. 34, pp. 159-180.

\*Chaudhuri, Goldberg, and Jia (2008) Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India. *American Economic Review*. 96(5), pp. 1477-1514.

Berry (1994). Estimating Discrete Choice Models of Product Differentiation. *RAND*. 25(2), pp. 242-262.

\*Berry, Levinsohn and Pakes (1995). Automobile Prices in Market Equilibrium. *Econometrica*. 63(4), pp. 841-90 [see also the NBER working paper version for perhaps a more pleasant read]

Berry, S. and Haile, P. (2014). Identification in Differentiated Products Markets using Market Level Data. *Econometrica*. 82, pp. 1749-1798.

Davis, P. (2000). Empirical Models of Demand for Differentiated Products. *European Economic Review*. 44, pp. 993-1005.

Anderson, S., DePalma, A., and Thisse, F. (1992). *Discrete Choice Theory of Product Differentiation*. Cambridge: MIT Press.

Bartik, M. (1987). The Estimation of Demand Parameters in Hedonic Pricing Models. *Journal of Political Economy*. 95, pp. 818-8.

Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*. 82, pp. 345-5.

\*Bajari, P. and Benkard, C. L. (2005) Demand Estimation with Heterogeneous Consumers and Unobserved Product Characteristics: A Hedonic Approach. *Journal of Political Economy*. 113(6): pp. 1239-1276.

### *Applications*

Berry, Levinsohn and Pakes (1993). Applications and Limitations of Some Recent Advances in Empirical Industrial Organization: Price Indexes and the Analysis of Environmental Change. *American Economic Review*. 83(2): pp. 240-246.

\*Petrin (2002). Quantifying the Benefits of New Products: The Case of the Minivan. *Journal of Political Economy*. 110(4), pp. 705-29.

Nevo (2001) Measuring Market Power in the Ready-to-Eat Cereal Industry. *Econometrica*. 69(2), pp. 307-322.

Goolsbee, A. and Petrin, A. (2004). The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV. *Econometrica*. 72(2), pp. 251-382.

Gentzkow, M. (2007). Valuing new goods in a model with complementarities: online newspapers. *American Economic Review*. 97(3), pp. 713-744.

Miravete, E., Siem, K., and Thurk, J. (2016). Naïve Policy Design and Legislative Inertia in the Regulation of Alcohol? R&R at *Econometrica*.

### *Textbook References*

Hayashi (2000). *Econometrics*. (Ch3 has a nice discussion of the standard endogeneity problems in demand estimation in a GMM framework)

Garces, D. (2010). *Quantitative Techniques for Competition and Antitrust Analysis* (Ch9 has an overview of demand estimation techniques)

Train, K. (2009). *Discrete Choice Methods with Simulation*.

## 2. Antitrust and Horizontal Merger Analysis

DOJ and FTC Antitrust Guidelines (<http://www.justice.gov/atr/public/guidelines/hmg-2010.html>)

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

Dafny, L., Duggan, M. and Ramanarayanan, S. (2012). Paying a Premium on Your Premium? Consolidation in the U.S. Health Insurance Industry. *American Economic Review*. 102(2), pp. 1161-1185.

Berry, S. and Waldfoegel, J. (2001). Do Mergers Increase Product Variety? Evidence from Radio Broadcasting. *Quarterly Journal of Economics*. pp. 1009-1025.

Gowrisankaran, G., A. Nevo and R. Town (2014). Mergers When Prices Are Negotiated: Evidence from the Hospital Industry. *American Economic Review*. 105(1), pp. 172-203.

## 3. Static Entry / Exit Models

Bresnahan, T., and Reiss, P. (1991) Entry and Competition in Concentrated Market. *Journal of Political Economy*. 99(5), pp. 977-1009.

Berry, S. (1992) Estimation of a Model of Entry in the Airline Industry. *Econometrica*. 60(4), pp. 889-917.

Berry, S., and Waldfoegel, J. (1999) Free Entry and Social Inefficiency in Radio Broadcasting. *RAND*. 30(3), pp.397-420.

Mazzeo, M. (2002). Product Choice and Oligopoly Market Structure. *RAND*. 33(2), pp. 1-22.

Berry, S. and Tamer, E. Identification in Models of Oligopoly Entry. (invited lecture at the 2005 World Congress of the Econometric Society)

Ciliberto, F. and Tamer, E. (2009). Market Structure and Multiple Equilibria in the Airline Markets. *Econometrica*. 77(6), pp. 1791-1828.

Seim, K. (2006). An Empirical Model of Firm Entry with Endogenous Product-type Choices. *RAND*. 37(3), pp. 619-640.

Jia, P. (2008). What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retail Industry. *Econometrica*. 76(6), pp. 1263-1316.

## 4. Moment Inequalities in Applied Work

Pakes, A., Porter, J., Ho, K., and Ishii, J. (2015). Moment Inequalities and Their Application. *Econometrica*. 83(1), pp. 315-334.

Pakes, A. (2010). Alternative Models for Moment Inequalities. *Econometrica*. 78(6), pp. 1783-1822.

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

Ho, K. (2009). Insurer Provider Networks in the Medical Care Market. *American Economic Review*. 99(1), pp. 393-430.

Ishii, J., Compatibility, Competition, and Investment in Network Industries: ATM Networks in the Banking Industry, working paper, 2008.

## 5. Search and Switching

Armstrong, M and J. Vickers (2009). Prominence and Consumer Search. *RAND*. 40(2), pp. 209-233.

Dube, J., Hitsch, G., and Rossi, P. (2010). State Dependence and Alternative Explanations for Consumer Inertia. *RAND*. 41(3), pp. 417-45.

Farrell, J.-P. and Klemperer, P. (2007). Coordination and Lock-In: Competition with Switching Costs and Network Effects, in *Handbook of Industrial Organization*, M. Armstrong and R. Porter, eds. Amsterdam: North Holland.

Hartmann, W. and Viard, V. (2008). Do Frequency Reward Programs Create Switching Costs? A Dynamic Structural Analysis of Demand In a Reward Program. *Quantitative Marketing and Economics*. 6, pp. 109-137.

Hong, H. and Shum, M. (2006). Using Price Distributions to Estimate Search Costs. *Rand*. 37(2), pp. 257-275.

Hortacsu, A. and Syverson, C. (2004). Product Differentiation, Search Costs, and Competition in the Mutual Fund Industry: A Case Study of S&P 500 Index Funds. *Quarterly Journal of Economics*. 119(2), pp. 403-456.

Klemperer, P. (1987), Markets with Consumer Switching Costs. *Quarterly Journal of Economics*. 102(2), pp. 375-94.

Klemperer, P. (1995), Competition when Consumers have Switching Costs: An Overview with Applications to Industrial Organization, Macroeconomics, and International Trade. *Review of Economic Studies*. 62(4), pp. 515-539.

Moraga-Gonzalez, J. and Wildenbeest, M. (2008). Maximum Likelihood Estimation of Search Costs. *European Economic Review*. 52(5), pp. 820-848.

Sorensen, A. (2000). Equilibrium Price Dispersion in Retail Markets for Prescription Drugs. *Journal of Political Economy*. 108, pp. 833-850.

Stahl D. (1989) Oligopolistic Pricing with Sequential Consumer Search. *American Economic Review*. 79(4), pp. 700-712.

Varian, H. (1980). A Theory of Sales. *American Economic Review*. 70(4), pp. 651-658.

Nosal, K. (2012) Estimating Switching Costs for Medicare Advantage Plans. Working paper.

## 6. Behavioral Industrial Organization

### *Loss Aversion and Reference-Point Dependent Preferences*

Heidhues, P. and Köszegi, B. (2008). Competition and Price Variation when Consumers are Loss Averse. *American Economic Review*. 98(4), pp. 1245-1268.

Herweg, F., Müller, D. and Weinschenk, P. (2010). Binary Payment Schemes: Moral Hazard and Loss Aversion. *American Economic Review*. 100(5), pp. 2451-2477.

*Time-inconsistent consumers*

DellaVigna, S. and Malmendier, U. (2006) Paying Not to Go to the Gym. *American Economic Review*. 96(3), pp.694-719.

DellaVigna, S. and Malmendier, U. (2004). Contract Design and Self Control: Theory and Evidence. *Quarterly Journal of Economics*. 119(2). pp. 353-402.

Goel, A. M. and Thakor, A. V. (2010), Do Envious CEOs Cause Merger Waves?. *Review of Financial Studies*. 23(2), pp. 487-517.

## 7. Two Sided Markets

### *Theory*

Armstrong, M. (2006). Competition in Two-Sided Markets. *RAND*. 37(3), pp. 668-691.

Rochet, J. and Tirole, J. (2006). Two-Sided Markets: A Progress Report. *RAND*. 37(3), pp. 645-667.

Jullien, B. and Pavan, A. (2013). Platform Competition under Dispersed Information. working paper.

### *Empirics*

Chou, C and Shy, O. (1990). Network Effects without Network Externalities. *International Journal of Industrial Organization*. 8, pp. 259-270.

Nair, H., Chintagunta, P, and Dube, J.-P. (2004). Empirical Analysis of Indirect Network Effects in the Market for Personal Digital Assistants. *Quantitative Marketing and Economics*. 2, pp. 23-58.

Lee, R. (2012). Home Videogame Platforms, in *The Oxford Handbook of the Digital Economy*.

Lee, R. (2013). Vertical Integration and Exclusivity in Platform and Two-Sided Markets. *American Economic Review*. 103(7), pp. 2960-3000.

Rysman, M. (2004). Competition Between Networks: A Study of the Market for Yellow Pages. *Review of Economic Studies*. 71(2), pp. 483-512.

## 8. Single Agent Dynamics, Estimation Approaches, and Dynamic Demand

### *Single Agent Dynamics*

Pakes, A. (1986). Patents as Options: Some Estimates of the Value of Holding European Patent Stocks. *Econometrica*. 54(4), pp. 755-784.

Rust, J. (1987). Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher. *Econometrica*. 55(5), pp. 999-1033.

Hotz, J, and Miller, R. (1993). Conditional. 71(2), ppie of Holding European

Gowrisankaran, G. and Rysman, M. (2012). Dynamics of Consumer Demand for New Durable Goods. *Journal of Political Economy*. 120(6), pp. 1173-1219.

Aguirregabiria, V. and Nevo, A. (2013). Recent Developments in Empirical Dynamic Models of Demand and Competition in Oligopoly Markets. Proceedings of the Econometric Society World Congress.

Schiraldi, P. (2011). Automobile Replacement: a Dynamic Structural Approach. *RAND*. 42(2), pp. 266-291.

## 9. Multi-Agent Dynamics and Games

### *Theory, Framework, and Computation:*

Maskin, E. and Tirole, J. (1988). A Theory of Dynamic Oligopoly, I. *Econometric*. 56(3), pp. 549-569.

Maskin, E. and Tirole, J. (1988). A Theory of Dynamic Oligopoly, II. *Econometric*. 56(3), pp. 571-599.

Maskin, E. and Tirole, J. (1988). A Theory of Dynamic Oligopoly, III. *European Economic Review*. 31, pp. 947-968.

Doraszelski, U. and Pakes, A. (2007). A Framework for Applied Dynamic Analysis in IO. Handbook of IO, vol 3.

Ericson, R. and Pakes, A. (1995). Markov-Perfect Industry Dynamics: A Framework for Empirical Work. *The Review of Economic Studies*. 62 (1), pp. 53-82.

Pakes, A. and McGuire, P. (1994). Computing Markov-Perfect Nash Equilibria: Numerical Implications of a Dynamic Differentiated Product Model. *Rand*. 25, pp. 555-589.

Pakes, A. and McGuire, P. (2001). Stochastic Algorithms, Symmetric Markov-Perfect Equilibrium, and the Curse of Dimensionality. *Econometrica*, 69 (5), pp. 1261-1281.

Doraszelski, U. and Satterthwaite, M. (2010). Computable Markov-Perfect [ite266\(ite2664r\)\]TJ/F15](#)

### *Estimation*

Pakes, A., and Ostrovsky, M. and Berry, S. Simple estimators for the parameters of discrete dynamic games (with entry/exit examples) RAND 2007.

Bajari, P., Benkard, L., and Levin, Jon. Estimating Dynamic Models of Imperfect Competition, EMA 2007

### **Background Reading**

#### 1. Basic IO Theory

Tirole, J. (1988). The Theory of Industrial Organization, MIT Press.

#### 2. Handbook Chapters in Empirical IO

Akerberg, D., L. Benkard, S. Berry, and A. Pakes (2007). Econometric Tools for Analyzing Market Outcomes. Demand estimation, production function estimation, dynamics, and entry. Handbook of Econometrics.

Reiss, P. and F. Wolak (2007), Structural Econometric Modeling: Rationales and Examples from I.O. Handbook of Econometrics.

Reiss, P. and S. Berry (2007), Entry. Handbook of IO.