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450-1: INDUSTRIAL ORGANIZATION AND PRICES I

Fall 2021

This course sequence provides a graduate-level introduction to Industrial Organization (IO). It is designed to provide a broad introduction to topics and industries that current researchers are studying as well as to expose students to a wide variety of techniques. It will start the process of preparing Ph.D. students to conduct thesis research in the area.

Lectures: Monday/Wednesday 1:30-3:20, KGH 1410

Course Web Page: see Canvas

Grading will be based on several problem sets and a final exam. The final is scheduled for Thursday, December 9 at 9am.

We will not discuss all of the papers on the reading list, but *we expect you to read all of the papers that we discuss in detail in class.*

The plans for how the course will be run are described below. However, we may modify various aspects, depending on campus restrictions, as well as feedback we receive from you and our own evaluations. We always welcome feedback on how to improve the course, and your feedback is especially welcome this year.

All lectures and office hours will be conducted in person.

We will post copies of the slides used during lectures before the topics are covered in class. You may find it useful to download or print out hard copies of the lecture slides before attending lectures in order to review the material in advance and/or to take notes during the lecture. The slides contain material that will be covered in class, as well as supplemental material, some of which will be covered in class. As far as the exam is concerned, you are only responsible for the material covered in class.

The following abbreviations are used for journal titles:

AER	American Economic Review
AEJ: Micro	American Economic Journal: Microeconomics
BJE	Bell Journal of Economics
EMA	Econometrica
IER	International Economic Review
IJO	International Journal of Industrial Organization
JE	Journal of Econometrics
JEH	Journal of Economic History
JEL	Journal of Economic Literature
JEMS	Journal of Economics & Management Strategy
JEP	Journal of Economic Perspectives
JET	Journal of Economic Theory
JIE	Journal of Industrial Economics
JLE	Journal of Law and Economics
JPE	Journal of Political Economy
QJE	Quarterly Journal of Economics
QME	Quantitative Marketing and Economics
REStat	Review of Economics and Statistics
REStud	Review of Economic Studies
RIO	Review of Industrial Organization
RJE	RAND Journal of Economics

I. General References

- D. Akerberg, L. Benkard, S. Berry and A. Pakes, “Econometric Tools for Analyzing Market Outcomes,” *Handbook of Econometrics*, Volume 6A, Elsevier, 2007, Chapter 63.
- V. Aguirregabiria, “Empirical Industrial Organization: Models, Methods and Applications,” 2019. http://aguirregabiria.net/wpapers/book_dynamic_io.pdf
- M. Armstrong and R. Porter, eds., *Handbook of Industrial Organization*, Volume 3, Elsevier, 2007. (HIO3)
- P. Davis and E. Garces, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton, 2010.
- K. Ho, A Hortacsu and A. Lizzeri, eds., *Handbook of Industrial Organization*, Volumes 4 and 5, Elsevier, forthcoming. (HIO4 and HIO5)
- P. Reiss and F. Wolak, “Structural Econometric Modeling: Rationales and Examples from Industrial Organization,” *Handbook of Econometrics*, Volume 6A, Elsevier, 2007, Chapter 64.
- R. Schmalensee, “On a Level with Dentists? Reflections on the Evolution of Industrial Organization,” RIO, November 2012, 157-79.
- R. Schmalensee and R. Willig, eds., *Handbook of Industrial Organization*, Volumes 1 and 2, Elsevier, 1989. (HIO1 and HIO2)
- J. Tirole, *The Theory of Industrial Organization*, MIT, 1988.

II. Static Models of Oligopoly Price/Quantity Competition

- Tirole, chap. 5, Section 2.1 (pp. 96–100); Sections 7.1, 7.2, 7.5 (pp. 279–88, 296–300).
- A. Mas-Colell, M. Whinston and J. Green, *Microeconomic Theory*, Oxford, 1995, Section 12.C.
- C. Shapiro, “Theories of Oligopoly Behavior,” *HIO1*, Chapter 6.
- X. Vives, *Oligopoly Pricing: Old Ideas and New Tools*, MIT, 1999.

1. The Cournot Model

- C. Davidson and R. Deneckere, “Long-run Competition in Capacity, Short-run Competition in Price, and the Cournot Model, RJE, Autumn 1986, 404-15.

P. Klemperer and M. Meyer, "Supply Function Equilibria in Oligopoly under Uncertainty," EMA, November 1989, 1243-78.

D. Kreps and J. Scheinkman, "Quantity Precommitment and Bertrand Competition Yield Cournot Outcomes," BJE, Autumn 1983, 326–37.

2. Price Competition with Product Differentiation

S. Salop, "Monopolistic Competition with Outside Goods," BJE, Spring 1979, 141–56.

A. Shaked and J. Sutton, "Relaxing Price Competition through Product Differentiation," ReStud, January 1982, 3–14.

3. Introduction to the Antitrust Laws and Horizontal Merger Policy

J. Asker and V. Nocke, "Collusion, Mergers and Related Antitrust Issues," HIO4.

L. Benkard, A. Yurukoglu and A. Zhang, "Concentration in Product Markets," mimeo, Stanford, 2021.

J. Farrell and C. Shapiro, "Horizontal Mergers: An Equilibrium Analysis," AER, March 1990, 107-26.

M. Motta, *Competition Policy: Theory and Practice*, Cambridge, 2004.

V. Nocke and M. Whinston, "Dynamic Merger Review," JPE, December 2010, 1200-51.

V. Nocke and M. Whinston, "Concentration Thresholds for Horizontal Mergers," AER, forthcoming.

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Department of Justice and Federal Trade Commission *Horizontal Merger Guidelines*, 2010.

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III. Entry

A. Dixit and J. Stiglitz, "Monopolistic Competition and Optimal Product Diversity," AER, June 1977, 297–308.

G. Mankiw and M. Whinston, “Free Entry and Social Inefficiency,” RJE, Spring 1986, 48–58.

J. Panzar, “Technological Determinants of Firm and Industry Structure,” *HIO1*, Chapter 1.

A. Shaked and J. Sutton, “Natural Oligopolies,” EMA, September 1983, 1469-1483.

A. Shaked and J. Sutton, “Multiproduct Firms and Market Structure,” RJE, Spring 1990, 45-62.

J. Sutton, *Sunk Costs and Market Structure*, MIT, 1991, Chapters 2 and 3.

J. Sutton, “One Smart Agent,” RJE, Winter 1997, 605-628.

J. Sutton, “Market Structure: Theory and Evidence,” *HIO3*, Chapter 35.

IV. Dynamic Models

Tirole, Chapter 6.

A. Mas-Colell, M. Whinston and J. Green, *Microeconomic Theory*, Oxford, 1995, Section 12.D.

E. Calvano, G. Calzolari, V. Denicolo and S. Pastorello, “Artificial Intelligence, Algorithmic Pricing and Collusion,” AER, October 2020, 3267-97.

J. Harrington, *The Theory of Collusion and Competition Policy*, MIT, 2017.

1. Collusion with Observable Demand Variation

Bagwell, K. and R. Staiger, “Collusion Over the Business Cycle,” RJE, Spring 1997, 82-106.

J. Haltiwanger and J. Harrington, “The Impact of Cyclical Demand Movements on Collusive Behavior,” RJE, Spring 1991, 89–106.

J. Rotemberg and G. Saloner, “A Supergame-Theoretic Model of Price Wars During Booms,” AER, June 1986, 390–407.

2. Multimarket Contact

D. Bernheim and M. Whinston, “Multimarket Contact and Collusive Behavior,” RJE, Spring 1990, 1–26.

3. Collusion with Capacity Constraints

W. Brock and J. Scheinkman, "Price-Setting Supergames with Capacity Constraints," *ReStud*, July 1985, 371–82.

O. Compte, F. Jenny and P. Rey, "Capacity Constraints, Mergers, and Collusion," *European Economic Review*, 2002, 1-29.

H. Vasconcelos, "Tacit Collusion, Cost Asymmetries, and Mergers," *RJE*, Spring 2005, 39-62.

4. Collusion with Unobservable Demand Variation (Imperfect Monitoring)

D. Abreu, D. Pearce and E. Stachetti, "Optimal Cartel Equilibria with Imperfect Monitoring," *JET*, June 1986, 251-69.

D. Abreu, D. Pearce and E. Stachetti, "Toward a Theory of Discounted Repeated Games with Imperfect Monitoring," *EMA*, September 1990, 1041-1063.

E. Green and R. Porter, "Non-cooperative Collusion under Imperfect Price Information," *EMA*, January 1984, 87–100.

G. Stigler, "A Theory of Oligopoly," *JPE*, February 1964, 44–61.

5. Collusion with Private Types

S. Athey, K. Bagwell and C. Sanchirico, "Collusion and Price Rigidity," *ReStud*, April 2004, 317-49.

J. Harrington and A. Skrzypacz, "Private Monitoring and Communication in Cartels: Explaining Recent Cartel Practices," *AER*, 2011, 2425-49.

P. McAfee and J. McMillan, "Bidding Rings," *AER*, 1992, 579-99.

6. Staggered Price Setting

E. Maskin and J. Tirole, "A Theory of Dynamic Oligopoly II: Price Competition, Kinked Demand Curves, and Edgeworth Cycles," *EMA*, May 1988, 571–99.

7. Collusion and Antitrust Enforcement

J. Baker, "Private Enforcement and the Deterrent Effect of Antitrust Damage Remedies," *Journal of Law, Economics, and Organization*, Fall 1988, 385-408.

L. Kaplow and C. Shapiro, "Antitrust," in M. Polinsky and S. Shavell, eds., *Handbook of Law and Economics*, Vol. 2, Elsevier, 2007, Chapter 16.

B. McCutcheon, "Do Meetings in Smoke-Filled Rooms Facilitate Collusion?" *JPE*, 1997, 330-50.

M. Whinston, *Lectures on Antitrust Economics*, MIT, 2006, Chapters 1 and 2.

8. Switching Costs

A. Beggs and P. Klemperer, "Multi-period Competition with Switching Costs," *EMA*, May 1992, 651-666.

J. Farrell and P. Klemperer, "Coordination and Lock-In: Competition with Switching Costs and Network Effects," *HIO3*, Chapter 31, esp. Sec. 2.

V. Empirical Studies of Pricing

1. Tests of Market Power

O. Ashenfelter and D. Sullivan, "Nonparametric Tests of Market Structure: An Application to the Cigarette Industry," *JIE*, June 1987, 483-98.

L. Berquist and M. Dinerstein, "Competition and Entry in Agricultural Markets: Experimental Evidence from Kenya," *AER*, December 2020, 3705-47.

S. Berry and P. Haile, "Identification in Differentiated Products Markets," *Annual Reviews*, 2015, 27-52.

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

T. Bresnahan, "Competition and Collusion in the American Automobile Market: The 1955 Price War," *JIE*, June 1987, 457-482.

T. Bresnahan, "Empirical Studies of Industries with Market Power," *HIO2*, Chapter 17.

A. Carvajal, R. Deb, J. Fenske and J. Quah, "Revealed Preference Tests of the Cournot Model," *EMA*, November 2013, 2351-79.

K. Corts, "Conduct Parameters and the Measurement of Market Power," *JE*, November 1998, 227-50.

D. Genesove and W. Mullin, "Testing Static Oligopoly Models: Conduct and Cost in the Sugar Industry, 1890-1914," *RJE*, Summer 1998, 355-77.

J. Panzar and J. Rosse, "Testing for 'Monopoly' Equilibrium," *JIE*, June 1987, 443-56.

R. Schmalensee, "Inter-Industry Studies of Structure and Performance," *HIO2*, Chapter 16.

2. Common Ownership

M. Anton, F. Ederer, M. Gine and M. Schmalz, "Common Ownership, Competition and Top Management Incentives," mimeo, Yale, 2021.

J. Azar, M. Schmalz and I. Tecu, "Anti-Competitive Effects of Common Ownership," *Journal of Finance*, August 2018, 1513-68.

M. Backus, C. Conlon and M. Sinkinson, "The Common Ownership Hypothesis: Theory and Evidence," *Brookings Economic Studies*, 2019.

M. Backus, C. Conlon and M. Sinkinson, "Common Ownership in America: 1980-2017," *AEJ Micro*, August 2021, 273-308.

3. Monopsony Power

J. Azar, S. Berry and I. Marinescu, "Estimating Labor Market Power," mimeo, Penn, 2021.

A. Goolsbee and C. Syverson, "Monopsony Power in Higher Education: A Tale of Two Tracks," *NBER*, mimeo, 2019.

J. Huang, "Monopsony, Cartels, and Market Manipulation: Evidence from the U.S. Meatpacking Industry, 1903–1918," mimeo, UCLA, 2020.

E. Prager and M. Schmitt, "Employer Consolidation and Wages: Evidence from Hospitals," *AER*, February 2021, 397-427.

4. Repeated Interaction

A. Eizenberg, D. Shilian and D. Blanga, "Estimating the Potential Effect of Multi-Market Contact on the Intensity of Competition," mimeo, Tel Aviv, 2021.

S. Borenstein and A. Shepard, "Dynamic Pricing in Retail Gasoline Markets," *RJE*, Autumn 1996, 429-51.

G. Ellison, "Theories of Cartel Stability and the Joint Executive Committee," *RJE*, Spring 1994, 37-57.

R. Porter, "A Study of Cartel Stability: The Joint Executive Committee, 1880-1886," *BJE*,

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5. Collusion

Y. Awaya and V. Krishna, "On Communication and Collusion," AER, February 2016, 285-315.

S. Albaek, P. Mollgaard and P. Overgaard, "Government Assisted Oligopoly Coordination? A Concrete Case," JIE, December 1997, 429-43.

S. Assad, R. Clark, D. Ershov and L. Xu, "Algorithmic Pricing and Competition: Empirical Evidence from the German Retail Gasoline Market," mimeo, Queen's, 2021.

D. Bernheim and E. Madsen, "Price Cutting and Business Stealing in Imperfect Cartels," AER, February 2017, 387-424.

M. Bourreau, Y. Sun and F. Verboven, "Market Entry, Fighting Brands and Tacit Collusion: Evidence from the French Mobile Telecommunications Market," AER, forthcoming.

D. Byrne and N. De Roos, "Learning to Coordinate: A Study in Retail Gasoline," AER, February 2019, 591-619.

J. Cave and S. Salant, "Cartel Quotas under Majority Rule," AER, March 1995, 82-102.

R. Clark and J.F. Houde, "Collusion with Asymmetric Retailers: Evidence from a Gasoline Price-Fixing Case," AEJ: Micro, August 2013, 97-123.

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M. Igami and T. Sugaya, "Measuring the Incentive to Collude: The Vitamin Cartels, 1990-1999," REStud, forthcoming.

L. Kaplow and C. Shapiro, "Antitrust," in Polinsky and Shavell, eds., *Handbook of Law and Economics*, Vol. 2, Elsevier, 2007, Chapter 16.

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R. Marshall and L. Marx, *The Economics of Collusion: Cartels and Bidding Rings*, MIT Press, 2012.

N. Miller, "Strategic Leniency and Cartel Enforcement," AER, June 2009, 750-68.

N. Miller, G. Sheu, and M. Weinberg, "Oligopolistic Price Leadership and Mergers: The US Beer Industry," AER, October 2021, 3123-59.

N. Miller and M. Weinberg, "Understanding the Price Effects of the Miller/Coors Joint Venture," EMA, November 2017, 1763-91.

R. Porter, "Mergers and Coordinated Effects," IJIO, 2020.

T. Sugaya and A. Wolitzky, "Maintaining Privacy in Cartels," JPE, December 2018, 2569-607.

C. Sullivan, "The Ice Cream Split: Empirically Distinguishing Price and Product Space Collusion," mimeo, Wisconsin, 2020.

VI. Production, Technology and Industry Structure

1. Estimation

D. Akerberg, K. Caves and G. Frazer, "Structural Estimation of Production Functions," EMA, November 2015, 2411-51.

J. Asker, A. Collard-Wexler and J. De Loecker, "Dynamic Inputs and Resource (Mis)Allocation," JPE, October 2014, 1013-1063.

L. Benkard, "Learning and Forgetting: The Dynamics of Aircraft Production," AER, September 2000, 1034-54.

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S. Bond, A. Hashemi, G. Kaplan and P. Zoch, "Some Unpleasant Markup Arithmetic: Production Function Elasticities and their Estimation from Production Data," mimeo, Chicago, 2020.

A. Collard-Wexler and J. De Loecker, "Reallocation and Technology: Evidence from the US Steel Industry," AER, January 2015, 131-171.

- J. De Loecker, "Product Differentiation, Multi-Product Firms and Estimating the Impact of Trade Liberalization on Productivity," EMA, September 2011, 1407-51.
- J. De Loecker, P. Goldberg, A. Khandelwal and N. Pavcnik, "Prices, Markups and Trade Reform," EMA, March 2016, 445-510.
- J. De Loecker and F. Warzynski, "Markups and Firm Level Export Status," AER, October 2012, 2437-71.
- M. Demirer, "Production Function Estimation with Factor-Augmenting Technology: An Application to Markups," mimeo, MIT, 2019.
- U. Doraszelski and J. Jaumandreu, "R&D and Productivity: The Knowledge Capital Model Revisited," ReStud, October 2013, 1338-83.
- A. Gandhi, S. Navarro and D. Rivers, "On the Identification of Gross Output Production Functions," JPE, August 2020.
- A. Gandhi, S. Navarro and D. Rivers, "How Heterogeneous is Productivity? A Comparison of Gross Output and Value Added," mimeo, Western, 2017.
- Z. Griliches and J. Mairesse, "Production Functions: The Search for Identification," NBER Working Paper No. 5067.
- C. Hsieh and P. Klenow, "Misallocation and Manufacturing TFP in China and India," QJE, November 2009, 1403-1448.
- J. Levinsohn and A. Petrin, "Estimating Production Functions Using Intermediate Inputs to Control for Unobservables," ReStud, April 2003, 317-41.
- S. Levitt, J. List and C. Syverson, "Toward an Understanding of Learning by Doing: Evidence from an Automobile Assembly Plant," JPE, August 2013, 643-81.
- S. Olley and A. Pakes, "The Dynamics of Productivity in the Telecommunications Industry," EMA, November 1996, 1263-97.
- C. Syverson, "Market Structure and Productivity: A Concrete Example," JPE, December 2004, 1181-222.
- C. Syverson, "What Determines Productivity?" JEL, February 2011, 326-365.
- F. Wolak, "An Econometric Analysis of the Asymmetric Information, Regulator-Utility

Interaction,” *Annales d’Economie et de Statistique*, 1994, 13-69.

2. Analysis of the Evolution of Markups in the Long-Run

L. Benkard, A. Yurukoglu, A. Zhang, “Concentration in Product Markets”, NBER Working Paper No. 28745

J. Brand, “Differences in Differentiation: Rising Variety and Markups in Retail Food Stores,” mimeo, University of Texas at Austin, 2021.

J. De Loecker, J. Eeckout and G. Unger, “The Rise of Market Power and the Macroeconomic Implications,” *QJE*, May 2020, 561-644.

H. Dopfer, A. MacKay, N. Miller, and J. Stiebale, “Rising Markups and the Role of Consumer Preferences,” mimeo, Harvard University, September 2021.

P. Grieco, C. Murry and A. Yurukoglu, “The Evolution of Market Power in the US Automobile Industry,” NBER Working Paper Series No. 29013

VII. Demand Estimation in Differentiated Products Industries

1. Pricing and Demand Models

S. Anderson, A. dePalma and J. Thisse, *Discrete Choice Theory of Product Differentiation*, MIT, 1992.

S. Berry, 1994, “Estimating Discrete-Choice Models of Product Differentiation,” *RJE*, Summer 1994, 242-62.

S. Berry, J. Levinsohn and A. Pakes, “Automobile Prices in Market Equilibrium,” *EMA*, July 1995, 841-90.

S. Berry, J. Levinsohn and A. Pakes, “Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market,” *JPE*, February 2004, 68-105.

S. Chaudhuri, P. Goldberg and P. Jia Barwick, “Estimating the Effects of Global Patent Protection in Pharmaceuticals: A Study of Quinolones in India,” *AER*, December 2006, 1477-514.

A. Deaton and J. Muellbauer, “An Almost Ideal Demand System,” *AER*, March 1980, 312- 26.

- J.P. Dube, J. Fox and C. Su, "Improving the Numerical Performance of Static and Dynamic Aggregate Discrete Choice Random Coefficients Demand Estimation," EMA, September 2012, 2231-67.
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- D. McFadden, "Econometric Analysis of Qualitative Response Models," *Handbook of Econometrics*, Volume 2, Elsevier, 1984, Chapter 24.
- A. Nevo, "[A Practitioner's Guide to Estimation of Random Coefficients Logit Models of Demand](#)," *JEMS*, Winter 2000, 513-48.
- A. Nevo, "[Measuring Market Power in the Ready-to-Eat Cereal Industry](#)," EMA, March 2001, 307-42.
- A. Nevo, "Empirical Models of Consumer Behavior," *Annual Reviews*, 2011, 51-75.

2. Welfare and Hedonic Prices

Hedonic Price Regressions and Price Indices

- P. Bajari and L. Benkard, "Demand Estimation with Heterogeneous Consumers and Unobserved Product Characteristics: A Hedonic Approach," *JPE*, December 2005, 1239-76.
- D. Epple, "Hedonic Prices and Implicit Markets: Estimating Demand and Supply Functions for Differentiated Products," *JPE*, January 1987, 59-80.
- R. Feenstra, "Exact Hedonic Price Indexes," *ReStat*, 1995, 634-53.
- Z. Griliches, "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change," reprinted in Griliches (ed.), *Price Indices and Quality Change: Studies in New Methods of Measurement*, Harvard, 1971.
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A. Goolsbee and A. Petrin, "The Consumer Gains from Direct Broadcast Satellites and the Competition with Cable TV," EMA, 2004, 351-381.

J. Hausman, "Valuation of New Goods Under Perfect and Imperfect Competition," in Bresnahan and Gordon (eds.) *The Economics of New Goods*, Chicago: NBER, 1996, including comment by Bresnahan (in the same volume) and reply to comment (and reply to reply).

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M. Trajtenberg, "The Welfare Analysis of Product Innovations, with an Application to Computed Tomography Scanners," JPE, April 1989, 444-79.

VIII. Additional Topics in Demand Estimation

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S. Berry and A. Pakes, "The Pure Characteristics Demand Model," IER, November 2007, 1193-225.

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- M. Gentzkow, "Valuing New Goods in a Model with Complementarity: Online Newspapers," AER, June 2007, 713-44.
- M. Goeree, "Limited Information and Advertising in the US Personal Computer Industry," EMA, September 2008, 1017-74.
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- C. Nosko, "Competition and Quality Choice in the CPU Market," mimeo, Chicago, 2014.
- T. Pires, "Costly Search and Consideration Sets in Storable Goods Markets," QME, September 2016, 157-193.

IX. Pass-Through

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- D. Besanko, J.P. Dube and S. Gupta, "Own-Brand and Cross-Brand Retail Pass-Through," Marketing Science, 2005.
- C. Conlon and N. Rao, "Discrete Prices and the Incidence and Efficiency of Excise Taxes," AEJ Policy, forthcoming.
- S. Dellavigna and M. Gentzkow, "Uniform Pricing in US Retail Chains," QJE, November 2019, 2011-84.
- N. Fabra and M. Reguant, "Pass-Through of Emissions Costs in Electricity Markets," AER, September 2014, 2872-99.
- P. Goldberg and R. Hellerstein, "A Structural Approach to Identifying the Sources of Local Currency Price Stability," ReStud, January 2013, 175-210.

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E. Nakamura and D. Zerom, "Accounting for Incomplete Pass-Through," ReStud, July 2010, 1192-230.

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X. Identification

S. Berry and P. Haile, "Identification in Differentiated Products Markets Using Market Level Data," EMA, September 2014, 1749-97.

S. Berry and P. Haile, "Nonparametric Identification of Multinomial Choice Demand Models with Heterogeneous Consumers," mimeo, Yale, 2010.

S. Berry, A. Gandhi and P. Haile, "Connected Substitutes and Invertibility of Demand," EMA, May 2013, 2087-111.

A. Gandhi and J.F. Houde, "Measuring Substitution Patterns in Differentiated Products Industries," mimeo, Wisconsin, 2019.

R. Matzkin, "Nonparametric Identification," *Handbook of Econometrics*, Volume 6b, Elsevier, 2007, Chapter 73.