

Ariel Pakes

Curriculum Vita

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Personal

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Citizenship: Dual U.S. and Canadian
Married to: Juliana Rojas Pakes. Two children.

Education

Degrees

Ph.D. Harvard University, June 1979.
M.A. Harvard University, 1976.

M.A. The Hebrew University of Jerusalem, June 1973, with distinction.

B.A. The Hebrew University of Jerusalem, June 1971.

Thesis Topic

Economic Incentives in the Production and Transmission of Knowledge: An Empirical Analysis.

Primary Fields (in alphabetical order)

Econometrics, Industrial Organization, Productivity and Technological Change.

Employment

- Mark and Sheila Wolfson Visiting Professor, Stanford University, Spring 2018.
- Trione Visiting Professor, Stanford University, Spring 2015.
- Thomas Professor of Economics, Department of Economics, Harvard University, July 2005 to present.
- Visiting Professor NYU, 2005/2006 academic year.
- Professor of Economics, Department of Economics, Harvard University, July 1999 to July 2005.
- Visiting Professor, Department of Economics, Harvard University, Spring 1999.
- Visiting Professor, Department of Economics, University of Chicago, Fall 1998.
- Charles and Dorothea Dilley Professor of Economics, Yale University, 1997 to 1999.
- Professor of Economics, Yale University, 1988 to 1997.
- Associate Professor (with tenure), Department of Economics, University of Wisconsin-Madison, 1986 to 1988.

- Associate Social Science Research Institute, 1986 to 1988.
- Visiting Research Associate, Economic Growth Center, Yale University, Fall, 1985.
- Senior Lecturer in Economics (with tenure), The Hebrew University of Jerusalem, 1984 to 1986.
- Visiting Assistant Professor, Department of Economics, University of Wisconsin, Madison, 1984-1985.
- Lecturer in Economics, The Hebrew University of Jerusalem, 1980 to 1984.
- Lecturer in Economics, Harvard University, 1979.

Honors and Awards

From Academies or Societies.

- BBVA Frontiers of Knowledge Award in Economics, Finance and Management, 2018. (joint with Robert Porter and Tim Bresnahan). Citation: *“Motivated by important and policy-relevant questions in applied economics they developed methodologies that had a significant and long-lasting impact on subsequent work in industrial organization as well as other applied fields”*.
- Elected to the National Academy of Sciences, 2017.
- Recipient of the 2017 Jean-Jacques Laffont Prize. Citation: *Awarded annually and recognizes an internationally renowned economist whose research is in the spirit of Professor Jean-Jacques Laffont’s work, and combines both theory & empirics.*
- Industrial Organization Society Distinguished Fellow, 2007.
- Elected Fellow of the American Academy of Arts and Sciences, 2002.
- Elected Fellow of the Econometric Society, 1988.

- 1986 recipient of the Frisch Medal. Citation: *Awarded every two years by the Econometric Society for the best applied article, empirical or theoretical, published in the journal Econometrica over the past five years.* The Article receiving the award was; “Patents as Options: Some Estimates of the Value of Holding European Patent Stocks”.

Additional Distinctions awarded papers.

- Recipient of the 2017 Robert F. Lanzillotti Prize for the Best Paper in Antitrust Economics awarded at the IIOC, for Asker J., Fershtman C., Jeon J., Pakes A.; The Competitive Effects of Information Sharing.
- Finalist: Best paper award. American Health Care Research Annual award. Paper receiving the award was: Kate Ho and Ariel Pakes (2014) “Hospital Choices, Hospital Prices and Financial Incentives to Physicians,” *American Economic Review*.

Fellowships.

- Harvard University Honorary Fellow. Academic Years 1974-78.
- Canada Council Doctoral Fellowship. Academic Years 1974-78.
- Eliezer Kaplan Fellowship for Research in the Social Sciences, 1971-73.

Named Lectures.

- The Fathauer Lecture in Political Economy, University of Arizona, March 2018, “From Models of Firm Behavior to the Analysis of Market Outcomes.”
- Keynote Speaker: AIPOC, Auckland New Zealand, December 2017, “Just Starting Out: Learning and Equilibrium in a New Market.”
- Keynote speaker: ERMAS, Cluj-Napoca, Romania, July 2017, “Dynamics in I.O.: An Equilibrium Concept and a Procurement Example.”
- Keynote speaker: CESifo Area Conference on Applied Microeconomics, Munich, March 2017, “Just Starting Out: Learning and Equilibrium in a New Market.”

- Inaugural Griliches lectures; The Asian Meetings of the Econometric Society, Kyoto, August, 2016, “Moment Inequalities: When and How to Use Them.”
- Keynote Speaker, North American Productivity Workshop, Quebec City, June 2015, “Just Starting Out: An Empirical Examination of Firms’ Learning Equilibrium Strategies.”
- Keynote Speaker, Cresse Conference on Advances in the Analysis of Competition Policy and Regulation, Crete, July 2015, “The Analysis of Dynamic Responses.”
- Plenary Speaker, 16th CEPR Conference on Applied Industrial Organization, Zurich, May 2015, “Methodological Issues in The Analysis of Market Dynamics.”
- Keynote Speaker, The International Society for Dynamic Games and Applications, Amsterdam, July 2014, “Dynamic Analysis of Market Outcomes.”
- The Cowles Lecture, Summer Meetings of the Econometric Society, Minneapolis, June 2014, “Dynamic Analysis of Market Outcomes: A Methodological Issue.”
- Keynote Speaker, Barcelona Summer Forum, Barcelona, June 2014, “Dynamic Analysis of Market Outcomes.”
- Keynote Speaker, North American Productivity Workshop, Ottawa, June 2014, “Hospital Choices, Hospital Outcomes, and Financial Incentives to Physicians.”
- Keynote Speaker, French Econometric Society, Toulouse, November 2013, “Inequalities for Semi-parametric Multinomial Choice with Fixed Effects”.
- Lawrence R. Klein Lecture, University of Pennsylvania, Philadelphia, April 2013, “Behavioral and Descriptive Forms of Econometric Models.”
- Keynote Speaker, EARIE (European Association for Research in Industrial Economics), Rome, August 2012, “Models for Dynamic Oligopolies.”

- The Sargan Lecture, The Royal Economic Society, Cambridge England, March 2012, “Interpretable Reduced Forms.”
- Keynote Speaker, CEPR conference, Tel Aviv, May 2011, “Dynamic Games with Asymmetric Information.”
- Keynote Speaker, The Spanish Industrial Organization Society Annual Meeting, Vigo, Spain, October 2009, “Simplifying Applied Work.”
- The Fukuzawa Lecture, The Far Eastern and South Asian Meeting of the Econometric Society, Tokyo, August 2009, “Simplifying the Assumptions in Applied Work: A Static and a Dynamic Example.”
- The Fiftieth Anniversary of the Rotterdam Econometrics Institute, Rotterdam, May 2006. “The Future of Econometrics: Some Econometric Problems in Applied I.O.”
- The Fisher-Schultz Lecture, the World Congress of the Econometric Society, London, August 2005, “Econometrics and Theory in Applied I.O.”
- Plenary Lecture, Conference in tribute to Jean Jacques Laffont, Toulouse, France, July 2005, “An Overview of Developments in Applied I.O.”
- The PIER lecture, The University of Pennsylvania, February 2005, “Nash and Econometrics.”
- Keynote speaker, The Society for Economic Dynamics Annual Meeting, Florence, Italy, July 2004, “Applied Analysis in Dynamic I.O.: Problems and Prospects.”
- Keynote Speaker, CEPR Conference, Hydra, Greece, May 2004, “Competitive Analysis of Mergers.”
- The Marshall Lectures, Cambridge, England, January 2004, “Models of Markets for Applied Work.”
- The Fishelson Lecture, Tel Aviv, January 2004, “Advances in Demand Analysis.”

- Keynote Speaker, First International Industrial Organization Conference, Boston, MA, April 2003, “Simplicity and Sensibility: Notes on the Econometrics of Industrial Organization.”
- The Journal of Applied Economics Invited Lectures, Kingston, Ontario, June 2002, “Demand Analysis in Characteristic Space.”
- The Richard T. Ely Lectures, John Hopkins University, Baltimore, Maryland, November 2001, “Dynamic Analysis in I.O.”
- Invited Plenary Lecture, EARIE (European Association for Research in Industrial Economics), Dublin, Ireland, July 2001, “A Framework for Dynamic Analysis in Applied I.O.”
- Invited plenary lecture, European meetings of the Econometric Society, Berlin 1998, “Simple Dynamic I.O. Models for Applied and Empirical Work.”
- Invited plenary lecture to the Society for Computational Economics, Geneva 1995, “Computational Problems In The Empirical Analysis of Some Simple I.O. Models.”
- Invited Lecture to the World Congress of the Econometric Society, Barcelona 1990, “Dynamic Structural Models: Problems and Prospects.”

Professional Activities.

NSF Panels.

Member and report co-author, special NSF panels for:

- Global Change, 1990.
- Computational Economics, 1991.
- Data Opportunities, 1993.

Other NSF Panels.

- NSF Presidential Fellow Advisory Panel, 1992.
- NSF Economics Advisory Panel, 1989, 1990.

Other Panels

-Antitrust panels; American Bar Association, 2000, Association of Competition Ecibinucs 2014, Cornerstone Health Care Panel, 2017, Cornerstone Merger Panel, 2018.

-Israel Council for Research and Development: Overseeing the integration of Census and *R&D* Surveys to create a panel on research performing firms in Israeli Industry.

- Member, Council for Research on Income and Wealth, 1994 to date.

-Member, Census Advisory Panel, 1995 to 2000. Co-chair of panel 1999.

-Israel Ministry of Education, the Council for Higher Education; Panel to assess the strengths of the economics departments at universities in Israel. Summer 2008.

Graduate and Post-Doctoral Students.

A list of Ariel Pakes' sixty three graduate students together with their initial placement, and his two post doctoral fellows is downloadable from his home page. Many of these students are now employed at major research universities.

Formal Associations with Research Institutes.

Scientific Board: The UBB Institute for Advanced Study in Science and Technology, Kluj-Npoca, Romania, 2017-.

Scientific Board: The Toulouse School of Economics, 2015-18.

Scientific Board: Center for Study of Auctions, Procurement, and Competition Policy, Penn State, 2006-2011.

Fellow Toulouse Network for Studies in Industrial Organization, 2004-2008.

Fellow Center for Microdata Methods and Practice (CEMMAP), London 2005-present.

Board of Directors: the Networks, Electronic Commerce, and Telecommunications Institute (NET) 2003-present.

Fellow, Harvard University Center for the Environment, 2000 to present.

Research Associate, National Bureau of Economic Research, 1983 to present.

Member Cowles Commission, 1997 to present.

Faculty Research Fellow, National Bureau of Economic Research, 1979 to 1983.

Research Associate, The Maurice Falk Institute for Economic Research in Israel, 1980 to 1986.

Other Formal Associations.

-Founding Editorial Board: *Microeconomic Insights*. A blog to explain the implications of findings from microeconomic research. Launched in January 2016.

Responsibility for Programs at Conferences.

- Chair, World Congress of the Econometric Society, Montreal, August 2015.
- NSF/NBER CEME conference in Econometrics, New York, August 2012.
- NBER Summer Institute, Industrial Organization, July 2012.
- American Economic Association, Winter Meeting, 2005.
- NBER Summer Institute, Industrial Organization and Productivity, 2002.
- Econometric Society, Summer Meeting, Maryland, 2000.
- Cowles Foundation, Conference on Structural Modeling, 2000.
- NBER, Productivity, Fall 1997, 1999.
- NBER, Recent Advances in Models of Supply and Demand, July, 1996.
- American Economic Association, Winter Meeting, Anaheim, 1992.
- NBER, Structural Models of Firm and Industry Behavior, annual, July 1992, July 1991, July 1990, July 1989, July 1988, July 1987.
- World Congress of the Econometric Society, Barcelona, 1990.
- Econometric Society Winter Meetings, Washington, December 1990.
- Econometric Society Winter Meetings, New York, December 1988.
- NBER, Technical Change and *R&D* Incentives, August 10-12, 1983.

Committees

Past Yale University Committees.

Divisional Committee for the Social Sciences.

Committee on Cooperative Research (patent and copyright policy).

Harvard University.

Committee for Business Economics

Committee for Health Economics

American Academy for Arts and Sciences.

Committee for the Nomination of Fellows (twice).

American Economic Association.

AEA Honors and Award Committee 2015 to present

Census Advisory Panel

Standing Committee of Economic Statistics

Econometric Society.

Council member: Econometric Society, 2015 to present

Chair of Program Committee: 2015 World Congress (Montreal).

Frisch Prize Committee (twice).

Walras-Bowley Lecture Committee (twice)

Committee for the Election of Fellows.

Japanese Econometric Society.

Nakahara Prize Committee, 2016.

Editing.

-Guest Editor, Journal of Marketing Research, Special issue on dynamic choice, 2012.

-Board of Editors, American Economic Journal, Micro, 2007 to date.

-Advisory Editor, Applied Economics Research Bulletin, 2006 to date.

- Associate Editor, Journal of the European Economics Association, 2003 to 2010.

- Editor, The RAND Journal of Economics, January 1999 to 2009.

- Associate Editor, Journal of Econometrics, 1996 to 1999.

- Co-editor (with K. Sokoloff), Proceedings of the National Academy of Sciences, ("Science, Technology, and the Economy"), 1996.

- Co-editor (with M. Fuss and R. Gronau), Journal of Econometrics, (Annals of Econometrics Issue), 1995.

- Advisory Editor, Economics Letters, 1993 to date.

- Associate Editor, Journal of Economic Dynamics and Control, 1993 to 2006.

- Associate Editor, Econometrica, 1989 to 1995.

- Associate Editor, International Journal of Industrial Organization, 1989 to 1995.
- Associate Editor, Economics of Innovation and New Technology, 1989, to date.

Articles Refereed for. American Economic Review; Binational Agricultural Research and Development Foundation; Canada Council; Econometrica; European Economic Review; International Economic Review; International Journal of Industrial Organization; Journal of the American Statistical Association; Journal of Economics Dynamics and Control; Journal of Economic Literature; Journal of Human Resources; Journal of Political Economy; Management Science; National Science Foundation; Quarterly Journal of Economics; Rand Journal of Economics; Review of Economics and Statistics; Review of Economics Studies.

Grants

Commonwealth Fund:

Prices, Incentives and Provider Consolidation in Health Care with Kate Ho and Mark Shepard (2015).

National Science Foundation:

(2000) Issues in the Applied Analysis of Markets. Three years.

(1998) Special Creativity Extension, "Empirical Implementation of Some Simple I.O. Models" Two year extension.

(1995) Accomplishment Based Grant, "Empirical Implementation of Some Simple I.O. Models." Three years.

(1991) "Equilibrium Models of the Auto Industry" (joint with Steve Berry and Jim Levinsohn).

(1989) "Dynamic Models of Firm and Industry Behavior" (joint with Rick Ericson).

(1986) "The Behavior of Small Science Based Firms" (joint with Rick Ericson).

Binational Science Foundation:

(2013) "Collusion in Auctions" (joint with John Asker and Chaim Fershtman).

(2009) "Dynamic Games with Asymmetric Information" (joint with Chaim Fershtman).

(1995) "A Framework for the Empirical Analysis of Cartels and Price Wars",

(joint with Chaim Fershtman, two years).

(1981) “Science Based Industry in Israel” (joint with Zvi Griliches).

Organization for Economic Cooperation and Development

(1998) “Patent Data and the National Accounts” (two year grant, joint with Jenny Lanjouw).

Environmental Protection Agency Research

(1992) “Regulation, the Environment and the Automobile Market” (two year grant joint with Steve Berry and Sam Kortum).

Israel National Council of Research and Development

(1981) “Science Based Industry in Israel: Development of a Data Set, and an Analytic Framework.”

Binational Agricultural Science Foundation

(1983) “Science Based Agroindustry: The Emergence of New Firms” (joint with Zvi Eckstein and Bob Evenson).

Written Lectures to Broader Professional Groups:

- The Jean Jacques Laffont Lecture “From Theory to Empirical Work; Modern I.O.” Toulouse, October 2017.
- The Basic Econometrics of Demand Systems, (with Aviv Nevo) the NBER, July 2012.
- Association for Competition Economics, Norwich England, November 2010. Also at office of the Director General, Competition Authority, European Union, Brussels, May 2011
 - “Upward Pricing Pressure Screening in the New Merger Guidelines”.
- Industry Canada, “Productivity and Innovation in Canada”, Montreal, November, 2006.
- The American Bar Association, Antitrust Law Task Force on Time, Change, and Materiality: “Economic Analysis of Merger Activity,” July 2001.
- The National Academy of Science Panel on the Cost of Living Index: “Hedonics and Price Indices,” January 2000.

- Federal Reserve Board Meeting, 1999: “Answers to Some Questions on Productivity Trends”.
- Bogen Lecturer, The Hebrew University: “Economic Models for Antitrust Analysis”, Jerusalem, December, 1997.
- National Academy of Sciences Symposium on Science and the Economy, Irvine, California, “Hedonic Cost Functions for Automobiles and the Costs of Fuel Efficiency,” October, 1995.
- Senate Finance Committee, the United States Congress, “Biases in the CPI,” April 6, 1995.
- National Academy of Sciences Symposium: “Technology and the Economy.” Organizer and chair of session in Washington, April 1994.
- American Academy for the Advancement of Science Symposium, “Data Needs for the 21st Century: Industrial Organization and Productivity,” Boston, Mass, February, 1993.
- NASA-NOAA-NSF conference on Global Warming; “Environmental Policy and Technological Change: Questions for Further Research.” New Haven, CT, April, 1990.
- Symposium Directed to Members of Israeli and European Science Policy Establishments. Organized by the Israel’s National Council of Research and Development at Kiryat Anavim (Israel, June 1984); “Science Based Industry in Israel: A look at the Data.”
- Symposium Directed to Israeli Industrialists and Members of Scientific Establishment. Organized by Maurice Falk Institute for Economic Research in Israel at the Hebrew University of Jerusalem (1982). “Measuring the Contribution of Research and Development to Industrial Development.”
- “New Economic Tools for Merger Analysis,” at Symposium on Economists’ Perspectives on Antitrust (for lawyers and their consultants), Charles Rivers Associates, Boston, April, 1977.

Lecture Series for Students and Faculty in Foreign Countries:

- CEMFI, Madrid, August 2016
- Shanghai School of Finance and Economics, Shanghai, 2015
- Ecores, Brussels, Belgium, 2015
- CEMFI, Madrid, Spain, 2011
- Geneva, Switzerland, 2007
- Rotterdam, Holland, 2006
- Stockholm, Sweden, 2006
- Helsinki, Finland, 2005
- Fontainebleau, France, 2003
- Pisa, Italy 2002
- Tel Aviv, Israel, 2001
- Bertinoro, Italy, 2000
- Gerzensee, Switzerland, 1999
- Lisbon, Portugal, 1997
- The Nike Lectures, Amsterdam, 1995

Lecture Series for Government Employees:

- Joint series for the Federal Trade Commission and the Department of Justice, November 2001 “The Analysis of Mergers with Differentiated Products.”
- Series for the Bank of Italy, September 2001, “Industrial Organization, Pricing Equations, and Productivity.”
- Spanish Civil Service and University Professors, June, 2005, 2006, 2007, 2008, 2009 “Topics in IO and Productivity”.

Publicly Available Computer Programs:

A. Pakes, G. Gowrisankaran, and P. McGuire, 1993, “The Pakes-McGuire Algorithm for Computing Markov Perfect Equilibria,”
(downloadable at <http://aida.econ.yale.edu/ariel/pmgnew>).

Published Articles.

Articles Published in Journals.

- Ariel Pakes and Zvi Griliches (1980) “Patents and $R\&D$ at the Firm Level: A First Report,” *Economics Letters*, 5(4): 377-381.
- Benjamin Eden and Ariel Pakes (1981) “On Measuring the Variance-Age Profile of Life-Time Earning,” *Review of Economic Studies*, 48(3): 385-394.
- Ariel Pakes (1982) “On the Asymptotic Bias of Wald-Type Estimators of a Straight Line when both Variables are Subject to Error,” *International Economic Review*, 23(2): 491-497.
- Ariel Pakes (1983) “On Group Effects and Errors in Variables in Aggregation,” *The Review of Economics and Statistics*, 65(1): 168-173.
- Ariel Pakes and Shmuel Nitzan (1983) “Optimal Contracts for Research Personnel, Research Employment and the Establishment of ‘Rival’ Enterprises,” *Journal of Labor Economics*, 1(4): 345-365.
- Ariel Pakes and Zvi Griliches (1984) “Estimating Distributed Lags in Short Panels with an Application to the Specification of Depreciation Patterns and Capital Stock Constructs,” *Review of Economic Studies*, 51(2): 243-262.
- Ariel Pakes (1985) “On Patents, R&D, and the Stock Market Rate of Return,” *Journal of Political Economy*, 93(2): 390-409.
- Mark Schankerman and Ariel Pakes (1985) “Valeur et obsolescence des brevets: Une analyse des statistiques de renouvellement des brevets européens,” *Revue Economique*, 36(5) ENSAE, Paris, September, 917-941).
- Ariel Pakes (1986) “Patents as Options: Some Estimates of the Value of Holding European Patent Stocks,” *Econometrica*, 54(4): 755-784.
- Mark Schankerman and Ariel Pakes (1986) “Estimates of the Value of Patent Rights in European Countries During the Post-1950 Period,” *Economic Journal*, 96(384): 1052-1076.

- Ariel Pakes (1987) “Mueller’s Profits in the Long Run,” *Rand Journal of Economics*, 18(2): Summer, 319-332.
- Laurence J. Kotlikoff and Ariel Pakes (1988) “Looking for the News in the Noise: Additional Stochastic Implications of Optimal Consumption Choice,” in *Annales, D’Economie et de Statistique*, (ENSAE, Paris), no. 9: 29-46.
- Ariel Pakes and David Pollard (1989) “Simulation and the Asymptotics of Optimization Estimators,” *Econometrica*, 57(5): 1027-1057.
- Ariel Pakes and Margarette Simpson (1989) “Patent Renewal Data,” *Brookings Papers on Economic Activity, Microeconomic Annual*, 331-401.
- Zvi Griliches, Bronwyn Hall, and Ariel Pakes (1990-1991) “R&D, Patents, and Market Value Revisited: Is There a Second Technological Opportunity Factor,” *Economics of Innovation and New Technology*, 1(3): 183-201.
- Ariel Pakes, Steve Berry, and Jim Levinsohn (1993) “Applications and Limitations of Some Recent Advances in Empirical Industrial Organization: Price Indexes and the Analysis of Environmental Change,” *A.E.R.*, Papers and Proceedings, 83(2): 240-246.
- Steve Berry and Ariel Pakes (1993) “Some Applications and Limitations of Recent Advances in Empirical Industrial Organization: Merger Analysis,” *A.E.R.*, Papers and Proceedings, 83(2): 247-252.
- with David Kendrick (editor) *et. al.*(1993) “Research Opportunities in Computational Economics,” *Computational Economics*, 6-3: 257-315.
- Ariel Pakes and Paul McGuire (1994) “Computing Markov-Perfect Nash Equilibrium: Numerical Implications of a Dynamic Differentiated Product Model,” *RAND Journal of Economics*, 25(4): 555-589.
- Melvyn Fuss and Ariel Pakes (1995) “Editors’ Introduction,” *Journal of Econometrics* (Annals of Econometrics Issue), 65(1): 1-8.
- Ariel Pakes and Steve Olley (1995) “A Limit Theorem for a Smooth Class of Semiparametric Estimators,” *Journal of Econometrics* (Annals of Econometrics Issue), 65(1): 295-332.

- Richard Ericson and Ariel Pakes (1995) “Markov-Perfect Industry Dynamics: A Framework for Empirical Work,” *Review of Economic Studies*, 62(1): 53-82.
- Steve Berry, Jim Levinsohn, and Ariel Pakes (1995) “Automobile Prices in Market Equilibrium,” *Econometrica*, 63(4): 841-890.
- Steve Olley and Ariel Pakes (1996) “The Dynamics of Productivity in the Telecommunications Equipment Industry,” *Econometrica*, 64(6): 1263-1297.
- Ariel Pakes and Kenneth Sokoloff (1996) “Science, Technology, and Economic Growth: Introduction,” *Proceedings of the National Academy of Sciences*, 93(23): 12655-12657.
- Steve Berry, Sam Kortum, and Ariel Pakes (1996) “Environmental Change and Hedonic Cost Functions for Automobiles,” *Proceedings of the National Academy of Sciences*, 93(23): 12731-12738.
- Ariel Pakes and Richard Ericson (1998) “Empirical Implications of Alternative Models of Firm Dynamics,” *Journal of Economic Theory*, 79(1): 1-45.
- Jenny Lanjouw, Ariel Pakes, and Jonathan Putnam (1998) “How to Count Patents and Value Intellectual Property: The Uses of Patent Renewal and Application Data,” *Journal of Industrial Economics*, 46(4): 405-432. (Originally prepared for the OECD conference on New Indicators for the Knowledge-Based Economy, Paris, June, 1996.)
- Steve Berry, Jim Levinsohn, and Ariel Pakes (1999) “Voluntary Export Restraints on Automobiles: Evaluating a Trade Policy,” *American Economic Review*, 89(3): 400-430.
- Chaim Fershtman and Ariel Pakes (2000) “A Dynamic Oligopoly with Collusion and Price Wars,” *RAND Journal of Economics*, 31(2): 207-236.
- Ariel Pakes and Paul McGuire (2001) “Stochastic Algorithms, Symmetric Markov Perfect Equilibria, and the ‘Curse’ of Dimensionality,” *Econometrica*, 69(5): 1261-1281.

- Ariel Pakes (2003) “A Reconsideration of Hedonic Price Indexes with an Application to PC’s,” *American Economic Review*, 93(5): 1578-1596.
- Steve Berry, Jim Levinsohn, and Ariel Pakes (2004) “Differentiated Products Demand Systems from a Combination of Micro and Macro Data: The New Car Market,” *Journal of Political Economy*, 112(1): 68-105.
- Steve Berry, Oliver Linton, and Ariel Pakes (2004) “Limit Theorems for Estimating the Parameters of Differentiated Product Demand Systems,” *Review of Economic Studies*, 71(3): 613-654.
- Ariel Pakes (2003) “Common Sense and Simplicity in Empirical Industrial Organization,” in *Review of Industrial Organization*, 23(3/4): 193-215. (Initially inaugural keynote speech at the First International Conference in Industrial Organization, Symphony Hall, Boston, April 2003).
- Ariel Pakes (2005) “Hedonics and the Consumer Price Index,” *Annales d’Economie et de Statistique*, 79-80, 729-248. (Paper given at a conference in honor of Zvi Griliches).
- Ariel Pakes, Michael Ostrovsky, and Steve Berry (2007) “Simple Estimators for the Parameters of Discrete Dynamic Games (with Entry-Exit Examples),” *RAND Journal of Economics*, 38(2): 373-399.
- Steve Berry and Ariel Pakes (2007) “The Pure Characteristics Demand Model,” *International Economic Review*, 48(4): 1193-1225. (Special issue in honor of Dan McFadden).
- Robin Lee and Ariel Pakes (2009) “Multiple Equilibria and Selection by Learning in an Applied Setting,” *Economics Letters*, 104(1): 13-16.
- Ariel Pakes (2010) “Alternative Models for Moment Inequalities,” *Econometrica*, 78(6): 1783-1822. This is a revised version of my Fisher-Schultz lecture presented at the World Congress of the Econometric Society, London, August 2005.

- Tim Erickson and Ariel Pakes (2011) “An Experimental Component Index for the CPI: From Annual Computer Data to Monthly Data on Other Goods,” *American Economic Review*, 101(5): 1707-1738.
- Moshe Ben-Akiva, Andr de Palma, Daniel McFadden, Maya Abou-Zeid, Pierre-Andr Chiappori, Matthieu de Lapparent, Steven N. Durlauf, Mogens Fosgerau, Daisuke Fukuda, Stephane Hess, Charles Manski, Ariel Pakes, Nathalie Picard and Joan Walker (2012) “Process and Context in Choice Models,” *Marketing Letters*, 23(2): 439-456.
- Kate Ho and Ariel Pakes (2011) “Do Physician Incentives Affect Hospital Choice? A Progress Report,” *International Journal of Industrial Organization*, 29(3): 317-322.
- Chaim Fershtman and Ariel Pakes (2012) “Dynamic Games with Asymmetric Information: A Framework for Empirical Work,” *The Quarterly Journal of Economics*, 127(4): 1611-1661.
- Kate Ho and Ariel Pakes (2014) “Physician Payment Reform and Hospital Referrals,” *American Economic Review Papers and Proceedings*, 104(5): 200-205.
- Kate Ho and Ariel Pakes (2014) “Hospital Choices, Hospital Prices, and Financial Incentives to Physicians,” *American Economic Review*, 104(12): 3841-3884.
- Ariel Pakes (2014) “Behavioral and Descriptive Forms of Choice Models,” *International Economic Review*, 55(3): 603-624.
- Ariel Pakes, Jack Porter, Kate Ho and Joy Ishii (2015) “Moment Inequalities and Their Application,” *Econometrica*, 83(1): 315-334.
- Ariel Pakes (2017) “Empirical Tools and Competition Analysis: Past Progress and Current Problems,” *International Journal of Industrial Organization*, 53: 241-266.
- Uli Doraszelski, Greg Lewis, and Ariel Pakes (2018) “Just Starting Out: Learning and Equilibrium in a New Market,” *American Economic Review*, 108(3): 565-615.

- Kate Ho, Ariel Pakes, and Mark Shepard (forthcoming) “The Evolution of Health Insurer Costs in Massachusetts, 2010-12,” *Review of Industrial Organization*.

Edited Volumes

- Volumes 1 and 2 of *Advances in Economics, Proceedings of the Eleventh World Congress of the Econometric Society*, Montreal, August 2015, editors Bo Honore, Ariel Pakes, Monika Piazzessi, and Larry Samuelson, Econometric Society Monograph Series, Cambridge University Press.

Articles Published in Books.¹

- Ariel Pakes and Mark Schankerman (1984), “The Rate of Obsolescence of Knowledge, Research Gestation Lags, and the Private Rate of Return to Research Resources,” pp. 73-88, in Z. Griliches (Ed.), *Patents, R&D, and Productivity*, The University of Chicago Press.
- Ariel Pakes and Mark Schankerman (1984), “An Exploration into the Determinants of Research Intensity,” pp. 209-232, in Z. Griliches (Ed.), *Patents, R&D and Productivity*, The University of Chicago Press.
- Ariel Pakes (1984), “Patents, R&D and the Stock Market Rate of Return: A Summary of Some Empirical Results,” in Z. Griliches (Ed.), *Patents, R&D, and Productivity*, The University of Chicago Press.
- Zvi Griliches, Ariel Pakes, and Bronwyn Hall (1987), “The Value of Patents as an Indicator of Inventive Activity,” in P. Dasgupta and P. Stoneham (Eds.), *Economic Policy and Technological Performance*, Center for Economic Policy Research, Cambridge University Press, London.
- Ariel Pakes (1994), “The Estimation of Dynamic Structural Models: Problems and Prospects, Part II. Mixed Continuous-Discrete Control Models and Market Interactions,” Chapter 5, pp. 171-259, of *Advances in Econometrics: Proceedings of the 6th World Congress of the Econometric Society*, edited by J.J. Laffont and C. Sims.

¹Not including papers reprinted from Journal articles.

- Uli Doraszelki and Ariel Pakes (2007) “A Framework for Applied Dynamic Analysis in I.O.,” Vol. 3, Chapter 30, 1889-1966, in the *The Handbook of Industrial Organization*, M. Armstrong and R. Porter ed.s (an early version of this paper by Ariel Pakes is NBER Discussion paper # 8024).
- Dan Akerberg, Lanier Benkard, Steve Berry, and Ariel Pakes (2007) “Econometric Tools for Analyzing Market Outcomes”, vol. 6, part A, Chapter 63 in the *The Handbook of Econometrics*, J.J. Heckman and E. Leamer (ed.s), North Holland.
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