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Volume Title: The Measurement of Saving, Investment, and Wealth

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Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-48468-8

Volume URL: <http://www.nber.org/books/lips89-1>

Conference Date: March 27-28, 1987

Publication Date: 1989

Chapter Title: Introduction to "The Measurement of Saving, Investment, and Wealth"

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Chapter URL: <http://www.nber.org/chapters/c8116>

Chapter pages in book: (p. 1 - 20)

Introduction

Robert E. Lipsey and Helen Stone Tice

The distinction between current consumption and saving, or putting aside for the future, has been with us for ages. It was the basis for Joseph's solution to the seven lean years he foresaw (Gen. 41:34–36) and for Aesop's fable of the ant and the grasshopper. Yet we still do not seem to have got it right, conceptually or empirically.

This distinction is central to macroeconomics and to the analysis of economic growth. In some theories of economic development, it is the crucial factor or even virtually the only one. It has figured prominently in the policy discussion about changes in U.S. tax laws, about the U.S. budget and trade deficits and possible cures for them, and in the analysis of the slowness of U.S. economic growth relative to that of other countries.

Despite the importance and venerability of the issue, there is probably no other concept for which U.S. official agencies issue annual estimates that differ by more than one-third, as they have done for net household saving. And there is probably no other concept for which reputable scholars claim that the correct measure is close to ten times the officially published one.

The Conference on Research in Income and Wealth has a long tradition of interest in these matters, and the 1987 Conference on the Measurement of Saving, Investment, and Wealth carried on this tradition with two major objectives. One was to look for ways to improve aggregate and sectoral saving and investment estimates, which have long been notorious for the size of discrepancies among different versions, for the size of revisions as new data accumulated, and for major disagreements about concepts. The second was to assess some of the new microdata on household wealth that have been provided by recent surveys, presumably much superior to earlier ones. The two objectives

were not entirely independent; it was hoped that the improved survey data might contribute also to solving some of the mysteries in the aggregate saving and wealth data.

Existing statistics on saving have a bad reputation among economists. Despite considerable interest in having accurate measures of saving for policy making and for economic analysis, the official measures of saving are criticized for errors both in concepts and in the statistical realization of those concepts. The data should have improved since 1955, when the Federal Reserve Board's Consultant Committee reported that the federal government's expenditures on statistics of saving were "extraordinarily small . . . not much in excess of \$20,000 per year . . . and . . . declining."

The macroeconomic measures most often cited are two components of the national income and product accounts (NIPAs)—personal saving and gross private saving; these measures are derived from the current account as incomes less current expenditures. Alternatively, aggregate saving can be measured from the capital account as the change in net wealth; such measures for nontangible types of saving are presented in the flow of funds accounts (FFAs) for various sectors. Although, in principle, these two approaches should yield the same results, in fact they do not in the United States and in a number of other countries as well; the differences are enormous at times. Part of the conference was therefore devoted to examining these largely statistical differences and attempting to account for them and to reduce them. In addition, some have proposed extensions to the saving concepts used in the "official" NIPA and FFA measures; the conference also considered some of these extensions and the effect of alternative definitions of saving and capital formation on the historical record.

Microeconomic research on household saving behavior has been enriched in recent years by the addition of several new data sets, which provide some types of data not previously available as well as affording a test of the applicability of results obtained from earlier surveys to a period far from the sample period. The conference focused on two of these in particular, the Survey of Income and Program Participation (SIPP), an ongoing survey at the Census Bureau, the first wave of which was carried out in 1984, and the Survey of Consumer Finances (SCF) for 1983, a much larger and more elaborate version of a survey conducted periodically for the Board of Governors of the Federal Reserve System by the Survey Research Center at the University of Michigan. Both of these were examined in detail in papers by those responsible for them, and both of them were used for one or more of the other papers at the conference.

Aside from the review of new microdata sets, the statistical issues we thought of as most in need of discussion and solution were the

continuing enormous discrepancies between NIPA and FFA saving estimates and the large discrepancies in international accounts that might have involved errors in the measurement of international saving and investment flows. On the conceptual side, we hoped for a discussion of the suitability of current definitions of saving and investment and particularly for some authoritative estimates of broader alternative concepts. Both the statistical and the conceptual issues had been raised at earlier conferences, and we wished to see the extent to which the current knowledge had improved.

As the reader will see, we made a little progress on the U.S. NIPA-FFA discrepancy but, to our regret, added only fragmentary information on the experience of foreign countries and none on developed countries, many of which must have faced the same problems. We also made some progress in assessing the effect of including consumer durables, government purchases of capital assets, and human capital in investment and including pension assets in personal saving and wealth. On some issues, however, we were not able to make any progress, even though their significance had been established at earlier conferences. The technical problems involved in broadening the investment concept to include expenditures on research and development and the accompanying problems of deflation of such expenditures and rates of depreciation on research and development capital received little attention in the proposals submitted, although there has been a good deal of recent research on these topics. We were also disappointed to receive very few proposals on international aspects of saving and investment measurement.

Historical Background

Since its founding half a century ago, the Conference on Research in Income and Wealth has examined a number of aspects of the measurement of saving, investment, and wealth. Conferences have at times focused on income and its constituents and at others on wealth; other conferences have examined aggregates, and still others have looked at distributional questions. This volume continues this tradition of looking at a number of dimensions of saving and wealth measurement; indeed, almost the only topic that it does not revisit is the measurement of national and sectoral wealth.

The first ten volumes included little on either wealth or saving, the main exceptions being Simon Kuznets's "On the Measurement of National Wealth" in volume 2 and, in volume 3, two papers on methods of estimating the distribution of wealth by C. L. Merwin, Jr., and by Charles Stewart and one on the volume and composition of saving by

Raymond Goldsmith. The assessment of the statistical quality of wealth distributions by Merwin was, in his own words, gloomy. That was not only because of "a paucity of pertinent data" (28) but also because there was little agreement on the definition of wealth or on the unit (families, individuals, estates) to be used for wealth distribution measures and, finally, because he questioned "the intrinsic usefulness of a distribution of wealth, when a distribution of income is contemporaneously available" (29).

The first paper on the distribution of saving, by Dorothy Brady and Rose Friedman, appeared in volume 10. It made use of what were described as the first large studies, done in the mid-1930s, to obtain direct estimates of saving, including data on saving through specific assets and liabilities. Volume 11 included Franco Modigliani's famous paper "Fluctuations in the Saving-Income Ratio," which, aside from its main points, included a plaintive note about the drastic revisions in official estimates of saving, including "its effect on the morale of the econometricians who put confidence in the old estimates."

After that, there was a major shift of the Conference's attention toward wealth. Volumes 12 and 14, covering the 1948 and 1950 meetings, were entirely devoted to wealth measurement. The introduction to the first of these by Morris Copeland referred to the neglect of wealth in the first decade of the Income and Wealth Conference and quoted an unpublished paper by Martin Gainsbrugh at the 1946 Conference characterizing wealth measurement as "the submerged half of the charter originally envisaged for the Conference." Volume 12 was on the measurement of aggregate national wealth and the aggregate wealth of various sectors. Volume 14 included theoretical discussions of the role of wealth and assets in economic behavior and papers on the measurement of both aggregate wealth and assets by type and of the distribution of wealth. The latter were based on estate tax data but did not include the tests of coverage by comparison with aggregates that became standard practice later.

Volume 15 included two papers on the distribution of saving by Janet Fisher and by Dorothy Brady that made extensive use of large-scale surveys of saving and wealth, among which were the prewar surveys of consumer expenditure and the postwar surveys of liquid assets and consumer finances conducted by the Survey Research Center of the University of Michigan, the first of a long line that extends to the present volume. The paper by Janet Fisher included many references to "the family life cycle" and to the fact that average saving rates continued to be positive after age sixty-five and, surprisingly, did not decline greatly from the peak levels. It also included warnings that have become familiar about the probable underrepresentation of the rich elderly population.

The attention of the Conference subsequently shifted to the measurement of capital formation. Volume 19, *Problems of Capital Formation*, edited by Franco Modigliani, considered two major issues. One of these, the calculation of depreciation in current prices, has since been enshrined in the U.S. NIPAs, although the treatment of the real capital gains implied by that estimate of depreciation remains a controversial issue. The other major issue was the treatment of quality change in capital goods in measuring capital formation. That issue, while it has recurred in later conferences, was not part of the current conference.

Volume 22, *A Critique of the National Income and Product Accounts*, edited by Joseph A. Pechman, naturally included some suggestions for expanding the official definition of capital formation. These included the addition of research and development expenditures and consumer durables and also an estimate of government capital formation. All these proposals return in the present Conference in the papers by Boskin, Robinson, and Huber; Holloway; Jorgenson and Fraumeni; and Hendershott and Peek, all supplying some such estimates. Volume 25, *Input, Output, and Productivity Measurement*, edited by John W. Kendrick, included more discussion of capital aggregates, in papers by Richard and Nancy Ruggles and by Daniel Creamer.

The next topic to occupy the Conference at several sessions was the use of consumer surveys as a source of information for social accounting. In volume 26, *The Flow of Funds Approach to Social Accounting*, edited by Vito Natrella, Arthur Broida pointed out the failure to use data from the University of Michigan's SCF in the FFAs and attributed that failure to a judgment that survey data were inaccurate. He included a discussion of the apparent understatements in asset holdings that would be implied in totals calculated from surveys, judging the inaccuracy by comparison with aggregates. That issue is another of the ones that recur in the present conference, only this time with at least some suggestion that it is now the aggregate estimates that should be judged by comparison with the surveys. Volume 29, *Measuring the Nation's Wealth*, included a paper on household wealth by F. Thomas Juster that emphasized the need for surveys overweighted with high-income families to estimate holdings of financial assets, a topic that plays a major role in the discussion at the present conference. The same paper included two suggestions that were more radical and are not repeated here. One was that surveys of tangible assets could better ask for characteristics of the assets, from which the surveyor could estimate value, rather than asking for value directly. The second was that surveys should collect, at the same time, information on individuals' levels of education that would give the survey takers the ability to estimate stocks of educational capital.

The Conference returned to issues of distribution in 1967 in *Six Papers on the Size Distribution of Wealth and Income*, edited by Lee Soltow (vol. 33). Some of the themes of the present conference appeared here, twenty years earlier, mainly in the paper "A Cohort Analysis of Changes in the Distribution of Wealth" by John B. Lansing and John Sonqvist, and in the comments by E. Scott Maynes. One was the difference between results from cross sections and those from following groups of individuals over time and the difficulty of inferring one from the other, an issue explored in the Jianakoplos, Menchik, and Irvine paper at this conference. A second is the unimportance of inheritances as a determinant of the wealth of the great majority of households (excluding the very wealthy), the question discussed here by Hurd and Mundaca. A third is the sensitivity of measures of wealth inequality to chance variability among the very small numbers of the highest-income households reached in a random sample, the problem discussed currently by Curtin, Juster, and Morgan and by McNeil and Lamas at this meeting.

Attention then again shifted to the measurement of aggregates. Volume 34, *Production and Productivity in the Service Industries*, edited by Victor Fuchs, included a paper on the measurement of the real output and productivity of commercial banks. As in the paper by Rymes in the current volume, the author of that paper, John Gorman, appealed to monetary theory to support one proposal for measurement, although, also as in the present volume, the discussants were far from convinced of the value of the method proposed. Volume 35, *Education, Income, and Human Capital*, edited by W. Lee Hansen, was the first Income and Wealth conference to devote attention to investment in human capital, the main subject of the paper by Jorgensen and Fraumeni in this volume. Even the term "human capital" was hardly, if ever, used in the earlier conferences, although some of the ideas were, of course, implied in the discussions of the relation between education levels and income.

In volume 38, *The Measurement of Economic and Social Performance*, edited by Milton Moss, the lead paper by F. Thomas Juster again drew attention to major omissions from the official measures of capital formation, namely investment in consumer durables, in government capital, and in intangible capital assets resulting from research and development, education, and training. He and others at the conference also brought up a relatively new theme: the idea of capital in the form of environmental quality that might be added to or used up and of the capital incorporated in social and political institutions. The stock of consumer durables, proposed earlier as a part of wealth, is estimated in Juster's paper; and, in the paper by Christensen and Jor-

genson, methods are outlined for extending the accounting framework to include investment in human capital and research and development, the former of which is accomplished in the paper by Jorgenson and Fraumeni in the present volume. A number of suggestions of the other papers were carried out in the paper "Is Growth Obsolete?" by James Tobin and William Nordhaus.

The 1972 Income and Wealth conference on *The Personal Distribution of Income and Wealth*, edited by James D. Smith (vol. 39), included several papers on wealth distribution, and another conference on distribution was held in 1974, *The Distribution of Economic Well-Being*, edited by Juster (vol. 41). The latter included two papers, one by Lawrence Osman and one by James D. Smith, Stephen Franklin, and Guy Orcutt, dealing with the importance of inheritance in the distribution of wealth, the topic discussed here in the paper by Hurd and Mundaca. Both papers gave only a small role to inheritance in general but did point to exceptions, particularly wealthy young families, for whom the result was predictable, and, more generally, families at the very upper end of the wealth distribution.

The 1975 conference on *New Developments in Productivity Measurement*, edited by John W. Kendrick and Beatrice N. Vaccara (vol. 44), contained no papers specifically devoted to saving or wealth estimation, but several of the papers inevitably bore on the subject because measures of capital input were needed for the measures of productivity. This was the case for the paper by Gollop and Jorgenson on U.S. productivity growth by industry and the international comparison by Christensen, Cummings, and Jorgenson, which form part of the series by Jorgenson and various colleagues that continues into the present volume. Both papers included measures of capital input and of labor quality, the latter reflecting the stock of human capital. Some human capital measures were also included in the paper on international comparisons of agricultural productivity by Yamada and Ruttan.

Volume 45, *The Measurement of Capital*, edited by Dan Usher, returned to some familiar issues, such as rates of depreciation, the widening of the scope of the concept of capital to include research and development and human capital, and estimation of the value of oil and gas reserves. A new proposal was Eisner's suggestion that real capital gains be treated as net investment. Perhaps as a reflection of the oil crisis and the panic over imminent exhaustion of natural resources, there was also a paper by John Soladay, "Measurement of Income and Product in the Oil and Gas Mining Industries," on measures of depletion, an important question for estimates of saving and net investment. The only previous paper in this area had been at the 1948 conference,

around the time of a previous period of worry about natural resource exhaustion. The paper by Boskin, Robinson, and Huber in the present volume includes estimates of government-owned land and mineral rights.

Volume 46, from a conference held in 1977 on *Modeling the Distribution and Intergenerational Transmission of Wealth*, edited by James D. Smith, the third in five years devoted to distribution questions, was the closest in that respect to the material of the present volume and involved several of the same authors. Several papers discussed the role of inheritance in the transmission of wealth, mainly dealing with small samples of that part of the population that did inherit rather than with the role of inheritance in the distribution of wealth in society as a whole. Several papers in that meeting discussed historical trends in wealth distribution, and two reported on synthetic distributions. James D. Smith's introduction pointed out the importance of the development of national balance sheets for the early estimates of wealth concentration, providing the aggregates for comparisons with the holdings of wealthy families and in general supplying what were thought of as more solidly based totals and distributions than could be arrived at from surveys. Now, the survey data have been developed so far that their producers are ready to claim, in this volume, that the aggregate data can be improved by using the results of the surveys, instead of the other way around.

The conference on *The U.S. National Income and Product Accounts*, edited by Murray Foss (vol. 47), in 1979 once again returned to the issue of quality adjustments in the measurement of capital goods prices, a topic of long standing with the conference, as was pointed out in the introduction. The paper by Ruggles included a set of complete household accounts covering assets and capital expenditures not treated as capital in the NIPAs and a set of revaluation accounts. The notorious discrepancies in saving estimates between the NIPAs and the FFAs, an issue we wished to investigate at this conference, were mentioned briefly by John Gorman in his discussion of the gross national product data improvement project.

The 1982 conference on *Economic Transfers in the U.S.*, edited by Marilyn Moon (vol. 49), discussed an asset item rarely included in the discussions of wealth distribution up to that time, the value of social security benefits and the corresponding payroll taxes. The 1983 conference on *Horizontal Equity, Uncertainty, and Economic Well-Being*, edited by Martin David and Timothy Smeeding (vol. 50), continued the emphasis on distributional issues and included a paper by Eugene Steuerle tying together wealth data from estate tax returns with income data for decedents and heirs. Hurd and Shoven calculated household balance sheets, including various forms of rights to pensions, social

security payments, Medicare and Medicaid, and so on. Several of the papers in this volume addressed the issue of the valuation of pension and social security wealth.

Perhaps the most striking developments in this history are the shift of interest toward distribution questions and the enormous improvement of the basic information on wealth distribution. Simon Kuznets commented in 1939, discussing Merwin's paper in volume 3, on "the daring feats of ingenuity performed by skillful statisticians in their attempts to overcome the absence of basic information." He then went on to ask, "Why was no information collected during these decades on a sufficiently comprehensive scale to make possible an acceptable distribution of income or wealth by size among individuals or families?" Among the factors he cited were the technical difficulties of obtaining information from family units that maintained no formal accounting systems and also the strong faith in the fairness of the economic system and the general attitude that the level of a person's income was the result of his efforts and was not the proper concern of the government. He attributed the development of the first large-scale surveys in the mid-1930s partly to changes in social attitudes: pessimism about future aggregate growth as a solution to social problems led to more interest in distribution and to the acceptance of a greater governmental role in affecting the distribution of consumption. In addition to the change in attitudes, there were also technical developments, including improvements in "the statistical theory that makes it possible to establish in advance the reliability of samples" and improvements in the "organizational machinery for dealing with large scale surveys" (92). Moreover, greater government involvement in distributional questions produced administrative records of certain types of income payments and of government programs to aid the distressed.

In this connection, it is interesting to note that one of the new surveys discussed in this program is the Survey of Income and Program Participation (SIPP), one of the justifications for which was to assess the coverage of government assistance programs.

There has been less obvious change on the side of aggregate saving and investment estimates, although they have undoubtedly improved in quality. One development urged in earlier conferences, the measurement of capital consumption in current prices, has been incorporated into the NIPAs, and the Commerce Department has answered the calls for data on investment in consumer durables and government capital by producing estimates for these outside the NIPAs. However, the saving data, particularly the sectoral estimates, remain a weak element in the accounts. There has been little official interest in incorporating human capital investment or other types of intangible

investment into the accounts, the quality change adjustment issue remains controversial and unsettled, and the discrepancies among saving estimates from different sources remain enormous.

Although the topics covered in this volume have much in common with those of past conferences, the papers included here also take a fresh look at several issues from a variety of perspectives. They examine major data sets in detail for their statistical properties and limitations. They discuss questions of current versus capital account measurement of saving, the treatment of pensions and pension wealth, and the scope of saving and wealth measures. Wealth estimates are developed from the new microdata on households, and a number of methodological issues are explored.

An Insider's Look at Saving Data

In this Conference, many of the major bodies of saving data receive the close examination and assessment that can be given only by an insider. The papers by Holloway, by Wilson, Freund, Yohn, and Lederer, by McNeil and Lamas, and by Curtin, Juster, and Morgan provide that kind of background for the NIPAs, the FFAs, the SIPP, and the SCF, respectively.

Thomas H. Holloway reviews the NIPA sources and statistical methods and the conventions that underlie the estimates. He examines the effect of altering some of these conventions on the story told by the official NIPA series and finds that, although there are changes in the levels of both amounts of saving and saving rates, their trends and cyclical behavior are not greatly altered. The statistical revisions of the NIPA estimates of saving have tended mainly to raise them. A point that emerges from Holloway's discussion of alternative conventions regarding sectoring and the scope of saving and investment measures is the desirability of avoiding overemphasis on single measures and of offering enough sectoral detail and estimates of the effects of alternative assumptions to permit users to construct whatever measures they prefer. Paul Wachtel makes the point even more strongly in his discussion.

John F. Wilson, James L. Freund, Frederick O. Yohn, Jr., and Walther Lederer provide a similar review of the household saving estimates from the FFAs. These, even adjusted to the NIPA definition, have typically been higher than NIPA personal saving, often by 50 percent or more in recent years. In the past, NIPA revisions have usually reduced the differences between the FFA and the NIPA saving estimates. The authors explore several potential statistical improvements in the FFAs involving reattributions of financial asset holdings toward sectors other than households that would tend in the opposite direction, that of reducing the FFA household saving estimates. They also discuss

the implications for the household account of some of the misreporting of international transactions, the subject of Stephen Taylor's paper, although George M. von Furstenberg, their discussant, offers his own speculations on this account and expresses some skepticism about the suggestions in this paper.

John M. McNeil and Enrique J. Lamas ask whether the SIPP provides useful measures of the relative net worth of various population subgroups and of year-to-year changes in net worth. They conclude that, despite limitations in coverage and underreporting, the SIPP data are useful in studying differentials in median wealth holdings among population groups. However, these limitations, the extensive use of imputations, and the sensitivity of both aggregate measures and concentration measures to the presence of high outliers, correctly or incorrectly reported, preclude the use of SIPP data in measuring the concentration of wealth or changes in wealth. A number of suggestions for changes in method and for validation research are made by Martin H. David in his discussion.

Richard T. Curtin, F. Thomas Juster, and James N. Morgan examine three recent household surveys of household net worth (SCF, PSID, and SIPP) to assess their quality and usefulness, with particular emphasis on the SCF. They conclude that the SCF, because of its heavy oversampling of high-income households, produces the most reliable estimates of wealth distribution and of wealth aggregates. However, all three surveys agree quite well in categories in which the distribution is not highly skewed and for wealth classes below the top one or two. In fact, they are sufficiently confident in the SCF to suggest that, in some categories, the household aggregates from it are more reliable than those in the FFAs. It is only recently that such a claim has been made, and the producers of the FFAs seem quite willing to consider it.

Current Account versus Capital Account Measurement of Saving

Should saving be measured from the current account or from the capital account? For individual households, only the change in wealth is generally available. In the aggregate statistics, by contrast, both methods are available. The NIPAs measure personal saving as income less current expenditures, and the estimate of saving thus includes the effects of measurement errors in both income and expenditures. Since saving is much smaller than either income or current expenditures, even small errors or revisions in those measures can produce very large errors or revisions in estimated saving. The FFAs measure financial saving through financial assets and liabilities (tangible saving is taken from the NIPAs) as the change in wealth other than revaluations. In other words, financial saving is the net acquisition of assets less the

net incurrence of liabilities; measured saving thus includes measurement errors in both acquisition and disposition of assets and issuance and retirement of liabilities. Here, too, the household sector is mostly derived as a residual, by subtracting known holdings by businesses and governments from known totals outstanding for most assets.

Despite the status of the NIPA measures as the most widely used and most "official" saving measures, a number of the participants favored the capital account view to obtain what they considered more valid measures of saving. In addition, such measures are much more easily linked to microdata from household wealth surveys, and indeed the latter data may improve the aggregate estimates, as Curtin, Juster, and Morgan observe. Richard and Nancy Ruggles, in a paper that was withdrawn after the death of Nancy Ruggles, also explored the use of the *Statistics of Income* balance sheet data for corporations, the main basis for the nonfinancial corporate sector in the FFAs, to disaggregate the saving of nonfinancial corporations along broad industry lines.

Clark W. Reynolds and Wayne Camard observe that FFA estimates have considerable potential for developing countries in addressing the role of finance in savings mobilization and in understanding the sectoral distribution of saving. Moreover, inconsistencies between capital account estimates, such as those represented by FFAs, and the current-account estimates of the NIPAs may lead to improvements in both sets of estimates, as was the experience in Colombia.

The balancing item in the NIPA foreign transactions account, net foreign investment by the United States, is conceptually equivalent to the current account balance in the balance of payments accounts or the capital account balance in the FFAs. The fact that the world has not kept track of these flows very well has been obvious from the fact that the total of these balances, conceptually zero, has approached a world net deficit of close to \$100 billion in some recent years.

Stephen Taylor looks at the implications of the recent IMF study on the world current account discrepancy for estimates of saving in the United States. The international data discrepancies since 1979 have been most pronounced in investment income accounts. They reflect the lack of consistent treatment of reinvested direct investment income, inadequate estimates of positions in interest-bearing assets, and omission of much shipping and other transportation expenses and revenues. U.S. investment income has been severely understated, but it is not clear how much the correction would increase U.S. income and saving measures. The main source of the measurement problems seems to be the enormous increase in international capital flows and in the resulting service payments and receipts. In the words of Michael P. Dooley, the discussant for Taylor's paper, these omissions are "the seeds of destruction for the usability of the data on international transactions" (p. 430).

The Measurement of Aggregate Saving: Conceptual Issues

In addition to the statistical problems encountered in the quantification of the NIPA and FFA saving measures, others have pointed out conceptual inadequacies over the years. For example, Blades and Sturm mentioned some of them in their attempt to compare saving rates internationally, such as the omission from saving of consumer investment in durables, enterprise research and development expenditures, educational expenses, and real capital gains and losses. Various papers at the Conference looked at these proposals (and other issues—nonmarket and illegal transactions, consistent pension treatment, alternative measures of government saving) and attempted to quantify the effects such changes might have on the historical record on U.S. saving rates.

The official saving measures for the United States tend to be the NIPA measures, which are shown in NIPA table 5.1. Personal saving and gross private saving are the most familiar, but certain sectoral concepts are also available—such as government saving and undistributed corporate profits and capital consumption allowances.

The NIPA convention of counting as investment only capital goods purchased by business—including the business of owner occupancy of housing—means that household saving in the form of automobiles and other consumer durable goods is excluded from both personal and private saving. The NIPA convention of counting as saving only saving out of income from current production means that saving measures exclude capital gains and exclude saving that arises from most non-market activities. The government surplus or deficit—government saving—reflects the capital formation convention and the pension attribution mentioned above.

Some of the papers propose only limited changes or question present treatment in only minor ways. Holloway's paper discusses the NIPA measures of personal saving and gross private saving; the latter is the preferable measure, in his opinion, because it is not affected by many of the imputations and attributions that make the straightforward interpretation of the personal saving measure as a measure of household saving troublesome. In particular, the distinction between personal and business components of saving by owners of noncorporate business and the treatment of the saving of pension funds, both private and public, make the measure of personal saving different from what one might think of as household saving.

Holloway shows the effects on saving rates of capitalizing consumer durable and government capital expenditures and attributing part of government pension fund saving to households. Others provide a more sweeping critique and propose more radical changes. Patric H. Hendershott and Joe Peek adjust the NIPA measures of personal and corporate saving to correct for what they view as four "measurement"—

really conceptual—errors in the official NIPA estimates. They do not make adjustments to include real capital gains or losses or investment in human capital, except to the extent that the former are incorporated in the interest rate adjustment. Personal saving is adjusted for the difference between income tax payments and actual liabilities, increased to reflect net purchases of government pension assets—including social security—and consumer durables, and reduced to reflect the portion of after tax interest income attributable to inflation. Corporate saving is increased by the portion of after tax interest expense attributable to inflation. Thus adjusted, measures of personal and private saving are only slightly below their post-1950 averages rather than greatly below, as reported in the official estimates. The adjusted measures are more volatile than the NIPA measures in the case of personal saving but less volatile in the case of corporate saving. The inflation premium adjustments remove the negative correlation between personal and corporate saving in the official figures. Frank de Leeuw raises some questions about both the social security and the inflation premium adjustments.

Thomas K. Rymes suggests that current imputations for bank output lack theoretical justification and presents two models of banking and the behavior of monetary authorities with different implications for imputation procedures, for banking output, and for rates of saving in the personal and government sectors. Anna J. Schwartz expresses skepticism about the models and their relevance to imputation. The importance of the issue for saving estimates appears to be small, but the discussion raises questions about the theoretical basis for many customary imputations. In particular, it points to the issue of the extent to which national accounting takes existing institutions for granted or values nonmarket or barter activities in relation to a theoretical norm of competitive markets or some definition of appropriate government policy.

Dale W. Jorgenson and Barbara M. Fraumeni not only broaden the official definition of investment to include human capital but measure the investment in human capital in terms of lifetime labor incomes, including nonmarket incomes, rather than in terms of the cost of such investment, as in the earlier work of Kendrick, Schultz, and others. The result is to depict 70–80 percent of “full investment” as human capital investment and almost all wealth—over 90 percent—as consisting of human wealth, even though the Jorgenson and Fraumeni estimates of nonhuman wealth are much larger than those of other investigators. Their “full gross private domestic product” is more than three times the official gross domestic product, mainly from the addition of the value of time in household production and leisure and investment in human capital.

Michael J. Boskin, Marc S. Robinson, and Alan M. Huber replace the conventional NIPA view of government output, saving, and wealth

with an accounting that allows for government capital formation in the form of construction and equipment and for government wealth in these forms and in the form of land, natural resources, and financial assets, and they estimate the output produced by government assets. They also make some calculations of contingent liabilities for employee pensions and social security. They find that, especially for state and local governments, where fixed capital is substantial, government investment (net of depreciation) is often sufficient to turn the government sector as a whole into a net saver despite large deficits as conventionally measured. As Robert Eisner points out in his discussion, they omit the government's role in human capital formation and they omit capital gains and losses. They are, in this respect, considerably less radical than Eisner himself in various writings or Jorgenson and Fraumeni in this volume.

The Treatment of Pensions and Pension Wealth

Pension rights, which constitute a significant fraction of household wealth, were omitted in many early household surveys. When they are included, their valuation presents complex problems for respondents. A special effort was made to have papers at the Conference that would examine such questions as how to value them and the most appropriate way of including them—and the contingent liabilities that they represent—in saving measures. Although most attention was focused on private pension plans, there was some attention to social security wealth, which, because of the uncertainties as to future benefits and obligations, presents the most difficult problems. The valuation concept often used was the present value of future benefits for the current adult population.

The NIPAs, as Holloway pointed out, are inconsistent in their treatment of public employee and private pension plans. They include saving by the latter in personal saving and exclude benefits from personal income while doing the reverse for the former. Holloway quantifies the results of imposing consistent treatment, as do both Hendershott and Peek and Boskin, Robinson, and Huber. The preferred solution, adopted in the FFAs, is to treat both as private. Neither NIPA or FFA personal or household saving includes that of the social security system, and most of the authors who mention it agree that it presents particularly knotty problems. Boskin, Robinson, and Huber discuss it as part of the issue of contingent claims against the government.

Pension wealth has often been omitted from wealth distribution microdata because respondents do not usually know how to value it. Ann A. McDermed, Robert L. Clark, and Steven G. Allen attempt to solve the difficulties posed by respondents' lack of knowledge by using both respondent information and additional information from the pension-provider component of the 1983 SCF survey. They find that the

use of pension-provider information raises the estimate of the value of pension wealth, that pension wealth is a significant component of household net worth, and that its inclusion in wealth reduces measured inequality in wealth distribution. Their discussant, Cordelia W. Reimers, is skeptical about the supposed effects on inequality. Edward N. Wolff and Marcia Marley also find that pension wealth, and particularly social security wealth, has grown relative to other forms of household wealth; including it reduces the measured concentration of wealth and changes the historical pattern of wealth inequality since the late 1940s from stability to continuing decline. However, Robert B. Avery, in his discussion, points out that there are many alternative estimates of social security wealth that vary widely, and only one of them was picked as the basis for the imputations to households. He also notes that the extrapolation to 1983 by Wolff and Marley ignores the major changes in the law that took place in 1982.

Wealth Estimates from New Microdata on Households

Two new microdata sets were examined or utilized by several authors. The SIPP appears in four of the papers: McNeil and Lamas; Curtin, Juster, and Morgan; Radner; and Wolff and Marley. The SCF is involved in the papers by Curtin, Juster and Morgan; Radner; McDermed, Clark, and Allen; Hurd and Mundaca; and Wolff and Marley. These papers, for the most part, had different aims and thus examined different aspects of the new data.

Aside from the "insiders'" reports mentioned earlier, Daniel B. Radner discusses wealth data requirements for the analysis of the economic status of households, emphasizing the resources available to households other than the very wealthy and focusing on age groups, especially the aged. Most of his analysis is based on the 1984 wealth supplement to SIPP, which has a number of desirable properties from his point of view, but he compares the SIPP relative means and medians to those from five household surveys and two synthetic estimates, finding that the SIPP results are broadly comparable to those obtained from other surveys. Marilyn Moon, the discussant, suggests the use of resource measures that combine income and wealth as preferable to analyses that treat them as alternative measures of resources available to households.

McDermed, Clark, and Allen use both the respondent and the pension-provider information in the 1983 SCF to study pensions as a component of wealth. Michael D. Hurd and B. Gabriela Mundaca, using data from the 1964 survey of the economic behavior of the affluent, estimate the fraction of household assets from inheritances and from gifts at 15–20 percent and 5–10 percent, respectively. Although much

less comprehensive in its information on this question, the 1983 SCF high-income supplement yields results consistent with those from the 1964 survey. While their discussant, Denis Kessler, shares their skepticism about some of the very high estimates of the importance of gifts and bequests, he considers the issue to be still unsettled and suggests that “direct survey estimates provide the weakest evidence” on this question. Wolff and Marley use both the SIPP and the 1983 SCF in their attempt to construct a consistent historical record on the household wealth distribution.

Methodological Matters

In the past, microdata have often been criticized for not producing aggregates that replicated the macro NIPA or FFA data sufficiently well. This time, staff of the Federal Reserve had worked closely to align SCF and FFA totals for certain well-specified household asset positions, and the implications were that the microdata might be the more accurate, particularly for certain classes of assets. In addition, there was some suggestion that direct estimation of FFA household entries might shift residual uncertainty to other sectors.

Several papers address methodological questions of using the information typically available in microdata. McNeil and Lamas and Curtin, Juster, and Morgan describe some of the lessons learned in their respective surveys on imputations, oversampling, and the like. In particular, heavy oversampling at the upper tail seems to be essential for developing a data set that is adequate for studying the distribution of wealth. McDermed, Clark, and Allen use both employer and employee responses to estimate pension wealth and thus implicitly provide a test of the accuracy of the pension information typically provided in household surveys.

Nancy Ammon Jianakoplos, Paul L. Menchik, and F. Owen Irvine use panel data to evaluate the use of cross-sectional data to draw life-cycle inferences. They assess the biases in cross-sectional inferences of life-cycle changes in the level and composition of household wealth by comparing age-wealth profiles based on five cross-sectional surveys of a panel with time-series age-wealth profiles for each of the fifteen age cohorts from the same panel observed over fifteen years. They find that productivity growth and differential mortality cause substantial distortions in age-wealth profiles based on cross-sectional data. Moreover, procedures heretofore used to adjust cross-sectional data for the productivity effect are unreliable and do not correct for the differential mortality effect.

Wolff and Marley assemble a consistent long-run record on household wealth and its distribution for the United States from a variety of

sources, including survey data, estate tax returns, and synthetic data sets. In the process, they discuss some of the methodological issues involved in reconciling microdata and published data on household wealth distribution, both with each other and with aggregate balance sheet data. They find that the inclusion of pension wealth and social security wealth changes the historical pattern of inequality since the late 1940s from stability to continuing decline because of the relative growth in such wealth. They also find that estimates of the level of wealth concentration are quite sensitive to the methods used in their construction and to the choice of wealth concepts.

Conclusion

Perhaps the major lesson of the Conference is the advance in the technology of wealth surveys to the point at which their producers no longer feel that they must defer to the producers of aggregate wealth data and the latter are at least partially ready to recognize a state of something like parity in accuracy. The most serious problem with the surveys, only partly cured by the device of heavy oversampling of upper-income and -wealth groups, remains their sensitivity, given the extreme skewness of the wealth distribution, to the inclusion or exclusion of exceptionally wealthy households and the large potential for distortions as the result of incorrect observations. The problem is discussed in the paper by Curtin, Juster, and Morgan and was highlighted by the controversy over the report of the Joint Economic Committee on changes in wealth distribution.

The other clear change in views is the readiness of many scholars to incorporate at least investment in consumer durables and government capital investment into measures of aggregate capital formation and the ease with which that can now be done, given the supplementary information on these topics published by the Department of Commerce. What is probably a neglected issue (although it receives some attention) is the importance of certain assumptions in constructing new estimates. Among the examples mentioned by readers is the assumption in Boskin, Robinson, and Huber that real prices of natural resources would rise indefinitely. Despite its underpinnings in classical theory, this assumption has been challenged by some readings of the long-run movements of the relative prices of natural resource products. Another set of assumptions that has received attention elsewhere, but little here, is that underlying the valuations of time spent in the acquisition of human capital.

There remain a number of topics in the area of saving and wealth measurement that the conference either did not reach or touched on only lightly. For example, there must be more experience than we heard

about in a variety of countries with the measurement of saving from NIPA and FFA accounts. Are huge differences typical, and is there some relation that would suggest where the errors lie? We heard relatively little about intangible investment, aside from the paper by Jorgenson and Fraumeni, although there has been a good deal of work in that area, particularly on research and development, its output, and its rate of depreciation or obsolescence. Aside from Taylor's paper on the IMF study of current account surpluses and deficits and some discussion in the paper by Wilson, Freund, Yohn, and Lederer, there was nothing on the measurement of wealth held in the form of international assets, a quite undeveloped area of wealth measurement now given prominence by the reported shift of the United States to the position of a net debtor. There is room for another conference on these issues.

We should not end this introduction without noting, with sadness, the deaths since the date of this conference of three members of the Conference on Research in Income and Wealth who had been active in it for many years. Nancy Ruggles, together with Richard Ruggles, had first contributed to the 1958 Income and Wealth Conference (vol. 25) on *Output, Input, and Productivity Measurement* a paper on "Concepts of Real Capital Stocks and Services," and they had prepared a paper for this meeting on saving by various industry sectors. Unfortunately, the paper had to be withdrawn after Nancy Ruggles' tragic death. Irwin Friend and Raymond Goldsmith, who were unable to attend this conference, both had made important contributions to the subjects discussed here. Irwin Friend's first contribution, at the 1951 Conference (vol. 17) on *Short-Term Economic Forecasting*, was on plant and equipment expenditures, with Jean Bronfenbrenner. Raymond Goldsmith's contributions spanned almost the entire history of the Income and Wealth Conference, beginning with a paper on "The Volume and Components of Saving in the United States, 1933-1937" for the April 1939 Conference (vol. 3). In Goldsmith's case, this and the measurement of wealth were subjects that occupied almost his whole working life.

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