

Kansas State University – Department of Economics

## **ECON 948: Empirical Industrial Organization Fall 2015**

Instructor: Dr. Philip Gayle

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**Office Hours:** Tuesdays & Thursdays, 9:30am to 10:30am, and by appointment

### **Course Description**

This is a Ph.D. level course in Empirical Industrial Organization. Industrial Organization studies the functioning of markets. It is concerned with business behavior and strategy, as well as their implications for economic efficiency. It also studies the role of public policies in promoting efficiency. The material covered in the references, listed by topics below, is more comprehensive than we can possibly cover in one semester. The reference list therefore serves at least two purposes: (1) to provide references for the issues we plan to discuss in class; and (2) to provide additional references that may be useful for your future research.

The course is empirical in nature, and uses econometric methods to analyze market outcomes resulting from behavior and strategy of economic agents in imperfectly competitive markets. Some of the topics we plan to discuss are: (1) *Identifying and Measuring Market Power*; (2) *Discrete Choice models of Demand and Methods of Estimation*; (3) *Short-Run Price/Quantity Competition in Differentiated-Products Industries*; (4) *Vertical Relationships between Firms*; (5) *Static Models of Entry and Industry Structure*; (6) *Dynamic Structural Models – Single Agent*; and (7) *Dynamic Structural Models – Multi-Agent/ Dynamic Oligopoly Games*.

The course will not follow any particular text, but instead will draw on materials from a series of journal articles in the field of Empirical Industrial Organization. Useful background reading for the econometric techniques used can be found in: “*Regression models for Categorical and Limited Dependent Variables*,” by J. Scott Long; “*Discrete Choice Methods with Simulation*,” by Kenneth Train; “*Methods of Moments and Semiparametric Econometrics for Limited Dependent Variable Models*,” by Myoung-jae Lee; “*Econometric Analysis*,” by William Greene; “*Econometric Analysis of Cross Section and Panel Data*,” by Jeffrey M. Wooldridge; and “*Basic Econometrics*,” by Damodar Gujarati.

A very good reference text for much of the theoretical relationships that empirical industrial organization economists attempt to estimate is: *The Theory of Industrial Organization* by Jean Tirole, MIT Press, 1988.

### **Recommended Reference Text:**

Tirole, Jean, “*The Theory of Industrial Organization*,” MIT Press, 1988.

### **Other Useful Texts:**

- (1) Church, Jeffrey and Roger Ware, *Industrial Organization A Strategic Approach*, McGraw-Hill, 2000.
- (2) Carlton, Dennis and Jeffrey Perloff, *Modern Industrial Organization*, Addison Wesley, 2000
- (3) Greene W., *Econometric Analysis*, (fourth edition), *Prentice- Hall, Inc.*, 2000.
- (4) Gujarati, Damodar, *Basic Econometrics*, McGraw Hill/Irwin, 2002.

- (5) Lee, Myoung-jae, *Methods of Moments and Semiparametric Econometrics for Limited Dependent Variable Models*, Springer, 1996.
- (6) Long, J. Scott, *Regression models for Categorical and Limited Dependent Variables*, SAGE Publications Inc., 1997
- (7) Train, Kenneth, *Discrete Choice Methods with Simulation*, Cambridge University Press, 2003.
- (8) Wooldridge, Jeffrey M., *Econometric Analysis of Cross Section and Panel Data*, The MIT Press, 2002.

### **Course Requirements**

Course requirements include several quizzes, class presentations, referee reports of research articles (articles will be assigned in class), and periodic problem sets some of which are computer-based.

### **Grading:**

- 40% Quizzes
- 30% Class Presentations
- 10% Referee Reports
- 10% Problem Sets
- 10% Class Participation

Letter grades are based on a curve.

### **Class Website**

Various class materials (Lecture notes and Homework Assignments) will be available on the class web page via K-State Online. You will need an e-ID and password to sign into K-State Online. If you currently do not have an e-ID you can create one for yourself via the K-State Online web page. Go to <http://public.online.ksu.edu/> and follow the instructions.

**Tentative list of topics to be covered:** Required readings are indicated by (\*).

#### **1. Introduction:**

- (i) What is Industrial Organization?
- (ii) How has the field Evolved?

#### **Relevant reading:**

- (\*) Tirole, pp. 1-13. Church and Ware, pp. 3-28.
- (\*) Schmalensee, R. 1988. "Industrial Economics: An Overview." *The Economic Journal* 98: 643-681.
- (\*) Schmalensee, R. 1989. "Inter-Industry Studies of Structure and Performance." *Handbook of Industrial Organization*, ed. R. Schmalensee and R. Willig. Amsterdam:North Holland.
- Bresnahan, T. 1989. "Empirical Studies of Industries with Market Power." *Handbook of Industrial Organization*, ed. R. Schmalensee and R. Willig. Amsterdam:North Holland 1011-1057.

#### **2. A model of Perfect Competition:**

- (i) Supply, Demand, and Market Equilibrium.
- (ii) Measures of consumers' and producers' surplus

### 3. Models of Oligopoly:

- (i) Quantity competition
- (ii) Price competition

#### Relevant reading:

(\*) Tirole, pp. 209-226.

### 4. Brief review of the linear regression model:

- (i) Ordinary least squares and instrumental variables estimation.
- (ii) Simultaneous equations, identification, and estimation.

### 5. Identifying and Measuring Market Power:

- (i) Structure-Conduct-Performance approach.
- (ii) The New Empirical Industrial Organization (NEIO) approach.
- (iii) Identification and estimation issues.

#### Relevant reading:

(\*) Church and Ware, Chap12.

Reiss, Peter and Frank A. Wolak (2005), "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," Prepared for the *Handbook of Econometrics*, Vol. 6.

(\*) Fageda, Xavier (2006), "Measuring Conduct and Cost Parameters in the Spanish Airline Market", *Review of Industrial Organization*, Vol. 28, 379 - 399.

(\*) Gagnepain, Philippe and Pedro L. Marin, (2005), "Alliances in the air: Some worldwide evidence", *Working Paper, Department of Economics, Universidad Carlos III de Madrid*.

(\*) Agostini, Claudio (2006), "Estimating Market Power in the US Copper Industry", *Review of Industrial Organization*, Vol. 28, 17 - 39.

(\*) Gasmí, F., J.J. Laffont, and Q. Vuong (1992), "Econometric Analysis of Collusive Behavior in a Soft-Drink Market", *Journal of Economics & Management Strategy*, Vol. 1, No. 2, 277 - 311.

(\*) Bresnahan, T. 1989. "Empirical Studies of Industries with Market Power," *Handbook of Industrial Organization*, ed. R. Schmalensee and R. Willig. Amsterdam:North Holland 1011-1057.

Gayle, Philip G. and Dave Brown (2014), "Airline Strategic Alliances in Overlapping Markets: Should Policymakers be Concerned?" *Economics of Transportation*, Volume 3, Issue 4, December 2014, Pages 243–256.

Kadiyali, V., K. Sudhir, and V. Rao, 2001. "Structural analysis of competitive behavior: New Empirical Industrial Organization methods in marketing," *International Journal of Research in Marketing*, Vol. 18, 161-186.

Bresnahan T., 1982. "The Oligopoly Solution is Identified," *Economic Letters*, 10, 87-92

Panzar, John and James Ross, 1987. "Testing for Monopoly Equilibrium," *Journal of Industrial Economics*, 443-56.

Genesove, D., and W. Mullin, 1998, "Testing Static Oligopoly Models: Conduct and Cost in Sugar Industry, 1890-1914," *RAND Journal of Economics*, Vol. 29:355-77.

Wolfram, C., 1999, "Measuring Duopoly Power in the British Electric Spot Market," *American Economic Review*, Vol. 89, 805-26.

Porter, R. 1983, "A Study of Cartel Stability: The Joint Executive Committee, 1880-1886," *Bell Journal of Economics*, Vol. 14, 301-314.

Ellison, G., 1994, "Theories of Cartel Stability and the Joint Executive Committee," *RAND Journal of Economics*, Vol. 25, 37-57.

Borenstein, S., and A. Shepard, 1996, "Dynamic Pricing in Retail Gasoline Markets," *RAND Journal of Economics*, Vol. 27, 429-51.

Chevalier, J., and D. Scharfstein, 1996, "Capital-Market Imperfections and Countercyclical Markups: Theory and Evidence," *American Economic Review*, Vol. 86, 703-25.

Chevalier, J., A. Kashyap, and P. Rossi, 2000, "Why Don't Prices Rise During Periods of Peak Demand? Evidence from Scanner Data," *NBER working paper, No. 7981*.

## 6. Discrete Choice models of Demand and Methods of Estimation:

- (i) Conditional Logit.
- (ii) Nested Logit.
- (iii) Random Coefficients (Mixed) Logit.

### Relevant reading:

- (\*) Berry, S., (1994). "Estimating Discrete-Choice Models of Product Differentiation," *RAND*, Vol. 25, 242-262.
- (\*) Nevo, A., (2000). "A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand," *Journal of Economics and Management Strategy*, 9(4), 513-548.
- Berry, S., Levinsohn, J., and A. Pakes, (1995). "Automobile Prices in Market Equilibrium," *Econometrica*, Vol. 63, 841-990.
- Goldberg P., and F. Verboven, (2001). "The Evolution of Price Dispersion in the European Car Market," *Review of Economic Studies*, Vol. 68, pp. 811-848.
- Gayle, Philip G. (2007). "Is Virtual Codesharing A Market Segmenting Mechanism Employed by Airlines?" *Economics Letters*, Vol. 95, No. 1, pp. 17-24.
- Gayle, Philip G. and Chi-Yin Wu (2015) "On the Extent to which the Presence of Intermediate-stop(s) Air Travel Products Influences the Pricing of Nonstop Air Travel Products," forthcoming in *Review of Network Economics*.

## 7. Short-Run Price Competition in Differentiated Products Industries:

- (i) Merger Analysis.
- (ii) Measuring market power in differentiated products industries.

### Relevant reading:

- (\*) Thomadsen, Raphael (2005), "The Effect of Ownership Structure on Prices in Geographically Differentiated Industries", *RAND Journal of Economics*, Vol. 36, No. 4, 908 - 929.
- (\*) Ivaldi, Marc and Frank Verboven (2005), "Quantifying the Effects from Horizontal Mergers in European Competition Policy", *International Journal of Industrial Organization*, 23 (9-10), 669-691.
- (\*) Petrin, Amil (2002), "Quantifying the Benefits of New Products: The Case of the Minivan", *Journal of Political Economy*, Vol. 110, No. 4, 705 - 729.
- (\*) Goldberg P., and F. Verboven, 2001. "The Evolution of Price Dispersion in the European Car Market," *Review of Economic Studies*, Vol. 68, pp. 811-848.
- (\*) Sudhir K., 2001. "Competitive Behavior in the Auto Market: A Structural Analysis," *Marketing Science*, Vol. 20, No. 1, pp. 42-60.
- (\*) Berry, S., M. Carnall, and P. Spiller, "Airline Hubs: Cost, Markups and the Implications of Customer Heterogeneity," *NBER working paper, No. 5561*.
- (\*) Nevo, A., 2001, "Measuring Market Power in the Ready-to-Eat Cereal Industry," *Econometrica*, Vol. 69, 307-342.
- (\*) Nevo, A., 2000, "A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand," *Journal of Economics and Management Strategy*, 9(4), 513-548.
- (\*) Nevo, A., 2000, "Mergers with Differentiated Products: The case of the Ready-To-Eat Cereal Industry," *RAND*, Vol. 31, No. 3, 395-421.
- Nevo, A., 1998. "Identification of the oligopoly solution concept in a differentiated-products industry," *Economics Letters*, Vol. 59, 391-395.

- Gayle, Philip G. and Dave Brown (2014), “Airline Strategic Alliances in Overlapping Markets: Should Policymakers be Concerned?” *Economics of Transportation*, Volume 3, Issue 4, December 2014, Pages 243–256.
- Gayle, Philip G. (2007), “Airline Code-share Alliances and their Competitive Effects,” *Journal of Law and Economics*, Vol. 50, pp. 781-819, November 2007.
- Gayle, Philip G. and Huubinh Le (2015), “Measuring Merger Cost Effects: Evidence from a Dynamic Structural Econometric Model,” Manuscript, *Kansas State University*, 2015. This paper won the Robert F. Lanzillotti Prize for Best Paper in Antitrust Economics at the 11<sup>th</sup> annual International Industrial Organization Conference (IIOC), held in Boston, Massachusetts, May 17-19, 2013.
- Goldberg, P., 1995, “Product Differentiation and Oligopoly in International Markets: The Case of the US Automobile Industry,” *Econometrica*, Vol. 63, 891-951.
- Berry, S., 1994, “Estimating Discrete-Choice Models of Product Differentiation,” *RAND*, Vol. 25, 242-262.
- Berry, S., Levinsohn, J., and A. Pakes, 1995, “Automobile Prices in Market Equilibrium,” *Econometrica*, Vol. 63, 841-990.
- Berry, S., J. Levinsohn, and A. Pakes, 1998, “Differentiated Products Demand Systems From a Combination of Micro and Macro Data: The New Car Market,” *NBER* No. 6481.
- Bresnahan, T., 1987, “Competition and Collusion in the American Automobile Market: The 1955 Price War,” *Journal of Industrial Economics*, Vol. 45, 457-482.
- Borenstein, 1989, “Hubs and High Fares: Dominance and Market Power in the U.S. Airline Industry,” *RAND*, 2(3), 344-365.

## 8. Vertical Relationships between Firms

### Relevant reading:

- (\*) Sudhir, K. (2001), “Structural analysis of Manufacturer Pricing in the Presence of a Strategic Retailer,” *Marketing Science*, Vol. 20, No. 3, pp. 244-264.
- (\*) Villas-Boas, Sofia Berto (2007), “Vertical Relationships between Manufacturers and Retailers: Inference with Limited Data,” *Review of Economic Studies*, Vol. 74, 625 - 652.
- (\*) Bonnet, Celine, Pierre Dubois, and Michel Simioni (2006), “Two-Part Tariffs versus Linear Pricing between Manufacturers and Retailers: Empirical Tests on Differentiated Products Markets,” *Working paper, University of Toulouse*.
- (\*) Villas-Boas, Sofia Berto (2007), “Using Retail Data for Upstream Merger Analysis,” CUDARE Working Paper, *University of California, Berkeley*.
- (\*) Villas-Boas, Sofia Berto (2007), “Wholesale Price Discrimination: Inference and Simulation,” CUDARE Working Paper, *University of California, Berkeley*.
- Gayle, Philip G. (2013), “On the Efficiency of Codeshare Contracts Between Airlines: Is Double Marginalization Eliminated?” *American Economic Journal: Microeconomics*, Volume 5, Issue 4, pp. 244-273, November 2013.

## 9. Static Models of Entry and Industry Structure

### Relevant reading:

- (\*) Berry, Steven and Peter Reiss (2006), “Empirical Models of Entry and Market Structure,” Draft Chapter for Volume III of the *Handbook of Industrial Organization*.
- (\*) Berry, Steven. 1992. “Estimation of a Model of Entry in the Airline Industry”, *Econometrica* 60 (4): 889-918.
- (\*) Berry Steven and Joel Waldfoegel. 1999. “Free Entry and Social Inefficiency in Radio Broadcasting,” *RAND Journal of Economics* 30 (Autumn): 397- 420.

- (\*) Mazzeo, Michael. 2002. "Product Choice and Oligopoly Market Structure," *RAND Journal of Economics*, Vol. 33 (2): 221 – 242.
- Bresnahan, Tim and Peter Reiss. 1990. "Entry in Monopoly Markets," *Review of Economics Studies*, 531-53.
- Bresnahan, Tim and Peter Reiss. 1991. "Entry and Competition in Concentrated Markets," *Journal of Political Economy* 99 (October): 977 – 1009.
- Bresnahan, Tim, and Peter Reiss. 1991. "Empirical Models of Discrete Games," *Journal of Econometrics* 48: 57-81.
- Elie Tamer (2003), "Incomplete Simulation Discrete Response Model with Multiple Equilibria," *The Review of Economic Studies*, Vol. 70, 147 - 165.
- Ciliberto, Federico and Elie Tamer (2006), "Market Structure and Multiple Equilibria in Airline Markets," Working Paper, *University of Virginia*.
- Gayle, Philip G. and Zijun Luo (2015), "Choosing between Order-of-Entry Assumptions in Empirical Entry Models: Evidence from Competition between Burger King and McDonald's Restaurant Outlets," *Journal of Industrial Economics*, Volume 63, Issue 1, pages 129–151, March 2015.
- Gayle, Philip G. and Chi-Yin Wu (2014) "A Re-examination of Incumbents' Response to the Threat of Entry: Evidence from the Airline Industry," *Economics of Transportation*, 2 (2014), pp. 119-130.
- Bajari, Patrick, Han Hong, and Stephen Ryan, (2007), "Identification and Estimation of a Discrete Game of Complete Information," Working paper, *University of Minnesota*.
- Whinston, Michael and S. Collins. 1993. "Entry and Competitive Structure in Deregulated Airline Markets: An Event Study Analysis of People Express," *RAND* 23 (Winter): 445-62.
- Reiss, Peter and Pablo Spiller. 1989. "Competition and Entry in Small Airline Markets," *Journal of Law and Economics* 32 (October): S179-202.
- Scott Morton, Fiona. 1999. "Entry Decisions in the Generic Pharmaceutical Industry." *RAND Journal of Economics* 30 (3); 421-40.
- Seim, Katja. 2002. "An Empirical Model of Firm Entry with Endogenous Product-Type Choices." *Stanford GSB. Mimeo*.
- Einav, Liran. 2002. "Seasonality and Competition in Time: an Empirical Analysis of Release Dates in the U.S. Motion Picture Industry," *Stanford University. Mimeo*.
- Toivannan, Otto and Mike Waterson. 2001. "Market Structure and Entry: Where's the Beer?" *University of Warwick Working Paper no. 593*.

## 10. Dynamic Structural Models – Single Agent

### Relevant reading:

#### Papers in Demand for Storable Goods:

- Aguirregabiria, Victor, and Aviv Nevo (2010) "Recent Developments in Empirical IO: Dynamic Demand and Dynamic Games," Conditionally accepted at *Advances in Economics and Econometrics: Theory and Applications. Tenth World Congress of the Econometric Society*.
- Hendel, Igal, and Aviv Nevo (2006), "Measuring the Implications of Sales and Consumer Inventory Behavior," *Econometrica*, Vol. 74, No. 6, 1637-1673.
- Erdem, Tülin, Susumu Imai, and Michael P. Keane (2003), "Brand and Quantity Choice Dynamics under Price Uncertainty," *Quantitative Marketing and Economics*, Vol. 1, 5-64.

#### Papers in Machine Replacement:

- Rust, John (1987), "Optimal Replacement of GMC Bus Engines: An Empirical Model of Harold Zurcher," *Econometrica*, Vol. 55, No. 5, 999-1033.
- Rust, John, and Geoffrey Rothwell (1995), "Optimal Response to a Shift in Regulatory Regime: The Case of the US Nuclear Power Industry," *Journal of Applied Econometrics*, Vol. 10, S75-S118.

- Das, Sanghamitra (1992), "A Micro-Econometric Model of Capital Utilization and Retirement: The Case of the U.S. Cement Industry," *The Review of Economic Studies*, Vol. 59, No. 2, 277-297.
- Kennet, D. M. (1993), "Did Deregulation Affect Aircraft Engine Maintenance? An Empirical Policy Analysis," *RAND Journal of Economics*, Vol. 24, No. 4, 542-558.
- Kennet, D. M. (1994), "A Structural Model of Aircraft Engine Maintenance," *Journal of Applied Econometrics*, Vol. 9, No. 4, 351-368.
- Kasahara, Hiroyuki (2009), "Temporary Increases in Tariffs and Investment: The Chilean Experience," *Journal of Business and Economic Statistics*, Vol. 27, No. 1, 113-127.

Papers in Store Location of Retail Choice:

- Holmes, Thomas J. (2006), "The Diffusion of Wal-Mart and Economies of Density," *Manuscript, University of Minnesota*.
- Aguirregabiria, Victor, and G. Vicentini (2006), "Dynamic Spatial Competition between Multi-Store Firms," *Manuscript, University of Toronto*.

Papers in New Durable Goods:

- Melnikov, Oleg (2000), "Demand for Differentiated Durable Products: The Case of the U.S. Printer Market," *Manuscript, Yale University*.
- Esteban, Susanna, and Matthew Shum (2007), "Durable-Goods Oligopoly with Secondary Markets: The Case of Automobiles," *RAND Journal of Economics*, Vol. 38, No. 2, 332-354.
- Carranza, Juan E. (2006), "Demand for Durable goods and the Dynamics of Quality," *Manuscript, University of Wisconsin-Madison*.
- Aguirregabiria, Victor (1999), "The Dynamics of Markups and Inventories in Retailing Firms," *The Review of Economic Studies*, Vol. 66, No. 2, 275-308.

Papers in Strategic Adoption of New Technologies:

- Park, Sangin (2004), "Quantitative Analysis of Network Externalities in Competing Technologies: The VCR Case," *The Review of Economic Studies*, Vol. 86, No. 4, 937-945.
- Schmidt-Dengler, Philipp (2006), "The Timing of New Technology Adoption: The Case of MRI," *Manuscript, London School of Economics*.

Papers in Advertising and Brand Loyalty:

- Ackerberg, Daniel A. (2001), "Empirically Distinguishing Informative and Prestige Effects of Advertising," *RAND Journal of Economics*, Vol. 32, No. 2, 316-333.
- Ackerberg, Daniel A. (2003), "Advertising, Learning, and Consumer Choice in Experience Good Markets: A structural Empirical Examination," *International Economic Review*, Vol. 44, No. 3, 1007-1040.

Papers in Industry Dynamics Selection and Growth:

- Aguirregabiria, Victor, Pedro Mira, and Hernan Roman (2007), "An Estimable Dynamic Model of Entry, Exit and Growth in Oligopoly Retail Markets," *American Economic Review*, Vol. 97, No. 2, 449-454.
- Collard-Wexler, Allan (2006), "Demand Fluctuations and Plant Turnover in the Ready-Mix Concrete Industry," *Manuscript, New York University*.
- Ryan, S. P. (2006), "The Costs of Environmental Regulation in a Concentrated Industry," *Manuscript, M. I. T.*
- Beresteanu, Arie, and Paul B. Ellickson (2006), "The Dynamics of Retail Oligopoly," *Manuscript, Duke University*.

## 11. Dynamic Structural Models – Multi-Agent/Dynamic Oligopoly Games

### Relevant reading:

- Aguirregabiria, Victor and Pedro Mira (2010): “Dynamic Discrete Choice Structural Models: A Survey,” *Journal of Econometrics*, forthcoming.
- Aguirregabiria, Victor and Chun-Yu Ho (2009) “A Dynamic Oligopoly Game of the US Airline Industry: Estimation and Policy Experiments,” *Journal of Econometrics*, forthcoming.
- Aguirregabiria, Victor, and Aviv Nevo (2010) “Recent Developments in Empirical IO: Dynamic Demand and Dynamic Games,” Conditionally accepted at *Advances in Economics and Econometrics: Theory and Applications. Tenth World Congress of the Econometric Society*.
- Aguirregabiria, V. and Pedro Mira (2007): “Sequential Estimation of Dynamic Discrete Games,” *Econometrica*, 75, 1-53.
- Bajari, P., L. Benkard, and J. Levin (2007): “Estimating Dynamic Models of Imperfect Competition,” *Econometrica*.
- Pakes, A., M. Ostrovsky, and S. Berry (2008): “Simple estimators for the parameters of discrete dynamic games (with entry / exit examples),” *RAND Journal of Economics*.
- Akerberg, D., L. Benkard, S. Berry, and A. Pakes (2006): “Econometric Tools for Analyzing Market Outcomes,” *Handbook of Econometrics*, volume 6.
- Aguirregabiria, V. (2004): “Pseudo Maximum Likelihood Estimation of Structural Models Involving Fixed-Point Problems,” *Economics Letters*, 84, 335-340.
- Aguirregabiria, V., H. Roman, and P. Mira (2007): “An Estimable Dynamic Model of Entry, Exit and Growth in Oligopoly Retail Markets,” *American Economic Review*, 97(2), 449-454.
- Gayle, Philip G. and Huubinh Le (2015), “Measuring Merger Cost Effects: Evidence from a Dynamic Structural Econometric Model,” Manuscript, *Kansas State University*, 2015. This paper won the Robert F. Lanzillotti Prize for Best Paper in Antitrust Economics at the 11<sup>th</sup> annual International Industrial Organization Conference (IIOC), held in Boston, Massachusetts, May 17-19, 2013.
- Gayle, Philip G. and Xin Xie (2015), “Entry Deterrence and Strategic Alliances,” Manuscript, *Kansas State University*.
- Holmes, T. (2007): “Diffusion of Wal-Mart and Economies of Density,” Manuscript. University of Minnesota.
- Doraszelski, U. and M. Satterthwaite (2007): “Foundations of Markov-Perfect Industry Dynamics: Existence, Purification, and Multiplicity,” manuscript, Harvard University.
- Kawahara, H. and K. Shimotsu (2007): “Nested Pseudo-likelihood Estimation and Bootstrapbased Inference for Structural Discrete Markov Decision Models,” Manuscript. The University of Western Ontario.
- Pesendorfer, M. and P. Schmidt-Dengler (2008): “Least Squares Estimators for Dynamic Games,” *Review of Economic Studies*, forthcoming.
- Ericson, R. and A. Pakes (1995): “Markov-Perfect Industry Dynamics: A Framework for Empirical Work,” *Review of Economic Studies*, 62, 53-82.
- Jovanovic, B., (1982): “Selection and the Evolution of Industry”, *Econometrica*, 50, 649-670.
- Pakes, Ariel and Paul McGuire. 1994. “Computing Markov-perfect Nash Equilibria: Numerical Implications of a Dynamic Differentiated Product Model,” *Rand Journal of Economics*, 25, 555-589.
- Pakes, A. and R. Ericson (1998): “Empirical Implications of Alternative Models of Firm Dynamics,” *Journal of Economic Theory*, 79, 1-45.
- Ryan, S. (2005): “The Costs of Environmental Regulation in a Concentrated Industry,” manuscript. MIT.
- Sweeting, A. (2007): “Dynamic Product Repositioning in Differentiated Product Industries: The Case of Format Switching in the Commercial Radio Industry,” NBER WP 13522.
- Benkard, L. (2004): “A Dynamic Analysis of the Market for Wide-Bodied Commercial



Aircraft Market,” *Review of Economics Studies*.

Klepper, S. and K. Simons (2000): "The Making of an Oligopoly: Firm Survival and Technological Change in the Evolution of the U.S. Tire Industry," *Journal of Political Economy*, 108(4).

Schmidt-Dengler, P. (2005): “The Timing of New Technology Adoption: The Case of MRI,” manuscript, Yale University.

Van Biesebroeck, J. and A. Hashmi (2007): “Market Structure and Innovation: A Dynamic Analysis of the Global Automotive Industry,” Manuscript. University of Toronto.

## 12. Production, Technology and Industry Structure

### Relevant reading:

Berndt, Ernst. 1991. The Practice of Econometrics, Chapters 3 and 9, *Addison-Wesley*.

Fuss, Mel, Dan McFadden and Yair Mundlak. 1978. “A Survey of Functional Forms in the Economic Analysis of Production,” in M. Fuss and D. McFadden (ed.), *Production Economics: A Dual Approach to Theory and Applications*, *North Holland*.

Griliches, Zvi and Jacques Mairese, 1995, “Production Functions: The Search for Identification,” *NBER Working Paper No.w5067*.

Olley, Steve and Ariel Pakes. 1996. “The Dynamics of Productivity in the Telecommunications Industry,” *Econometrica*, 64 (6), 1263-97.

Levinsohn, Jim and Amil Petrin. 2000. “Estimating Production Functions Using Inputs to Control for Unobservables,” *NBER Working Paper No. w7819*.

Evans, David and James Heckman. 1984. “A Test for Subadditivity of the Cost Function with an Application to the Bell System,” *American Economic Review*, 74(4), 615-23, plus Comment and Errata, *American Economic Review*, 76(4), 854-8.

Roller, L. 1990. “Modeling Cost Structure: the Bell System Revisited,” *Applied Economics*, 22, 1661-1674.

Wolak, Frank. 1994. “An Econometric Analysis of the Asymmetric Information Regulator-Utility Interaction,” *Annales D’Economie et de Statistique*, 34, 12-69.

Benkard, Lanier. 2000. “Learning and Forgetting: The Dynamics of Aircraft Production,” *American Economic Review*, 90 (4), 1034-54.

### Relevant University Statements:

#### 1. [Statement Regarding Academic Honesty](#)

Kansas State University has an Honor System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor System. The policies and procedures of the Honor System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The honor system website can be reached via the following URL: [www.k-state.edu/honor](http://www.k-state.edu/honor). A component vital to the Honor System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is stated: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

#### 2. [Statement Regarding Students with Disabilities](#)

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. If you are a student enrolled in campus/online courses through the Manhattan or Olathe campuses, contact the [Student Access Center](#) at [accesscenter@k-state.edu](mailto:accesscenter@k-state.edu), 785-532-6441; for Salina campus, contact the [Academic and Career Advising Center](#) at [acac@k-state.edu](mailto:acac@k-state.edu), 785-826-2649.

### 3. **Statement Defining Expectations for Classroom Conduct**

All student activities in the University, including this course, are governed by the [Student Judicial Conduct Code](#) as outlined in the Student Governing Association [By Laws](#), Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class.

### 4. **Campus Safety Statement**

Kansas State University is committed to providing a safe teaching and learning environment for student and faculty members. In order to enhance your safety in the unlikely case of a campus emergency make sure that you know where and how to quickly exit your classroom and how to follow any emergency directives. To view additional campus emergency information go to the University's main page, [www.k-state.edu](http://www.k-state.edu), and click on the Emergency Information button.