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EDUCATION:

B.A. Economics, Wellesley College, 1972, Wellesley College Scholar Status.
Ph.D. Economics, Boston College, 1980.

PROFESSIONAL APPOINTMENTS:

Research Fellow, IZA Network, IZA Institute of Labor Economics, Bonn, Germany, 2019-present

Treasurer, Western Maine Wellesley Club, 2018-present

Special-Term Professor, China Center for Human Capital and Labor Market Research, Central University of Finance and Economics, Beijing, China, June 2011-present.

Professor of Public Policy, Emerita, Muskie School of Public Service, University of Southern Maine, September 2015-present.

World Bank Consultant (short-term), September 24, 2015-May 31, 2016; January 16, 2017-June 30, 2017

National Bureau of Economic Research (NBER) Research Associate, Program on Productivity, 2005-present.

Senior Fellow, Center for Economics, Finance, and Management Studies, Hunan University, Changsha, China, 2014-present.

Senior Fellow, China Center for Human Capital and Labor Market Research, Central University of Finance and Economics, Beijing, China, 2009-present.

Vice-President, Charter Fellow and Executive Committee of the Society for Economic Measurement, 2014-present.

Professor of Public Policy and Chair of the Ph.D. Program in Public Policy, Muskie School of Public Service, University of Southern Maine, Fall 2005-August 2015.

Chair of the Public Policy and Management Masters Program, Muskie School of Public Service, University of Southern Maine, June 1, 2012-October 18, 2013.

Chair, International Association for Research in Income and Wealth (IARIW), August 2012-August 2014.

Chair, Committee on the Status of Women in the Economics Profession, American Economic Association, July 1, 2008 – December 31, 2011.

Associate Executive Director for Academic and Student Affairs, Muskie School of Public Service, University of Southern Maine, July 2010 to June 2011.

Associate Dean for Research, Muskie School of Public Service, University of Southern Maine, Fall 2007 to August 2010.

Co-manager of the School, performing the duties of a Dean, Muskie School of Public Service, University of Southern Maine, February to July 2010.

Associate Dean for Academic and Student Affairs, Muskie School of Public Service, University of Southern Maine, Fall 2009 to July 2010.

President, The National Economics Club, Washington, DC, 2002.

Vice-President or Board Member, The National Economics Club, Washington, DC, 2001.

Chief Economist, Bureau of Economic Analysis, 1999-June 2005.

Professor, Northeastern University, 1994-Fall 2004.

Research Fellow, Program on Technology and Economic Policy, Harvard University, Kennedy School of Government, Sabbatical Leave, 1988-1989; Continuing Position, 1988-1991; from Summer 1992-1998.

Visiting Scientist/Economics Program Director, National Science Foundation, Arlington, VA, July 1995-July 1996.

Advisor to the Chief Economist, Bureau of Economic Analysis, U.S. Department of Commerce, September 1994-June 1995.

Associate Professor, Northeastern University, 1988-1994.

Visiting Scholar, Program on Technology and Economic Policy, Harvard University, Kennedy School of Government, Spring Semester, 1992.

Assistant Professor, Northeastern University, 1982-1988.

Visiting Lecturer, Tufts University, Part-Time, 1981-1982.
Economist, Dale Jorgenson Associates, 1980-1982.

Assistant Professor, Wellesley College, Part-Time, 1980-1981.
Instructor, Wellesley College, Spring, Part-Time, 1980.
Research Associate, Dale Jorgenson Associates, 1978-1980.
Research Associate, Data Resources, Inc., 1974-1978.
Research Assistant, Data Resources, Inc., 1972-1974.

AWARDS:

Wellesley College Athletic Hall of Fame, sculler (rower), inducted October 2016.

Gold Medal, highest award given by the U. S. Department of Commerce, for work on R&D while Chief Economist of the Bureau of Economic Analysis, November 8, 2006.

American Economic Association, Committee on the Status of Women in the Economics Profession, Carolyn Shaw Bell Award, given to an individual for furthering the status of women in the economics profession, 2006.

Gretchen Elizabeth Evenson Award, given to the senior who has best achieved and exemplified the virtues and qualities of womanhood, 1968.

Aldina Nash Award, Lake Washington Rowing Club, 1968.

BOOKS:

Measuring Human Capital, editor and co-author of the introduction and three chapters, Academic Press, Cambridge, MA, 2021.

Measuring Economic Growth and Productivity: Foundations, KLEM Production Models, and Extensions, editor and author of one chapter, Academic Press, Cambridge, MA, November 2019 (copyright 2020).

Productivity and U.S. Economic Growth, Harvard University Press, co-authored with Dale W. Jorgenson and Frank M. Gollop, 1987, published in the People's Republic of China in Chinese, 1990, Greek language edition: Gutenberg: Gutenberg University Press, 1999, reissued in paperback form by iUniverse.com, September 1999.

JOURNAL GUEST EDITING:

Review of Income and Wealth, IARIW-OECD Special Conference on the Future of the National Accounts: “W(h)ither the SNA?”, with Peter van de Ven and Ann Harrison, Income and Wealth series 63, supplement 2, December 2017.

Review of Income and Wealth, IARIW-ICRIER Special Conference on Experiences and Future Challenges in Measuring Income Inequality and Poverty in South Asia, with Deb Kusum Das, Income and Wealth series 65, supplement 1, November 2019.

PAPERS:

Human Capital and Education

1. “Human Capital Growth – with Region and Gender in Perspective,” chapter 6 of United Nations Environmental Program, *Inclusive Wealth Report 2022*, UNEP, forthcoming, with Gang Liu, also available as NBER Working Paper 30035, May 2022 and IZA Discussion Paper 15273, May 2022.
2. “Introduction” with Gang Liu, in Barbara M. Fraumeni, editor, *Human Capital Measurement*, Academic Press, Cambridge, MA, 2021, in Barbara M. Fraumeni, editor, *Human Capital Measurement*, Academic Press, Cambridge, MA, 2021, pp. ix-xix.
3. “Summary of Lim, S. S., et al., ‘Measuring Human Capital: A Systematic Analysis of 195 Countries and Territories, 1990-2016,’” with Gang Liu, in Barbara M. Fraumeni, editor, *Human Capital Measurement*, Academic Press, Cambridge, MA, 2021, pp. 117-23.
4. “Summary of World Economic Forum, ‘The Global Human Capital Report 2017—Preparing People for the Future of Work,’” with Gang Liu, in Barbara M. Fraumeni, editor, *Human Capital Measurement*, Academic Press, Cambridge, MA, 2021, pp. 125-138.
5. “The Accumulation of Human and Market Capital in the United States: The Long View, 1948–2013,” with Michael S. Christian and Jon D. Samuels, in Barbara M. Fraumeni, editor, *Human Capital Measurement*, Academic Press, Cambridge, MA, 2021, pp. 167-97; an earlier version published as National Bureau of Economic Research (Cambridge, MA, USA) May 2020 working paper 27170 and IZA Institute of Labor Economics (Bonn, Germany) May 2020 discussion paper 13239.
6. “Health and Economic Impact of Air Pollution in the States of India: the Global Burden of Disease Study 2019” and its supplementary appendix, *Lancet Planetary Health*, with Anamika Pandey and many others, volume 5, January 2021, pp. e25-38, published online December 22, 2020.
7. “A Brief Introduction to Human Capital Measures,” with Gang Liu, National Bureau of Economic Research (Cambridge, MA, USA) July 2020 working paper 27561 and IZA Institute of Labor Economics (Bonn, Germany) July 2020 discussion paper 13494.
8. “Regional Distribution and Dynamics of Human Capital in China, 1985-2014,” *Journal of Comparative Economics*, with Haizheng Li, Junzi He, and Qinyi Liu, volume 47, issue 4, December 2019, pp. 853-866.
9. “Accumulation of Market and Human Capital in the United States, 1975-2012: An Analysis by Gender,” with Michael S. Christian, in Barbara M. Fraumeni, editor, *Measuring Economic Growth and Productivity: Foundations, KLEM Production Models, and Extensions*, Academic Press, Cambridge, MA, November 2019, pp. 509-529; an earlier version published as National Bureau of Economic Research (Cambridge, MA, USA) May 2019 working paper 25864 and IZA Institute of Labor Economics (Bonn, Germany) May 2019 discussion paper 12364.

10. "Human Capital: Educational Attainment Progress," chapter 7 of Urban Institute (Kyushu University) and United Nations Environmental Program, *Inclusive Wealth Report 2018*, with Gang Liu, Abingdon, Oxon, England, Routledge, 2018, pp. 179-193.
11. "Human Capital Productivity," chapter 5 of part I of Deb Kusum Das, ed., *Productivity Dynamics in Emerging and Advanced Countries*, Routledge, Oxfordshire, England, 2018, pp. 140-153.
12. "Accumulation of Human and Nonhuman Capital, Revisited," *Review of Income and Wealth*, series 63, supplement 2, December 2017, pp. S381-S410; previous versions presented at the IARIW Special Conference W(h)ither the SNA in Paris, France, with Michael S. Christian and Jon D. Samuels, April 17, 2015 and a NBER Working Paper 21284, June 2015.
13. "Regional Distribution and Dynamics of Human Capital in China 1985-2014: Education, Urbanization, and Aging of the Population," with Haizheng Li, Junzi He, Qinyi Liu, and Xiang Zheng, NBER Working Paper 22906, December 2016.
14. "Measuring Human Capital: Country Experiences and International Initiatives," in *Growth and Stagnation in the World Economy*, Dale W. Jorgenson, Kyoji Fukao, and Marcel Timmer (eds.), with Gang Liu, Cambridge University Press, 2016, pp. 429-468.
15. United Nations Economic Conference for Europe, *Guide on Measuring Human Capital*, Prepared by the Task Force on Human Capital, ECE/CES/STAT/6, 2016, acknowledged as primary having primary responsibility for drafting Chapter 7: Human capital country studies, as well as working on other parts of the publication as a member of the Task Force on Human Capital.
16. "Choosing a Human Capital Measure: Educational Attainment Gaps and Rankings," NBER Working Paper 21283, June 2015.
17. "Human Capital: Country Estimates Using Alternative Approaches," chapter 4 in UNU-IHDP and UNEP, *Inclusive Wealth Report 2014, Measuring Progress Toward Sustainability*, with Gang Liu, Cambridge: Cambridge University Press, 2014, pp. 109-122.
18. "Human Capital Measurement: A Bird's Eye View" Chapter 3 in UNU-IHDP and UNEP (2014). *Inclusive Wealth Report 2014, Measuring Progress Toward Sustainability*, with Gang Liu, Cambridge: Cambridge University Press, 2014, pp. 83-107.
19. "Human Capital Estimates in China: New Panel Data 1985-2010," in *China Economic Review*, with Haizheng Li, Qinyi Liu, Bo Li, and Xiaobei Zhang, volume 30, issue C, 2014, pp. 397-418.
20. "Regional Distribution and Development of Human Capital in China," *Economic Research Journal* co-authored with Haizheng Li, Na Jia, Xiaobei Zhang, in Chinese, July 2013, pp. 49-62.
21. *Human Capital Report: Capital in China 2012*, with Haizheng Li, Na Jia, and Xiaobei Zhang, draft version presented December 14, 2012 in Beijing, China at the China Center for Human Capital and Labor Market Research at the Central University for Finance and Economics.
22. "Human Capital Productivity: A New Concept for Productivity Analysis" *International Productivity Monitor*, Number 24, Fall 2012, pp. 20-26.

23. "Human Capital in China, 1985-2008," with Haizheng Li, Yunling Liang, Zhiqiang Liu, and Xiaojun Wang, *Review of Income and Wealth*, volume 59, issue 2, June 2013, pp. 212-234.
24. Panel on Measuring Higher Education Productivity: Conceptual Framework and Data Needs, Theresa A. Sullivan, Christopher Mackie, William F. Massy, and Esha Sinha, eds., *Improving Measurement of Higher Education Productivity*, National Research Council of the National Academies, Committee on National Statistics and Board on Testing and Assessment, The National Academies Press, Washington, D.C., May 2012. This is a panel authored book and I was a member of the panel.
25. "Human Capital Accounts: Choice of Rates and Construction of Volume Indices," National Bureau of Economic Research Working Paper Number 16895, March 2011, published by the Italian Statistical Agency in Italian, *Capitale Umano Definizione e Misurazioni*, edited by (A cura di) Leonello Tronti, Associazione Italiana degli Economisti del Lavoro, Fondazione Giovanni Agnelli, Societa Italiana di Statistica (SIS), CEDAM, Milan, 2012, pp. 129-147, 2012.
26. "Human Capital and Economic Growth in China," listed as contributor to the publication with Haizheng Li and Glenn-Marie Lange, Chapter 6 of *The Changing Wealth of Nations, Measuring Sustainable Development in the New Millennium*, The International Bank for Reconstruction and Development/The World Bank, Washington, DC., 2011, pp. 105-118.
27. "China's Human Capital Measurement and Index Construction," co-authored with Haizheng Li, Yunling Liang, Zhiqiang Liu, and Xiaojun Wang, *Economic Research Journal*, in Chinese, August 2010, pp. 42-54.
28. "Human Capital in China," co-authored with Haizheng Li, Zhiqiang Liu, and Xiaojun Wang, National Bureau of Economic Research Working Paper Number 15500, November 2009.
29. "Human Capital in China," co-authored with Haizheng Li, Zhiqiang Liu, and Xiaojun Wang, China Center for Human Capital and Labor Market Research, Central University of Finance and Economics, prepared for the International Symposium on Measuring Human Capital and Its Impact on Welfare and Growth: Inaugurating the China Human Capital Index, Beijing, China, October 10, 2009.
30. "Human Capital: From Indicators to Accounts," paper presented at a Fondazione Giovanni Agnelli/OECD workshop on human capital accounts, Turin, Italy, November 4, 2008, available at http://www.oecd.org/document/39/0,3343,en_2649_33715_41153767_1_1_1_1,0.html.
31. "Cuentas de Produccion Domestica de los Hogares para Canada, Mexico, y Estados Unidos: Aspectos Metodologicos, Resultados y Recomendaciones," in *La Economia Invisible y las Desigualdades de Genero*, Organization Panamericana de la Salud, Washington, D.C. 2008, pp. 21-34.

32. "Household Production Accounts for Canada, Mexico, and the United States: Methodological Issues, Results and Recommendations," chapter 2 in Pan American Health Organization (Regional Office of the World Health Organization), United Nation's Economic Commission for Latin American Countries, and State Agency for National Research Council of Spain, *The Invisible Economy and Gender Inequalities: The Importance of measuring and Valuing Unpaid Work*, 2010, pp. 19-30 – Spanish version of the paper listed above.
33. "Household Production Accounts for Canada, Mexico, and the United States: Methodological Issues, Results, and Recommendations," IARIW 30th General Conference, Portoroz, Slovenia, August 26, 2008, available at <http://www.iariw.org/papers/2008/fracmeni.pdf>.
34. "Measuring the Education Output of Government Using a Human Capital Approach: What Might Estimates Show?" in United Nations Economic Commission for Europe and Statistics Netherlands, *Measuring Capital Beyond the Traditional Measures, Proceedings of the Seminar Session of the 2007 Conference of European Statisticians*, United Nations, New York and Geneva, 2008, pp. 113-123, paper presented at the Fifty-fifth Plenary Session, Geneva, 11-13 June 2007.
35. "Price and Real Output Measures for the Education Function of Government: Exploratory Estimates for Primary and Secondary Education," co-authored with Marshall B. Reinsdorf, Brooks B. Robinson, and Mathew P. Williams, in John Greenlees and Charles Hulten, eds., *Price Index Concepts and Measurement*, CRIW NBER Book Series Studies in Income and Wealth, University of Chicago Press, 2009, pp.373-403.
36. "Real Output Measures for the Education Function of Government: A First Look at Primary and Secondary Education," co-authored with Marshall B. Reinsdorf, Brooks B. Robinson, and Matthew P. Williams, paper presented at the Public Services Performance Workshop, National Institute of Economic and Social Research, London, UK, March 2, 2004.
37. "The Output of the Education Sector as Determined by Education's Effect on Lifetime Income," paper presented at the Brookings Program on Output and Productivity Measurement in the Service Sector, Workshop on Measuring the Output of the Education Sector, Brookings Institution, Washington, DC, April 7, 2000.
38. "The Quality of the U.S. Work Force, 1948-90," co-authored with Dale W. Jorgenson and Mun S. Ho, paper presented by Dale W. Jorgenson at the NBER Summer Institute, Cambridge, MA, July 21, 1994.
39. "Education and Economic Growth," *Atlantic Economic Journal*, co-authored with Dale W. Jorgenson, Vol. 21, No. 2, 1993, pp. 1-25.
40. "Investment in Education and U.S. Economic Growth," *Scandinavian Journal of Economics*, co-authored with Dale W. Jorgenson, Vol. 94, supplement, 1992, pp. S51-70.
41. "Investeringar i Utbildning och Ekonomisk Tillvax i USA," in L. Bergman, (ed.), *Produktiviteten & Ekonomisk Tillvaxt, Ekonomiska Radet 1991*, co-authored with Dale W. Jorgenson, Ekonomiska Radet, Stockholm, Sweden, 1992, pp. 71-99.

42. "The Output of the Education Sector," in Z. Griliches, T. Breshnahan, M. Manser, and E. Berndt (eds.), *The Output of the Service Sector*, co-authored with Dale W. Jorgenson, Chicago, NBER, 1992, pp. 303-341.
43. "Investment in Education and U.S. Economic Growth," in M. Bloomfield, M. Thorning and C. Walker (eds.), *The Saving Challenge: The Options for Productivity and Growth*, co-authored with Dale W. Jorgenson, Westview Press, Boulder, Colorado, 1990, pp. 114-143.
44. "Investment in Education," *Educational Researcher*, co-authored with Dale W. Jorgenson, Vol. XVIII, No. 4, May 1989, pp. 35-44.
45. "Investment in Education and U.S. Economic Growth," co-authored with Dale W. Jorgenson, Conference on Welfare, Quality and Productivity in the Service Industries: An International Symposium on Productivity Concepts and Measurement Problems, Uppsala University, Uppsala, Sweden, May 21-23, 1991.
46. "Productivity and U.S. Economic Growth: 1979-1985," co-authored with Dale W. Jorgenson, Discussion Paper, Harvard Institute of Economic Research, Cambridge, MA, December 1990.
47. "The Accumulation of Human and Non-Human Capital, 1948-1984," in R. Lipsey and H. Tice, *The Measurement of Saving, Investment and Wealth*, co-authored with Dale W. Jorgenson, Chicago, University of Chicago Press, NBER, 1989, pp. 227-282, presented in at the CRIW, NBER Conference on the Measurement of Saving, Investment, and Wealth, March 27, 1987.
48. "The Output of the Education Sector," paper presented at an invited American Economic Association (AEA) session entitled "New Developments in National Income and Product Accounts," Allied Social Science Association (ASSA) Annual Meeting, Atlanta, December 1989.
49. "The Output of the Education Sector," paper presented at the NBER Productivity Winter Meetings and Summer Institute of the Measurement of Output and Prices subgroup, 1988.

Nonhuman Capital and Productivity

50. "U.S. Agricultural Productivity: A Review of Current Methods," co-authored by Richard Shumway, Lilyan Fulginiti, Jon Samuels, and Spiro Stefanou, *Applied Economic Perspectives and Policy*, advance online access January 11, 2016, paper publication 2016, vol. 38, number 1, pp. 1-29.
51. "Frontiers and Opportunities in Productivity Research," part of a "Symposium on Priorities and Directions for Future Productivity Research," *International Productivity Monitor*, Number 27, Fall 2014, pp. 20-21.
52. Panel on Developing Science, Technology and Innovation Indicators for the Future (as a panel member), Robert E. Litan, Andrew W. Wyckoff, and Kaye Husbands Fealing, eds. (2014) *Capturing Change in Science, Technology, and Innovation: Improving Indicators to Inform Policy*, National Research Council of the National Academies, The National Academies Press, Washington, DC.
53. *Measurement of U.S. Agricultural Productivity: A 2014 Review of Current Statistics and Proposals for Change*, co-authored with C. Richard Shumway, Lilyan E. Fulginiti, Jon D. Samuels, and Spiro E. Stefanou, September 2014.

54. "A Proposal to Include Motor Vehicles in the U.S. Travel and Tourism Accounts," co-authored with Sumiye Okubo and Mahnaz Fahim-Nader, *Survey of Current Business*, June 2007, pp. 30-42, available at http://www.bea.gov/scb/pdf/2007/06%20June/0607_Travel.pdf.
55. "An Integrated BEA/BLS Production Account: A First Step and Theoretical Considerations," co-authored with Michael J. Harper, Susan G. Powers, and Robert E. Yuskavage, in Dale W. Jorgenson, J. Steven Landefeld, and William D. Nordhaus, eds., *A New Architecture for the U.S. National Accounts*, CRIW/NBER, University of Chicago Press, 2006, pp. 355-435.
56. "Improved U.S. Travel and Tourism Satellite Accounts: Extension to Include Imputed Services of Motor Vehicles and Vacation Homes," paper presented by co-authors Sumiye Okubo and Mahnaz Fahim-Nader at the International Conference on Tourism Satellite Accounts: Credible Numbers for Good Business Decisions, Vancouver, BC Canada, May 8-10, 2001.
57. "Alternative Treatments of Consumer Durables in the National Accounts," paper presented by co-author Sumiye Okubo at the Bureau of Economic Analysis (BEA) Advisory Committee meeting, May 11, 2001.
58. "The Measurement of Depreciation, Capital Stocks, and Changes in Stocks in the U.S. National Income and Product Accounts," co-authored with Shelby W. Herman, paper presented at IARIW's 26th General Conference, Cracow, Poland, August 28, 2000.
59. "Depreciating Personal Computers," co-authored with Shelby W. Herman, BEA National Income and Product Accounts (NIPA) comprehensive proposal, 1999.
60. "Revision of Service Life for Highways and Streets," co-authored with Jennifer Franklin, BEA NIPA comprehensive revision proposal, 1999.
61. "Productivity, Wealth, Intangible and Human Capital," paper presented at the CRIW, NBER Pre-conference on New Developments in Productivity Analysis, Washington, D.C., November 22, 1997.
62. "Expanding Economic Accounts for Productivity Analysis: A Nonmarket and Human Capital Perspective," CRIW, NBER Conference on New Developments in Productivity Analysis, Silver Spring MD, March 21, 1998.
63. "The Measurement of Depreciation in the U.S. National Income and Product Accounts," *Survey of Current Business*, pp. 7-23, July 1997.
64. "Productivity and Economic Growth," teachers textbook supplement to Richard Tresch, *Principles of Economics*, West Publishers, 1994.
65. "The Economics of Technical Progress: A Comment," *Eastern Economic Review*, Volume XV, No. 4, October-December 1989, p. 337.
66. "A General Analysis of U.S. Interindustry Productivity Growth Differences, 1948-1979," in J. W. Kendrick, (ed.), *Interindustry Differences in Productivity Growth*, co-authored with Dale W. Jorgenson and Frank M. Gollop, Boston, Ballinger, 1987.
67. "The Role of Capital in U.S. Economic Growth, 1948-1979," in A. Dogramaci, (ed.), *Measurement Issues and Behavior of Productivity Variables*, co-authored with Dale W. Jorgenson, Boston, Klower-Nijhoff, 1986, pp. 161-244.

68. "Productivity and Growth of Sectoral Output in the United States, 1948-1979," co-authored with Dale W. Jorgenson and Frank M. Gollop Discussion Paper Number 1217, Cambridge, Harvard Institute of Economic Research, February 1986.
69. "The Role of Capital in U.S. Economic Growth, 1948-1979," co-authored with Dale W. Jorgenson, Discussion Paper Number 1134, Cambridge, Harvard Institute of Economic Research, February 1985.
70. "Relative Prices and Technical Change," in W. Eichhorn, R. Henn, K. Neumann, and R. W. Shephard (eds.), *Quantitative Studies on Production and Prices*, co-authored with Dale W. Jorgenson, Federal Republic of Germany, Physica-Verlag, Wurzburg-Wein, 1983, pp. 241-269.
71. "The Role of Capital and Productivity in U.S. Economic Growth," *Conference Proceedings of the Small Business Research Conference*, Vol. 2, Bentley College, Waltham, March 5-7, 1981, pp. 197-217.
72. "Relative Prices and Technical Change in Production," in E. Berndt and B. Field (eds.), *Modeling and Measuring Natural Resource Substitution*, co-authored with Dale W. Jorgenson, Cambridge, MIT Press, 1981, pp. 17-47.
73. "Capital Formation and U.S. Economic Growth, 1948-1976," in A. Dogramaci (ed.), *Productivity Analysis: A Range of Perspectives*, co-authored with Dale W. Jorgenson, Boston, Martinus Nijhoff, November 1980, pp. 49-70.
74. "Rate of Return by Industrial Sector in the United States, 1948-1976," *American Economic Review*, co-authored with Dale W. Jorgenson, Vol. 70, No. 2, May 1980, pp. 326-330; reprinted in Committee on Commerce, Science, and Transportation, United States Senate, *Industrial Innovation*, Ninety-Sixth Congress, First Session, 1979, pp. 110-120.
75. "The Sectoral Sources of U.S. Economic Growth, 1948-1976," in J. Frohn and R. Staglin (eds.), *Empirischen Wirtschaftsforschung*, co-authored with Dale W. Jorgenson, Berlin, Duncker, and Humblot, 1980, pp. 27-40, reprinted in Committee on Commerce, Science and Transportation, United States Senate, *Industrial Innovation*, Ninety-Sixth Congress, First Session, 1979, pp. 82-101.
76. "The Role of Capital in U.S. Economic Growth, 1948-1976," in G. von Furstenberg, (ed.), *Capital, Efficiency, and Growth*, co-authored with Dale W. Jorgenson, Cambridge, Ballinger, 1980, pp. 9-250.
77. "Substitution and Technical Change in Production," co-authored with Dale W. Jorgenson, Discussion Paper Number 752, Cambridge, Harvard Institute of Economic Research, March 1980; presented at the International Symposium of Natural Resources and Production, Karlsruhe, Federal Republic of Germany, June 23-July 4, 1980.
78. "U.S. Economic Growth, 1949-1979," co-authored with Dale W. Jorgenson and Frank M. Gollop, NBER Seminar on Productivity and Investment, Cambridge, July 25, 1983.
79. *Investment, Capital Stock, and Capital Input by Industry*, co-authored with Dale W. Jorgenson, Report to the Office of Tax Analysis, U.S. Treasury Department, July 1981.

E-commerce, New Economy, and Digital Economy

80. "E-Commerce: Measurement and Measurement Issues," paper presented at the ASSA Annual Meeting, New Orleans, LA, January 5, 2001, *American Economic Review*, May 2001, pp. 318-322.
81. "Measuring the New Economy in the United States," co-authored with J. Steven Landefeld, submitted as a supporting paper to the 49th plenary session of the Conference of European Statisticians, Geneva, Switzerland, June 11-13, 2001.
82. "Measuring the New Economy," paper co-authored and presented by J. Steven Landefeld, BEA Advisory Committee Meeting, BEA, Washington, DC, May 5, 2000, published in the *Survey of Current Business*, March 2001, pp. 23-40.
83. "Measurement, Productivity, and the New Economy," paper presented at the 10th Anniversary Conference, Valencian Institute of Economic Research, Valencia, Spain, December 18, 2000, published in Spanish.
84. "Government Statistics: E-commerce and the Electronic Economy," paper co-authored with Marilyn E. Manser and Thomas L. Mesenbourg, Jr., presented by Mesenbourg at the Federal Economic Statistics Advisory Committee (FESAC) meeting, Bureau of Labor Statistics (BLS), Washington, DC, June 15, 2000.
85. "The Digital Economy and E-Commerce from a Measurement Perspective: Keeping Up With the Changes," co-authored with Brent Moulton, presented at the Federation of Tax Administrators Conference, Nashville, TN, September 29, 1999.
86. "The National Accounts in a Changing Economy: How BEA Measures E-Commerce," co-authored with Ann M. Lawson, and G. Christian Ehemann, paper presented at the Brookings Program on Output and Productivity Measurement in the Service Sector, Brookings Institution, Washington, DC, September 24, 1999.

Highways

87. *How Should We Measure Infrastructure? The Case of Highways and Streets*, BEA Working Paper 2022-2, with Robert Kornfeld, April 2022, also available as NBER Working Paper 30045, May 2022.
88. *Productive Highway Capital Stocks and the Contribution of Highways to Growth in GDP, Volume I*, under subcontract to Battelle Memorial Institute. subcontract no. 208937 to work order BAT-03-21, Federal Highway Administration, U.S. Department of Transportation, October 2007.
89. *Productive Highway Capital Stocks and the Contribution of Highways to Growth in GDP, Volume II, Documentation*, under subcontract to Battelle Memorial Institute, subcontract no. 208937 to work order BAT-03-21, Federal Highway Administration, U.S. Department of Transportation, October 2007.
90. *Task 1 Report, Updating Productive Highway Capital Stocks*, report written under subcontract to Battelle Memorial Institute, subcontract No. 208937, BAT-03-21, Federal Highway Administration, Department of Transportation, March 19, 2007.
91. *Productive Highway Capital Stock Measures*, report written under subcontract to Battelle Memorial Institute, contract DTFH61-97-C-00010, BAT-98-006, Federal Highway Administration, Department of Transportation, January 1999.

92. "Strategies for Measuring Productive Highway Capital Stocks," paper presented at the National Academy of Sciences (NAS), Transportation Research Board (TRB) and Bureau of Transportation Statistics Conference for Information Requirements for Transportation Economic Analysis, Irvine, CA, August 19, 1999.
93. "Productive Highway Capital Stocks Final Results," paper presented at the NBER Summer Institute, Cambridge, MA, July 20, 1999.
94. "Productive Highway Capital Stocks," paper presented at the Enos Transportation Foundation conference, Washington, DC, February 16, 1999.

R&D

95. "R&D in the National Income and Product Accounts: A First Look at Its Effect on GDP," co-authored with Sumiye Okubo, in Carol Corrado, John Haltiwanger, and Daniel Sichel, eds., *Measuring Capital in the New Economy*, CRIW/NBER, University of Chicago Press, 2005, pp. 275-316.
96. "R&D in U.S. National Accounts," co-authored with Sumiye Okubo, paper presented at the IARIW's 28th General Conference, Cork, Ireland, August 26, 2004.
97. "R&D in the National Income and Product Accounts: A First Look at Its Effect on GDP," co-authored with Sumiye Okubo, paper presented at the CRIW, NBER Conference on Measuring Capital in the New Economy, April 26-27, 2002, also presented at the Winter NBER Productivity meetings, December 6, 2002.
98. "R&D in the National Income and Product Accounts: A First Look at Its Effect on GDP," co-authored with Sumiye Okubo, November 2002 version of the above paper presented at the Winter NBER Productivity meetings, December 6, 2002.
99. "R&D Satellite Accounts and Returns to Private R&D," co-authored with Sumiye Okubo, paper presented at a Society of Government Economists (SGE) session, ASSA Annual Meeting, New Orleans, LA, January 7, 2001.
100. "Using National Accounts to Assess the Role of R&D in the U.S. Economy," paper co-authored and presented by Sumiye Okubo at the U.S.-China Joint Policy Seminar, U.S. National Science Foundation (NSF), National Natural Science Foundation of China, October 24, 2000.

Other

101. "Dale Weldeau Jorgenson (1933-2022): In Memoriam," *Review of Income and Wealth*, series 68, number 3, September 2022, pp. 830-33.
102. "Gross Domestic Product: Are Other Measures Needed?" *IZA World*, May 30, 2017, updated, May 2022, online at <https://wol.iza.org/articles/gross-domestic-product-are-other-measures-needed>.
103. Introduction to the Special Issue of the *Review of Income and Wealth* on the *Future of the National Accounts: "W(h)ither the SNA?"*, with Peter van de Ven and Ann Harrison, *Income and Wealth* series 63, supplement 2, December 2017.

104. "How to Measure Sustainable Progress," co-authored with Partha Dasgupta, Anantha Duraiappah, Shunsuke Managi, Edward Barbier, Ross Collins, Haripraya Gundimeda, Gang Liu, and Kevin J. Mumford, in *Letters, Science Magazine*, American Association for the Advancement of Science, November 13, 2015.
105. "Economic Surveys of Households and Industries," co-authored with Edward J. Spar, Chapter 31 in Payson, Steven, ed. *Public Economics in the United States: How the Federal Government Analyzes and Influences the Government, Volume 3, Statistical Measurement, Strategy Development, and Accountability in Government Economics*, Praeger, 2014, pp. 781-96.
106. "Comments on 'Productivity or Employment: Is It a Choice?'" *International Productivity Monitor*, Number 24, Spring 2013, pp. 61-64.
107. "Economic Analysis," pp. 23-27 and "Appendix A, B, C, and D," pp. 62-128 in Cutler Institute for Health and Social Policy, Muskie School of Public Service, University of Southern Maine *2012 Maine Child Support Guidelines Review and Recommendations*, Prepared for the Maine Department of Health and Human Services, Office for Family Independence, Division of Child Support Enforcement, July, 2012.
108. "National Accounts Statistics," Miodrag Lovric, ed., *International Encyclopedia of Statistical Science*, Springer-Verlag, New York, NY, 2011, pp. 937-939.
109. "Taking the Pulse of the Economy: Measuring GDP," *Journal of Economic Perspectives*, co-authored with J. Steven Landefeld and Eugene P. Seskin, Vol. 22, No. 2, Spring 2008, pp. 193-216.
110. "Accounting for Household Production: A Prototype Satellite Account Using the American Time Use Survey," co-authored with J. Steven Landefeld and Cindy M. Vojtech, *Review of Income and Wealth*, June 2009, pp. 205-25.
111. "Accounting for Nonmarket Household Production: A National Accounts Approach Using the American Time Use Survey," co-authored with J. Steven Landefeld and Cindy M. Vojtech, paper co-presented at the American Time Use Early Results Conference, Bethesda, MD, December 8-9th, 2005.
112. Panel to Study the Design of Nonmarket Accounts, Katharine G. Abraham and Christopher Mackie, eds., *Beyond the Market, Designing Nonmarket Accounts for the United States*, National Research Council of the National Academies, Committee on National Statistics, The National Academies Press, Washington, D.C., 2005. This is a panel authored book and I was a member of the panel.
113. "Bureau of Economic Analysis Disaster Damage Estimates," paper presented at the Forum on Risk Management and Assessments of Natural Hazards, Washington, DC, February 6, 2001.
114. "Ruggles & Ruggles: A National Income Accounting Partnership," *Survey of Current Business*, April 2001, pp. 14-15.
115. "The Status of Integrated Environmental and Economic Accounting in the USA," paper presented at the Environmental Valuation in Europe Workshop, Green National Accounting in Europe: Comparison of Methods and Experiences, Fondazione Eni Enrico Mattei, Milan, Italy, March 7, 2000.

116. “The Jorgenson System of National Accounting,” in Lawrence J. Lau, (ed.), *Econometrics, Volume 2: Econometrics and the Cost of Capital*, The MIT Press: Cambridge, MA, 2000, pp. 111-142.
117. “Zvi Griliches and His Contribution to Economic Measurement,” *Survey of Current Business*, January 2000, pp. 15-17.
118. “Through the Eyes of the Mentor,” *Diversity Newsletter, Working Group on Diversity Issues*, BEA, Vol. 7, No. 4, October 30, 2001.
119. *Econometrics and Data of the 9 Sector Dynamic General Equilibrium Model*, co-authored with Ernst R. Berndt, Edward A. Hudson, Dale W. Jorgenson, and Thomas M. Stoker, Final Report to the Macroeconomic Analysis Division, Energy Information Administration, Volume III, March 1981.
120. *Final Report to the Macroeconomic Analysis Division, Energy Information Administration, Volume III*, March 1981, co-authored with Ernst R. Berndt, Edward A. Hudson, Dale W. Jorgenson, and Volume III, March 1981.
121. “Appendix 1, Data Development for the DGEM Household Model,” in *The 36 Sector Model of Household Behavior*, report by Data Resources Inc. to the Applied Economics Division, Federal Preparedness Agency, General Services Administration, 1979, pp. A1-A45.
122. *The 36 Sector Model of Producer Behavior, Volume I*, Report to the Applied Economics Division, Federal Emergency Management Agency, October 31, 1979.
123. *Fuel and Energy Use in the United States*, co-authored with Dale W. Jorgenson and Frank M. Gollop, report to the U.S. Department of the Interior, July 1, 1976.

BOOK REVIEWS:

1. “Review of 'The New System of National Accounts' edited by John W. Kendrick,” *Journal of Economic Literature*, Volume XXXV, No. 4, pp. 2052-2053, December 1997.
2. “Review of 'The Total Incomes System of Accounts' by Robert Eisner,” *Journal of Economic Literature*, Volume XXIX, No. 2, pp. 609-610, June 1991.
3. “Review of 'The Economics of Invention: A Study of the Determinants of Inventive Activity' by Geoffrey Wyatt,” *Journal of Economic Literature*, Volume XVIII, No. 4, pp. 718-719, June 1988.
4. “Review of 'Modeling and Measuring Natural Resource Substitution',” *Journal of Economic Literature*, Vol. 20, No. 2, December, 1982, pp. 1603-1604.

EDITORIAL AND ADVISORY BOARDS:

Transportation Research Board, National Research Council’s Value of Transportation Infrastructure Task Force, August 2013-April 2017.
 Bureau of Transportation Statistics, U.S. Department of Transportation’s Transportation Advisory Committee, Sept. 2012 – September 2018.
 Temporary Advisory Group, Department of Commerce, National Institute of Standards and Technology, Manufacturing Extension Program, 2011-2014.
 World Wealth Report Advisory Committee, 2010-2011.
 Advisory Board, *Journal of Economic Perspectives*, 2004-2007.

Academic Advisory Panel, Federal Reserve Bank of Boston, 2005-2012.
Editorial Board, *The Review of Income and Wealth*, 2000-present.
Editorial Board, *Education Economics*, 1999-2015.
Advisory Board, *International Productivity Monitor*, 2001-present.
Group on Measurement of Non-financial Assets (Canberra group II), Organization for Economic Co-operation and Development, Expert Group advising the United Nations Statistical Commission on the revisions to the *1993 System of National Accounts, revision 1*
New England Economic Partnership Board, 2006-2010
CSWEP Board, Eastern representative 1998-2000, at-large 2002-2004.
Member of the Transportation Research Board's Committee on National Transportation Data Requirements and Programs, 1999-2008.
Ex-officio member of BEA's Diversity Working Group, 2000-2005

OTHER:

Intersecretariat Working Group on National Accounts (ISWGNA) Sub-group on Well-being and Sustainability, Education and Human Capital, United Nations Statistics Division, 2020-present.

National Academies of Sciences, Engineering, Medicine, Division of Engineering and Physical Sciences, Board on Infrastructure and the Constructed Environment
Committee on Defining a Renewal Strategy for Federal Facilities, 2019-present.

United Nations Economic Commission for Europe, Conference of European Statisticians, Task Force on Satellite Accounts for Education and Training, 2016-2018.

United Nations Economic Commission for Europe, Conference of European Statisticians, Task Force on Measuring Human Capital, 2014-2016.

Committee to review the Agricultural Productivity Program of the U.S. Department of Agriculture, 2013-2015.

Technical Advisor, Organization for Economic Co-operation and Development Human, Capital Consortium, 2009-August 2012.

OECD/United Nations Economic Commission for Europe/Eurostat on Measuring Sustainable Development, 2009-13.

Committee on National Statistics of the National Academies of Science Panel on Productivity in Higher Education, 2009-12.

National Research Council/Division of Behavioral and Social Sciences and Education of the National Academies of Science Panel on Developing Science, Technology, and Innovation Indicators for the Future, 2011-13.

Council Member, IARIW, 2006-12, 2014-2016 as past Chairperson.

American Economic Association Representative to the Council on Professional Associations on Federal Statistics, 2010-2015.

Member, American Economic Association's Economic Statistics Committee, 2006-2011.

Member, NAS CNSTAT Panel on Nonmarket Accounts, 2002-5, Panel authored book, Abraham, Katharine and Christopher Mackie (eds.) *Beyond the Market: Designing Nonmarket Accounts for the United States*, 2005.

Liaison/BEA organizer for two new advisory committees which began operation in Spring of 2000: the BEA Advisory Committee and FESAC, a joint BEA, BLS, and Census committee.

Member of the Canberra city group on capital stocks, 1999-present, acknowledged contributor to the OECD *Capital Stock Manual*, 2001.

BEA (US) representative to the London city group on environmental accounting, 1999-present, which produced *Integrated Environmental and Economic Accounting 2003*, (*SEEA 2003*), United Nations, European Commission, International Monetary Fund, OECD, World Bank, draft, 2003.

Creation and management of the ASA/BEA/NSF fellowship program which was initiated in July 1999.

Coordinator of BEA funding of research by NSF principal investigators, 1999-2005.

Designer of the CSWEP Carolyn Shaw Bell Award, given to an individual who has furthered the status of women in the economics profession, and Chair of the Award Committee, 1998-2002.

NSF Economics Program Officer who shepherded the Creating Career Opportunities for Female Economists (CCOFFE) junior faculty mentoring grant proposal through its early phase, 1996.

Facilitator at the national AEA, CSWEP, NSF, CCOFFE mentoring workshop, ASSA Annual Meeting, Chicago, IL, January 1998.

Co-organizer and Senior Mentor at the regional AEA, CSWEP, NSF, CCOFFE mentoring workshop for female assistant professors, Eastern Economic Association Meetings, March 13-14, 1999.

BEA mentoring program, 2000-2005.

Member, Integrated Management Team, Muskie School of Public Service, 2008-2014.

MEMBERSHIPS:

American Economic Association
Research Associate, NBER Conference on Research in Income and Wealth, elected
International Association for Research in Income and Wealth
Research Fellow, IZA Institute of Labor Economics, elected
International Association of Feminist Economists
Committee on the Status of Women in the Economics Profession

SELECTED REVIEW ACTIVITY:

American Economic Review, Quarterly Journal of Economics,
Review of Economics and Statistics, Review of Income and Wealth, Economic Journal,
Canadian Journal of Economics, Economic Inquiry, Feminist Economics,
Quarterly Journal of Business and Economics, Journal of Productivity Analysis,
Economics Letters, Economics of Education Review, World Bank,
China Economic Review, International Productivity Monitor, Routledge, National
Science Foundation Economics Program program officer, Panelist, Professional
Opportunities for Women in Research and Education, Science of Science and Innovation
Policy, NSF/Census Research Network review, National Institutes of Health, Alfred P.
Sloan Foundation, The Glaser Progress Foundation, B.E. Press, Economic Letters,
Committee on National Statistics of the National Academies of Science, Journal of
Regional Analysis, Society of Government Economists, Transportation Research
Record/Transportation Annual Meeting, African Educational Research Journal, Journal
of Applied Econometrics, International Regional Science Review, Annals of Global
Health, Economics and Statistics, Macroeconomic Dynamics, Growth and Change: A
Journal of Urban and Regional Policy, Economics of the Household

THESIS:

The Role of Capital in U.S. Economic Growth, 1948-1976, Economics,
Boston College, July 1980.

NSF GRANTS:

“Extensions of Economic Growth Analysis: Human Capital and Computers,”
Research Opportunities for Women, Career Advancement Award,
July 1, 1989 - December 31, 1990, SES-8908462.

“U.S.-U.K. Cooperative Research: New Measures of Educational Output and Investment
for the U.K.” International Program, October 15, 1997 - September 30, 2000.

NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA GRANTS:

“China Human Capital Index System and Application Research,” Grant # 71273288, January 2013 - December 2016.

Director's Grant, “Process Management Review for Data Research Centers Sponsored by the National Natural Science Foundation,” Grant # 71740005, July 2017 - December 2018.

“Measuring Human Capital in China: Further Investigations,” Grant # 71773151, January 2018 - December 2021.

“A Study on The Measurement of Human Capital Incorporating Educational Quality and Corporate Management Skills,” Grant # 72111540274, January 2022 - December 2023.

“Population Quantity and Quality and their Role in Economic Development,” Grant # 72273163, starting from January 2023 to December 2026.

SELECTED CONTRACTS OR SUBCONTRACTS:

Consultant/Sub-contractor, CDM Smith, on project “Update of Valuation of U.S. Army Corps of Engineers Capital Stock,” CDM Smith subcontract, March 15, 2017-September 30, 2017.

“Senior Expert to Review the Results and Analysis of Human Capital Accounts,” World Bank contract, January 16, 2017-June 15, 2017.

“Human Capital: Review of Major Measures and a Proposal for a World Bank Measure,” World Bank contract, September 24, 2015-May 31, 2016.

“Update of Valuation of U.S. Army Corps of Engineers Capital Stock and Estimation of Return on Investment,” subcontract with CDM, November 2011- September 2012.

“Validation Study of the “SAS Programming and Documentation for ‘Accounting for Human Capital: Expanded Methods for Measuring Study,’” for the Bureau of Economic Analysis, September 2009-February 1, 2010.

“Analysis of Issues Related to the Strategic Multimodal Analysis,” for the Federal Highway Administration, U.S. Department of Transportation, through Battelle Memorial Institute, January 13, 2008-May 31, 2008, subcontract No. 215566, BAT-03.

“Contributions of Highway Investment to Sustainable Economic Growth,” for the Federal Highway Administration, U.S. Department of Transportation, through Battelle Memorial Institute, December 2006-October 31, 2007, subcontract No. 208937, BAT-03-21.

“Quality-Adjustment of the Public Capital Stock,” for the Federal Highway Administration, U.S. Department of Transportation, through Battelle Memorial Institute, July 1, 1997 - April 1, 1998, BAT-97-015.

COMPLETED PH.D. THESES SUPERVISED AS FIRST READER:

John Wong, *A Simulation Model of National Health Insurance*, Law, Policy and Society Program, Northeastern University, completed February 1990.

Kamlesh Misra, *A Logit Analysis of Housing Choice in Rio de Janeiro, Brazil*, Economics, Northeastern University, completed November 1990.

Caroline Beetz, *Comparative Advantage in Computer Hardware Manufacture*, Economics, Northeastern University, completed April 1991.

Anthony Carilli, *A Cross-Sectional Analysis of the Effects of Taxation on Saving: The Cost of a Flat Tax*, Economics, Northeastern University, completed February 1991.

Roland A. Santos, *The Dynamics of Banking*, Economics, Northeastern University, completed August 1992

Anthony Cicerone, *Measuring Racial Price Discrimination in the Boston Housing Market*, Economics, Northeastern University, completed February 1994.

Laura Schultz, *Measuring Rates of Return to R&D*, Economics, George Washington University, completed August 2007, (co-chair).

Nona Tsotseria, *The Chronic Care Model, How It Affects Quality of Diabetes Care For Persons With Serious Mental Illnesses In Mainecare*, Public Policy, Muskie School of Public Service, University of Southern Maine, completed April 2013.

Lisa Pohlmann, *Women Leaders of Environmental Advocacy Organizations: A Qualitative Study*, Public Policy, Muskie School of Public Service, University of Southern Maine, completed December 2013.

Barbara Granville, *The Personal and Professional Characteristics of Master Therapists*, Public Policy, Muskie School of Public Service, University of Southern Maine, completed December 2014.

Mary DeRose, *A Place Called Crockett's Corner: A Case Study of Landscape Change in a Defined Area of South Portland, Maine, 1624-2013*, Muskie School of Public Service, University of Southern Maine, completed December 2015.

COURSES TAUGHT:

Microeconomics: Principles, Intermediate, Introductory Graduate, MA, MBA, Ph.D.; Industrial Organization, Regulation and Antitrust, Women in the Labor Force, Government Expenditures, and Taxation, undergraduate; Money and Banking, undergraduate, Health Economics and Public Policy, MBA; Government Expenditures and Taxation, MA/Ph.D.; Computer Training for Economists, MA, Ph.D., MBA Economics, Research Design, MA, Economics and Public Policy, MA., Economic Foundations for Public Policy Research, Ph.D., Applied Statistics for Management and Policy, MA; Seminar in Quantitative Methods (Statistics), Ph.D., Advanced Quantitative Methods (Regression Analysis), Ph.D., Economic and Business Data and Methodology, BA, MA, An Introduction to National Accounts BA, MA, Ph.D. (Joint Program in Survey Methodology one day course), National Income Statistics (online 3-week course through statistics.com, open to anyone), Co-taught Topics in Human Capital, MA level, Co-taught Topics in Labor Economics, MA level.

ATHLETE:

Competed in the first sanctioned Women's National Rowing Championship in 1966. Five national champion lightweight sculling titles (single dash, double, and quad), 1967-69.

Aldina Nash Award, Lake Washington Rowing Club, 1968.

Traveled to the European Championships in Klagenfurt, Austria as an alternate, second sanctioned Women's U.S. National Rowing Team, 1969.

Umpire, Head of the Charles Rowing Regatta, 1990-present.

Inducted into the Wellesley College's Athletic Hall of Fame as a rower, October 15, 2016.

Rowed in the Head of the Charles rowing regatta on October 22, 2017.