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Curriculum Vitae

Joseph E. Harrington, Jr.

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Academic Positions

Patrick T. Harker Professor, Department of Business Economics & Public Policy, The Wharton School, University of Pennsylvania, Sept 2012 – present (Affiliate, Penn Program on Regulation)

Associate, Norwegian School of Economics and Bergen Center for Competition Law and Economics (BECCLE), Jan 2018 – Dec 2022

Visiting Scholar, Einaudi Institute for Economics and Finance (Rome), Sept 2017

Cátedras de Excelencia (Chair of Excellence), Departamento de Economía, Universidad Carlos III de Madrid, Sept - Dec 2012

Professor, Department of Economics, Johns Hopkins University, July 1994 - Aug 2012

Visiting Professor, Department of Economics, Harvard University, Sept 2005 - May 2006

Visiting Scholar, Institut d'Anàlisi Econòmica-CSIC, Universitat Autònoma de Barcelona, July 1997 - Dec 1997

Visiting Scholar, Department of Management & Strategy, J. L. Kellogg Graduate School of Management, Northwestern University, Sept 1991 - Aug 1992

Associate Professor, Department of Economics, Johns Hopkins University, July 1990 - July 1994

Visiting Assistant Professor, Department of Economics, University of North Carolina-Chapel Hill, Jan 1987 - June 1987

Assistant Professor, Department of Economics, Johns Hopkins University, July 1984 - July 1990

Education

Ph.D. Economics, Duke University, 1984

B.A., University of Virginia, 1979

Administrative Positions

Chair, Department of Business Economics & Public Policy, The Wharton School, University of Pennsylvania, July 2018 - present

Chair, Department of Economics, Johns Hopkins University, July 2007 - June 2012

Founder & Chair, MA Program in Applied Economics, Johns Hopkins University, Jan 1997 - June 1997, Jan 1998 - Aug 2012

Editorial Boards

Economics Letters: Editor, 2017 - present; Associate Editor, 2013-17

Journal of Industrial Economics: Associate Editor, 2013 - present

Review of Industrial Organization: Associate Editor, 2014-24

Foundations and Trends in Microeconomics: Co-Editor, 2005-10

RAND Journal of Economics: Co-Editor, 1999-2008; Associate Editor, 1997-99

Southern Economic Journal: Associate Editor, 1997-2008

Economics of Governance: Associate Editor, 2002-05

Journal of Economics and Management Strategy: Co-Editor, 1991-99

International Journal of Industrial Organization: Guest Co-Editor, Special CRESSE Issue, 2016; Co-Editor, 1993-99; Associate Editor, 1991-93

Other Scientific Positions

Research Fellow, MaCCI (Mannheim Centre for Competition and Innovation), 2017 - present

Competition and Regulation European Summer School and Conference (CRESSE): Member, Scientific Committee, 2010 – present

Member, International Advisory Committee, Complex Engineering Systems Institute (ISCI), Universidad de Chile, 2018 - present

Centre for European Economic Research (ZEW): Research Fellow, 2017-2019; Research Associate, 2013-17

Industrial Organization Society: President, 2012-13; Vice President, 2010-11; Member, Board of Directors, 2010-17

Grants

National Science Foundation (SES-1148129) "Cartel Birth, Death, and Detection," 2013-17 (\$304,744)

Carol and Lawrence Zicklin Center for Business Ethics Research, The Wharton School, University of Pennsylvania, "Identifying the Boundaries of Unlawful Collusion," 2014-15 (\$4,000)

Strengthening Efficiency and Competitiveness in the European Knowledge Economies" (SEEK) "The Anatomy of Hard Core Cartels - Theory and Empirical Evidence," (co-PI: Kai Hüschelrath), 2013-14 (150,000€)

National Science Foundation (SES-0516943) "Fighting Hard Core Cartels," 2005-09

(\$238,379)

National Science Foundation (SES-0209486) "The Effects of Antitrust Laws on Cartel Pricing," 2002-05 (\$258,862)

National Science Foundation (ECS-0224817) "Dynamic Game-Theoretic Models of Electric Power Markets and their Vulnerability," (co-PIs: Benjamin Hobbs, Terry Friesz, and Jong-Shi Pang), 2002-05 (\$600,000)

National Science Foundation (SES-0078752) "Computational Modeling of Multi-Level/Multi-Unit Organizations" (co-PI: Myong-Hun Chang), 2000-02 (\$199,430)

National Science Foundation (SES-0000649), "Rigidity and Flexibility in Social Systems - Further Research," 2000-01

National Science Foundation (SES-9708910), "Rigidity and Flexibility in Social Systems," 1997-2000

Technology Fellows Program, Johns Hopkins University, 1998-99

Spanish Ministry of Education, 1997-98

Short Courses

"Collusive Practices" and "Cartel Screening" - Competition and Regulation European Summer School (CRESSE) – June 2023 (Rhodes), June 2022 (Crete), Sept 2021 (virtual), July 2019 (Rhodes), June 2018 (Crete)

"Collusive Practices" - Competition and Regulation European Summer School (CRESSE) – June 2017 (Crete), June 2016 (Rhodes), July 2015 (Crete), July 2013 (Corfu), July 2012 (Crete), June 2011 (Rhodes), June/July 2010 (Crete), July 2009 (Crete)

"Dynamic Theories of Price and Investment in Markets with Imperfect Competition," Norwegian School of Economics and Business Administration, May 2019

"Collusive Practices," ISCI-CRESSE Latin America Summer School (Santiago, Chile) – Dec 2018

"Advances in the Theory of Collusion," University of Oslo, May 2018

"Cartels and Collusion," The World Bank (Washington, D.C.), Feb 2017

"Anti-competitive Information Exchange Practices," Joint Workshop of Competition Commission of South Africa, University of Cape Town, and CRESSE (Cape Town), Oct 2016

"Collusive Practices," Competition Commission of South Africa (Pretoria) - Sept 2015, March 2010

"Antitrust Law & Economics Institute for Judges," American Bar Association Section of Antitrust Law and George Mason University School of Law Judicial Education Program, Oct 2014

"Industrial Organization," Hanqing Advanced Institute of Economics and Finance, Renmin University of China, July 2014

"Collusive Practices," CIRC-CRESSE Winter School on the Role of Economics in Competition Law (New Delhi), Nov 2013

"Lectures on Collusion and Cartels," Pontificia Universidad Católica de Chile - Sept 2013, Oct 2011

"Distinguished Visiting Scholar Mini-Course: Game Theory" University of Cincinnati, Oct 2010

"Lectures on Collusion and Cartels," Universidad Carlos III de Madrid (Spain), June 2010

"Lectures on Cartels," Justus-Liebig-University Giessen (Germany), Jan 2010

"Industrial Organization," Norwegian School of Economics and Business Administration - Aug 2008, May 1999

"Economics of Collusion," ENCORE (Economics Network for Competition and Regulation), University of Amsterdam, July 2004

"Economic Regulation," Summer School in Regulation and Antitrust, Universidade Nova de Lisboa, July 2002

Awards, Honors, Service, Keynote and Public Lectures

Jerry S. Cohen Memorial Fund Writing Award for the Best Antitrust Publication on Information Exchanges ("Horizontal Price Exchanges," *Cardozo Law Review*, August 2023)

Interview, Penn-Wharton Budget Model Certificate Program, Hot Topics: Antitrust Policy, February 2023, August 2023, April 2024

Keynote Lecture, LEAR Competition Festival (Rome), September 2022

Panel Member, "Information Sharing Among Employers: Harms, Benchmarks & Lesson from Industry," Public Workshop on Promoting Competition in Labor Markets, U.S. Department of Justice & Federal Trade Commission, December 2021

Public Lecture, Bagwell Center for the Study of Markets and Economic Opportunity, Kennesaw State University, October 2021

Member, Selection Committee, Young Talent Competition Award, LEAR Competition Festival – 2021, 2022, 2023

Lecture, Algorithmic Market Activity, Online Workshop Series – Center for Intellectual Property and Competition Law & Swiss Competition Authority, May 2021

Strategy Talk, DePaul University, February 2021

Antitrust Writing Awards, Academic Steering Committee, Member - 2015, 2019, 2021

Keynote Lecture, Association of Competition Economists (virtual), November 2020

Keynote Lecture, Fifth Annual BECCLE Competition Policy Conference, Bergen Center for Competition Law and Economics, Norwegian School of Economics (Bergen, Norway), April 2019

Federal Trade Commission Panel on Algorithmic Collusion, Nov 2018

Keynote Lecture, 29th Annual Workshop of the Competition Law & Policy Institute of New Zealand (Wellington), Aug 2018

Best Academic Concerted Practices Article - 2018 Antitrust Writing Awards

"Antitrust in High-Speed: Colluding through Algorithms and Other Technologies," Dechert LLP and the New York State Bar's Antitrust Law Section (panel member), Jan 2018

Keynote Lecture, CEPR-JIE Conference on Applied Industrial Organization (Jerusalem), May 2017

Workshop on Economics of Competition Policy, Asia Pacific Economic Cooperation – Competition Policy and Law Group (Nha Trang, Viet Nam), February 2017

Speaker, Día de la Competencia - Fiscalía Nacional Económica (Santiago), November 2016

Keynote Lecture, Taller de Organización Industrial (Marbella, Chile), November 2016

Høstkonferansen – Norwegian School of Economics (Oslo), October 2016

Asia Pacific Economic Cooperation – Competition Policy and Law Group (Lima), August 2016

Annual Event of Competition, Apoyo Consultoria (Lima), August 2016

Bertha C. and Roy E. Leigh Distinguished Lecture in Economics, Washington State University, March 2016

Commencement Speaker, M.S. in Economics Program, School of Economics, Drexel University, March 2016

Keynote Lecture, Legal and Illegal Cartels Conference (Mannheim), December 2015

Plenary Speaker, Pre-BRICS International Competition Conference (Durban), Nov 2015

Plenary Speaker, OECD Global Forum on Competition (Paris), Oct 2015

Public Lecture, Competition Commission of South Africa (Pretoria), Sept 2015

Keynote Lecture, 4th International ESRA Workshop - Economics of Competition and Industrial Organization (Cape Town), September 2015

Keynote Lecture, Trends in Regulatory Competition (Lima), September 2015

Invited Talk, London Experimental Conference, Royal Holloway University (London), June 2015

New Frontiers: Business School Distinguished Lecture Series, Middlesex University (London), May 2015

Keynote Lecture, First Annual BECCLE Competition Policy Conference, Bergen Center for Competition Law and Economics, Norwegian School of Economics (Bergen, Norway), April 2015

Keynote Lecture, Antitrust Competition and Policy Center Summer Workshop, Hanqing Advanced Institute of Economics and Finance, Renmin University of China, July 2014

Distinguished Scholar in Industrial Organization, School of Economics, Drexel University, 2013-14

Keynote Lecture, Chilean Economic Association Meetings (Encuentro Anual Sociedad de Economía de Chile, Santiago), Sept 2013

Keynote Lecture, German Economic Association Meetings (Verein für Socialpolitik, Düsseldorf), Sept 2013

Joseph Harrington Dean's Undergraduate Award (Department of Economics, Johns Hopkins University) named in my honor, May 2012

Keynote Lecture, Deterring EU Competition Law Infringements: Are We Using the Right

Sanctions? (Brussels), Dec 2012

Bayard Wickliffe Heath Memorial Lecture, University of Florida Levin College of Law, March 2012

Speaker, Día de la Competencia - Fiscalía Nacional Económica (Santiago), October 2011

Honorable Mention for the Jerry S. Cohen Memorial Fund Writing Award for Antitrust Scholarship, 2010 (“Endogenous Cartel Formation with Heterogeneous Firms,” *RAND Journal of Economics*, Spring 2010)

Keynote Lecture, Advances in Competition Law, Instituto Sistemas Complejos de Ingeniería (Santiago), Dec 2010

Keynote Lecture, 3rd Conference of the Research Network on Innovation and Competition Policy (Vienna), Oct 2009

Keynote Lecture, 3rd Annual Competition Commission, Competition Tribunal and Mandela Institute Conference on Competition Law, Economics and Policy (Pretoria), Sept 2009

Competition Policy Lecture, European Summer School and Conference in Competition & Regulation (Crete), July 2009

Keynote Lecture, Amsterdam Center for Law and Economics, Fifth Annual Competition & Regulation Meeting (Amsterdam), March 2009

Keynote Lecture, 15th WZB Conference on Markets and Politics and the 2nd Conference of the Research Network on Innovation and Competition Policy (Berlin), Oct 2008

ENRE Best Publication Award, INFORMS (Energy, Natural Resources and Environment Section), 2007

Keynote Lecture, 1st Conference of the Research Network on Innovation and Competition Policy: Modern Approaches in Competition Policy (Mannheim), May 2007

Co-Organizer, Conference in Honor of Jim Friedman's 70th Birthday, Nov 2006

Keynote Lecture, EARIE Conference (Amsterdam), Aug 2006

Member, Program Committee, International Industrial Organization Conference, 2006-07

Keynote Lecture, Csef-Igier Symposium on Economics and Institutions (Capri), June/July 2005

ENCORE Fellow (U. of Amsterdam), 2003

Plenary Speaker, Taipei International Conference on Industrial Economics, June 2000

Fellow of the *International Journal of Industrial Organization* (Inducted 1997)

Duncan Black Award for the Best Article in *Public Choice*, 1990

Awarded National Fellowship, Hoover Institution, 1990-91 (declined for personal reasons)

Articles

“Cost Coordination,” *RAND Journal of Economics*, forthcoming.

“Competitor Coupons: A Remedy for Residual Collusion,” *Journal of Competition Law & Economics*, 19 (2023), 610-627.

“Horizontal Price Exchanges” (co-authored with Christopher R. Leslie), *Cardozo Law Review*, 44

(August 2023), 2301-2359.

"The Practical Requirements of a Successful Cartel," in *Research Handbook on Cartels*, Peter Whelan, ed., Edward Elgar, 2023.

"Cartel Screening and Machine Learning," (co-authored with David Imhof), *Stanford Computational Antitrust*, 2 (2022), 133-154.

"The Effect of Outsourcing Pricing Algorithms on Market Competition," *Management Science*, 68 (2022), 6889-6906.

"The Anticompetitiveness of a Private Information Exchange of Prices," *International Journal of Industrial Organization*, 85 (2022), 102793.

"Collusion in Plain Sight: Firms' Use of Public Announcements to Restrain Competition," *Antitrust Law Journal*, 84 (2022), 521-563.

"There May be No Pass Through of a Merger-Related Cost Efficiency," *Economics Letters*, 208 (2021) 11050.

"Protecting Consumers from Collusive Prices Due to AI" (co-authored with Emilio Calvano, Giacomo Calzolari, Vincenzo Denicolò, and Sergio Pastorello), *Science*, 370 (27 November 2020), 1040-1042.

"A Dynamic Computational Model of Social Stigma" (co-authored with Myong-Hun Chang), *Journal of Artificial Societies and Social Simulation*, 23 (2020), 2(1).

"Horizontal and Vertical Agreements: Differences between the European Union and the United States," *Belgrade Law Review*, 68 (2020), 7-27.

"Collusion through Coordination of Announcements" (co-authored with Lixin Ye), *Journal of Industrial Economics*, 67 (2019), 209-241.

"Rent Sharing to Control Non-cartel Supply in the German Cement Market" (co-authored with Kai Hüschelrath and Ulrich Laitenberger), *Journal of Economics and Management Strategy*, 27 (2018), 149-166.

"Developing Competition Law for Collusion by Autonomous Artificial Agents," *Journal of Competition Law & Economics*, 14 (2018), 331-363.

"Does Enforcement Deter Cartels? A Tale of Two Tails" (co-authored with Iwan Bos, Steve Davies, Peter L. Ormosi), *International Journal of Industrial Organization*, 59 (2018), 372-405.

"A Proposal for a Structural Remedy for Illegal Collusion," *Antitrust Law Journal*, 82 (2018), 335-359. (Best Academic Concerted Practices Article - 2018 Antitrust Writing Awards)

"Successes and Challenges in the Fight Against Cartels," in *Competition Policy for the New Era: Insights from the BRICS Countries*, Tembinkosi Bonakele, Eleanor M. Fox, and Liberty Mncube, eds., Oxford: Oxford University Press, 2017, 136-143.

"The Deterrence of Collusion by a Structural Remedy," *Economics Letters*, 160 (2017), 78-81.

"What Can the Duration of Discovered Cartels Tell Us About the Duration of All Cartels?," (co-authored with Yanhao (Max) Wei) *Economic Journal*, 127 (2017), 1977-2005.

"A Theory of Collusion with Partial Mutual Understanding," *Research in Economics*, 71 (2017), 140-158. (Special Issue on Game Theory)

"The Relative Efficacy of Price Announcements and Express Communication for Collusion: Experimental Findings," (co-authored with Roberto Hernan-Gonzalez and Praveen Kujal) *Journal of Economic Behavior & Organization*, 128 (2016), 251-264.

"Heterogeneous Firms Can Always Collude on a Minimum Price," *Economics Letters*, 138 (2016), 46-49.

- "When Should We Expect a Corporate Leniency Program to Result in Fewer Cartels?," (co-authored with Myong Chang) *Journal of Law and Economics*, 28 (2015), 417-449.
- "The Discontent Cartel Member and Cartel Collapse: The Case of the German Cement Cartel," (co-authored with Kai Hüschelrath, Ulrich Laitenberger, and Florian Smuda), *International Journal of Industrial Organization*, 42 (2015), 106-119. (Reprinted in *Comparative Competition Policy*, S. B. Farmer, ed., Edward Elgar, 2020)
- "Competition Policy and Cartel Size," (co-authored with Iwan Bos) *International Economic Review*, Vol. 56 (February 2015), 133-153.
- "The Comity-Deterrence Trade-off and the FTAIA: *Motorola Mobility* Revisited," *Competition Policy International: Antitrust Chronicle*, January 2015.
- "Cartel Sales Dynamics when Monitoring for Compliance is More Frequent than Punishment for Non-Compliance," (co-authored with Juan-Pablo Montero) in *Analysis of Competition Policy and Sectoral Regulation*, M. Pietz and Y. Spiegel, eds., Boston: Now Publishers, 2014, pp. 179-193.
- "*Motorola Mobility* and the FTAIA: A Deterrence-Based Definition of 'Direct' Effect," *Competition Policy International: Antitrust Chronicle*, September 2014.
- "Penalties and the Deterrence of Unlawful Collusion," *Economics Letters*, 124 (2014), 33-36.
- "Individual Learning and Social Learning: Endogenous Division of Cognitive Labor in a Population of Co-evolving Problem-solvers," (co-authored with Myong-Hun Chang) *Administrative Sciences*, 3 (June 2013), 53-75.
- "Corporate Leniency Programs when Firms have Private Information: The Push of Prosecution and the Pull of Pre-emption," *Journal of Industrial Economics*, 61 (March 2013), 1-27.
- "Evaluating Mergers for Coordinated Effects and the Role of 'Parallel Accommodating Conduct'," *Antitrust Law Journal*, 78 (2013), 651-668.
- "Signaling and Tacit Collusion in an Infinitely Repeated Prisoners' Dilemma," (co-authored with Wei Zhao) *Mathematical Social Sciences*, 64 (November 2012), 277-289.
- "Corporate Leniency with Private Information: An Exploratory Example," in *Recent Advances in the Analysis of Competition Policy and Regulation*, J. Harrington and Y. Katsoulakos, eds., Cheltenham, UK: Edward Elgar, 2012.
- "Private Monitoring and Communication in Cartels: Explaining Recent Collusive Practices," (co-authored with Andrzej Skrzypacz), *American Economic Review*, 101 (October 2011), 2425-2449.
- "Posted Pricing as a Plus Factor," *Journal of Competition Law & Economics*, 7 (2011), 1-35.
- "When is an Antitrust Authority not Aggressive Enough in Fighting Cartels?," *International Journal of Economic Theory*, (A Special Issue on Game Theory and Industrial Organization in Honor of James Friedman), 7 (2011), 39-50.
- "Supplying Anti-Viral Drugs during a Pandemic: The Role of Manufacturer Reserve Programs," (co-authored with Edbert Hsu), *Journal of Health Economics*, 29 (May 2010), 438-444.
- "Endogenous Cartel Formation with Heterogeneous Firms," (co-authored with Iwan Bos), *RAND Journal of Economics*, 41 (Spring 2010), 92-117. (Honorable Mention for the Jerry S. Cohen Memorial Fund Writing Award for antitrust scholarship given out by the American Antitrust Institute)
- "Modelling the Birth and Death of Cartels with an Application to Evaluating Antitrust Policy," (co-authored with Myong-Hun Chang), *Journal of the European Economic Association*, 7 (December 2009),

1400-1435.

"Avoiding Market Dominance: Product Compatibility in a Market with Network Effects," (co-authored with Jiawei Chen and Ulrich Doraszelski), *RAND Journal of Economics*, 40 (Autumn 2009), 455-485.

"Optimal Corporate Leniency Programs," *Journal of Industrial Economics*, 56(2008), 215-246.

"Detecting Cartels," in *Handbook of Antitrust Economics*, P. Buccirossi, ed., The MIT Press, 2008.

"Collusion with Monitoring of Sales," (co-authored with Andrzej Skrzypacz), *RAND Journal of Economics*, 38 (Summer 2007), 314-331.

"Behavioral Screening and the Detection of Cartels," in *European Competition Law Annual 2006: Enforcement of Prohibition of Cartels*, Claus-Dieter Ehlermann and Isabela Atanasiu, eds., Hart Publishing, 2007.

"Innovators, Imitators, and the Evolving Architecture of Social Networks," (co-authored with Myong-Hun Chang), *Organization Science*, 18 (July 2007), 648-666.

"The Impact of the Corporate Leniency Program on Cartel Formation and the Cartel Price Path," (co-authored with Joe Chen), *The Political Economy of Antitrust*, V. Ghosal and J. Stennek, eds., Elsevier, 2007.

"Equilibrium Pricing in a (Partial) Search Market: The Shopbot Paradox," (co-authored with Megan Leahey), *Economics Letters*, 94 (January 2007), 111-117.

"Handedness and Earnings," (co-authored with Robert Moffitt and Christopher Ruebeck), *Laterality*, 12 (2007), 101-120.

"Cartel Pricing Dynamics with Cost Variability and Endogenous Buyer Detection," (co-authored with Joe Chen), *International Journal of Industrial Organization*, 24 (November 2006), 1185-1212.

"How Do Cartels Operate?," *Foundations and Trends in Microeconomics*, Vol. 2, Issue 1, July 2006.

"Agent-Based Models of Organizations," (co-authored with Myong-Hun Chang), *Handbook of Computational Economics, II: Agent-Based Computational Economics*, L. Tesfatsion and K. Judd, eds., Elsevier, 2006.

"Collusive Game Solutions via Optimization," (co-authored with Benjamin Hobbs, Jong-Shi Pang, Andrew Liu, and Grant Roch), *Mathematical Programming B*, 104 (2005), 407-435. (ENRE Best Publication Award, INFORMS, 2007)

"Optimal Cartel Pricing in the Presence of an Antitrust Authority," *International Economic Review*, 46 (February 2005), 145-169. (Reprinted in *Recent Developments in Monopoly and Competition Policy*, G. Norman, ed., Edward Elgar, 2008.)

"Discovery and Diffusion of Knowledge in an Endogenous Social Network," (co-authored with Myong-Hun Chang), *American Journal of Sociology*, 110 (January 2005), 937-976.

"Co-Evolution of Firms and Consumers and the Implications for Market Dominance," (co-authored with Myong-Hun Chang), *Journal of Economic Dynamics and Control*, 29 (January 2005), 245-276.

"Cartel Pricing Dynamics in the Presence of an Antitrust Authority," *RAND Journal of Economics*, 35 (Winter 2004), 651-673. (Reprinted in *Pricing Tactics, Strategies, and Outcomes, Volume II*, M. Waldman and J. Johnson, eds., Edward Elgar, 2007.)

"Post-Cartel Pricing during Litigation," *Journal of Industrial Economics*, 52 (December 2004), 517-

533. (Non-technical version published in *Global Competition Litigation Review*, 3 (2011), 125-130.)
- "Organization of Innovation in a Multi-Unit Firm: Coordinating Adaptive Search on Multiple Rugged Landscapes," (co-authored with Myong-Hun Chang) in *Economic Complexity: Non-linear Dynamics, Multi-agents Economies, and Learning*, W. Barnett, C. Deissenberg, and G. Feichtinger, eds., ISETE, Vol. 14, Elsevier, 2004.
- "Fluidity of Social Norms in a Hierarchical System," in *Computational Models in Political Economy*, K. Kollman, J. Miller, and S. Page, eds., MIT Press, 2003.
- "Some Implications of Antitrust Laws for Cartel Pricing," *Economics Letters*, 79 (June 2003) 377-383.
- "Multi-Market Competition, Consumer Search, and the Organizational Structure of Multi-Unit Firms," (co-authored with Myong-Hun Chang), *Management Science*, 49 (April 2003) 541-552.
- "Decentralized Business Strategies in a Multi-Unit Firm," (co-authored with Myong-Hun Chang), *Annals of Operations Research* (Special Issue on "Game Practice"), 109 (January 2002), 77-98.
- "A Simple Game-Theoretic Explanation for the Relationship between Group Size and Helping," *Journal of Mathematical Psychology*, 45 (April 2001), 389-392.
- "Centralization vs. Decentralization in a Multi-Unit Organization: A Computational Model of a Retail Chain as a Multi-Agent Adaptive System," (co-authored with Myong-Hun Chang), *Management Science*, 46 (November 2000), 1427-1440.
- "A Theory of Rigid Extremists and Flexible Moderates with an Application to the U.S. Congress," (co-authored with S. Brock Blomberg), *American Economic Review*, 90 (June 2000), 605-620.
- "Progressive Ambition, Electoral Selection, and the Creation of Ideologues," *Economics of Governance*, 1 (2000), 13-23 (inaugural issue).
- "The Equilibrium Level of Rigidity in a Hierarchy," *Games and Economic Behavior*, 28 (August 1999), 189-202.
- "Rigidity of Social Systems," *Journal of Political Economy*, 107 (February 1999), pp. 40-64.
- "The Social Selection of Flexible and Rigid Agents," *American Economic Review*, 88 (March 1998), 63-82.
- "Organizational Structure and Firm Innovation in a Retail Chain," (co-authored with Myong-Hun Chang), *Computational and Mathematical Organization Theory*, 3 (Winter 1997), 267-288.
- "A Spatial Theory of Positive and Negative Campaigning," (co-authored with Gregory D. Hess), *Games and Economic Behavior*, 17 (December 1996), 209-229.
- "Product Variety and Firm Agglomeration," (co-authored with Jeffrey Fischer), *RAND Journal of Economics*, 27 (Summer 1996), 281-309.
- "The Interactive Effect of Product Differentiation and Cost Variability on Firm Profit," (co-authored with Myong-Hun Chang), *Journal of Economics and Management Strategy*, 5 (Summer 1996), 175-193.
- "Experimentation and Learning in a Differentiated-Products Duopoly," *Journal of Economic Theory*, 66, June 1995, 275-288.
- "Managerial Reputation and the Competitiveness of an Industry," (co-authored with Shuichi Senbongi) *International Journal of Industrial Organization*, 13 (March 1995), 95-110.
- "Cooperation in a One-Shot Prisoners' Dilemma," *Games and Economic Behavior*, 8 (February 1995), 364-377.

- "The Dynamics of the Free-Rider Problem in Takeovers," (co-authored with Jacek Prokop), *Review of Financial Studies*, 6 (Winter 1993), 851-882.
- "Economic Policy, Economic Performance, and Elections," *American Economic Review*, 83 (March 1993), 27-42.
- "The Impact of Re-election Pressures on the Fulfillment of Campaign Promises," *Games and Economic Behavior*, 5 (January 1993), 71-97.
- "The Revelation of Information through the Electoral Process: An Exploratory Analysis," *Economics and Politics*, 4 (November 1992), 255-275.
- "The Role of Party Reputation in the Formation of Policy," *Journal of Public Economics*, 49 (October 1992), 107-121.
- "Modelling the Role of Information in Elections," *Mathematical and Computer Modelling*, 16 (August/September 1992), 133-145.
- "Uncertainty over Product Differentiation in a Price-Setting Duopoly: A Non-Robustness Result," *Economics Letters*, 39 (1992), 283-288.
- "The Determination of Price and Output Quotas in a Heterogeneous Cartel," *International Economic Review*, 32 (November 1991), 767-792. (Reprinted in *Cartels - Volume II*, M. Levenstein and S. Salant, eds., Edward Elgar Publishing, 2007.)
- "The Joint Profit Maximum as a Free-Entry Equilibrium Outcome," *European Economic Review*, 35 (July 1991), 1087-1101.
- "The Impact of Cyclical Demand Movements on Collusive Behavior" (co-authored with John Haltiwanger), *RAND Journal of Economics*, 22 (Spring 1991), 89-106. (Reprinted in *Cartels - Volume I*, M. Levenstein and S. Salant, eds., Edward Elgar Publishing, 2007.)
- "The Role of Risk Preferences in Bargaining when Acceptance of a Proposal Requires Less than Unanimous Approval," *Journal of Risk and Uncertainty*, 3 (June 1990), 135-154.
- "The Power of the Proposal Maker in a Model of Endogenous Agenda Formation," *Public Choice*, 64 (January 1990), 1-20.
- "Collusion and Predation under (Almost) Free Entry," *International Journal of Industrial Organization*, 7 (September 1989), 381-401.
- "Collusion Among Asymmetric Firms: The Case of Different Discount Factors," *International Journal of Industrial Organization*, 7 (June 1989), 289-307.
- "A Re-evaluation of Perfect Competition as the Solution to the Bertrand Price Game," *Mathematical Social Sciences*, 17 (June 1989), 315-328.
- "The Advantageous Nature of Risk Aversion in a Three Player Bargaining Game where Acceptance of a Proposal Requires a Simple Majority," *Economics Letters*, 30 (1989), 195-200.
- "The Effects of Irreversible Investment in Durable Capacity on the Incentive for Horizontal Merger," (co-authored with Myong-Hun Chang), *Southern Economic Journal*, 55 (October 1988), 443-453.
- "Oligopolistic Entry Deterrence under Incomplete Information," *RAND Journal of Economics*, 18 (Summer 1987), 211-231.
- "Finite Rationalizability and Cooperation in the Finitely Repeated Prisoners' Dilemma," *Economics Letters*, 23 (1987), 233-237.
- "Collusion in Multiproduct Oligopoly Games under a Finite Horizon," *International Economic Review*,

28 (February 1987), 1-14.

"A Non-cooperative Bargaining Game with Risk Averse Players and an Uncertain Finite Horizon," *Economics Letters*, Vol. 20 (1986), 9-13.

"Limit Pricing When the Potential Entrant is Uncertain of Its Cost Function," *Econometrica*, 54 (March 1986), 429-437.

"Noncooperative Behavior by a Cartel as an Entry-Detering Signal," *Rand Journal of Economics*, 15 (Autumn 1984), 426-433.

Policy Papers, Comments, Reviews, and Other Published Papers

"Developing More Vigorous Anti-Cartel Enforcement by Promoting Deterrence," *Competition Policy International Antitrust Chronicle*, August 2022.

"Cartel Screening is for Companies, Law Firms, and Economic Consultancies, not just Competition Authorities," *Centro Competencia*, November 3, 2021.

"Thoughts on Why Certain Markets are More Susceptible to Collusion and Some Policy Suggestions for Dealing with Them," OECD Background Paper, Global Forum on Competition, October 19, 2015.

"Game Theory in a Liberal Arts Education," in *International Handbook on Teaching and Learning Economics* (Gail Hoyt and KimMarie McGoldrick, editors), Cheltenham, England: Edward Elgar, 2012, 505-513.

"Comment on 'Antitrust Sanctions'," *Competition Policy International Journal*, 6 (Autumn 2010), 41-51.

"Antitrust Enforcement," in *The New Palgrave: Dictionary of Economics*, 2nd Edition, L. Blume and S. Durlauf, eds., Macmillan, 2008, 181-184.

"Issues in Antitrust Enforcement," (co-authored with Vivek Ghosal and Johan Stennek) in *The Political Economy of Antitrust*, V. Ghosal and J. Stennek, eds., Elsevier, 2007.

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Books (Author)

Hub-and-Spoke Cartels: Why They Form, How They Operate, and How to Prosecute Them (co-

authored with Luke Garrod and Matthew Olczak), The MIT Press, 2021.

The Theory of Collusion and Competition Policy, The MIT Press, 2017.

Games, Strategies, and Decision Making, Worth Publishers, 2009 (translated into Chinese); 2nd Edition, Worth Publishers, 2015.

Economics of Regulation and Antitrust (co-authored with W. Kip Viscusi and David E. M. Sappington), 5th Edition, The MIT Press, 2018.

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Books (Editor)

Cartels Diagnosed: New Insights on Collusion (co-edited with Maarten Pieter Schinkel), Cambridge University Press, in progress.

Recent Advances in the Analysis of Competition Policy and Regulation (co-edited with Yannis Katsoulakos), Edward Elgar, 2012.

Working Papers

“An Economic Test for an Unlawful Agreement to Adopt a Third Party's Pricing Algorithm,” September 2023.

“The Challenges of Third Party Pricing Algorithms for Competition Law,” February 2024.

Presentations before Competition Authorities

Fiscalía Nacional Económica (Chile), Directorate of Competition - European Commission, Hong Kong Competition Commission, Autorità Garante della Concorrenza e del Mercato (Italy), Fair Trade Commission (Japan), Autoriteit Consument & Markt (The Netherlands), New Zealand Commerce Commission, Konkurransetilsynet (Norway), Autoridade da Concorrência (Portugal), Competition Commission of Singapore, Competition Commission of South Africa, Comisión Nacional de los Mercados y la Competencia (Spain), Antitrust Division of the U.S. Department of Justice, U.S. Federal Trade Commission, International Competition Network for Chief & Senior Economists (Vancouver, Bergen)

Conference/Symposium Presentations (since 2013)

79th Economic Policy Panel Meeting (Brussels), April 2024; Oxford-Man Institute Learning in Games and Algorithmic Collusion Workshop, October 2023; MaCCI Summer Institute on Competition Policy (Edesheim, Germany), June 2023; BECCLE Competition Policy Conference (Bergen, Norway), June 2023; “Computational Antitrust: Implementing Antitrust 3.0,” Stanford University Codex Center (virtual), Dec 2022; “Expanding the Boundaries of Competition Law: Article 1A Greek Competition Law, Section 5 FTC Act, Article 32f GWB,” Hellenic Competition Commission Webinar, Nov 2022; Athena Competition Law & Policy Forum (Athens), June 2022; BECCLE Competition Policy Conference (Bergen, Norway), June 2022; International Industrial Organization Conference (Boston), May 2022; CRESSE -

JUFE Conference and Lectures on Competition Policy (virtual), May 2021; EUI Pricing Technologies and their Economic and Social Consequences (virtual), March 2021; Penn Journal of Business Law Symposium: The Interplay of Antitrust Laws and Our Current Business Environment (Philadelphia), February 2020; American Economic Association Meetings (San Diego), Jan 2020; Tercer Taller de Organización Industrial (Viña del Mar, Chile), Dec 2018; Big Data, AI, and Algorithms: Do New Technologies Require New Approaches to Competition Law? (Brussels), Nov 2018; Taxation and Regulation in the Digital Economy (Bergen), Oct 2018; XXIII Jornadas de Economía Industrial (Barcelona), Sept 2018; 8th Annual ZJU Conference on Industrial Economics, June 2018 (Hangzhou, China); HKUST Workshop on Industrial Organization, June 2018 (Hong Kong); Triangle Microeconomics Conference (UNC-Duke), April 2018; CRESSE Twelfth International Conference on Competition & Regulation (Crete), July 2017; MaCCI Summer Institute in Competition Policy (Romrod, Germany), June 2017; BECCLE Competition Policy Conference (Bergen, Norway), April 2017; ICN Chief/Senior Economists Workshop (Vancouver), Sept 2016; UBC Summer Conference on Industrial Organization (Kelowna, BC), July 2016; Barcelona GSE Summer Forum, June 2016; Hal White Conference (Washington, D.C.), June 2016; Pre-BRICS International Competition Conference (Durban), Nov 2015; OECD Global Forum on Competition (Paris), Oct 2015; Extraterritoriality of Antitrust Law in the US and Abroad: A Hot Issue (George Washington U. Law School), Sept 2015; CRESSE Tenth International Conference on Competition & Regulation (Crete), July 2015; EARIE Conference (Milan), August 2014; MaCCI Summer Institute in Competition Policy (Romrod, Germany), June 2014; International Industrial Organization Conference (Chicago), April 2014; MaCCI Summer Institute in Competition Policy (Edesheim, Germany), June 2013; Canadian Economic Association Meetings (Montreal) - invited session, June 2013; Workshop on Decision Making and Bribery (U. of Pennsylvania), June 2013; Cartels: A Conference in Honor of Robert F. Lanzillotti (U. of Florida), March 2013

Miscellaneous

Founding Member, House Warming Circle, Pathways to Housing PA, 2015

Member, Board of Directors, Wide Angle Youth Media, 2011-12

Member, External Review Committee: Dept of Economics, National University of Singapore, 2012, 2017; School of Economics, Georgia Institute of Technology, 2015; School of Economics, Drexel University, 2014

Special Lectures: “Collusion: The Art & Science of Harming Consumers,” Oxford Economics Society (2023), “Collusion: The Hidden Evil in the Marketplace,” Western Pennsylvania Penn Alumni Club (2017); “The Role of Mathematics in Economics,” The Bryn Mawr School 6th Grade Mathematics Class (2001); Mathematical Economics Forum, Wake Forest University (2001); “Game Theory,” Gettysburg College (1993)

External Examiner, Doctoral Thesis: University of Zurich (2022), University of Amsterdam (2020), Hebrew University (2017), Toulouse School of Economics (2016), Universidad Carlos III de Madrid (2012 - twice), University of Copenhagen (2010), University of Amsterdam (2009), Universidad de Alicante (2004), Stockholm University (2000), Universitat Autònoma de Barcelona (1997)