Prof. Ralph Siebert, PhD
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Research areas: strategic alliances (mergers, rjvs, licensing), dynamic models
Industries: semiconductors, pharmaceuticals, housing

COURSE OUTLINE

Econ 621: Empirical Industrial Organization

Office hours by appointment, Krannert Center, Office #233

COURSE DESCRIPTION

The purpose of this course is to introduce the student to the major areas encompassed by industrial organization, focusing on recent empirical studies based on modern theoretical approaches.

Throughout the course we study mainly empirical analyses which clarify the interactions between market structure, technological innovation and firm behavior. Topics are shown in the reading list below.

NOTES

-Industrial Organization concentrates on the question how differences between firms and markets affect market structure, conduct and performance.

-Industrial Organization mainly focuses on imperfectly competitive markets, real world institutions, and the internal organization of firms.

-Non-cooperative game theory is a widely used theoretical tool in IO

-IO also has a long tradition as an empirically oriented field.

-Modern Empirical Industrial Organization: Theory, Data, Econometrics, Reduced form and Structural Models

COURSE PREREQUISITES

Mandatory: Microeconomics, Econometrics
Strongly recommended: Industrial Organization (theory), Microeconometrics
Optional: Time Series, Panel Data

COURSE COMPLEMENTARITIES

Trade, Experimental Economics, Strategy, Marketing, Finance, Agricultural Economics.

COURSE WORK

Students will be evaluated on the basis of

- Two assignments (each one to work on, max 2 students, econ understanding and programming)
- final take home exam

Textbooks

We will not use a textbook in this course. However, I recommend some very useful background texts:

1. Berndt, E., 1990, *The Practice of Econometrics*, Addison-Wesley.
2. Carleton, D.W. and J.M. Perloff, 1994, *Modern Industrial Organization*, Second Edition, Harper Collins College Publishers.
3. **Cameron, A.C. and P.K. Trivedi, 2005, *Microeconometrics*, Cambridge University Press.**
4. Greene, W., *Econometric Analysis*, ISBN 0-13-013297-7, Macmillan, New York.
5. Judge, G., R. Hill, W. Griffiths, H. Luetkepohl, and T. Lee, 1988, "*Introduction to the Theory and Practice of Econometrics*", Wiley.
6. **Martin, S., "*Advances in Industrial Organization*", ISBN 0631217576.**
7. Scherer, F.M. and D. Ross, 1990, *Industrial Market Structure and Economic Performance*, Third Edition, Boston: Houghton Mifflin Company.
8. Shy, O., 1996, *Industrial Organization: Theory and Applications*, MIT Press.
9. **Tirole, J., 1993, *The Theory of Industrial Organization*, ISBN 0-262-20071-6, MIT Press.**
10. **Wooldridge, J., *Econometric Analysis of Cross Section and Panel Data*, ISBN 0262232197.**
11. Reiss, P. and F. Wolak, 2003, *Structural Econometric Modeling: Rationales and Examples from Industrial Organization*, prepared for the Handbook of Econometrics, vol. 5, http://www.stanford.edu/~preiss/makeit.pdf

Class 1: Structure/Conduct/Performance

- Traditional Approaches: SCP, reduced form

Bain, J., 1956, *Barriers to Competition*, Cambridge, Harvard University Press.

Schmalensee, R., 1989, "Interindustry Studies of Structure and Performance" in: *Handbook of Industrial Organization*, Chapter 16.

Scherer, F.M., 1990, *Industrial Market Structure and Economic Performance*, Houghton Mifflin.

Martin, S., 1988, "Market power and/or efficiency?," *Review of Economics and Statistics* , 70(2), pp. 331-35.

Class 2: Definition and Examples of Structural Modeling

- Definition for structural models (correlation versus endogeneity, counterfactuals, Econometric into theory, interpretation of error term

Reiss, P. and F. Wolak, 2011, *Structural Econometric Modeling: Rationales and Examples from Industrial Organization*, Handbook of Econometrics.

Class 3: Gibrat's Law

- Market structure and firm size distributions in industries, Gibrat's Law
- Growth, entry, exit
- Truncated Regression and Sample selection bias

Simon, H and C. Bonini, 1958, "The Size Distribution of Business Firms," *American Economic Review*, vol. 48, no. 4, pp. 607-17.

Evans, D., 1987, "Tests of Alternative Theories of Firm Growth," *Journal of Political Economy*, vol. 95, no. 4, pp. 657-74.

Mansfield, E., 1962, "Entry, Gibrat's Law, Innovation, and the Growth of Firms," *American Economic Review*, pp. 1023-1051.

Class 4: Ongoing PhD Work Presentation

Class 5: Selection (Tobit) Models

- Cont'd growth, entry, exit
- Truncated Regression and Sample selection bias

Hall, B., 1987, "The Relationship between Firm Size and Firm Growth in the US Manufacturing Sector," *The Journal of Industrial Economics*, pp. 583-606.

Heckman, J. and S. Urzua, and E. Vytlacil, 2005, "Understanding instrumental Variables in Models with Essential Heterogeneity. Review of Economics and Statistics.

Cameron, A.C. and P.K. Trivedi, 2005, *Microeconometrics*, Cambridge University Press.

Class 6: Cost Functions (Cobb Douglas and Translog)

- Single- and Multiproduct cost functions

Röller, L.-H., 1990, "Modelling Cost Structure: The Bell System Revisited," *Applied Economics*, Vol. 22, No.12, 1661-1674.

Baumol, J., J. C. Panzar and R. D. Willig, 1982, *Contestable Markets and the Theory of Industry Structure*, Harcourt Brace Jovanovich, New York, Chapter 4 and 7.

Class 7: Multiproduct Cost Functions

- Scale and Scope and Subadditivity
- Natural monopoly in multiproduct setting, AT&T, necessary and sufficient conditions

D. Evans and J. Heckman, 1984, "Multiproduct Cost Function Estimates and Natural Monopoly Tests for the Bell System," in *Breaking up Bell*, D. Evans (ed.), North Holland, New York, pp. 253-82.

Problem Set 1: "A Cost Function Model for the Pre-divestiture U.S. Telecommunication Industry"

Class 8: Ongoing PhD Work Presentation

Class 9: Efficiency and Productivity

- Unobserved firm-level productivity
- Input distance and output distance functions

Schmidt, P. and R.C. Sickles, 1984, "Production frontiers and panel data" Journal of Business & Economic Statistics, Vol. 2, pp. 367-374.

Cornwell, C., P. Schmidt, and R.C. Sickles, 1984, "Production frontiers with cross-sectional and time-series variation in efficiency levels", Journal of Econometrics. Vol. 46, pp. 185-200.

Good, D.H., L.H. Röller and R.C. Sickles, 1993, "US airline deregulation: implications for European transport", The Economic Journal, Vol. 103, pp. 1028-1041.

Class 10: Production Functions (Productivity, Simultaneity and Selection Problems)

- Unobserved firm-level productivity
- Simultaneity and selection bias
- IV versus proxy approach

Olley, S., and A. Pakes, 1996, "The Dynamics of Productivity in the Telecommunucations Equipment Industry," *Econometrica*, vol. 64, no. 6, pp. 1263-1297.

Levinsohn, J., and A. Petrin, 2003, "Estimating Production Functions using Inputs to Control for Unobservables," Review of Economic Studies, pp. 317-343.

Wooldridge, Jeffrey M., 2009. "On estimating firm-level production functions using proxy variables to control for unobservables," Economics Letters, Elsevier, vol. 104(3), pages 112-114, September, (see also working paper version).

Ackerberg, D., K. Caves, and G. Frazer, 2005, "Structural identification of production functions" working paper.

Van Biesebroeck, J., 2003, "Productivity Dynamics with Technology Choice: An Application to Automobile Assembly", *Review of Economic Studies, Vol. 70, No. 1, pp. 167-198.*

DeLoecker, Jan, 2010, "Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity", NBER # WP 13155, Revised and resubmitted at *Econometrica*.

DeLoecker, Jan and F. Warzynski, 2010, "Markups and Firm-level Export Status", NBER WP # 15198/ CEPR WP # 7450.

James Tybout, Entry in Exporting Markets, Penn State University.

Class 11: Demand-Side Structural Models: Vertical Product Differentiation

- Vertical product differentiation: Own and Cross price elasticities

Bresnahan, Timothy F., 1987, "Competition and Collusion in the American Automobile Industry: The 1955 Price War," *Journal of Industrial Economics*, Vol. 35, no. 4, pp. 457-482.

Class 12: Demand-Side Structural Models: Logit

- Product differentiation: Own and Cross price elasticities, Logit, IIA

Berry, S., 1994, "Estimating Discrete Choice Models of Product Differentiation," *Rand Journal of Economics*, vol. 25, no. 2, pp. 242-262.

Problem Set 2: "Estimating a Discrete-Choice Model of Product Differentiation

Class 13: Demand-Side Structural Models: Random Coefficient Models

- Random Coefficient Models

Berry, S., J. Levinsohn, and A. Pakes, 1995, "Automobile Prices in Market Equilibrium," Econometrica, vol. 63, no. 4, pp. 841-90.

Nevo, A., 2000, "A Practitioner's Guide to Estimation of Random-Coefficients Logit Models of Demand," Journal of Economics & Management Strategy, vol. 9, issue 4, pp. 513-548.

Petrin, A. and K. Train, 2010, "A Control Function Approach to Endogeneity in Consumer Choice Models,'' *Journal of Marketing Research*, Vol. 47, No. 1, pp. 3-13.

Ackerberg, D. "Advertising, Learning, and Consumer Choice in Experience Good Markets: A Structural Empirical Examination", *International Economic Review*, Vol. 44, No. 3, August 2003, pp. 1007-1040

Ackerberg, D. "Empirically Distinguishing Informative and Prestige Effects of Advertising", *RAND Journal of Economics*, Vol. 32, No. 2, Summer 2001. pp. 100-118.

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, *JPE*.

Berry, S., J. Levinsohn, and A. Pakes,, 1999 "Voluntary Export Restraints on Automobiles: Evaluating a Trade Policy", *The American Economic Review*, Vol. 89, No. 3, pp. 400-430.

Petrin, A., 2002, "Quantifying the Benefits of New Products: The Case of the Minivan", *Journal of Political Economy*, vol. 110, no. 4, pp. 705-29.

Goerree, Marketing BLP paper. Econometrica.

Class 14: Housing Market

Bajari, P. And M. Kahn, 2005, *"Estimating Housing Demand with an Application For Explaining Racial Segregation in Cities"*, Journal of Business and Economic Statistics.

Siebert, R., 2015, *"The Impact of Imperfect Information on Prices and Qualities: Evidence from the Housing Market"*, under review.

Siebert, R., 2015, *"The Impact of Foreclosure on Housing Prices"*, under review.

Campbell, J., S. Giglio, and P. Pathak l, Forced Sales and House Prices, mimeo.

Murphy, A., A Dynamic Model of Housing Supply, mimeo.

Class 15: Single Agent Dynamic Models

- Fixed Point Algorithms and optimal stopping time

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

Hotz, V.J. and R. Miller, 1993, "Conditional Choice Probabilities and the Estimation of Dynamic Models," *Review of Economic Studies*, 60, pp. 497-529.

Aguirregabiria, V., and P. Mira, 2002, "Swapping the Nested Fixed Point Algorithm: A Class of Estimators for Discrete Markov Decision Models," *Econometrica*, 70, no. 4, pp. 1519-1543.

Pakes, A., 1986, "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks", *Econometrica*, *54*, pp. 755-84.

Topics that we be covered depending on interest

Multi Agent Dynamic Models

- Two stage models
- Nested Pseudo Likelihood

Bajari, P., L. Benkard, and J. Levin, 2007, "Estimating Dynamic Models of Imperfect Competition," *Econometrica.*

Stephen R., 2010, "The Costs of Environmental Regulation in a Concentrated Industry," under revision at *Econometrica.*

Liu, A.-H., Siebert, R., and C. Zulehner, 2012, "Excessive Entry and Social Inefficiencies: A Policy Experiment on Dynamic Efficiency Gains" under review.

Siebert, R. and C. Zulehner, 2010, "The Impact of Market Demand and Innovation on Market Structure," under review at *American Economic Review*.

Aguirregabiria, V., and P. Mira, 2007, "Sequential Estimation of Dynamic Discrete Games," *Econometrica.*

Collard-Wexler, A., 2006, "Demand Fluctuations and Plant Turnover in the Ready-Mix Concrete Industry".

Pakes, A., M. Ostrovsky, and S. Berry, 2007, "Simple Estimators for the Parameters of Discrete Dynamic Games," *Rand Journal of Economics.*

Aguirregabiria, V. and Siebert, R., "A Simple Method to Estimate Dynamic Games."

Suzuki paper on locations, IER.

Ericson, R. and A. Pakes, 1995, "Markov Perfect Industry Dynamics: A Framework for Empirical Work," *Review of Economic Studies* , Vol. 62, No. 1, pp. 53-82.

Pakes, A., and P. McGuire, 1994, "Computing Markov Perfect Nash Equilibrium: Numerical Implications of a Dynamic Differentiated Product Model," *Rand Journal of Economics* , pp. 555-589.

Goettler, R. and B. Gordon (2009). Competition and innovation in the microprocessor industry: Does AMD spur Intel to innovate more? Working Paper, Columbia University.

Agguiregabiria and Ho, 2010, IJIO.

Pakes and Ho, Moment Inequality estimators, presented in Toronto.

Productivity Estimation

Problem Set: "Productivity Estimation in the Airline Industry"

Adoption of NewTechnologies

Genesove, D. 2000, "The Adoption of Offset Presses in the Daily Newspaper Industry in the United States," CEPR discussion paper.

Einav, L., 2010, "Not All Rivals Look Alike: Estimating an Equilibrium Model of The Release Date Timing Game," *Economic Inquiry*.

Schmidt-Dengler, P., 2006, "The Timing of New Technology Adoption: The Case of MRI," mimeo.

Ryan, S. and Tucker, C., 2007, "Heterogeneity and the Dynamics of Technology Adoption", mimeo.

Sweeting, A., 2009, "The Strategic Timing of Radio Commercials: An Empirical Analysis Using Multiple Equilibria," *Rand Journal of Economics*, 40(4), Winter.

Identification of Market Power and Semi-Structural Approaches

- Identification of Market Power, identification of demand and supply

Bresnahan, Timothy F., 1982, "The Oligopoly Solution Concept is Identified," *Economic Letters*, 10, pp. 87-92.

Lau, L.J., 1982, "On Identifying the Degree of Competitiveness from Industry Price and Output Data," *Economic Letters*, 10, pp. 93-99.

Panzar, J. and J. Rosse "Testing for Monopoly Equilibrium," *Journal of Industrial Economics*, Vol. 35, no. 4, pp. 443-456.

Sullivan, D., 1985, "Testing hypotheses about firm behavior in the cigarette industry," *Journal of Political Economy*, 93, 586-598.

Nevo, A., 2001, "Measuring Market Power in the Ready-to-Eat Cereal Industry", *Econometrica ,Vol. 6*9, no. 2, 307-342.

Problem Set: "A Structural Model of the Airline Industry"

(Static) Entry Models and Sunk Costs

- Equilibrium firms in different industries, retrieve fixed costs

Bresnahan, T. F. and P. C. Reiss (1987). "Do entry conditions vary across markets?" Brookings Papers on Economic Activity 1987 (3, Special Issue On Microeconomics), 833–881.

Bresnahan, T. and P. Reiss, 1991, "Entry and Competition in Concentrated markets," *Journal of Political Economy*, pp. 977-1009.

Bresnahan, T. F. and P. C. Reiss (1990), "Entry in monopoly markets," *The Review of Economic Studies*, 57 (4), 531–553.

Bresnahan, T. and P. Reiss, 1991, “Empirical Models of Discrete Games,” *Journal of Econometrics*, 48, pp. 57-81.

Berry, S. and J. Waldfogel, 1999, “Free Entry and Social Inefficiency in Radio Broadcasting,” *Rand Journal of Economics*, vol. 30, no. 3, pp. 397-420.

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

Sutton, J, 1998, *Technology and Market Structure*. Cambridge, Massachusetts: MIT Press.

Mazzeo, Rand Journal of Economics

Seim

Strategic Alliances/Mergers/RJVs/Innovation

Benkard, L., Aaron Bodoh-Creed and John Lazarev, 2010,”Simulating the Dynamic Effects of Horizontal Mergers: U.S. Airlines.”

Pesendorfer, M., 2003, “Horizontal Mergers in the Paper Industry”, *Rand Journal of Economics*, 34(3), pp. 495-515.

Ivaldi, M. and F. Verboven, 2002, “Quantifying the Effects from Horizontal Mergers in the European Competition Policy”, CEPR working paper, no 2697.

Gowrisankaran, G., 1999, "A Dynamic Model of Endogenous Horizontal Mergers", *Rand Journal of Economics*, 30, no. 1, pp. 56-83.

Pinkse, J., and M. Slade, 200?, “Mergers, Brand Competition, and the Price of a Pint”, *Econometrica.*

Banerjee, A., and E. Woodrow, 1998, "Are Mega-Mergers Anticompetitive? Evidence from the first Great Merger Wave", *RAND*, 29, no. 4, 803-827.

Berry, S., and A. Pakes, 1993, "Some Applications and Limitations of Recent Advances in Empirical Industrial Organization: Merger Analysis", *AER*, vol. 83, no. 2 , pp. 247-252.

Farrell, J., and C. Shapiro, 1990, "Horizontal Mergers: An Equilibrium Analysis", *American Economic Review*, vol. 80, no. 1, pp. 107-26.

Perry, M., and R. Porter, 1985, "Oligopoly and the Incentives for Horizontal Merger", *American Economic Review*, vol. 75, no. 1, pp. 219-227.

Salant, Switzer, and Reynolds, 1983, "Losses from Horizontal Mergers", *Quarterly Journal of Economics*, vol. 98, no. 2, pp. 185-99.

Shapiro, C., 1995, "Mergers with Differentiated Products", U.S. Department of Justice, Antitrust Division, http://www.usdoj.gov/atr/public/speeches/shapiro.spc.htm

Dept. of Justice, Antitrust Division, 2002, *"The Merger Guidelines"*. http://www.usdoj.gov/atr/public/premerger.htm

Pitofsky, R., 1997, "Staples and Boeing: What They Say About Merger Ecforcment at the FTC", FTC mimeo., http://www.ftc.gov/opa/1997/09/pitmerg.htm

Röller, L.-H., R. Siebert, and M. Tombak, 2007, "RJVs and Firm Heterogeneities," *Economic Journal*.

Siebert, R., 2009, "Jostling for Advantage or Not: Choosing Between Patent Portfolio Races and Ex Ante Licensing (with Georg von Graevenitz)," *Journal of Economic Behavior and Organization.*

Siebert, Ralph, 2010, "The Impact of Ex Ante Licensing on Innovation: Evidence from the Semiconductor Industry".

Martin, S., 1996, "R&D Joint Ventures and Tacit Product Market Collusion," *European Journal of Political Economy* 11(4), pp. 733-741.

Martin, S., 2002, "Spillovers, Appropriability, and R&D," *Journal of Economics* 75(1), pp. 1-32.

D'Aspremont, and A. Jacquemin, 1988, "Cooperative and noncooperative R&D in Duopoly with Spillovers", *American Economic Review*, pp. 1133-1137.

Kamien, M., E. Muller, and I. Zang, 1992, "Research Joint Ventures and R&D Cartels," *American Economic Review*, 82, pp. 1293-1306.

*Siebert, R. and K. Gugler, 2007, "Market Power versus Efficiency Effects of Mergers and Research Joint Ventures: Evidence from the Semiconductor Industry," *Review of Economics and Statistics*.

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

Collard-Wexler, A, 2010, Mergers and Sunk Costs: An application to the ready-mix concrete industry

Collard-Wexler, A, 2010, Mergers in Two-Sided Markets: An Application to the Canadian Newspaper Industry

Supply-Side Structural Models

- Estimation of Market Power: Mergers, Collusion

Bresnahan, T., 1989, "Empirical Studies in Industries with Market Power," in Handbook of Industrial Organization, chapter 17, pp. 1011-1058.

Pinkse, J., M. Slade and C. Brett, 2003, "Spatial Price Competition: A Semiparametric Approach"

Genesove, D. and W.P. Mullin, 1998, "Testing static oligopoly models: conduct and cost in the sugar industry, 1890-1914," *Rand Journal of Economics*, Vol. 29, No. 2, pp. 355-377.

Auctions

Laffont, J.-J., H. Ossard and Q. Vuong, 1995, "Econometrics of First Price Auctions," *Econometrica*, pp. 953-980.

Cason, T.N., K. Kannan, and R. Siebert, R., 2009, "An Experimental Analysis of the Impact of Information Revelation Policies in Sequential Auctions with Cost Uncertainties," revise and resubmit *Management Science*.

Guerre, E., I. Perrigne and Q. Vuong, 2000, "Optimal Nonparametric Estimation of First-Price Auctions," *Econometrica*, Econometric Society, Vol. 68, No. 3, pp. 525-574.

Sweeting, A. and Roberts, J., 2010, "Entry and Selection in Auctions".

Donald, S.G., H.J. Paarsch and J. Robert, 2006, "An empirical Model of the Multi-Unit, Sequential, Clock Auction", *Journal of Applied Econometrics*, pp. 1221–1247.

Bajari, P. and A. Hortasu, 2005, "Are Structural Estimates of Auction Models Reasonable? Evidence from Experimental Data," mimeo.

Other Topics

Collusion and Cartels (Bresnahan, deRoos Ellison, Martin, Pakes, Porter)

Dynamic Demand (Aguirregabiria, Gowrisankaran, Hendel, Nevo, Rysman)
Intertemporal Price Discrimination (Cason, Chintagunta, Gowrisankaran)

Price Discrimination and Willingness to Pay

Nevo, A. and C. Wolfram (2002), "Why Do Manufacturers Issue Coupons? An Empirical Analysis of Breakfast Cereals," *RAND Journal of Economics,* 33, 319-339.

Busse, M. and M. Rysman. (2005), "Competition and Price Discrimination in Yellow Pages Advertising", *RAND Journal of Economics*, 36, 378-390.

Miravete, E., 2003, "Choosing the Wrong Calling Plan? Ignorance and Learning," *American Economic Review*, 93, 297-310.

Learning by Doing

Benkard, L., "A Dynamic Analysis of the Market for Wide-Bodied Commercial Aircraft," *Review of Economic Studies*.

Siebert, R., 2010, "Learning by Doing and Cannibalization Effects at Multi-Vintage Firms: Evidence from the Semiconductor Industry," B.E. Journal of Economic Analysis & Policy.

Other papers to discuss

Ghemawat and Spence, Learning by Doing and Entry and Spillovers, QJE

Chandra, A., and D.O. Staiger, "Identifying provider prejudice in health care", NBER working paper 16382.

Chaudhuri, S., P.K. Goldberg and P. Jia, 2006,"Estimating the E_ects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India," The American Economic Review, Vol. 96, No. 5 (Dec., 2006), pp. 1477-1514.

Connor, John M. et al., 2008. "The impact of collusion on price behavior: Empirical results from two recent cases," International Journal of Industrial Organization, Elsevier, vol. 26(6), pages 1290-1307, November

John Connor, 2005. "Collusion and price dispersion," Applied Economics Letters, Taylor and Francis Journals, vol. 12(6), pages 335-338.

Röller and Steen, 2006, Collusion in the Cement industry, AER.