Economics 640
Empirical Industrial Organization
Fall 2021

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Lecture Location:
Schönberggasse 1 (SOF)
Room: E-09
Time: Thurs, 8:15-12:00

IO analyzes competition between firms in all its guises, but takes as inputs an understanding of consumer demand and firms' costs and productivities and is itself used as an input into sector and competition policymaking. Each of these topics will be covered.

Following that of the academic literature, the focus of the course will be on structural econometric methods. Those methods that constitute the canon in empirical IO (demand estimation, productivity estimation, entry, etc.) will be introduced, as well as applications that rely on these to build customized econometric models designed for the industry and research question being studied.

A working knowledge and comfort with microeconomic theory and econometric methods at the level of the first-year economics PhD sequence is required. The course emphasizes how structural methods combine theory and econometrics with a given dataset to answer research questions of economic interest.

Structural methods are only learned well if they are programmed on a computer, so there will be a number of empirical problem sets during the course. These will cover the core material as well as present additional optional material allowing motivated students to spend the time necessary to implement the models covered in lecture on sample data.

There is no text for the course. Readings will consist of specific chapters from relevant texts and individual research papers. We will let you know the week before each lecture which papers will be covered.

As we will be reading and discussing as a group individual research papers, adequate preparation is essential for a successful discussion. For each paper covered in the course, we will (try to) provide written questions a week ahead to guide your reading (and thinking). For each paper, we encourage you to read these questions first, then skim the paper briefly to get a sense of its structure and claims, and then finally read through it carefully (answering the questions in detail).

We will meet weekly, on Thursdays, from 8:15-12:00. The time will be split into two sessions: first session will be

a lecture and the second session will be a tutorial. In practice, we may "borrow" the tutorial sessions for lectures, particularly early in the term.

Evaluation will be determined by your long-run interests in structural estimation and/or empirical IO. If you are intending for empirical IO to be a core interest, then you will be expected to complete the problem sets and your grade will depend on course participation (20%), performance on the problem sets (80%).If you are taking the course as a secondary interest (welcome!), then you will be expected to complete referee reports instead of the problem sets (this will generally be the easier option as the referee report will rely on the preparation you do for individual lectures) and your grade will depend on course participation (20%), performance on the referee reports (80%). We will provide guidance about what we're looking for in the referee reports.

What follows here is a short outline of the topics covered. In the following pages, we provide much more detail on these topics, both the papers to be covered in lecture as well as related papers.

1. Introduction to Structural Econometric Estimation (1 lecture)
2. Productivity estimation (2-3 lectures)
3. Demand and Pricing (3-4 lectures)
4. Single-agent dynamics (2-3 lectures)
5. Media Bias (1-2 lectures)
6. Other topics (if time and interest), e.g.
    - Bargaining, Econometrics review, Search, Endogenous products/quality, Entry, Learning, Policy applications, ...

- **Topic 1: Introduction to Structural Econometric Estimation**

  - The debate between structural and experimental/quasi-experimental methods:

    * In the 2010 *JEP*, with an IO focus:

      Angrist, Joshua D. and Jörn-Steffen Pischke, "The Credibility Revolution in Empirical Economics: How Better Research Design is Taking the Con out of Econometrics," *Journal of Economic Perspectives*, 2010, *24* (2), 3-30.

      Nevo, Aviv and Michael Whinston, "Taking the Dogma out of Econometrics: Structural Modeling and Credible Inference," *Journal of Economic Perspectives*, 2010, *24* (2), 69-82.

      Einav, Liran and Jonathan Levin, "Empirical industrial Organization: A Progress Report," *Journal of Economic Perspectives*, 2010, *24* (2), 157-160.

    * In the 2010 *JoMetrics*, with a labor focus:

      Keane, Michael, "Structural vs. atheoretic approaches to econometrics," *Journal of Econometrics*, 2010, *156* (1), 3-20.

      Rust, John, "Comments on: 'Structural vs. atheoretic approaches to econometrics'," *Journal of Econometrics*, 2010, *156* (1), 21-24.

      Blundell, Richard, "Comments on: 'Structural vs. atheoretic approaches to econometrics'," *Journal of Econometrics*, 2010, *156* (1), 25-26.

      Heckman, James and Sergio Urzúa, "Comparing IV with structural models: What simple IV can and cannot identify," *Journal of Econometrics*, 2010, *156* (1), 27-37.

    * In the 2010 *JEL*, with a development/labor focus:

      Deaton, Angus, "Instruments, Randomization, and Learning about Development," *Journal of Economic Literature*, 2010, *48* (2), 424-455.

      Imbens, Guido, "Better LATE Than Nothing: Some Comments on Deaton (2009) and Heckman and Urzua (2009)," *Journal of Economic Literature*, 2010, *48* (2), 399-423.

  - Surveys of Structural Methods (IO/Marketing Focus):

    Reiss, Peter and Frank Wolak, "Structural Econometric Modeling: Rationales and Examples from Industrial Organization," in J. J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, North-Holland, 2007, chapter 64, pp. 4277-4415

    Chintagunta, Pradeep, Tülin Erdem, Peter E. Rossi, and Michel Wedel, "Structural Modeling in Marketing: Review and Assessment," *Marketing Science*, 2006, *25* (6), 604-616.

– Structural examples from lecture notes:

Crawford, Gregory S. and Ali Yurukoglu, "The Welfare Effects of Bundling in Multichannel Television Markets," *American Economic Review*, 2012, *102* (2), 643-685.

Crawford, Gregory S., Robin S. Lee, Michael D. Whinston, and Ali Yurukoglu, "The Welfare Effects of Vertical Integration in Multichannel Television Markets," *Econometrica*, 2018, *86* (3), 891-954.

- **Topic 2: Production Function (Productivity) Estimation**

  – Methods and (a sample of) IO Applications:

Ackerberg, Daniel, C. Lanier Benkard, Steven Berry, and Ariel Pakes, "Econometric Tools for Analyzing Market Outcomes," in J. J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, North-Holland, 2007, chapter 63, pp. 4171-4276, Section 2

Olley, G. Steven and Ariel Pakes, "The Dynamics of Productivity in the Telecommunications Equipment Industry," *Econometrica*, 1996, *64*, 1263-1297.

Levinsohn, James and Amil Petrin, "Estimating Production Functions Using Inputs to Control for Unobservables," *Review of Economic Studies*, 2003, *70* (3), 317-341.

Ackerberg, Daniel, Kevin Caves, and Garth Frazer, "Identification Properties of Recent Production Function Estimators," *Econometrica*, 2015, *83* (6), 2411-2451. (The current best practice for productivity estimation using structural methods)

De Loecker, Jan, Eeckhout, Jan and Gabriel Unger, "The Rise of Market Power and the Macroeconomic Implications," *Quarterly Journal of Economics*, 2020, *135* (2), 561-644.

De Loecker, Jan, and Frederic Warzynski, "Markups and firm-level export status," *American Economic Review*, 2012, *102* (6), 2437-71.

De Loecker, Jan, Pinelopi K. Goldberg, Amit K. Khandelwal, and Nina Pavcnik, "Prices, markups, and trade reform," *Econometrica*, 2016, *84* (2), 445-510.

Doraszelski, Ulrich, and Jordi Jaumandreu, "Reexamining the De Loecker & Warzynski (2012) method for estimating markups," Working Paper, 2021.

Bond, Steve, Arshia Hashemi, Greg Kaplan, and Piotr Zoch, "Some unpleasant markup arithmetic: Production function elasticities and their estimation from production data," *Journal of Monetary Economics*, 2021.

De Loecker, Jan, and Chad Syverson, "An Industrial Organization Perspective on Productivity," NBER Working Paper #29229, 2021.

Autor, David, David Dorn, Lawrence F. Katz, Christina Patterson, and John Van Reenen, "The fall of the labor share and the rise of superstar firms," *Quarterly Journal of Economics*, 2020, *135* (2), 645-709.

Gandhi, Amit, Salvador Navarro, and David A. Rivers, "On the identification of gross output production functions," *Journal of Political Economy*, 2020, *128* (8), 2973-3016.

Basu, Susanto, "Are price-cost markups rising in the united states? a discussion of the evidence," *Journal of Economic Perspectives*, 2019, *33* (3), 3-22.

Traina, James, "Is aggregate market power increasing? production trends using financial statements," Working Paper, 2018.

Griliches, Zvi and Jacques Mairesse, "Production Functions - The Search for Identification," NBER Working Paper #5067, 1995.

Syverson, Chad, "What determines productivity?", *Journal of Economic Literature*, 2011, v49n2, 326-65.

Foster, Lucia, John Haltiwanger, and Chad Syverson, "Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability?," *American Economic Review*, 2008.

De Loecker, Jan, "Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity," *Econometrica*, 2011, *79* (5), 1407-1451.

Doraszelski, Ulrich, and Jordi Jaumandreau, "R&D and Productivity: Estimating Endogenous Productivity," *Review of Economics Studies*, 2013, *80*, 1338-1383.

Grieco, Paul and Ryan McDevitt, "Productivity and Quality in Health Care: Evidence from the Dialysis Industry," *Review of Economic Studies*, 2017, *84* (3), 1071-1105.

Hsieh, Chang-Tai and Peter J. Klenow, "Misallocation and Manufacturing TFP in China and India." *Quarterly Journal of Economics*, 2009, *124* (4), 1403-48.

Haltiwanger, John, Robert Kulick, and Chad Syverson, "Misallocation Measures: The Distortion That Ate the Residual," Working Paper, University of Chicago, 2017.

- Applications outside IO:

  * In International Trade (a sample, many more):

    Haskel, Jonathan, Sonia Pereira, and Matthew J. Slaughter, "Does Inward Foreign Direct Investment Boost the Productivity of Domestic Firms?," *Review of Economics and Statistics*, 2007, *89* (3), 482-496.

    Javorcik, Beata Smarzynska, "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers Through Backward Linkages," *American Economic Review*, 2004, *94* (3), 605-627.

    Pavcnik, Nina, "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants," *Review of Economic Studies*, 2002, *69* (1), 245-276.

Eaton, Jonathan, Samuel Kortum, and Francis Kramarz, "An Anatomy of International Trade: Evidence From French Firms," *Econometrica*, 2011, *79* (5), 1453-1498. (Doesn't strictly estimate productivities in the way the other papers listed here do, but is a good example of structural work in trade)

* In innovation, R&D, management, and technology adoption (a sample, many more):

Keller, Wolfgang, "International Technology Diffusion," *Journal of Economic Literature*, 2004, *62*, 752-782.

Kortum, Samuel and Josh Lerner, "Assessing the Contribution of Venture Capital to Innovation," *The RAND Journal of Economics*, 2000, *31* (4), 674-692.

Bloom, Nicholas and John Van Reenen, "Measuring and Explaining Management Practices Across Firms and Countries," *Quarterly Journal of Economics*, 2007, *122* (4), 1351-1408.

* In development economics (a sample, many more):

Tybout, James, "Manufacturing Firms in Developing Countries: How Well Do They Do, and Why?," *Journal of Economic Literature*, 2000, *38*, 11-44.

Aw, Bee Yan, Xiaomin Chen, and Mark J. Roberts, "Firm-level evidence on productivity differentials and turnover in Taiwanese manufacturing," *Journal of Development Economics*, 2001, *66* (1), 51-86.

Blalock, Garrick and Paul J. Gertler, "Learning from exporting revisited in a less developed setting," *Journal of Development Economics*, 2004, *75* (2), 397-416.

- **Topic 3: Demand Estimation**

  - Methods and (a sample of) IO Applications:

Ackerberg, Daniel, C. Lanier Benkard, Steven Berry, and Ariel Pakes, "Econometric Tools for Analyzing Market Outcomes," in J. J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, North-Holland, 2007, chapter 63, pp. 4171-4276, Section 2

Berry, Steven, "Estimating Discrete Choice Models of Product Differentiation," *Rand Journal of Economics*, 1994, *25* (2), 242-262.

Berry, Steven, James Levinsohn, and Ariel Pakes, "Automobile Prices in Market Equilibrium," *Econometrica*, 1995, *63* (4), 841-890.

Train, Kenneth, *Discrete Choice Methods with Simulation*, Cambridge, UK: Cambridge University Press, 2009. (Good resource for estimating demand using individual-level data, and free on Train's website.)

Nevo, Aviv, "A Practictioner's Guide to Random Coefficients Discrete Choice Models of Demand," *Journal of Economics and Management Strategy*, 2000, *9* (4), 513-548. (great to get you started on your own matlab code)

Dube, Jean-Pierre, Jeremy T. Fox, and Che-Lin Su, “Improving the Numerical Performance of BLP Structural Demand Estimators,” *Econometrica*, 2012, *80* (5), 2231-2267.

Grieco, Paul, Charles Murry, and Ali Yurukoglu, "The Evolution of Market Power in the US Auto Industry," NBER Working Paper #29013, 2021.

Conlon, Christopher, and Jeff Gortmaker, "Best Practices for Differentiated Products Demand Estimation with PyBLP," *The RAND Journal of Economics*, 2020, *51* (4), 1108-1161.

Gandhi, Amit, and Jean-François Houde, "Measuring Substitution Patterns in Differentiated-Products Industries," NBER Working Paper #26375, 2019.

Petrin, Amil, “Quantifying the Benefits of New Products: The Case of the Minivan,” *Journal of Political Economy*, 2003, *110* (4), 705-729.

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

Bresnahan, Timothy, “Empirical Studies of Industries with Market Power,” in R. Schmalensee and R. Willig, eds., *Handbook of Industrial Organization*, Vol. 2, Amsterdam: North-Holland, 1989, chapter 17, pp. 1011-1058.

Davis, Peter and Eliana Garcés, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton University Press, 2010.

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

Crawford, Gregory S. and Ali Yurukoglu, “The Welfare Effects of Bundling in Multichannel Television Markets,” *American Economic Review*, 2012, *102* (2), 643-685.

Hausman, Jerry, “Valuation of New Goods under Perfect and Imperfect Competition,” in T. Bresnahan and R. Gordon, eds., *The Economics of New Goods*, University of Chicago Press, 1996. (especially also the comments, reply comments, and rejoinder! - links on website)

Hausman, Jerry, Gregory Leonard, and J. Douglas Zona, “Competitive Analysis with Differentiated Products,” *Annales d’Economie et Statistique*, 1994, *34*, 159-180.

Trajtenberg, Manuel, “The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners,” *Journal of Political Economy*, 1989, *97* (2), 444-479.

Davis, Peter, “Spatial Competition in Retail Markets: Movie Theaters,” *Rand Journal of Economics*, 2008, *37* (4), 964-982.

Bronnenberg, Bart J., Jean-Pierre Dubé, and Matthew Gentzkow, “The Evolution of Brand Preferences: Evidence from Consumer Migration,” *American Economic Review*, *102* (6), 2472-2508.

Dubois, Pierre, Rachel Griffith, and Aviv Nevo, "Do Prices and Attributes Explain International Differences in Food Purchases?," *American Economic Review*, 2014, *104* (3), 832-67.

Fox, Jeremy T., Kyoo Kim, Stephen P. Ryan, and Patrick Bajari, "A simple estimator for the distribution of random coefficients," *Quantitative Economics*, 2011, *2* (3), 381-418.

Gentzkow, Matthew, "Valuing New Goods in a Model with Complementarity: Online Newspapers," *American Economic Review*, 2007, *97* (3), 713-744.

Chaudhuri, Shubham, Pinelopi K. Goldberg, and Panle Jia, "Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Case Study of Quinolones in India," *American Economic Review*, 2006, *96* (5), 1477-1514.

– Applications outside IO:

  * In International Trade:

    Berry, Steven, James Levinsohn, and Ariel Pakes, "Voluntary Export Restraints on Automobiles: Evaluating a Trade Policy," *American Economic Review*, 1999, *89* (3), 400-430.

    Goldberg, Pinelopi, "Product Differentiation and Oligopoly in International Markets: The Case of the US Automobile Industry," *Econometrica*, July 1995, *63*, 891-951.

    Khandelwal, Amit, "The Long and Short (of) Quality Ladders," *Review of Economic Studies*, 2010, *77*, 1450-1476.

    Verboven, Frank, "International Price Discrimination in the European Car Market," *Rand Journal of Economics*, 1996, v27n2, 240-68.

    Verhoogen, Eric A., "Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector," *Quarterly Journal of Economics*, 2008, *123* (2), 489-530.

  * In Public Finance and Banking and Finance:

    Epple, Dennis and Holger Sieg, "Estimating Equilibrium Models of Local Jurisdictions," *Journal of Political Economy*, 1999, *107* (4), 645-681. (A different demand structure, but an important structural paper in Public Finance)

    Bayer, Patrick, Fernando Ferreira, and Robert McMillan, "A Unified Framework for Measuring Preferences for Schools and Neighborhoods," *Journal of Political Economy*, 2007, *115* (4), 588-638.

    Bajari, Patrick and Matthew E. Khan, "Estimating Housing Demand With an Application to Explaining Racial Segregation in Cities," *Journal of Business & Economic Statistis*, 2005, *23* (1), 20-33.

    Dick, Astrid, "Demand estimation and consumer welfare in the banking industry," *Journal of Banking and Finance*, 2008, *32*, 1661-1676.

Ferreyra, Maria Marta, "Estimating the Effects of Private School Vouchers in Multi-district Economies," *American Economic Review*, 2007, *97* (3), 789-817.

Fershtman, Chaim, Neil Gandal, and Sarit Markovich, "Estimating the effect of tax reform in differentiated product oligopolistic markets," *Journal of Public Economics*, 1999, *74* (2), 151-170.

Schroth, Enrique, "Innovation, Differentiation, and the Choice of an Underwriter: Evidence from Equity-Linked Securities," *Review of Financial Studies*, 2006, *19* (3), 1041-1080.

∗ In Growth, Development, and Labor:

Klette, Tor Jakob and Zvi Griliches, "Empirical Patterns of Firm Growth and R&D Investment: a Quality Ladder Model Interpretation," *Economic Journal*, 2000, *110*, 363-387.

Lommerud, Kjell Erik, Odd Rune Straume, and Lars Sørgard, "National versus international mergers in unionized oligopoly," *RAND Journal of Economics*, 2006, *37* (1), 212-233.

Timmons, Christopher, "Estimating spatial differences in the Brazilian cost of living with household location choices," *Journal of Development Economics*, 2006, *80*, 59-83.

- **Topic 4: Single-Agent Dynamics**

  – Methods and (a sample of) IO Applications:

Ackerberg, Daniel, C. Lanier Benkard, Steven Berry, and Ariel Pakes, "Econometric Tools for Analyzing Market Outcomes," in J. J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, North-Holland, 2007, chapter 63, pp. 4171-4276, Section 3.

Rust, John, "Structural Estimation of Markov Decision Processes," in R. Engle and D. McFadden, eds., *Handbook of Econometrics, Vol. 4*, North Holland, 1994, pp. 3082-146.

Hotz, Joseph, and Robert Miller, "Conditional Choice Probabilties and the Estimation of Dynamic Models," *Review of Economic Studies*, 1993, *60*, 497-529.

Judd, Kenneth and Che-Lin Su, "Constrained Optimization Approaches to Estimation of Structural Models," *Econometrica*, 2012, *80* (5), 2213-2230.

Keane, Michael P., and Kenneth Wolpin, "The Solution and Estimation of Discrete Choice Dynamic Programming Models by Simulation and Interpolation: Monte Carlo Evidence," *Review of Economics and Statistics*, 1994, *76* (4), 648-672.

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

Hotz, Joseph, Robert Miller, Seth Sanders, and Jeffrey Smith, "A Simulation Estimator for Dynamic Models of Discrete Choice," *Review of Economic Studies*, 1994, *61* (2), 265-289.

Aguirregabiria, Victor and Pedro Mira,"Swapping the nested fixed point algorithm: a class of estimators for discrete Markov decision models," *Econometrica*, 1902, *70* (4), 1519-1543.

Aguirregabiria, Victor and Pedro Mira,"Dynamic Discrete Choice Structural Models: A Survey," *Journal of Econometrics*, 2010, *156* (1), 38-67.

Gowrisankaran, Gautam and Marc Rysman, "Dynamics of Consumer Demand for New Durable Consumer Goods," *Journal of Political Economy*, 2012, *120*, 1173-1219.

Pakes, Ariel, "Patents as Options: Some Estimates of the Value of Holding European Patent Stocks," *Econometrica*, 1986, *54* (4), 755-84.

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

Schiraldi, Pasquale, "Automobile replacement: a dynamic structural approach," *The RAND Journal of Economics*, 2011, *42* (2), 266-291.

- Surveys and Applications outside IO:

  * In Labor and Health (a sample, many more):

    Keane, Michael P., Petra E. Todd, and Kenneth I. Wolpin, "The Structural Estimation of Behavioral Models: Discrete Choice Dynamic Programming Methods and Applications," in Orley Ashenfelter and David Card, eds., *Handbook of Labor Economics, Vol. 4, Part A*, Elsevier, 2007, chapter 4, pp. 331-461.

    Abbring, Jaap, and James J. Heckman, "Econometric Evaluation of Social Programs, Part III: Distributional Treatment Effects, Dynamic Treatment Effects, Dynamic Discrete Choice, and General Equilibrium Policy Evaluation," in J. J. Heckman and E. Leamer, eds., *Handbook of Econometrics*, North-Holland, 2007, chapter 72, pp. 5145-5303.

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

    Eckstein, Zvi and Kenneth Wolpin, "Why Youths Drop Out of High School: The Impact of Preferences, Opportunities, and Abilities," *Econometrica*, 1999, *67* (6), 1295-1340.

    Cunha, Flavio, James J. Heckman, and Susanne M. Schennach, "Estimating the Technology of Cognitive and Noncognitive Skill Formation," *Econometrica*, 2010, *78* (3), 883-931.

    Wolpin, Kenneth I., "Estimating a Structural Search Model: The Transition from School to Work," *Econometrica*, 1987, *55* (4), 801-817.

    Miller, Robert A., "Job Matching and Occupational Choice," *Journal of Political Economy*, 1984, *92* (6), 1086-1120.

Gilleskie, Donna, "A Dynamic Stochastic Model of Medical Care Use and Work Absence," *Econometrica*, 1998, *66* (1), 1-45.

* In Public Finance:

Sieg, Holger, "Estimating a Dynamic Model of Household Choices in the Presence of Income Taxation," *International Economic Review*, 2000, *41* (3), 637-668.

Adda, Jérôme and Russell Cooper, "Balladurette and Juppette: A Discrete Analysis of Scrapping Subsidies," *Journal of Political Economy*, 2000, *108* (4), 778-806.

Golosov, Mikhail, Aleh Tsyvinski, and Iván Werning, "New Dynamic Public Finance: A Users Guide," *NBER Macroeconomics Annual*, 2007.

Yoon, Chamna, "The Decline of the Rust Belt: A Dynamic Spatial Equilibrium Analysis," Working paper, University of Pennsylvania, 2012.

* In International Trade and Development:

Artuç, Erhan, Shubham Chaudhuri, and John McLaren, "Trade Shocks and Labor Adjustment: A Structural Empirical Approach," *American Economic Review*, 2010, *100* (3), 1008-1045.

Robertson, Raymond and Donald H. Dutkowsky, "Labor Adjustment Costs in a Destination Country: The Case of Mexico," *Journal of Development Economics*, 2006, *67* (1), 29-54.

- **Topic 5: Media Bias**

  - Methods and (a sample of) IO Applications:

Gentzkow, Matthew and Jesse M Shapiro, "What drives media slant? Evidence from US daily newspapers," *Econometrica*, 2010, *78* (1), 35-71.

Groseclose, Tim and Jeffrey Milyo, "A measure of media bias," *The Quarterly Journal of Economics*, 2005, *120* (4), 1191-1237.

Laver, Michael, Kenneth Benoit, and John Garry, "Extracting policy positions from political texts using words as data," *American Political Science Review*, 2003, *97* (2), 311-331.

Gentzkow, Matthew, Jesse M Shapiro, and Matt Taddy, "Measuring polarization in high-dimensional data: Method and application to congressional speech," Technical Report, National Bureau of Economic Research 2016.

Martin, Gregory J. and Ali Yurukoglu, "Bias in Cable News: Persuasion and Polarization" *American Economic Review*, 2017, *107* (9), 2565-99.

Mullainathan, Sendhil and Andrei Shleifer, "The market for news," *American Economic Review*, 2005, *95* (4), 1031-1053.

Puglisi, Riccardo, and James M Snyder, "Empirical studies of media bias," *Handbook of Media Economics. Amsterdam: Elsevier*, 2016.

Gentzkow, Matthew, Jesse M Shapiro, and Daniel F. Stone, "Media Bias in the Marketplace: Theory," *Handbook of media economics. Amsterdam: Elsevier*, 2016.

- **Topic 6: Bargaining**

  - Methods and (a sample of) IO Applications:

    Nash, John, F., Jr., "The Bargaining Problem," *Econometrica*, 1950, *18* (2), 155-162.

    Muthoo, Abhinay, *Bargaining Theory with Applications*, 1999, Cambridge, UK: Cambridge University Press, Chapter 2.

    Rubinstein, Ariel, "Perfect Equilibrium in a Bargaining Model," *Econometrica*, 1982, *50* (1), 97-109.

    Horn, Henrick, and Asher Wolinsky, "Bilateral Monopolies and Incentives for Merger," *The RAND Journal of Economics*, 1988, *19* (3), 408-419.

    Crawford, Gregory S. and Ali Yurukoglu, "The Welfare Effects of Bundling in Multichannel Television Markets," *American Economic Review*, 2012, *102* (2), 643-685.

    Grennan, Matthew, "Price Discrimination and Bargaining: Empirical Evidence from Medical Devices," *American Economic Review*, 2013, *103* (1), 145-177.

    Lee, Robin S., and Kyna Fong, "Markov-Perfect Network Formation: An Applied Framework for Bilateral Oligopoly and Bargaining in Buyer-Seller Networks," Working Paper, NYU, 2013.

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

    Draganska, Michaela, Daniel Klapper, and Sofia B. Villas-Boas, "A Larger Slice or a Larger Pie? An Empirical Investigation of Bargaining Power in the Distribution Channel," *Marketing Science*, 2010, *29* (1), 57-74.

    Meza, Sergio, and K. Sudhir, "Do private labels increase retailer bargaining power?" *Quantitative Marketing and Economics*, 2010, *8*, 333-363.

    Gowrisankaran, Gautam, Aviv Nevo, and Robert Town, "Mergers When Prices Are Negotiated: Evidence from the Hospital Industry," *American Economic Review*, 2015, *105* (1), 172-203.

- **Topic 7: Search**

  - Methods and (a sample of) IO Applications:

Baye, Michael R., John Morgan, and Patrick Scholten, "Information, Search, and Price Dispersion," in T. Hendershott, ed., *Handbooks in Information Systems, v1: Economics and Information Systems*, Elsevier Science, 2006.

Burdett, Kenneth, and Kenneth L. Judd, "Equilibrium Price Dispersion," *Econometrica*, 1983, *51* (4), 955-969.

De Los Santos, B. I., Ali Hortacsu, and Mattias Wildenbeest, "Testing Models of Consumer Search using Data on Web Browsing and Purchasing Behavior," *American Economic Review*, 2012, *102* (6), 2955-2980.

Hong, Han, and Matthew Shum, "Using Price Distributions to Estimate Search Costs," *RAND Journal of Economics*, 2006, *37* (2), 257-275.

Hortaçsu, Ali, and Chad Syverson, "Product Differentiation, Search Costs, and Competition in the Mutual Fund Industry: A Case Study of S&P 500 Index Funds," *Quarterly Journal of Economics*, 2012, *119* (2), 403-456.

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