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EDUCATIONAL BACKGROUND

Ph.D., University of Pittsburgh (1976) Economics
M.A., University of Pittsburgh (1975) Economics
B.A., University of Pittsburgh (1972) Economics, Philosophy

Fields of Specialization

Urban/Regional Economics
Econometrics
Macroeconomics

HONORS AND SPECIAL RECOGNITIONS:

Fellow of Regional Science Association International, Elected 2010

Senior Fellow, The Rimini Center for Economic Analysis

PROFESSIONAL EXPERIENCE

Current Position: Emeritus Economist
Federal Reserve Bank of Philadelphia

Affiliations: Fellow, Regional Science Association International
Senior Fellow, Rimini Centre for Economic Analysis

Associate Editor: Journal of Regional Science, Appointed June 1994
Regional Science and Urban Economics, Appointed November 2010.
Journal of Urban Economics, 2012

Previous Positions: January 2018 - December 2018
Adjunct Professor
Finance Department Wharton School
University of Pennsylvania

January 1999 - December 2004
Adjunct Professor
Real Estate Department
Wharton School
University of Pennsylvania

University of Pennsylvania
September 1993 - December 1993
Adjunct Instructor
Department of Economics
Temple University

July 1991 - July 1993
January 1994 – December 1997
Adjunct Associate Professor
Real Estate Center
Department of Finance
Wharton School
University of Pennsylvania.

January 2004 – October 2017 Senior Economic Advisor
and Economist Federal Reserve Bank of Philadelphia

June 1992 - January 2003
Economic Advisor - Federal Reserve Bank of Philadelphia

January 1984 - June 1992
Senior Economist and Research Advisor - Federal Reserve
Bank of Philadelphia

January 1981 - December 1983
Senior Economist-Federal Reserve Bank of Philadelphia

September 1981 - May 1991
Lecturer in Finance
Wharton School
University of Pennsylvania

August 1978 - December 1980
Assistant Professor, Department of Economics and Fellow, Center for
Metropolitan Studies, University of Missouri- St Louis.

September 1977 - August 1978
Assistant Professor, Department of Economics
University of Missouri - Kansas City

September 1976 - 1977
Assistant Professor, Department of Economics, Florida

International University, Miami, Florida

September 1972 - 1976

Teaching Fellowship, Department of Economics
University of Pittsburgh

Courses Taught:

Principles of Economics - Macro
Intermediate Macroeconomics
Urban Economics
Econometrics (Graduate Level)
Intermediate Macroeconomics (MBA Program)
Intermediate Microeconomic (MBA Program)
Urban Real Estate Economics (Undergraduate and MBA Programs)
Urban Economics (Ph.D. Level)

RESEARCH AND SCHOLARLY ACTIVITY

Publications

Books:

Economies of Scale in Manufacturing Location: Theory and Measurements, Leiden, The Netherlands: Martinus Nijhoff, 1978.

Articles:

"Increasing Returns to Scale in Metropolitan Manufacturing," *Journal of Regional Sciences*, Vol. 19, No. 3, 1979, pp. 363-373.

"Contrasts in Agglomeration: New York and Pittsburgh: Reconsidered," *Urban Studies*, Vol. 17, 1980, pp. 343-51.

"Interest Rate Effects and Intertemporal Consumption," *Journal of Monetary Economics*, Vol. 9, No. 2, 1982, pp. 223-234.

"Manufacturing Agglomeration Economies as Returns to Scale: A Production Function Approach," *Papers, Regional Science Association*, Vol. 50, 1982, pp. 96-108.

"Do Metropolitan Areas Matter?" *Modeling and Simulation*, Vol. 15, No. 1, 1984, pp. 247-252, with Edwin S. Mills.

"Declining City Productivity and the Growth of Rural Regions: A Test of Alternative Explanations," *Journal of Urban Economics*, Vol. 18, No. 1, 1985, pp. 11-27.

"Is There a Role for Public Policy in Regional Economic Growth?" *Modeling and Simulation*, Vol. 16, No. 1, 1985, pp. 251-259, with Edwin S.

Mills.

"The Determinants of County Growth," *Journal of Regional Science*, Vol. 27, No. 1, 1987, pp. 39-54, with Edwin S. Mills; reprinted in David A. Plane, Lawrence D. Mann, Kenneth Button and Peter Nijkamp(editors) *Regional Planning, Classics in Planning*, vol.4, Northampton, MA: Edward Elgar Publishing, 2007.

"Comparisons of Agglomeration or What Chinitz Really Said: Reply," *Urban Studies*, Vol. 24, 1987, pp. 75-76.

"Interregional Flows of Funds as a Measure of Economic Integration, in the United States," *Journal of Urban Economics*, vol. 26, No. 1, July 1989, pp. 20-29, with Richard Lang.

"Regional Impacts of Exchange Rate Movements," *Regional Science Perspectives*, Vol. 20, No. 1, 1990, pp. 89-102, with Brian Cody and Richard Voith.

"Urban Agglomeration Economies in the Presence of Technical Change," *Journal of Urban Economics*, vol. 29, No. 1, January 1991, pp. 82-95, with Paul S. Calem.

"The Concentration/conduct Relationship in Bank Deposit Markets," *The Review of Economics and Statistics*, Vol. 73, No. 2, May 1991, pp. 268-276, with Paul Calem.

"Accounting for Differences in Aggregate State Productivity," *Regional Science and Urban Economics*, vol. 22, No. 4, December 1992, pp. 597-617, with Richard Voith).

"Are Regional Incomes Converging? A Time Series Analysis," *Journal of Monetary Economics* Vol. 32, 1993, pp. 335-346, with Leonard Mills.

"The Effects of Exchange Rate and Relative Productivity Changes on U.S. Output at the State Level," *Urban Studies*, Vol. 31, No. 2, March 1994, pp. 219-232, with Brian Cody and Richard Voith.

"Regional Income Dynamics," *Journal of Urban Economics*, Vol. 37, No. 1, January 1995, pp. 88-106, with Robert DeFina.

"Testing Neoclassical Convergence in Regional Incomes and Earnings," *Regional Science and Urban Economics* Vol. 26, No. 6, December 1996, pp. 565-90, with Leonard Mills.

"Convergence and the U.S. States: A Time Series Analysis," *Journal of Regional Science* Vol. 36, No. 4, 1996, pp. 597-616, with Leonard Mills.

"Are Regional Incomes Converging? Some Further Evidence: Reply" *Journal of Monetary Economics* Vol. 32, No. 3, December 1996, pp. 599-602, with Leonard Mills.

"The Differential Regional Effects of Monetary Policy: Evidence from the U.S. States," *The Review of Economics and Statistics*, Vol. 80, No. 4, November 1998, pp.572-587, with Robert DeFina.

"The Differential Effects of Monetary: Evidence from the U.S. States," *Journal of Regional Science*, Vol. 39, No. 2, May 1999, pp. 339-358, with Robert DeFina.

"Regional Income Fluctuations: Common Trends and Common Cycles," *The Review of Economics and Statistics*, Vol. 83, No. 3, August 2001, pp. 446-56, with Keith Sill.

"Aggregate Employment Growth and the Deconcentration of Metropolitan Employment," *Journal of Monetary Economics*, Vol. 48, No. 3, December 2001, pp. 549-83, with Satyajit Chatterjee.

"Sectoral Shocks and Metropolitan Employment Growth," *Journal of Urban Economics*, Vol. 50, 2001, pp. 396-417, with Robert DeFina and Keith Sill.

"Employment Deconcentration: A New Perspective on America's Postwar Urban Evolution," *Journal of Regional Science*, Vol. 42, No. 3, August 2002, pp. 455-75, with Satyajit Chatterjee.

"How Strong is Co-Movement in Employment Over the Business Cycle? Evidence from State/Sector Data," *Journal of Urban Economics*, Vol.55, 2004, pp. 298-315, with Robert DeFina.

"Compensating Differentials and the Social Benefits of the NFL," *Journal of Urban Economics*, Vol. 56, 2004, pp. 25-50, with N. Ed Coulson

"Compensating Differentials and the Social Benefits of the NFL: Reply," *Journal of Urban Economics*, Vol. 60, 2006, pp. 132-138, with N. Ed Coulson

"Urban Density and the Rate of Innovation," *Journal of Urban Economics*, Vol. 61, 2007, pp 389-419, with Robert Hunt and Satyajit Chatterjee. Reprinted in Philip McCann (editor) *New Developments in Spatial Economics and Economic Geography*, Northampton, MA: Edward Elgar Publishing Limited, 2013.

"The Long and Large Decline in State Employment Growth Volatility," *Journal of Money Credit and Banking*, Vol. 45, 2013, pp. 521-534, with

Robert DeFina and Keith Sill.

“Local Deficits and Local Jobs: Can U.S. States Stabilize Their Own Economies” *Journal of Monetary Economics* Vol. 60:5, July 2013, pp. 517-530, with Robert Inman.

“Fiscal Stimulus in Economic Unions: What Role for States,” *Tax Policy and the Economy*, Vol. 30, 2016, pp. 1-50, with Robert Inman.

“The Agglomeration of American R&D Labs,” *Journal of Urban Economics*, Vol. 101, 2017, pp. 14-26, with Kristy Buzard, Jake Carr, Robert Hunt, and Tony Smith.

“Beautiful City: Leisure Amenities and Urban Growth,” *Journal of Regional Science*, Vol. 59 (3), 2019, pp. 361-408, with Albert Saiz.

Book Chapters:

“Dynamics of County Growth,” in, Ake Anderson, David Batten, Borje Johansson, and Peter Nijkamp (eds.), *Advances in Spatial Theory and Dynamics*, Studies in Regional and Urban Economics, No. 20, New York: Elsevier/North-Holland, 1989, with Edwin S. Mills.

"Monetary Policy and the U.S. States and Regions: Some Implications for European Monetary Union," in J. Von Hagen and C. Waller (eds.) *Regional Aspects of Monetary Policy in Europe*, Kluwer Academic Publishers, 2000.

"Macroeconomic Analysis Using Regional Data: An Application to Monetary Policy," in Richard Arnott and Daniel McMillen (eds.) *A Companion to Urban Economics*, Oxford: Blackwell-Synergy, 2007, pp. 440-459, with Robert DeFina.

“What Explains the Quantity and Quality of Local Inventive Activity?” Brookings-Wharton, *Papers on Urban Affairs* (2009) pp.65-124, with Robert Hunt.

“The Geography of Research and Development Activity in the U.S.” In *Handbook of Economic Geography and Industry Studies*,” Frank Giarratani, Geoff Hewings, and Philip McCann, eds. Cheltenham: Edward Elgar Publishing (2013) with Kristy Buzard.

“Agglomeration and Innovation” in *Handbook of Regional and Urban Economics*, Vols. 5A, G. Duranton, V.J. Henderson, and W. Strange (eds.), Elsevier Science B.V, (2015) with William Kerr.

Other Publications:

"From Centralization to Deconcentration: Economic Activity Spreads Out", *Business Review*, Federal Reserve Bank of Philadelphia, May/June 1982.

"New Employment Growth Trends: The U.S. and the Third District," *Business Review*, Federal Reserve Bank of Philadelphia, September/October 1983; Excerpted in *Penn Forum*, Vol. 1, No. 4, November 1983.

"Do Public Policies Affect Country Growth?" *Business Review*, Federal Reserve Bank of Philadelphia, July/August 1985, with Edwin S. Mills.

"Do Regional Wages Differ?" *Business Review*, Federal Reserve Bank of Philadelphia, July/August 1986, pp. 17-25.

"Productivity in Cities: Does City Size Matter," *Business Review*, Federal Reserve Bank of Philadelphia, November/December 1987, pp. 3-12.

"What Can Output Measures Tell Us About Deindustrialization in the National and its Regions?" *Business Review*, Federal Reserve Bank of Philadelphia, January/February 1989, pp. 17-25; reprinted in Rubin E. Slesinger and Robert Sinclair (editors) *Readings in Current Economics*, Redding, California: CAT Publishing Co., 1990.

"Should States Fear the Effects of a Changing Dollar?" *Business Review*, Federal Reserve Bank of Philadelphia, September/October 1990, pp. 3-12.

"Are Regional Per Capita Earnings Diverging?" *Business Review*, Federal Reserve Bank of Philadelphia, March/April 1992, pp. 3-12.

"Highways and Education: The Road to Productivity?" *Business Review*, Federal Reserve Bank of Philadelphia, September/October 1993.

"Do Education and Training Lead to Faster Growth in Cities?" *Business Review*, Federal Reserve Bank of Philadelphia, January/February 1995, pp 15-22.

"Does Monetary Policy Have Differential Regional Effect?" *Business Review*, Federal Reserve Bank of Philadelphia, March/April 1996, pp 17-27, with Robert DeFina.

"Regional Economies: Separating Trends from Cycles" *Business Review*, Federal Reserve Bank of Philadelphia, May/June 1997, pp 19-31, with Keith Sill.

"Trends in Metropolitan Employment Growth," *Business Review*, Federal Reserve Bank of Philadelphia, July/August 1998, pp 19-31.

"Do States Respond Differently to Changes in Monetary Policy Effect?" *Business Review*, Federal Reserve Bank of Philadelphia, July/August 1999, pp 17-27, with Robert DeFina.

"From Centralization to Deconcentration: People and Jobs Spread Out" *Business Review*, Federal Reserve Bank of Philadelphia, November/December 2000, pp 15-27.

"Knowledge Spillovers: Cities' Role in the New Economy," *Business Review*, Federal Reserve Bank of Philadelphia, First Quarter 2001, pp. 17- 26.

"A Confluence of Events? Explaining Fluctuations in Local Employment" *Business Review*, Federal Reserve Bank of Philadelphia, First Quarter 2003, pp. 6-12.

"Should Cities Be Ready for Some Football? Assessing the Social Benefits of Hosting an NFL Team," *Business Review*, Federal Reserve Bank of Philadelphia, Second Quarter 2004, pp. 7-17, with Ed Coulson.

"The Economic Role of Cities in the 21st Century," Federal Reserve Bank of Philadelphia *Business Review* (Third Quarter 2005). pp. 9-15.

"The Great Moderation in Economic Volatility: A View from the States," Federal Reserve Bank of Philadelphia *Business Review* (First Quarter 2007), pp. 11-19.

"The Geography of Research and Development Activity in the U.S." (with Kristy Buzard) Federal Reserve Bank of Philadelphia *Business Review* (Third Quarter 2008). pp. 1-11.

"Three Keys to the City: Resources, Agglomeration Economies, and Sorting," Federal Reserve Bank of Philadelphia, *Business Review* (Third Quarter 2011).

"Clusters of Knowledge: R&D Proximity and the Spillover Effect," Federal Reserve Bank of Philadelphia, *Business Review* (Third Quarter 2013), with Jake K. Carr.

"New Ideas in the Air: Cities and Economic Growth" Federal Reserve Bank of Philadelphia, *Business Review* (Fourth Quarter 2014).

"Did the Fiscal Stimulus Work?" *Economic Insights*, First Quarter 2017 Vol. 2, Issue 1 pp. 6-16.

Current Research“

“Localized Knowledge Spillovers: Evidence from the Spatial Clustering of R&D Labs and Patent Citations,” with Kristy Buzard, Jake Carr, Bob Hunt and Tony Smith, Revised and resubmitted to *Regional Science and Urban Economics* (September 24, 2019).

“The Role of Startups for Local Labor markets.” With Thorsten Drautzburg, Revised and resubmitted to *Journal of Applied Econometrics* (September 26, 2019)

“Do Non-Compete Covenants Influence State Startup Activity? Evidence from the Michigan Experiment,” Working Paper No. 17-30, Department of Research, Federal Reserve Bank of Philadelphia.