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JAMES H. STOCK

Department of Economics
Harvard University
Cambridge, MA 02138

email: James_Stock@harvard.edu

EDUCATION

Ph.D.	Department of Economics, University of California, Berkeley, California, August 1983
M.A.	Department of Statistics, University of California, Berkeley, California, June 1982
B.S.	Major in Physics, Yale University, New Haven, Connecticut, June 1978

PRIMARY POSITIONS

2022 – present	Inaugural Director, Salata Institute for Climate and Sustainability, Harvard University
2021 – present	Inaugural Vice Provost for Climate and Sustainability, Harvard University
2007 – present	Harold Hitchings Burbank Professor of Political Economy, Department of Economics, Harvard University
2013 – 2014	Member, Council of Economic Advisers
2006 – 2009	Chair, Department of Economics, Harvard University
2002 – 2007	Professor of Economics, Department of Economics, Harvard University
1998 – 2002	Roy E. Larsen Professor of Political Economy, John F. Kennedy School of Government, Harvard University
1991 – 1998	Professor of Political Economy, John F. Kennedy School of Government, Harvard University
1990 – 1991	Professor of Economics, University of California – Berkeley
1988 – 1990	Associate Professor of Public Policy, John F. Kennedy School of Government, Harvard University
1983 – 1988	Assistant Professor of Public Policy, John F. Kennedy School of Government, Harvard University

OTHER PROFESSIONAL AFFILIATIONS

Editorial (selected)

Co-Editor, *Brookings Papers on Economic Activity* (2015 – 2023)
Editorial Board, *Environmental and Energy Policy and the Economy* (NBER) (2018 – 2022)
Co-Editor, *Econometrica* (2009 – 2012)
Managing Editor and Chair, Board of Editors, *The Review of Economics and Statistics* (1992 – 2003)
Guest Editor, *Journal of the European Economic Association* (2003)
Past Associate Editor: *Econometrica, Econometric Theory, Journal of Economic Dynamics and Control, Journal of Business Cycle Measurement and Analysis (OECD), Journal of Forecasting*

Prizes

Isaac Kerstenstzky Scholarly Achievement Award, 2010 (CIRET/FGV)

Honorary Fellowships (selected)

Founding Fellow, International Association for Applied Econometrics (2018)
Fellow, International Institute of Forecasting (2017)
Fellow, *The Econometric Society* (elected 1992)
Research Associate, National Bureau of Economic Research (1989 – 2012, 2014 – present)
Sloan Research Fellowship (1988 – 1990)
Faculty Research Fellow, National Bureau of Economic Research (1986 – 1989)
National Fellow, Hoover Institution, Stanford University (1986 – 1987)

Boards and panels

Co-chair, Brookings Institution Task Force on Carbon Scoring (2023-present)
Member, Climate-related Financial Risk Advisory Committee of the Financial Stability Oversight Council (2023-present)
Member, Roundtable on Macroeconomics and Climate-related Risks, National Academies of Sciences, Engineering, and Medicine (2022-2025)
Economic Advisory Panel, Federal Reserve Bank of New York (2021 – 2023)
NBER Business Cycle Dating Committee (2009 – 2012, 2016 – present)
Climate Advisory Board, Vulcan Inc. (2017 – 2018)
Panel of Economic Advisers, Congressional Budget Office (2017 – present)
Editor Search Committee, *American Economic Journal: Macroeconomics*
Academic Research Council, Housing Finance Policy Center, The Urban Institute (2014 – 2016)
Council of Economic Advisers to President Obama (2012 – 2014)
Massachusetts Tax Expenditure Commission (2011 – 2012)
Council of Economic Advisors to Massachusetts Governor Deval Patrick (2008 – 2012)
Economics Panel, National Science Foundation (2004 – 2006)
Fellow Nominating Committee, the Econometric Society (2004)
Advisory Panel, Business Cycle Indicators (The Conference Board, 1999 – 2012)
Academic Advisory Group, Federal Reserve Bank of Boston (2002 – 2012)
Scientific Advisory Board, CREI, Universitat Pompeu Fabra (2003 – 2012)
Editorial Board, *Massachusetts Benchmarks* (1997 – 2012)
External Review Committee, Wharton Dept. of Statistics (2001)
National Academy of Sciences Panel on the Effect of Weight on Automobile Safety (1996)

Other

University Fellow, Resources for the Future (2019 – present)
Nonresident Senior Fellow, Economic Studies, The Brookings Institution (2015 – present)
Nonresident Fellow, Center for Global Energy Policy, Columbia University (2015 – 2019)
Faculty Associate, Harvard University Consortium for the Environment (2015 – present)
Faculty Fellow, Harvard Environmental Economics Program (2015 – present)
Fellow, American Academy of Arts and Sciences (elected 2006)
Consultant, *European Central Bank* (various years 1998 – 2002)
Co-chair, NBER-NSF Conference on Time Series (2001 –2012)
Organizer, International Seminar on Macroeconomics (ISOM) (1996, 1999, 2002)

BOOKS

Introduction to Econometrics. Addison Wesley Longman (2003, 2007, 2011, 2015, 2019) (with M.W. Watson).

Introduction to Econometrics: Brief Edition. Addison Wesley Longman (2007) (with M.W. Watson).

EDITED BOOKS

Business Cycles, Indicators and Forecasting, *NBER Studies in Business Cycles* 28, University of Chicago Press for the NBER, 1993 (with M.W. Watson).

Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg, Cambridge University Press, 2005 (with D.W.K. Andrews).

RECENT MANUSCRIPTS/WORKING PAPERS

"The Macroeconomic Effects of Climate Policy Uncertainty," manuscript, March 2025 (with K. Gavriilidis, D.R. Kanzig, and R. Raghavan).

"Macroeconomics and Climate Change," 2025, NBER Working Paper 33567 (with A. Bilal).

"Charging Uncertainty: Real-Time Charging Data and Electric Vehicle Adoption," 2025. NBER Working Paper 33342 (with O.I. Asensio, E. Buckberg, C. Cole, L. Heeney, and C.R. Knittel).

"The Market and Climate Implications of U.S. LNG Exports," NBER Working Paper 32228, March 2024 (with M. Zaragosa-Watkins).

"Emissions and Electricity Price Effects of a Small Carbon Tax Combined with Renewable Tax Credit Extensions," manuscript, October 2021 (with D. Stuart).

"Robust Decarbonization of the US Power Sector: Policy Options," NBER Working Paper 28677, April 2021 (with D. Stuart).

PUBLISHED AND FORTHCOMING ARTICLES

"Recovering from COVID," forthcoming, *Brookings Papers on Economic Activity*, 2025, Spring (with M.W. Watson).

"Climate Policy Reform Options in 2025." Forthcoming, *Environmental and Energy Policy and the Economy*, Vol. 6, University of Chicago Press for the NBER (with J. Bistline, KA Clausing, N. Mehrotra, and C. Wolfram)

"Is Newey-West Optimal Among q=1 Kernels?" *Journal of Econometrics*, 2024, 240(2) (with T. Kolokotrones and C. Walker).

"Economic Benefits of COVID-19 Screening Tests," *Review of Economic Design*, 2024, 28: 689-722 (with A. Atkeson, M. Droste, and M. Mina).

"Policies for Electrifying the Light-Duty vehicle Fleet in the United States," *American Economic Association Papers & Proceedings*, 2023, 113: 316-322 (with C. Cole, M. Droste, CR Knittel, and S. Li).

"Climate Royalty Surcharges," *Journal of Environmental Economics and Management* 120, 2023 (with B. Prest).

"The Macroeconomic Impact of Europe's Carbon Taxes," *American Economic Journal: Macroeconomics*, 2023, 15:3, 265-286 (with G. Metcalf).

"An Econometric Model of International Long-run Growth Dynamics," *The Review of Economics and Statistics*, 104:5, 2022, 857-876 (with Ulrich Müller and Mark Watson).

"Comprehensive Evidence Implies a Higher Social Cost of Carbon," *Nature* 610, 687-692 (2022) (with Rennert et al.).

"The Size-Power Tradeoff in HAR Inference," *Econometrica* 89(5), September 2021, 2497-2516 (with E. Lazarus and D.J. Lewis).

"Slack and Cyclically Sensitive Inflation," *Journal of Money, Credit, and Banking* 52, 393-420 (2021) (with M.W. Watson).

"Adapting to the COVID-19 Pandemic," forthcoming, *American Economic Review Papers & Proceedings*, May 2021 (with M. Droste).

"High Frequency Data and a Weekly Economic Index During the Pandemic," *American Economic Review Papers & Proceedings*, May 2021 (with D.J. Lewis, K. Mertens, and M. Trivedi).

"Rethinking Economics in the Age of Cheap Money," *Foreign Affairs*, March/April 2021, 174-185.

"Eight Priorities for Calculating the Social Cost of Carbon," *Nature* (comment), February 19, 2021 (with G. Wagner, D. Anthoff, M. Cropper, S. Dietz, KT Gillingham, B Groom, JP Kelleher, and FC Moore).

"Policies for a Second Wave," *Brookings Papers on Economic Activity*, June 2020 (with D. Baqaee, E. Farhi, and M. Mina).

"US Economic Activity During the Early Weeks of the SARS-CoV-2 Outbreak," *Covid Economics* 6, April 17, 2020), 1-21 (with D.J. Lewis and K. Mertens).

"Data Gaps and the Policy Response to the Novel Coronavirus," *Covid Economics* 3, April 10, 2020, 1-11.

"Analysis of Proposed 20-year Mineral Leasing Withdrawal in Superior National Forest," *Ecological Economics* 174:1-9 (2020) (with Jacob Bradt).

"Quasi-Experimental Estimates of the Transient Climate Response using Observational Data," *Climatic Change* 160: 361-371 (2020) (with Giselle Montamat).

"The Federal Reserve's Current Framework for Monetary Policy: A Review and Assessment," *International Journal of Central Banking*, February 2020, 5-70 (with Janice C. Eberly and Jonathan H. Wright).

"Measuring the Macroeconomic Impact of Carbon Taxes," *American Economic Review: Papers and Proceedings* v. 110 (2020), 101-106 (with Gilbert Metcalf).

"The Effects of Fuel Prices, Regulations, and Other Factors on U.S. Coal Production, 2008-2016," *The Energy Journal* 41(1) (2020), 55-81 (with John Coglianese and Todd Gerarden).

"The Price of Biodiesel RINs and Economic Fundamentals," *American Journal of Agricultural Economics* 102(3) (2020), 734-752, with discussion and rejoinder (with Scott H. Irwin and Kristen McCormack).

"Federal Coal Program Reform, the Clean Power Plan, and the Interaction of Upstream and Downstream Climate Policies," *American Economic Journal – Economic Policy* 12(1) (2020), 167-199 (with T. Gerarden and S. Reeder).

"Weak Instruments in IV Regression: Theory and Practice," *Annual Review of Economics* 11(1) (2019), 727–753 (with I. Andrews and L. Sun).

"The Business Cycle is Alive and Well," *Business Economics* 54(1) (2019), 79-84. (Awarded Abramson Scroll by the National Association of Business Economists for outstanding article in *Business Economics*).

"Cost Pass-Through to Higher Ethanol Blends at the Pump: Evidence from Minnesota Gas Station Data," *Journal of Environmental Economics and Management* 93 (2019), 1-19 (with Jing Li).

"HAR Inference: Recommendations for Practice," (including discussion and rejoinder) *Journal of Business & Economic Statistics* 36 no. 4 (2018), 541-574 (with Eben Lazarus, Daniel J. Lewis, and Mark W. Watson).

"Inference in Structural Vector Autoregressions Identified with an External Instrument," *Journal of Econometrics*, November 2018 (with J. Montiel Olea and M.W. Watson).

"The Cost of Reducing Greenhouse Gas Emissions," *Journal of Economic Perspectives* 32 (Fall 2018), 53-72 (with Kenneth Gillingham).

"Identification and Estimation of Dynamic Causal Effects in Macroeconomics Using External Instruments," *Economic Journal* 128 (2018), 917-948 (with Mark W. Watson).

"The Disappointing Recovery of Output Since 2009," *Brookings Papers on Economic Activity* (Spring 2017), 1-89 (with J. Fernald, R.E. Hall, and M.W. Watson).

"The Pass-Through of RIN Prices to Wholesale and Retail Fuels under the Renewable Fuel Standard," *Journal of the Association of Environmental and Resource Economists* 4(4) (2017), 1081-1119 (with B. Meiselman).

"Twenty Years of Time Series Econometrics in Ten Pictures," *Journal of Economic Perspectives* 31(2) (Spring 2017), 59-86 (with Mark Watson).

"Integrated Assessment Models and the Social Cost of Carbon: A Review and Assessment of U.S. Experience," *Review of Environmental Economics and Policy* 11(1) (2017), 80-99 (with G. Metcalf).

"Anticipation, Tax Avoidance, and the Elasticity of Gasoline Demand," *Journal of Applied Econometrics* 32(1) (2017), 1-15 (with J. Coglianese, L.W. Davis, and L. Kilian).

"Core Inflation and Trend Inflation," *The Review of Economics and Statistics* 98(4) (2016), 770-784 (with MW Watson).

"The Economic Recovery Five Years after the Financial Crisis," *Business Economics* 49(1) (2014), 21-26.

"Empirical Evidence on Inflation Expectations in the New Keynesian Phillips Curve," *Journal of Economic Literature* 52:1 (2014), 124-188 (with S. Mavroeidis and M. Plagborg-Møller).

"Estimating Turning Points Using Large Data Sets," *Journal of Econometrics* 178 (2014), 368-381 (with M.W. Watson).

"Consistent Factor Estimation in Dynamic Factor Models with Structural Instability," *Journal of Econometrics* 177 (2013), 289-304 (with B. Bates, M. Plagborg-Møller, and M.W. Watson).

"Does Temperature Contain a Stochastic Trend: Linking Statistical Results to Physical Mechanisms," *Climatic Change* 118:3-4 (2013), 729-743 (with R. Kaufmann, H. Kauppi, and Michael L. Mann).

"Generalized Shrinkage Methods for Forecasting Using Many Predictors," *Journal of Business and Economic Forecasting* 30:4 (2012), 481-493 (with M.W. Watson).

"Disentangling the Channels of the 2007-2009 Recession," *Brookings Papers on Economic Activity* Spring 2012 (with M.W. Watson), 81-135.

"Reconciling Anthropogenic Climate Change with Observed Temperature 1998 – 2008," *Proceedings of the National Academy of Sciences* v. 108, no. 29 (July 29, 2011), 11790-11793 (with R. Kaufmann, H. Kauppi, and M. Mann).

"Modeling Inflation after the Crisis," in *Macroeconomic Policy: Post-Crisis and Risks Ahead, Proceedings of the Federal Reserve Bank of Kansas City 2010 Jackson Hole Symposium* (with M.W. Watson).

"The Other Transformation in Econometric Practice: Robust Tools for Inference," (2010) *Journal of Economic Perspectives*, Spring 2010, 83-94.

"Indicators for Dating Business Cycles: Cross-History Selection and Comparisons," (2010) *American Economic Review: Papers and Proceedings* 2010, 16-19 (with M.W. Watson).

"Does Temperature Contain a Stochastic Trend? Evaluating Conflicting Statistical Results," (2010) *Climatic Change* 101, 395-405 (with R.K. Kaufmann and H. Kauppi).

"Efficient Two-Sided Nonsimilar Invariant Tests in IV Regression with Weak Instruments," with D.A. Andrews and M.J. Moreira, *Journal of Econometrics* 146 (2008) 241-254.

"Heteroskedasticity-Robust Standard Errors for Fixed Effects Regression," *Econometrica* 76 (2008), 155-174 (with M.W. Watson).

"Inference with Weak Instruments," in *Advances in Economics and Econometrics, Theory and Applications: Ninth World Congress of the Econometric Society, Vol. III*, ed. by R. Blundell, W. K. Newey, and T. Persson. Cambridge, UK: Cambridge University Press, 2007 (with D.A. Andrews), 122-173.

"Testing with Many Weak Instruments," *Journal of Econometrics* 138 (2007), 24-46 (with D.W.K. Andrews).

"Performance of Conditional Wald Tests in IV Regression with Weak Instruments," (2007) *Journal of Econometrics* 139, 116-132 (with D.W.K. Andrews and M. Moreira).

"Why Has Inflation Become Harder to Forecast," *Journal of Money, Credit, and Banking* 39 (2007), 3-34 (with M. Watson).

"Emissions, Concentrations and Temperature: A Time Series Analysis," (2006) *Climatic Change* 77, numbers 3-4, 249-278 (with R. Kaufmann and H. Kauppi).

"Optimal Two-Sided Invariant Similar Tests for Instrumental Variables Regression," (2006), *Econometrica* 74, 715-752 (with D.W.K. Andrews and M. Moreira).

"A Comparison of Direct and Iterated Multistep AR Methods for Forecasting Macroeconomic Series," *Journal of Econometrics* 135 (2006), 499 – 526 (with M. Marcellino and M.W. Watson).

"Asymptotic Properties of the Hahn-Hausman Test for Weak Instruments," *Economics Letters* 89 (2005), 333 - 342 (with J. Hausman and M. Yogo).

"Understanding Changes in International Business Cycle Dynamics," *Journal of the European Economic Association* 3 no. 5 (September 2005), 968-1006 (with M.W. Watson).

"Combination Forecasts of Output Growth in a Seven-Country Data Set," (2004), *Journal of Forecasting* 23, 405-430 (with M.W. Watson).

"Has the Business Cycle Changed? Evidence and Explanations," (2003) in *Monetary Policy and Uncertainty*, Federal Reserve Bank of Kansas City, 9 – 56 (with M.W. Watson).

"Macroeconomic Forecasting in the Euro Area: Country Specific vs. Area-Wide Information," *European Economic Review* 47 (2003), 1 – 18 (with M. Marcellino and M.W. Watson).

"Testing Hypotheses about Mechanisms for the Unknown Carbon Sink: A Time Series Analysis," *Global Biogeochemical Cycles*, 17 (2003), 1072 (with Robert A. Kaufmann).

"Forecasting Output and Inflation: The Role of Asset Prices," *Journal of Economic Literature* 41 (2003), 788 – 829 (with M.W. Watson).

"Who Invented Instrumental Variable Regression?" *Journal of Economic Perspectives* 17 (2003), 177–194 (with F. Trebbi).

"Has the Business Cycle Changed and Why?" *NBER Macroeconomics Annual* 2002, 159–218 (with M.W. Watson).

"Robust Monetary Policy Under Uncertainty in a Small Model of the U.S. Economy," *Macroeconomic Dynamics* (2002) 6: 85-110 (with A. Onatski).

"Forecasting Using Principal Components from a Large Number of Predictors," *Journal of the American Statistical Association*, 97 (December 2002), 1167–1179 (with M.W. Watson).

"Macroeconomic Forecasting Using Diffusion Indexes," *Journal of Business and Economic Statistics*, 20, no. 2 (2002), 147–162 (with M.W. Watson).

"A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments," *Journal of Business and Economic Statistics*, 20 (2002), 518 – 529 (with M. Yogo and J. Wright).

"Vector Autoregressions," *Journal of Economic Perspectives* 15 (Fall 2001), 101 – 116 (with M.W. Watson).

“Confidence Intervals for Autoregressive Coefficients Near One,” *Journal of Econometrics*, v. 103 (2001), 155 – 181 (with G. Elliott).

“GMM With Weak Identification,” *Econometrica* 68 (2000), 1055 – 1096 (with J. Wright).

“Pre-Recession Pattern of Six Economic Indicators in the USA,” *Journal of Forecasting* 19 (2000), 65-80 (with V. Keilis-Borok, A. Soloviev and P. Mikhalev).

“Forecasting Inflation,” *Journal of Monetary Economics* 44, no. 2, (1999), 293-335 (with M. Watson).

“A Dynamic Factor Model Framework for Forecast Combination,” *Spanish Economic Review* 1, 91-121 (1999) (with L. Chan and M. Watson).

“Testing for and Dating Common Breaks in Multivariate Time Series,” *Review of Economic Studies*, 63 (1998), 395-432 (with J. Bai and R. Lumsdaine).

“Median Unbiased Estimation of Coefficient Variance in a Time Varying Parameter Model,” *Journal of the American Statistical Association*, 93 (1998), 349-358 (with M. Watson).

“Inference in a Nearly Integrated Autoregressive Model with Nonnormal Innovations,” *Journal of Econometrics*, 80 (1997), 269-286 (with T.J. Rothenberg).

“Instrumental Variables Regression with Weak Instruments,” *Econometrica* 65, no. 3 (1997), 557-586 (with D. Staiger).

“The NAIRU, Unemployment, and Monetary Policy,” *Journal of Economic Perspectives*, 11 (Winter 1997), 33-51 (with D. Staiger and M. Watson).

“VAR, Error Correction and Pretest Forecasts at Long Horizons,” *Oxford Bulletin of Economics and Statistics* 58, no. 4 (1996), 685-701; reprinted in A. Banerjee and D.F. Hendry (eds.), *The Econometrics of Economic Policy*, Oxford: Basil Blackwell, 1997, 115-132.

“Efficient Tests for an Autoregressive Unit Root,” *Econometrica*, 64 (1996), 813-836 (with G. Elliott and T.J. Rothenberg).

“Measuring Money Growth When Financial Markets Are Changing,” *Journal of Monetary Economics*, 37 (1996), no. 1, 3-28 (with M. Feldstein).

“Evidence on Structural Instability in Macroeconomic Time Series Relations,” *Journal of Business and Economic Statistics*, 14 (1996), 11-30 (with M.W. Watson).

“Inference in Models with Nearly Nonstationary Regressors,” *Econometric Theory*, 11 (1995), 1131-47 (with C. Cavanagh and G. Elliott).

“Inference in Time Series Regression When the Order of Integration of a Regressor is Unknown,” *Econometric Theory*, 10 (1994), 672-700 (with G. Elliott).

“Deciding Between I(1) and I(0),” *Journal of Econometrics*, 63 (1994), 105-131.

“A Simple Estimator of Cointegrating Vectors in Higher-Order Integrated Systems,” *Econometrica*, 61 (1993), no. 4, 783-820 (with M.W. Watson).

"Recursive and Sequential Tests of the Unit Root and Trend Break Hypotheses: Theory and International Evidence," *Journal of Business and Economic Statistics*,10 (1992), 271-288 (with A. Banerjee and R.L. Lumsdaine).

"Confidence Intervals for the Largest Autoregressive Root in U.S. Economic Time Series," *Journal of Monetary Economics*, 28 (1991), no. 3, 435-460.

"Stochastic Trends and Economic Fluctuations," *American Economic Review*, 81 (1991), no. 4, 819-840 (with R. King, C. Plosser and M. Watson).

"Efficient Windows and Labor Force Reduction," *Journal of Public Economics*, 43 (1990), 131-159 (with R.L. Lumsdaine and D.A. Wise).

"Pensions, the Option Value of Work, and Retirement," *Econometrica* 58, no. 5 (September 1990), 1151-1180 (with D.A. Wise).

"Inference in Linear Time Series Models with Some Unit Roots," *Econometrica* 58, no. 1 (January 1990), 113-144 (with C. Sims and M. Watson).

"Fenetres et Retraites," *Annales D'economie et de Statistique*, no. 20/21 (1991), 219-242 (in French; with R.L. Lumsdaine and D.A. Wise).

"Drawing Inferences from Statistics Based on Multi-Year Asset Returns," (1989), *Journal of Financial Economics* 25, 323-348 (with M. Richardson).

"Semiparametric Estimation of Index Coefficients," *Econometrica* 57, no. 6 (November 1989), 1403-1430 (with J. Powell and T. Stoker).

"New Indexes of Coincident and Leading Economic Indicators," *NBER Macroeconomics Annual*, 1989, 351-393 (with M. Watson).

"Nonparametric Policy Analysis," *Journal of the American Statistical Association* 84, no. 406 (June 1989), 567-575.

"Estimating Integrated Higher Order Continuous Time Autoregressions with an Application to Money-Income Causality," *Journal of Econometrics*, 42 (1989), 319-336 (with A.C. Harvey).

"Hysteresis and the Evolution of Postwar U.S. and U.K. Unemployment," in W. Barnett, J. Geweke and K. Schell, eds., *Economic Complexity: Chaos, Sunspots, Bubbles, and Nonlinearity: Proceedings of the Fourth International Symposium in Economic Theory and Econometrics* (1989), 361-382.

"Interpreting the Evidence on Money-Income Causality," *Journal of Econometrics* 40, no. 1 (January 1989), 161-182 (with M.W. Watson).

"Nonparametric Policy Analysis: An Application to Estimating Hazardous Waste Cleanup Benefits," in W. Barnett, J. Powell, and G. Tauchen (eds.), *Nonparametric and Semiparametric Methods in Econometrics and Statistics*, Cambridge University Press, Ch. 3, 77-98.

"Testing for Common Trends," *Journal of the American Statistical Association* 83, no. 404 (December 1988), 1097-1107 (with M.W. Watson).

"A Reexamination of Friedman's Consumption Puzzle," *Journal of Business and Economic Statistics* 6, no. 4 (October 1988), 401-414.

"Continuous Time Autoregressive Models with Common Stochastic Trends," *Journal of Economic Dynamics and Control* 12, no. 2/3 (June/September 1988), 365-384 (with A.C. Harvey).

"The Convergence of Multivariate `Unit Root' Distributions to their Asymptotic Limits: The Case of Money-Income Causality," *Journal of Economic Dynamics and Control* 12, no. 2/3 (June/September 1988), 489-502 (with L. Ljungqvist, M. Park, and M. Watson).

"Variable Trends in Economic Time Series," *Journal of Economic Perspectives* 2, no. 3 (Summer 1988), 147-174 (with M. Watson). Reprinted in Long-Run Economic Relationships, Readings in Cointegration, edited by R.F. Engle and C.W.J. Granger, Oxford University Press.

"Estimating Continuous Time Processes Subject to Time Deformation: An Application to Postwar U.S. GNP," *Journal of the American Statistical Association*, 83 (1988), 77-85.

"Integrated Regressors and Tests of the Permanent Income Hypothesis," *Journal of Monetary Economics* 21, no. 1 (1988), 85-96 (with K. West).

"Measuring Business Cycle Time," *Journal of Political Economy*, 95 (1987), 1240-1261.

"Asymptotic Properties of Least Squares Estimators of Cointegrating Vectors," *Econometrica 55* (September 1987), 1035-1056.

"Forecasting and Interpolation Using Vector Autoregressions with Common Trends," *Annales d'Economie et de Statistique* 6/7 (1987), 279-287 (with A.C. Harvey and F.J. Fernandez-Macho).

"Regression Tests Versus Volatility Tests of the Efficiency of Foreign Exchange Markets," *Journal of International Money and Finance* (1987), 49-56 (with Jeffrey Frankel).

"Demand Disturbances and Aggregate Fluctuations: The Implications of Near Rationality," *Economic Journal* 97, No. 385 (March 1987), 49-64 (with S.R.G. Jones).

"Does GNP Have a Unit Root?" *Economics Letters*, 22 (1986), 147-51 (with M. Watson).

"The Farm Debt Crisis and Public Policy," *Brookings Papers on Economic Activity* 1986:2, 441-479 (with C. Calomiris and R.G. Hubbard).

"The Estimation of Higher Order Continuous Time Autoregressive Models," *Econometric Theory* 1 (1985), 97-112 (with A.C. Harvey).

"Real Estate Mortgages, Foreclosures, and Midwestern Agrarian Unrest, 1865-1920," *Journal of Economic History* 44, No. 1 (1984), 89-105.

CHAPTERS IN EDITED VOLUMES

"The Short-Run Macroeconomics of the Energy Transition: A Review and Directions for Research." Forthcoming, Volume XXVI, Book Series on Central Banking, Central Bank of Chile (with A. Bilal).

“Trend, Seasonal, and Sectoral Inflation in the Euro Area,” in G. Castex, J. Galí, and D. Saravia (eds.), *Changing Inflation Dynamics, Evolving Monetary Policy*, Volume 27, Book Series on Central Banking, Central Bank of Chile (2021) (with M.W. Watson).

“Climate Change, Climate Change Policy, and Economic Growth,” *NBER Macroeconomics Annual* 2019. Chicago University Press for the NBER, Ch. 7, 399-419.

“An Economist’s View of Solar Geoengineering Governance under Uncertainty,” in *Governance of the Deployment of Solar Geoengineering*, Harvard Project on Climate Agreements (February 2019).

“Developing and Maintaining a Reference Value for the Social Cost of Carbon,” in *Market Mechanisms and The Paris Agreement*, Harvard Project on Climate Agreements, 31-34 (2017).

“Factor Models and Structural Vector Autoregressions in Macroeconomics,” *Handbook of Macroeconomics: Volume 2* (2016) (with Mark W. Watson).

“A State-Dependent Model for Inflation Forecasting,” (2015), Ch. 3 in *Unobserved Components and Time Series Econometrics*, Oxford: Oxford University Press (with Andrea Stella).

“Dynamic Factor Models,” (2011), Ch. 2 in M.J. Clements and D.F. Hendry (eds.), *Oxford Handbook on Economic Forecasting*, Oxford: Oxford University Press (with M.W. Watson).

“The Evolution of National and Regional Factors in U.S. Housing Construction,” (2010). Ch. 3 in T. Bollerslev, J. Russell, and M. Watson (eds), *Volatility and Time Series Econometrics: Essays in Honor of Robert F. Engle*, Oxford: Oxford University Press (with M.W. Watson).

“Phillips Curve Inflation Forecasts,” Ch. 3 in *Understanding Inflation and the Implications for Monetary Policy* (2009), Jeffrey Fuhrer, Yolanda Kodrzycki, Jane Little, and Giovanni Olivei (eds). Cambridge: MIT Press. (with M.W. Watson).

“Forecasting in Dynamic Factor Models Subject to Structural Instability” (2009), Ch. 7. in Neil Shephard and Jennifer Castle (eds), *The Methodology and Practice of Econometrics: Festschrift in Honor of D.F. Hendry*, Oxford: Oxford University Press (with M.W. Watson).

“Inference with Weak Instruments,” (2007), *Advances in Econometrics: Proceedings of the Ninth World Congress of the Econometric Society*, Cambridge: Cambridge University Press (with D.W.K. Andrews).

“Forecasting with Many Predictors” (2005), Ch. 6 in Graham Elliott, Clive W.J. Granger and Allan Timmermann (eds.), *Handbook of Economic Forecasting*, Elsevier, 515-554.

“Testing for Weak Instruments in Linear IV Regression,” (2005), Ch. 5 in J.H. Stock and D.W.K. Andrews (eds), *Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg*, Cambridge University Press (with M. Yogo), 80-108.

“Asymptotic Distributions of Instrumental Variables Statistics with Many Weak Instruments,” (2005), Ch. 6 in J.H. Stock and D.W.K. Andrews (eds), *Identification and Inference for Econometric Models: Essays in Honor of Thomas J. Rothenberg*, Cambridge University Press (with M. Yogo).

“Structural Stability and Models of the Business Cycle,” (2004), *De Economist* 152, no. 4, 197-209.

"How Did Leading Indicator Forecasts Do During the 2001 Recession?" *Federal Reserve Bank of Richmond Economic Quarterly* 89/3 (summer 2003) 71 – 90 (with M. Watson).

"Time Series: Economic Forecasting," entry in *International Encyclopedia for the Social and Behavioral Sciences*, Amsterdam: Elsevier (2002), 15721 – 15724.

"Instrumental Variables in Economics and Statistics," entry in *International Encyclopedia for the Social and Behavioral Sciences*, Amsterdam: Elsevier (2002), 7577 – 7582.

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"Business Cycle Fluctuations in U.S. Macroeconomic Time Series," ch. 1 in J. Taylor and M. Woodford (eds), *Handbook of Macroeconomics.* 1997. Amsterdam: Elsevier, 3-64. (with M. Watson).

"How Precise are Estimates of the Natural Rate of Unemployment?" in C. Romer and D. Romer (eds.), *Reducing Inflation: Motivation and Strategy*, University of Chicago Press for the NBER, 1997, 195-242 (with D. Staiger and M.W. Watson).

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"Unit Roots, Structural Breaks, and Trends," ch. 46 in R. Engle and D. McFadden (eds.), *Handbook of Econometrics*, volume IV. Amsterdam: Elsevier, 1994, 2740-2843.

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"Systems of Economic Indicators in the United States," *Journal of the Institute of the U.S.A. and Canada*, USSR National Academy of Sciences, Moscow, December 1991, 22-28 (with S.A. Nikolaenko); in Russian.

"Three Models of Retirement: Computational Complexity versus Predictive Validity," in D. Wise (ed), *Topics in the Economics of Aging*, University of Chicago Press for the NBER, 19-57.

"Estimation, Smoothing, Interpolation, and Distribution for Structural Time Series Models in Discrete and Continuous Time," in P.C.B. Phillips (ed.), *Models, Methods and Applications of Econometrics (Festschrift for A.R. Bergstrom)*, Cambridge MA: Blackwell, 55-70.

"A Probability Model of the Coincident Economic Indicators," in G. Moore and K. Lahiri, eds., *The Leading Economic Indicators: New Approaches and Forecasting Records*, Cambridge: Cambridge University Press, 1991, 63-90 (with M.W. Watson).

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PUBLISHED REVIEWS, COMMENTS, & GENERAL INTEREST OUTLETS

"Driving Deep Decarbonization," *IMF Finance & Development*, September 2021, 13-15.

"The Rate Debate: Rethinking Economics in the Age of Cheap Money," *Foreign Affairs*, March-April 2021, 174-185.

"Eight Priorities for Calculating the Social Cost of Carbon," *Nature* 590, 548-550, February 2021 (with G. Wagner, D. Anthoff, M. Cropper, S. Dietz, KT Gillingham, B. Groom, JP Kelleher, and FC Moore).

"Keep Climate Policy Focused on the Social Cost of Carbon," *Science* 373, August 2021, 850-852 (with J.E Aldy, M.J Kotchen, and R. Stavins).

"Opportunities for Advances in Climate Change Economics: Targeting Carbon's Costs, Policy Designs, and Developing Countries," *Science* v. 352, issue 6283, 292-293 (with Charles Kolstad and 26 others).

"Dynamic Factor Models: A Brief Retrospective," in S.J. Koopmans (ed.) *Advances in Econometrics*, v. 35. (2015).

"Discussion of 'Labor Force Participation: Recent Developments and Future Prospects' by Stephanie Aaronson et. al." *Brookings Papers on Economic Activity*, Fall 2014, 261-271.

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"Discussion of 'The Role of Expectations in Inflation Dynamics' by Jeffrey Fuhrer," *The International Journal of Central Banking* 8, No. S1 (2012), 167-174.

"Discussion of 'Inflation Dynamics and the Great Recession' by Ball and Mazumder," *Brookings Papers on Economic Activity*, Spring 2011, 387-402.

"Discussion of Cogley and Sargent, 'Evolving Post-World War II Inflation Dynamics'," *NBER Macroeconomics Annual* 2001, 379 – 386.

"Comment on 'Policy Rules and Inflation Targeting' by G. Rudebusch and L. Svensson," in J. Taylor (ed.), *Monetary Policy Rules*, University of Chicago Press for the NBER, 1999, 153 – 262.

"Discussion of 'Foundation of the Goldilocks Economy' by Robert Gordon," *Brookings Papers on Economic Activity*, 1998:2, 334-346.

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"Bayesian Approaches to the 'Unit Root' Problem: A Comment," *Journal of Applied Econometrics*, 6(4), 1991, 403-411.

"Unit Roots in GNP: Do We Know and Do We Care?: A Comment," *Carnegie-Rochester Conference on Public Policy*, 26, Spring 1990.

Review of Francis Diebold, "Empirical Modeling of Exchange Rate Dynamics," *Journal of International Economics*, 27 (1989), 185-198 (with Jeffrey A. Frankel).

"Temporal Aggregation and Structural Inference in Macroeconomics: A Comment," *Carnegie*-Rochester *Conference on Public Policy*, 26 (Spring 1987), 131-140.

SELECTED OLDER UNPUBLISHED PAPERS

“Forecasts in a Slightly Misspecified Finite Order VAR” (2011), NBER Working Paper 16714 (with U. Müller).

“Implications of Dynamic Factor Models for VAR Analysis,” manuscript (2005) (with M.W. Watson).

“Optimal Tests for Reduced Rank Time Variation in Regression Coefficients and Level Variation in the Multivariate Local Level Model,” manuscript (2005) (with P. Eliasz and M.W. Watson).

“Empirical Bayes Forecasts of One Time Series Using Many Predictors,” manuscript (2000) (with T. Knox and M.W. Watson).

“Confidence Intervals in Cointegrating Regressions with Nearly Integrated Regressors,” manuscript (1996), Kennedy School of Government (with M.W. Watson).

“Dynamic Economic Models Subject to Time Deformation,” Ph.D. Dissertation, Department of Economics, University of California, Berkeley, California, August 1983.

SELECTED SPEECHES, TESTIMONY, AND REPORTS

Testimony, Hearing on the Future of the Federal Coal Program, House Subcommittee on Energy and Mineral Resources, July 11, 2019.

“Climate Change, Climate Change Policy, and Economic Growth,” Plenary presentation, NBER Macroeconomics Annual, April 11, 2019.

“The Renewable Fuel Standard: Concerns, Deals, Reform,” MIT Center for Energy and Environmental Policy Research, November 15, 2018.

“Comment on EPA-DOT Proposed SAFE Vehicle Rule for MY 2021-2026 Passenger Cars and Light Trucks,” October 26, 2018 (with Kenneth Gillingham and Wade Davis).

“Comment on U.S. Forest Service (USFS) Environmental Assessment (EA) on Proposed 20-year Mineral Leasing Withdrawal in Superior National Forest” August 6, 2018 (with Jacob Bradt).

“The Business Cycle is Alive and Well,” National Association of Business Economists Annual Meeting, Plenary Lecture, September 30, 2018.

“An Econometrician’s Take on the CO2-Climate Debate,” NYU-Stern 10th Annual Volatility Conference, April 27, 2018.

“RINs and RFS Reform Proposals,” National Ethanol Conference, San Antonio Texas, February 13, 2018.

Reforming the Renewable Fuel Standard. Report, Columbia-SIPA Center on Global Energy Policy (February 2018).

“Prospects for a Coal Renaissance,” MIT Center for Energy and Environmental Policy Research,” April 27, 2017.

“Statistical Analysis of Climate Data,” Plenary Talk, MIT Statistics and Data Science Conference, April 21, 2017.

Aligning Federal Minerals Leasing Policy and Climate Policy, Report, The Hamilton Project (2016) (with K.T. Gillingham).

The Renewable Fuel Standard: A Path Forward. Report, Columbia Center on Global Energy Policy, April 2015.

"The Implication of Lower Oil Prices for the U.S. Economy Amid the Shale Boom," Policy Brief, Columbia Center on Global Energy Policy, December 4, 2014.

"Cyclical Stabilization and the Structure of Mortgage Finance" (speech), The Housing Finance Policy Center at the Urban Institute, November 13, 2013.

"The Cost of Delaying Action to Stem Climate Change," CEA report, July 2014.

"The Labor Force Participation Rate Since 2007: Causes and Policy Implications," CEA report, July 2014.

"The All-of-the-Above Energy Strategy as a Path to Sustainable Economic Growth," CEA report, June 2014.

"Economic Activity during the Shutdown and Debt Limit Brinksmanship," CEA report, October 2013.

OP-EDs AND OTHER

"Fix the reconciliation biofuels tax credits to align with climate goals". *The Hill*, September 27, 2021.

"How to reach 50 percent zero-emission vehicles". *The Hill*, September 1, 2021.

"More Than Tax Credits Are Needed to Decarbonize the Power Sector". *The Hill*, May 17, 2021

"The Right Discount Rate for Regulatory Costs and Benefits". *Wall Street Journal*, March 4, 2021

"Capitol invasion opened the door for sensible climate policy". *The Hill*, January 22, 2021.

"Lockdowns are too blunt a weapon against Covid". *Financial Times*, September 4, 2020.

"Hearing on Carbon Price, Competitive Supply, and Consumer Protection". Testimony submitted to the Joint Committee on Telecommunications, Utilities and Energy, January 14, 2020.

"We don't know what climate change will cost – that doesn't mean we can ignore it," *The Hill*, May 9, 2018 (with Robert Pindyck).

"Oil, Agriculture and the Environment Deserve an Improved Renewable Fuel Standard," *The Hill*, March 6, 2018.

"S.1821: An Act combating climate change and H.1726: An Act to promote green infrastructure, reduce greenhouse gas emissions, and create jobs," Testimony submitted to the Joint Committee on Telecommunications, Utilities and Energy, June 20, 2017.

"Comment on Proposed Denial of Petitions for Rulemaking to Change the RFS Point of Obligation: Docket ID No. EPA-OAR–2016–0544" (February 2017).

"A Bipartisan Opportunity to Move Forward on Biofuels Policy," *The Hill*, November 23, 2016.

"If the US had price on carbon, would Keystone XL have made sense?" *The Conversation*, November 9, 2015.

"U.S. Renewable Fuels Move Forward," *Reuters U.S.*, June 3, 2015.

"The Real Cost of Coal," *New York Times*, March 24, 2015 (with David Hayes).

"The Moment Is Right for Housing Reform, *Wall Street Journal*, April 25, 2014.

"On Energy, 'All of the Above' Is Working," *Politico Magazine*, May 29, 2014.

SELECTED LECTURES AND COURSES

"The Macroeconomic Impact of Carbon Pricing," IMF Short Course, January 23, 2024.

"The Economics and Econometrics of Climate Change Policy," Study Center Gerzensee Advanced Courses in Economics, May 30-June 3, 2022.

"The Economics and Econometrics of Climate Change Policy," CEMFI Summer School Course, August 30-September 3, 2021.

"Time Series Econometrics," American Economics Association Continuing Education Course, January 6-8, 2019 (with M.W. Watson).

"Identification of Dynamic Causal Effects in Macroeconomics," The Denis Sargan Lecture at the Royal Economics Society, April 11, 2017.

"Weak Instruments and What To Do About Them," NBER Summer Institute Methods Lecture, July 22, 2018 (with I. Andrews).

"Time Series Econometrics," American Economics Association Continuing Education Course, January 5-7, 2015 (with M.W. Watson).

"Recent Developments in Time Series Econometrics," American Economics Association Continuing Education Course, January 5-7, 2010 (with M.W. Watson).

"What's New in Econometrics: Time Series," NBER Summer Institute mini-course, July 2008 (with Mark Watson).

Executive Education courses for central bankers (Northwestern University, Duisenberg School of Finance, Dutch Central Banks; various dates 2007 – 2016).

NBER/NSF Conference on Time Series Analysis, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2001, 2003, 2005, 2007, 2009, 2014, 2016.

American Economic Association/Econometric Society Meetings, 1984- (various).

World Congress of the Econometric Society, 1985, 1990, 1995, 2000, 2005, 2010, 2015.

National Bureau of Economic Research Summer Institute, 1985- (various).

SELECTED GRANTS RECEIVED

National Bureau of Economic Research Grant (Leading Indicators), 1987-1991.

Sloan Research Fellowship, 1988-1990.

National Science Foundation (Economics Group), 1984-1986, 1987-1988, 1989-1991, 1992-1993, 1994-1995, 1997 – 2001, 2002 – 2005, 2007 – 2009.