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450-2: INDUSTRIAL ORGANIZATION AND PRICES II Winter 2022

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 11:00-12:50, KGH 1410

Course Web Page: see Canvas

Grading will be based on several problem sets and a final exam. We will not discuss all of the papers on the reading list, but *we expect you to read all of the papers we discuss in detail in class*. This reading list is intended to be a reference for the future, and it includes some topics that we will not have time to cover. Students are encouraged to contact us if there are particular topics that are particularly suited to their interests.

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.

As per University requirements, classes will be online for the first two weeks of the quarter. After that, the plan is for all lectures and office hours to 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. As far as the exam is concerned, you are only responsible for the material covered in class.

I. General References

D. Akerberg, L. Benkard, S. Berry and A. Pakes, “Econometric Tools for Analyzing Market Outcomes,” *Handbook of Econometrics*, Volume 6A, 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, North-Holland, 2007. (HIO3)

P. Davis and E. Garces, *Quantitative Techniques for Competition and Antitrust Analysis*, Princeton University Press, 2010.

K. Ho, A. Hortacsu and A. Lizzeri, eds., *Handbook of Industrial Organization*, Volumes 4 and 5, Elsevier, forthcoming. (HIO4 and HIO5)

R. Schmalensee and R. Willig, eds., *Handbook of Industrial Organization*, Volumes 1 and 2, North-Holland, 1989. (HIO1 and HIO2)

II. Additional Topics in Demand Estimation (Illanes)

J. Fox, K.I. Kim, S. Ryan and P. Bajari, “A Simple Estimator for the Distribution of Random Coefficients,” *QE*, November 2011, 381-418.

J. Fox, K.I. Kim and C. Yang, “A Simple Nonparametric Approach to Estimating the Distribution of Random Coefficients in Structural Models,” *JE*, 2016, 236-54.

M. Goeree, “Limited Information and Advertising in the US Personal Computer Industry,” *EMA*, September 2008, 1017-74.

G. Illanes and M. Padi, “Competition, Asymmetric Information, and the Annuity Puzzle: Evidence from a Government-run Exchange in Chile,” NBER Working Paper No. 26285.

A. Nevo, J. Turner and J. Williams, “Usage-Based Pricing and Demand for Residential Broadband,” *EMA*, March 2016, 411-43.

III. Pass-Through (Illanes)

B. Adams and K. Williams, “Zone Pricing in Retail Oligopoly,” *AEJ Micro*, February 2019, 124-56.

D. Besanko, J.P. Dube and S. Gupta, “Own-Brand and Cross-Brand Retail Pass-Through,” *Marketing Science*, Winter 2005, 123-37.

- C. Conlon and N. Rao, "Discrete Prices and the Incidence and Efficiency of Excise Taxes," *AEJ Policy*, November 2020, 111-43.
- 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.
- E. Miravete, K. Seim and J. Thurk, "Market Power and the Laffer Curve," *EMA*, September 2018, 1651-87.
- E. Nakamura and D. Zerom, "Accounting for Incomplete Pass-Through," *ReStud*, July 2010, 1192-230.
- G. Weyl and M. Fabinger, "Pass-Through as an Economic Tool: Principles of Incidence under Imperfect Competition," *JPE*, June 2013, 528-83.

IV. Non-Parametric Identification of Demand (Illanes)

- 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 Differentiated Products Demand Using Micro Data," mimeo, Yale, 2020.
- S. Berry and P. Haile, "Foundations of Demand Estimation," *HIO4*, Chapter 1.
- 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, 2020.
- R. Matzkin, "Nonparametric Identification," *Handbook of Econometrics*, Volume 6b, 2007, Chapter 73.

V. Computation (Illanes)

* D. Akerberg, “A New Use of Importance Sampling to Reduce Computational Burden in Simulation Estimation,” *QME*, December 2009, 343-76.

D. Goldberg, “What Every Computer Scientist Should Know About Floating-Point Arithmetic,” *ACM Computing Surveys*, 1991.

K. Judd, “Computational Economics and Economic Theory: Substitutes or Complements?” *Journal of Economic Dynamics and Control*, 1997, 907–42.

* K. Judd, *Numerical Methods in Economics*, 1998, MIT Press.

J. Nocedal and S. Wright, *Numerical Optimization*, 2006, Springer-Verlag, Chapters 2, 8, and 15.

VI. Market Structure (Porter)

1. Entry Models

P. Bajari, H. Hong and S. Ryan, “Identification and Estimation of Discrete Games of Complete Information,” *EMA*, September 2010, 1529-68.

* S. Berry, “Estimation of a Model of Entry in the Airline Industry,” *EMA*, July 1992, 889–918.

S. Berry and P. Reiss, “Empirical Models of Entry and Market Structure,” *HIO3*, Chapter 29.

S. Berry and E. Tamer, “Identification in Models of Oligopoly Entry,” in R. Blundell, W. Newey and T. Persson, eds., *Advances in Economics and Econometrics: Theory and Applications*, Vol. 2, Cambridge, 2007, Chapter 2.

T. Bresnahan and P. Reiss, “Entry in Monopoly Markets,” *ReStud*, October 1990, 531-53.

* T. Bresnahan and P. Reiss, “Entry and Competition in Concentrated Markets,” *JPE*, October 1991, 977–1009.

J. Espin-Sanchez, A. Parra and Y. Wang, “Equilibrium Uniqueness in Entry Games with Private Information,” mimeo, Yale, 2021.

P. Grieco, “Discrete Games with Flexible Information Structures: An Application to Local Grocery Markets,” *RJE*, Summer 2014, 303-40.

* P. Jia, “What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retail Industry,” *EMA*, November 2008, 1263-316.

* A. Sweeting, “The Strategic Timing Incentives of Commercial Radio Stations: An Empirical Analysis Using Multiple Equilibria,” *RJE*, Winter 2009, 710-42.

* E. Tamer, "Incomplete Simultaneous Discrete Response Model with Multiple Equilibria," *ReStud*, January 2003, 147-65.

2. Entry and Product Quality

S. Berry, A. Eizenberg and J. Waldfogel, "Optimal Product Variety in Radio Markets," *RJE*, Fall 2016, 463-97.

* S. Berry and J. Waldfogel, "Free Entry and Social Inefficiency in Radio Broadcasting," *RJE*, Autumn 1999, 397-420.

S. Berry and J. Waldfogel, "Product Quality and Market Size," *JIE*, March 2010, 1-31.

A. Butters and T. Hubbard, "Industry Structure, Segmentation and Quality Competition in the U.S. Hotel Industry," mimeo, Northwestern, 2021.

P. Ellickson, "Does Sutton Apply to Supermarkets?" *RJE*, Spring 2007, 43-59.

Y. Fan, "Ownership Consolidation and Product Characteristics: A Study of the US Daily Newspaper Market," *AER*, August 2013, 1598-1628.

M. Gentzkow, J. Shapiro and M. Sinkinson, "Competition and Ideological Diversity: Historical Evidence from US Newspapers," *AER*, October 2014, 3073-114.

T. Hubbard and M. Mazzeo, "When Demand Increases Cause Shakeouts," *AEJ: Micro*, November 2019, 216-49.

D. Matsa, "Competition and Product Quality in the Supermarket Industry," *QJE*, August 2011, 1539-91.

* M. Mazzeo, "Product Choice and Oligopoly Market Structure," *RJE*, Summer 2002, 221-42.

* K. Seim, "An Empirical Model of Firm Entry with Endogenous Product-Type Choices," *RJE*, Autumn 2006, 619-40.

J. Sutton, "Market Structure: Theory and Evidence," *HIO3*, Chapter 36.

A. Sweeting, "The Effects of Mergers on Product Positioning: Evidence from the Music Radio Industry," *RJE*, Summer 2010, 372-97.

R. Watson, "Product Variety and Competition in the Retail Market for Eyeglasses," *JIE*, June 2009, 217-51.

T. Wollman, "Trucks without Bailouts: Equilibrium Product Characteristics for Commercial

Vehicles,” AER, June 2018, 1364-1406.

3. Entry Deterrence

J. Chevalier, “Capital Structure and Product Market Competition: Empirical Evidence from the Supermarket Industry,” AER, June 1995, 415-35.

* G. Ellison and S. Ellison, “Strategic Entry Deterrence and the Behavior of Pharmaceutical Incumbents Prior to Patent Expiration,” AEJ: Micro, February 2011, 1-36.

* A. Goolsbee and C. Syverson, “How do Incumbents Respond to the Threat of Entry? Evidence from the Major Airlines,” QJE, November 2008, 1611-33.

V. Kadiyali, “Entry, Its Deterrence, and Its Accommodation: A Study of the U.S. Photographic Film Industry,” RJE, Autumn 1996, 452-78.

C. Snider, “Predatory Incentives and Predation Policy: The American Airlines Case,” mimeo, UCLA, 2009.

C. Snider and J. Williams, “Barriers to Entry in the Airline Industry: A Multi-Dimensional Regression Discontinuity Analysis of AIR-21,” REStat, December 2015, 1002-22.

4. Entry, Growth, and Turnover

J. Abbring and J. Campbell, “Last-in First-out Oligopoly Dynamics,” EMA, September 2010, 1491-527.

T. Bresnahan and D. Raff, “Inter-industry Heterogeneity and the Great Depression: The American Motor Vehicles Industry, 1929-1935,” JEH, June 1991, 317-31.

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A. Collard-Wexler, “Mergers and Sunk Costs: An Application to the Ready-Mix Concrete Industry,” AEJ: Micro, November 2014, 407-47.

A. Collard-Wexler and J. De Loecker, “Reallocation and Technology: Evidence from the U.S. Steel Industry,” AER, January 2015, 131-71.

T. Dunne, M. Roberts, and L. Samuelson, “Patterns of Firm Entry and Exit in U.S. Manufacturing,” RJE, Winter 1988, 495-515.

- T. Dunne, M. Roberts, and L. Samuelson, "The Growth and Failure of U.S. Manufacturing Plants," QJE, November 1989, 671-98.
- P. Golder and G. Tellis, "Pioneer Advantage: Marketing Logic or Marketing Legend," JMR, May 1993, 158-70.
- H. Hopenhayn, "Entry, Exit and Firm Dynamics in Long Run Equilibrium," EMA, September 1992, 1127-50.
- B. Jovanovic, "Selection and the Evolution of Industry," EMA, May 1982, 649-70.
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- A. Pakes and R. Ericson, "Empirical Applications of Alternative Models of Firm Dynamics," JET, March 1998, 1-45.
- J. Sutton, "Gibrat's Legacy," JEL, March 1997, 40-59.

VII. Price Discrimination and Price Dispersion (Porter)

1. Price Discrimination

- M. Busse and M. Rysman, "Competition and Price Discrimination in Yellow Pages Advertising," RJE, Summer 2005, 378-90.
- K. Gerardi and A. Shapiro, "Does Competition Reduce Price Dispersion? New Evidence from the Airline Industry," JPE, February 2009, 1-37.
- P. Goldberg, "Dealer Price Discrimination in New Car Purchases: Evidence from the Consumer Expenditure Survey," JPE, June 1996, 622-54.
- A. Hortacsu, O. Natan, H. Parsley, T. Schweg and K. Williams, "Organizational Structure and Pricing: Evidence from a Large U.S. Airline," mimeo, Yale, 2021.
- * J. Lazarev, "The Welfare Effects of Intertemporal Price Discrimination: An Empirical Analysis of Airline Pricing in U.S. Monopoly Markets," mimeo, NYU, 2013.
- P. Leslie, "Price Discrimination in Broadway Theater," RJE, Autumn 2004, 520-41.
- * B. McManus, "Nonlinear Pricing in an Oligopoly Market: The Case of Specialty Coffee," RJE, Summer 2007, 513-33.
- E. Miravete, "Estimating Demand for Local Telephone Service with Asymmetric Information and Optional Calling Plans," ReStud, October 2002, 943-71.

- E. Miravete, K. Seim, and J. Thurk, "One Markup to Rule Them All: Taxation by Liquor Pricing Regulation," *AEJ Micro*, February 2020, 1-41.
- J. Mortimer, "Price Discrimination, Copyright Law and Technological Innovation: Evidence from the Introduction of DVDs," *QJE*, August 2007, 1307-50.
- A. Nevo and C. Wolfram, "Why Do Manufacturers Issue Coupons? An Empirical Analysis of Breakfast Cereals," *RJE*, Summer 2002, 319-39.
- F. Scott Morton, F. Zettelmeyer, and J. Silva-Risso, "Consumer Information and Price Discrimination: Does the Internet Affect the Pricing of New Cars to Women and Minorities," *QME*, March 2003, 65-92.
- A. Shepard, "Price Discrimination and Retail Configuration," *JPE*, February 1991, 30-53.
- B. Shiller and J. Waldfogel, "Music for a Song: An Empirical Look at Uniform Song Pricing and its Alternatives," *JIE*, December 2011, 630-60.
- L. Stole, "Price Discrimination and Competition," *HIO3*, Chapter 34.
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- H. Varian, "Price Discrimination," *HIO1*, Chapter 10.
- S. Villas-Boas, "An Empirical Investigation of the Welfare Effects of Banning Wholesale Price Discrimination," *RJE*, Spring 2009, 20-46.
- K. Williams, "The Welfare Effects of Dynamic Pricing: Evidence from Airlines," mimeo, Yale, 2021, forthcoming, EMA.

2. Bargaining

- A. Collard-Wexler, G. Gowrisankaran, and R. Lee, "'Nash-in-Nash' Bargaining: A Microfoundation for Applied Work," *JPE*, February 2019, 163-95.
- * M. Grennan, "Price Discrimination and Bargaining: Empirical Evidence from Medical Devices," *AER*, February 2013, 145-77.
- K. Ho and R. Lee, "Insurer Competition in Health Care Markets," *EMA*, March 2017, 379-417.
- K. Ho and R. Lee, "Equilibrium Provider Networks: Bargaining and Exclusion in Health Care Markets," *AER*, February 2019, 473-522.

3. Search

- J. Allen, R. Clark and J.-F. Houde, “The Effect of Mergers in Search Markets: Evidence from the Canadian Mortgage Industry,” *AER*, October 2014, 3365-96.
- B. De Los Santos, A. Hortacsu, and M. Wildenbeest, “Testing Models of Consumer Search using Data on Web Browsing and Purchasing Behavior,” *AER*, October 2012, 2955-80.
- P. Diamond, “A Model of Price Adjustment,” *JET*, June 1971, 156-58.
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- A. Gavazza and A. Lizzeri, “Frictions in Product Markets,” *HIO4*, Chapter 6.
- K. Hendricks, A. Sorensen, and T. Wiseman, “Observational Learning and Demand for Search Goods,” *AEJ: Micro*, February 2012, 1-31.
- * H. Hong and M. Shum, “Using Price Distributions to Estimate Search Costs,” *RJE*, Summer 2006, 257-75.
- * A. Sorensen, “Equilibrium Price Dispersion in Retail Markets for Prescription Drugs,” *JPE*, August 2000, 833-50.
- * D. Stahl, “Oligopolistic Pricing with Sequential Consumer Search,” *AER*, September 1989, 700-12.
- D. Stahl, “Oligopolistic Pricing with Heterogeneous Consumer Search,” *IJIO*, April 1996, 243-68.

4. Bundling

- L. Cabral and G. Natividad, “Bundling Sequentially Released Durable Goods,” mimeo, NYU, 2021, forthcoming, *JIE*.
- C. Chu, P. Leslie and A. Sorensen, “Bundle-Size Pricing as an Approximation to Mixed Bundling,” *AER*, February 2011, 263-303.
- * G. Crawford and A. Yurukoglu, “The Welfare Effects of Bundling in Multi-Channel Television Markets,” *AER*, March 2012, 643-85.
- N. Hagpanah and J. Hartline, “When is Pure Bundling Optimal?” *REStud*, May 2021, 1127-56.

K. Ho, J. Ho, and J. Mortimer, "The Use of Full-Line Forcing Contracts in the Video Rental Industry," *AER*, April 2012, 686-719.

P. McAfee, J. McMillan, and M. D. Whinston, "Multiproduct Monopoly, Commodity Bundling, and Correlation of Values," *QJE*, May 1989, 371-83.

VIII. Advertising and Information Disclosure (Porter)

D. Akerberg, "Empirically Distinguishing Informative and Prestige Effects of Advertising," *RJE*, Summer 2001, 316-33.

K. Bagwell, "The Economic Analysis of Advertising," *HIO3*, Chapter 28.

D. Bergemann and M. Ottaviani, "Information Markets and Nonmarkets," *HIO4*, Chapter 8.

B. Bollinger, P. Leslie and A. Sorensen, "Calorie Posting in Chain Restaurants," *AEJ: Policy*, February 2011, 91-128.

B. Bronnenberg, J.P. Dube, M. Gentzkow and J. Shapiro, "Do Pharmacists Buy Bayer? Informed Shoppers and the Brand Premium," *QJE*, November 2015, 1669-726.

D. Dranove and G. Jin, "Quality Disclosure and Certification: Theory and Practice," *JEL*, December 2010, 935-63.

M. Grennan and A. Swanson, "Transparency and Negotiated Prices: The Value of Information in Hospital-Supplier Bargaining," *JPE*, April 2020, 1234-68.

G. Jin and P. Leslie, "The Effect of Information on Product Quality: Evidence from Restaurant Hygiene Grade Cards," *QJE*, May 2003, 409-51.

F. Luco, "Who Benefits from Information Disclosure: The Case of Retail Gasoline," *AEJ: Micro*, May 2019, 277-305.

A. Mathios, "The Impact of Mandatory Disclosure Laws on Product Choice: An Analysis of the Salad Dressing Market," *JLE*, October 2000, 651-77.

R. McDevitt, "'A' Business by Any Other Name: Firm Name Choice as a Signal of Firm Quality," *JPE*, August 2014, 909-44.

J. Milyo and J. Waldfogel, "The Effect of Price Advertising on Prices: Evidence in the Wake of 44 Liquormart," *AER*, December 1999, 1081-96.

R. Sauer and K. Leffler, “Did the Federal Trade Commission’s Advertising Substantiation Program Promote More Credible Advertising?” *AER*, March 1990, 191-203.

J. Zinman and E. Zitzewitz, “Wintertime for Deceptive Advertising?” *AEJ: Policy*, January 2016, 177-92.

IX. Auctions – Part 1 (Porter)

1. Structural Analysis of the Standard Model

Theory

V. Krishna, *Auction Theory, 2nd edition*, Academic Press, 2010.

P. Milgrom, *Putting Auction Theory to Work*, Cambridge University Press, 2004.

Empirics

A. Aradillas-Lopez, A. Gandhi and D. Quint, “Identification and Inference in Ascending Auctions with Correlated Private Values,” *EMA*, March 2013, 489-534.

S. Athey and P. Haile, “Nonparametric Approaches to Auctions,” *Handbook of Econometrics*, Volume 6A, Chapter 60.

S. Athey and P. Haile, “Empirical Models of Auctions,” in R. Blundell, W. Newey and T. Persson, eds., *Advances in Economics and Econometrics, Theory and Applications: Ninth World Congress of the Econometric Society*, Cambridge, 2006, Chapter 1.

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E. Guerre, I. Perrigne and Q. Vuong, “Optimal Nonparametric Estimation of First-Price Auctions,” *EMA*, May 2000, 525-74.

P. Haile and E. Tamer, “Inference with an Incomplete Model of English Auctions,” *JPE*, February 2003, 1-51.

K. Hendricks and R. Porter, “An Empirical Perspective on Auctions,” *HIO3*, Chapter 32.

A. Hortacsu and I. Perrigne, “Empirical Perspectives on Auctions,” *HIO5*, forthcoming.

J.-J. Laffont, H. Ossard and Q. Vuong, “Econometrics of First Price Auctions,” *EMA*, July 1995, 953-980.

H. Paarsch and H. Hong, *An Introduction to the Structural Econometrics of Auction Data*, MIT Press, 2006.

I. Perrigne and Q. Vuong, “Econometric Methods for Auctions,” *Handbook of Econometrics*, forthcoming.

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2. Tests of the Theory

A. Aradillas-Lopez, A. Gandhi and D. Quint, “A Simple Test for Moment Inequality Models with an Application to English Auctions,” *JE*, September 2016, 96-115.

P. Bajari and A. Hortacsu, “Are Structural Estimates of Auction Models Reasonable? Evidence from Experimental Data,” *JPE*, August 2005, 703-41.

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X. Tang, “Bounds on the Revenue Distributions in Counterfactual Auctions with Reserve Prices,” *RJE*, Spring 2011, 175-203.

3. Unobserved Heterogeneity

G. Compiani, P. Haile and M. Sant’Anna, “Common Values, Unobserved Heterogeneity and Endogenous Entry in U.S. Offshore Oil Lease Auctions,” *JPE*, October 2020, 3872-912.

- J. Freyberger and B. Larsen, "Identification in Ascending Auctions, with an Application to Digital Rights Management," QE, forthcoming.
- P. Haile and Y. Kitamura, "Unobserved Heterogeneity in Auctions," *Econometrics Journal*, January 2019, C1-19.
- C. Hernandez, D. Quint and C. Turansick, "Estimation in English Auctions with Unberved Heterogeneity," RJE, Fall 2020, 868-904.
- Y. Hu, D. McAdams and M. Shum, "Identification of First-Price Auction Models with Non-Separable Unobserved Heterogeneity," JE, June 2013, 186-93.
- E. Krasnokutskaya, "Identification and Estimation in Highway Procurement Auctions under Unobserved Auction Heterogeneity," *ReStud*, January 2011, 293-327.
- J. Roberts, "Unobserved Heterogeneity and Reserve Prices in Auctions," RJE, Winter 2013, 712-32.
- U. Song, "Nonparametric Estimation of an eBay Auction Model with an Unknown Number of Bidders," mimeo, UBC, 2004.

4. Entry Effects in Auctions

- V. Bhattacharya, J. Roberts and A. Sweeting, "Regulating Bidder Participation in Auctions," RJE, Winter 2014, 675-704.
- M. Gentry and T. Li, "Identification in Auction Models with Selective Entry," EMA, January 2014, 315-44.
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- J. Roberts and A. Sweeting, "When Should Sellers Use Auctions?" AER, August 2013, 1830-61.
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5. Other Extensions of the Standard Model

- D. Akerberg, K. Hirano and Q. Shahriar, "Identification of Time and Risk Preferences in Buy Price Auctions," *QE*, November 2017, 809-49.
- J. Allen, R. Clark, B. Hickman and E. Richert, "Resolving Failed Banks: Uncertainty, Multiple Bidding and Auction Design," mimeo, Queen's, 2020.
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- S. Athey and J. Levin, "Information and Competition in U.S. Forest Service Timber Auctions," *JPE*, April 2001, 375-417.
- S. Athey, J. Levin and E. Seira, "Comparing Open and Sealed Bid Auctions: Theory and Evidence from Timber Auctions," *QJE*, February 2011, 207-57.
- P. Bajari, S. Houghton and S. Tadelis, "Bidding for Incomplete Contracts: An Empirical Analysis of Adaptation Costs," *AER*, April 2014, 1288-319.
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- V. Bolotnyy and S. Vasserman, "Scaling Auctions as Insurance: A Case Study of Infrastructure Procurement," mimeo, Stanford, 2021.
- P. Haile, "Auctions with Resale Markets: An Application to U.S. Forest Service Timber Sales," *AER*, June 2001, 399-427.
- E. Krasnokutskaya, K. Song, and X. Tang, "The Role of Quality in Internet Service Markets," *JPE*, January 2020, 75-117.
- B. Larsen, "The Efficiency of Real World Bargaining: Evidence from Wholesale Used-Auto Auctions," *REStud*, March 2021, 851-82.
- D. Miller, "Subcontracting and Competitive Bidding on Incomplete Procurement Auctions," *RJE*, Winter 2014, 705-46.
- J. Roberts and A. Sweeting, "Bailouts and the Preservation of Competition: The Case of the Federal Timber Contract Payment Modification Act," *AEJ: Micro*, August 2016, 257-88.

6. Auctions of Multiple Objects

- J. Balat, "Highway Procurement and the Stimulus Package: Identification and Estimation of Dynamic Auctions with Heterogeneity," mimeo, Texas, 2017.
- T. Borgers, I. Cox, M. Pesendorfer and V. Petricek, "Equilibrium Bids in Sponsored Search Auctions: Theory and Evidence," *AEJ Micro*, November 2013, 163-87.
- J. Donna and J. Espin-Sanchez, "Complements and Substitutes in Sequential Auctions: The Case of Water Auctions," *RJE*, Spring 2018, 87-127.
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