

CHARLES R. HULTEN

ADDRESS:

Department of Economics
3114 Tydings Hall
University of Maryland
College Park MD 20742
(301) 405-3549
email: hulten@econ.umd.edu
Web page: <http://econweb.umd.edu/~hulten/>

DEGREES:

A.B. (Statistics) University of California, Berkeley, 1965
Ph.D. (Economics) University of California, Berkeley, 1973

PRINCIPAL APPOINTMENTS:

- Professor of Economics, Emeritus, University of Maryland, 2016-present
- Professor of Economics, University of Maryland, 1985-2016
- Research Associate, National Bureau of Economic Research 1985-present
- Senior Research Associate, The Urban Institute, 1978-1985
- Assistant Professor, Department of Economics, Johns Hopkins University, 1971-1978

OTHER:

- Senior Fellow, The Conference Board, 2006-present
- Adjunct Senior Fellow, Technology Policy Institute, 2013-present
- Fellow, Society for Economic Measurement, 2014-present

CURRENT PROFESSIONAL SERVICE:

- Chairman, Executive Committee, Conference on Research in Income and Wealth, 1985-2016.
- Member, Bureau of Economic Analysis Advisory Committee.

RECENT RESEARCH:

“Measuring the Economy of the 21st Century”, NBER Reporter, 4, December, 2015, 1-7.

Hulten, Charles, and, 2017. “Accounting for Growth in the Age of the Internet: The Importance of Output-Saving Technical Change,” NBER Working Paper 23315, April 2017 (with Leonard Nakamura).

“The Importance of Education and Skill Development for Economic Growth in the Information Era,” in *Education, Skills, and Technical Change: Implications for Future U.S. GDP Growth*, Hulten and Ramey, eds., Studies in Income and Wealth, The University of Chicago Press for the NBER, Chicago, forthcoming.

“Education, Skills, and Technical Change, Implications for Future U.S. GDP Growth: An Introduction and Overview”, in *Education, Skills, and Technical Change: Implications for Future U.S. GDP Growth*, Hulten and Ramey, eds., Studies in Income and Wealth, The University of Chicago Press for the NBER, Chicago, forthcoming (with Valery A. Ramey).

“Measuring GDP and Welfare in the 21st Century,” Paper Presented at the NBER Conference on Research in Income and Wealth *Measuring and Accounting for Innovation in the 21st Century*, Carol Corrado, Javier Miranda, Jonathan Haskel, and Daniel Sichel, Organizers, Washington D.C., March 10-11, 2017 (with Leonard Nakamura).

SELECTED PUBLICATIONS:

1. PROFESSIONAL JOURNALS:

Intangible Capital and Productivity Theory:

“How Do You Measure a ‘Technological Revolution’?” *American Economic Review*, May 2010, 99-104 (with Carol A. Corrado).

“Intangible Capital and U.S. Economic Growth,” *Review of Income and Wealth*, 55, 3, September 2009, 661-685 (with Carol A. Corrado and Daniel Sichel).

"Productivity Dynamics in Manufacturing Plants," *Brookings Papers on Economic Activity, Microeconomics 1992*, (with Martin N. Baily and David Campbell), 187-249.

"Growth Accounting when Technical Change is Embodied in Capital," *American Economic Review*, Vol. 82, No. 4, September 1992, 964-980.

"Productivity Change, Capacity Utilization, and the Sources of Efficiency Growth," *Journal of Econometrics*, Vol. 33, 1986, 31-50.

"On the 'Importance' of Productivity Change," *American Economic Review*, Vol. 69, No. 1, March 1979, 126-135.

"Growth Accounting with Intermediate Inputs," *Review of Economic Studies*, Vol. 45, No. 3, October 1978, 511-518.

"Technical Change and the Reproducibility of Capital," *American Economic Review*, Vol. 65, No. 5, December 1975, 956-965.

"Divisia Index Numbers," *Econometrica*, Vol. 41, No. 6, November 1973, 1017-25.

Regional and International Productivity Measurement:

"Regional Productivity Growth in U.S. Manufacturing: 1951-1978," *American Economic Review*, Vol. 74, No. 1, March 1984, 152-162 (with Robert M. Schwab).

"The Sources of Japanese Economic Growth, 1955-71," *Review of Economics and Statistics*, Vol. 60, No. 3, August 1978, 351-361 (with Mieko Nishimizu).

Infrastructure and Public Sector Productivity:

"Infrastructure, Externalities, and Economic Development: A Study of Indian Manufacturing Industry," *World Bank Economic Review*, Vol. 20, No. 2, 2006, 291-308 (with Esra Bennathan and Sylaja Srinivasan).

"A Fiscal Federalism Approach to Infrastructure Policy," *Regional Science and Urban Economics*, 27, 1997, 139-159, (with Robert M. Schwab).

"Infrastructure Spending: Where Do We Go From Here?" *National Tax Journal*, Vol. 46, No. 3, September 1993, 261-275 (with Robert M. Schwab).

"Public Capital Formation and the Growth of Regional Manufacturing Industries," *National Tax Journal*, Vol. XLIV, No. 4, Part 1, December 1991, 121-134 (with Robert M. Schwab).

"The Growth of the Public Capital Stock," *American Economic Review*, Vol. 74, No. 2, May 1984, 166-173 (with George E. Peterson).

"Productivity Change in State and Local Governments," *Review of Economics and Statistics*, May 1984, Vol. LXVI, No. 2, 256-265.

Measurement of Economic Depreciation:

"Issues in the Measurement of Economic Depreciation," *Economic Inquiry*, Vol. XXXIV, No. 1, January 1996, 10-23 (with Frank C. Wykoff).

"The Estimation of Economic Depreciation Using Vintage Asset Prices: An Application of the Box-Cox Power Transformation," *Journal of Econometrics*, Vol. 15, 1981, 367-396 (with Frank C. Wykoff).

"The Measurement of Economic Depreciation," in *Depreciation, Inflation, and the Taxation of Income from Capital*, Charles Hulten, ed., The Urban Institute, Washington, D.C., 1981, 81-125 (with Frank C. Wykoff).

"Economic Depreciation and Accelerated Depreciation: An Empirical Analysis of the Conable-Jones 10-5-3 Proposal," *National Tax Journal*, Vol. 34, No. 1, March 1981, 45-60 (with Frank C. Wykoff).

Tax Policy:

"A Haig-Simons Comprehensive Income Tax," *National Tax Journal*, Vol. XLIV, No. 1, March 1991, pp. 67-78 (with Robert M. Schwab).

"The Taxation of High Technology Industries," *National Tax Journal*, September 1984, Vol. XXXVII, No. 3, 327-346 (with James W. Robertson).

"Tax Policy and the Investment Decision," *American Economic Review*, Vol. 74, No. 2, May 1984, 236-241.

"Economic Depreciation and Accelerated Depreciation: An Empirical Analysis of the Conable-Jones 10-5-3 Proposal," *National Tax Journal*, Vol. 34, No. 1, March 1981, 45-60 (with Frank C. Wykoff).

2. CHAPTERS IN UNIVERSITY PRESS VOLUMES:

"Introduction," in *Measuring Wealth and Financial Intermediation and Their Links to the Real Economy*, C.R. Hulten and M.B. Reinsdorf, eds., Studies in Income and Wealth, vol. 73, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2015, 1-16 (with M.B. Reinsdorf)

"Connecting the Supply and Demand Sides of the Economy: Productivity, Asset Valuation, and Tobin's 'q'," in *Measuring Wealth and Financial Intermediation and Their Links to the Real Economy*, C.R. Hulten and M.B. Reinsdorf, eds., Studies in Income and Wealth, vol. 73, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2015, 125-147 (with Carol A. Corrado).

"Innovation Accounting", in *"Measuring Economic Progress and Economic Sustainability,"* in D.W. Jorgenson, J.S. Landefeld, and P. Schreyer, eds., Studies in Income and Wealth, vol. 72, The University of Chicago Press for the

National Bureau of Economic Research, Chicago, 2014, 595-628 (with Carol A. Corrado).

"On the Theory and Political Economy of Data: An Essay in Memory of Zvi Griliches," in *Hard-To-Measure Goods and Services: Essays in Memory of Zvi Griliches*, Ernst R. Berndt and Charles R. Hulten, eds., Studies in Income and Wealth, vol. 67, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2007, 15-27.

"The 'Architecture' of Capital Accounting: Basic Design Principles," in *A New Architecture for the National Accounts*, Conference on Research in Income and Wealth, Dale Jorgenson, Stephen Landefeld, and William Nordhaus, eds., Studies in Income and Wealth, vol. 66, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2006, 193-214.

"Measuring Capital and Technology: An Expanded Framework," in *Measuring Capital in the New Economy*, Carol Corrado, John Haltiwanger and Daniel Sichel, eds., Studies in Income and Wealth, vol. 65, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2005, 11-41 (with Carol Corrado, and Daniel Sichel).

"Total Factor Productivity: A Short Biography," in *New Developments in Productivity Analysis*, Charles R. Hulten, Edwin R. Dean, and Michael J. Harper, eds., Studies in Income and Wealth, vol. 63, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2001, 1-47.

"Does Infrastructure Investment Increase the Productivity of Manufacturing Industry in the U.S.?" *Econometrics and the Cost of Capital: Essays in Honor of Dale Jorgenson*, Lawrence J. Lau, ed., M.I.T. Press, 2000, 143-164 (with Robert Schwab).

"Implications of BEA's Treatment of Computer Prices for Productivity Measurement," in *Price Measurements and Their Uses*, Murray F. Foss, Marilyn E. Manser, and Allan H. Young, eds., The University of Chicago Press for the National Bureau of Economic Research, Chicago, 1993, 359-362.

"The Measurement of Capital," in *Fifty Years of Economic Measurement: The Jubilee of the Conference on Research in Income and Wealth*, Ernst R. Berndt and Jack E. Triplett, eds., Studies in Income and Wealth, Vol. 54, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 1990, 119-152.

"Energy, Obsolescence, and the Productivity Slowdown," in *Technology and Capital Formation*, Dale W. Jorgenson and Ralph Landau, eds., M.I.T. Press, Cambridge, Massachusetts, 1989, 225-258.

"Income Originating in the State and Local Sector," in *Fiscal Federalism: Quantitative Studies*, in Harvey Rosen, ed., University of Chicago Press for the National Bureau of Economic Research, Chicago, 1988, 215-254 (with Robert M. Schwab).

"Economic Depreciation and the Taxation of Structures in U.S. Manufacturing Industries: An Empirical Analysis," in *The Measurement of Capital*, Studies in Income and Wealth, Vol. 45, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 1980, 83-109 (with Frank C. Wykoff).

3. ARTICLES IN HANDBOOKS AND DICTIONARIES:

"Growth Accounting," *Handbook of the Economics of Innovation*, Chapter 23, Bronwyn H. Hall and Nathan Rosenberg (eds.), Elsevier-North Holland, 2010, 987-1031.

"The Divisia Index," in *The New Palgrave: A Dictionary of Economic Theory and Doctrine*, John Eatwell, Murray Milgate and Peter Newman, eds., The Macmillan Press, London, 1987, 899-900. Revised for the new edition, 2007.

"Amortization," in *The New Palgrave: A Dictionary of Economic Theory and Doctrine*, John Eatwell, Murray Milgate and Peter Newman, eds., The Macmillan Press, London, 1987, 88-89. Revised for the new edition, 2007.

"Depreciation Allowances," in *The McGraw-Hill Encyclopedia of Economics*, Douglas Greenwald, ed., McGraw-Hill, New York, 1994, 267-270.

4. BOOKS EDITED:

Measuring Wealth and Financial Intermediation and Their Links to the Real Economy, C.R. Hulten and M.B. Reinsdorf, eds., Studies in Income and Wealth, vol. 73, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2015.

Price Index Concepts and Measurement, W. Erwin Diewert, John Greenlees, and Charles R. Hulten, eds., Studies in Income and Wealth, vol. 70, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2010.

Hard-To-Measure Goods and Services: Essays in Memory of Zvi Griliches, Ernst R. Berndt and Charles R. Hulten, eds., Studies in Income and Wealth, vol. 67, The University of Chicago Press for the National Bureau of Economic Research, Chicago 2007.

New Developments in Productivity Analysis, Charles R. Hulten, Edwin R. Dean, and Michael J. Harper, eds., Studies in Income and Wealth, Studies in Income

and Wealth, vol. 63, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 2001.

A Comparison of Productivity Growth in Japan and the United States, Charles R. Hulten, ed., Studies in Income and Wealth, Vol. 53, The University of Chicago Press for the National Bureau of Economic Research, Chicago, 1991.

The Legacy of Reaganomics, Charles R. Hulten and Isabel V. Sawhill, eds., The Urban Institute Press, Washington, D.C., 1984 (with Isabel V. Sawhill).

Depreciation, Inflation, and the Taxation of Income from Capital, Charles Hulten, ed., The Urban Institute, Washington, D.C., 1981.

5. SELECTED OTHER WORK:

"Measuring Intangible Capital and its Contribution to Economic Growth in Europe," *EIB Papers*, European Investment Bank, volume 14, number 1, December 2009, 62-93 (with van Ark, Bart, Janet X. Hao, and Carol A. Corrado).

"Innovation, Intangibles And Economic Growth: Towards a Comprehensive Accounting of the Knowledge Economy," *Yearbook on Productivity 2007, Papers Presented at the Saltsjobaden Conference, October 2007*, Statistics Sweden, 2008, 127-146 (with Bart van Ark).

"Price Hedonics: A Critical Review," *Economic Policy Review*, Federal Reserve Bank of New York, vol. 9, no. 3, September 2003, 5-15.

"Capital and Wealth in the Revised SNA," in *The New Standard System of National Accounts*, John W. Kendrick, ed., Kluwer Academic Publishers, Boston, 1995, 149-181.

"Infrastructure and the Economy," in J.M. Pogożinski, ed., *Readings in Public Policy*, Blackwell Publishers, Cambridge, 1995, 213-234 (with Robert M. Schwab).

"Infrastructure and Competitiveness: What the Data Really Show," in Jack M. Mintz and Ross S. Preston, eds., *Infrastructure and Competitiveness*, John Deutsch Institute for the Study of Economic Policy, Kingston, Canada, 1994, 173-203 (with Robert M. Schwab).

"How Does Public Infrastructure Affect Regional Economics Performance: Discussion," in Alicia Munnell, ed., *The Third Deficit: The Shortfall in Public Capital Investment*, Federal Reserve Bank of Boston, Series No. 34, Boston, 1990, pp. 104-107.

"Infrastructure, Productivity, Growth and Competitiveness," in *Infrastructure Needs Assessments and Financing Alternatives*, U.S. House of Representatives, Committee on Banking, Finance, and Urban Affairs, Serial No. 101-117, Washington, D.C., May 8, 1990, 64-81.

"The Importance of Productivity Change in the Economic Growth of Nine Industrialized Countries," in *Lagging Productivity Growth: Causes and Remedies*, Shlomo Maital and Noah M. Meltz, eds., Ballinger, Cambridge, Mass., 1980, 85-100 (with Mieko Nishimizu).