

Zvi Griliches, 1930–99

Zvi Griliches and His Contributions to Economic Measurement

IN MARCH 1998, Zvi Griliches opened the Conference on Research in Income and Wealth's meeting on "New Directions in Productivity Analysis" by remembering three economists—Theodore Schultz, Edwin Mansfield, and Edward Denison—who had recently died and who were important in the development of the topic and to his own career.¹ Sadly, we now add Griliches' name to his list of important contributors to economic measurement who are no longer with us.

Griliches was born in Kaunas, Lithuania. In 1941, the Nazis forced his family to resettle in a Jewish ghetto, and in June 1944, the Griliches family was sent to a concentration camp, where his parents died. Educated at Hebrew University in Israel, in 1951, Griliches won a scholarship in agricultural economics to the University of California at Berkeley. After earning an M.S., he moved to the University of Chicago in 1955; there, as a pupil of Theodore Schultz, he earned an M.A. and a Ph.D. in economics and became a tenured faculty member. In 1965, he won the John Bates Clark Medal of the American Economic Association, an award to "that economist under the age of forty who is adjudged to have made a significant contribution to economic thought and knowledge."² In 1969, he moved to Harvard University, where he remained for the rest of his career. In 1975, he served as the president of the Econometric Society and was elected to the National Academy of Sciences. From 1978 until recently, he was Director of the National Bureau of Economic Research's (NBER's) Productivity and Technical Change Program. In 1993, he served as the president of the American Economic Association.

Griliches, an econometrician par excellence, cared deeply about, investigated critically, and devoted much time to assembling large data sets for his econometric models. Data sources and data methodologies were as important to him as econometric techniques. He devoted his presidential address to the January 1994 meeting of the American Economic Association to measurement issues. In this address, he worried that measurement problems have become more severe, positing that "the fraction of the economy for which the productivity numbers are half reasonable had fallen to below one-third" from about one-half

in the early post-World War II period.³ He cataloged data problems that ranged from those affecting price statistics and national accounts estimates to those with the measurement of R&D and with the lack of adequate responses to government surveys. He then went on to speculate why the data were not better in spite of studies by prestigious commissions and committees every decade or so since 1961: Really hard measurement problems, underfunding of statistical agencies who have little clout in Washington, and insufficient "emphasis on the value of data and data collection in our training of graduate students and in the reward structure of our profession."⁴ Even when addressing econometricians, as in his essay "Economic Data Issues" in the *Handbook of Econometrics*, he stressed the importance of data.⁵

Through his research, his participation on various committees and commissions concerned with measurement, and his direct interaction with other scholars and with BEA staff, Griliches had a significant influence on BEA's estimates and programs.

As an economist who recognized the importance of measurement, he studied the methodologies that underlie the estimates of technical change, real output, and productivity. At the macro level, he partnered with Dale Jorgenson to publish estimates of total output, input, and productivity for the U.S. private domestic economy.⁶ These estimates were primarily based on such BEA national accounts estimates as real gross domestic product (GDP), investment, capital stocks, property income, and persons engaged in production. This article led to a debate on productivity measurement concepts and methodology with Edward Denison, who had worked for some 20 years at BEA and who later returned to become BEA's Associate Director for National Economic Accounts. Although BEA does not publish estimates of productivity, BEA recognized the important ramifications of the debate for the underlying national accounts data.⁷ This debate stimulated ongoing work at BEA and the Bureau of Labor Statistics (BLS) on the measurement of capital stocks, depreciation, inventories, prices, and the number and compensation of persons engaged in production.

1. See "Comments" in *New Developments in Productivity Analysis* in the selected bibliography.

2. "John Bates Clark Award, Citation on the Occasion of the Presentation of the Medal to Zvi Griliches, December 29, 1965," *American Economic Review* 56 (May 1966): 6.

3. See "Productivity, R&D, and the Data Constraint" in the selected bibliography.

4. Griliches, "Productivity," 14.

5. See the introduction "Data and econometricians—the uneasy alliance" to "Economic Data Issues" in the selected bibliography.

6. See with Dale W. Jorgenson, "The Explanation of Productivity Change" in the selected bibliography.

7. For a reprint of the debate and additional comments by the participants, see with Dale W. Jorgenson, "The Explanation of Productivity Change" and "Issues in Growth Accounting" in the selected bibliography.

NOTE.—This tribute was prepared by Barbara M. Fraumeni.

At the micro level, Griliches' research focused on hedonic price indexes and quality change, output of hard-to-measure sectors, and the problem of correctly accounting for the introduction of new goods. His pioneering 1961 paper on hedonic prices indexes for automobiles for the Stigler Commission was the catalyst for the subsequent extensive literature on the subject.⁸ Throughout his career Griliches continued to be a major force in the field of hedonics, which allow the use of "regression techniques to relate the prices of different 'models' or versions of a commodity to differences in their characteristics, 'qualities,' and discover thereby the relative valuation of such qualities..."⁹ BEA now uses hedonic-type price indexes to deflate a variety of key components of GDP. Of these, the most widely known is the index for computers and other peripheral equipment, which was originally constructed by a BEA and IBM consortium and is now constructed by BLS and embedded in their consumer price indexes (CPI's) and producer price indexes (PPI's).¹⁰ BEA also uses hedonic price indexes for other high-tech products, such as semiconductors, prepackaged software, and telecommunications equipment.¹¹ The components of personal consumption expenditures (PCE's) are primarily deflated using CPI's, which are adjusted for quality change using a combination of hedonics and other methods. For PCE, hedonic CPI's include those for televisions, apparel, rent, and used cars.¹² Hedonics are also used by the Census Bureau in calculating price indexes for single-family and multifamily structures that are used by BEA in the preparation of estimates of real gross private domestic investment.¹³ Without the introduction of hedonics that was championed by Griliches, BEA's measure of real GDP would be significantly different.

In addition, Griliches also worried about difficult-to-measure sectors, particularly the service sectors. He highlighted the importance of focusing on these sectors, prompting BEA to help sponsor a Brookings Institution workshop series on measurement in these sectors. As part of the recent comprehensive revision of the national income and product accounts, BEA introduced improved estimates of the real value of unpriced bank services. BEA is currently developing estimates of gross output for a number of

additional industries and expects to examine the measurement of activities in other service industries, such as insurance.¹⁴

Most recently, Griliches, along with Ernst Berndt, was researching the measurement problems arising from the introduction of new goods. This research, partly funded by BEA, emphasized the introduction of computers that embody new technologies and of other new products such as pharmaceuticals.

Griliches' work on various committees is a major part of his legacy to economic measurement. In 1995-96, the most recent of his frequent involvements in reviews of measurement problems, he served on the U.S. Senate Finance Committee's Advisory Commission to Study the Consumer Price Index.¹⁵ Earlier, Griliches had served on several National Academy Sciences committees: The Committee on Ability Testing in 1978-82, the Committee on National Statistics in 1979-82, and the Committee on Science, Engineering, and Public Policy in 1984-88. For the American Economic Association, he was a member of the U.S. Census Advisory Committee in 1970-72 and in 1981-83 and a member of the Committee on the Quality of Economic Statistics in 1988-89. In addition, he served on the Secretary of Commerce's Advisory Committee on Industrial Innovation in 1978-80, on the Statistics Canada Price Measurement Advisory Committee in 1995, and on the Executive Committee of the Conference on Research in Income and Wealth beginning in 1978. Most recently, he was asked to serve on the new BEA Advisory Committee, which is now being formed.

The full extent of Griliches' impact on economic measurement may be difficult to assess because many economists have been influenced by his research and by direct interaction with him. For example, Griliches was an omnipresent force at the NBER Productivity Meetings. He could be depended upon to astutely assess the strengths and weaknesses of any paper or research proposal, including his own. Typically, he would smile broadly and then offer comments that would spark critical debate. Arguably, it was through these meetings that he exerted the greatest effect on the research programs and agendas undertaken by those from both within and outside the Harvard community.

Griliches' presence and his advice will be sorely missed, but his influence on economic measurement will continue through the researchers he has trained to value data and measurement methodology.

8. See "Hedonic Price Indexes for Automobiles: An Econometric Analysis of Quality Change" in the selected bibliography.

9. See "Hedonic Price Indexes and the Measurement of Capital and Productivity: Some Historical Reflections" in the selected bibliography.

10. Rosanne Cole, Y.C. Chen, Joan A. Barquin-Stolleman, Ellen Dulberger, Nurhan Helvacian, and James H. Hodge, "Quality-Adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment," *SURVEY* 66 (January 1986): 41-50.

11. Bruce T. Grimm, "Price Indexes for Selected Semiconductors, 1974-96," *SURVEY* 78 (February 1998): 8-24; for software, see Brent R. Moulton, Robert P. Parker, and Eugene P. Seskin, "A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts: Definitional and Classificational Changes," *SURVEY* 79 (August 1999): 7-20.

12. Kenneth J. Stewart and Stephen B. Reed, "CPI Research Series Using Current Methods, 1978-98," *Monthly Labor Review* 122 (June 1999): 29-38.

13. Frank de Leeuw, "A Price Index for New Multifamily Housing," *SURVEY* 73 (February 1993): 33-42.

14. Brent R. Moulton and Eugene P. Seskin, "A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts: Statistical Changes," *SURVEY* 79 (October 1999): 6-17.

15. Michael Boskin, Ellen Dulberger, Robert Gordon, and Dale W. Jorgenson, *Final Report of the Advisory Commission to Study the Consumer Price Index* (Washington, DC: U.S. Government Printing Office, December 1996): 104-172.

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