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THE DISTRIBUTION OF PERSONAL INCOME

A STUDY OF STATISTICS ON THE SIZE DISTRIBUTION OF PERSONAL INCOME IN THE UNITED STATES

PREPARED FOR USE OF THE

SUBCOMMITTEE ON ECONOMIC STATISTICS

OF THE

JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES

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LETTERS OF TRANSMITTAL

DECEMBER 29, 1964.

To the Members of the Joint conomic Committee:

Transmitted herewith for the use of the Joint Economic Committee and other Members of the Congress is a study of statistics on the size distribution of personal income in the United States.

This survey of income distribution statistics, as currently reported by some half dozen Government agencies, has been prepared for the Subcommittee on Economic Statistics by T. Paul Schultz. The analytical significance of size distribution data, and the content, shortcomings, overlap, and improvement of presently available statistics are reviewed in some detail.

The study is being made available at this time for students of problems in this area in the interest of improving our information. The views expressed are those of the author, T. Paul Schultz, and therefore do not represent conclusions of the Joint Economic Committee, its individual members, or its staff.

PAUL H. DOUGLAS,
Chairman, Joint Economic Committee.

DECEMBER 28, 1964.

Senator PAUL H. DOUGLAS,
Chairman, Joint Economic Committee,
U.S. Congress, Washington, D.C.

DEAR MR. CHAIRMAN: As a part of its continuing program to understand and, wherever possible, to improve the quality of the available statistical and empirical materials relating to our economy, the Subcommittee on Economic Statistics asked the staff to prepare a study on the concepts and data involved in the size distribution of personal income. The attached materials represent part of the study of the currently available statistics upon which the academic community must build its theoretical discussions and upon which the Joint Economic Committee and the Congress must base their policy recommendations and action.

We have long felt as a nation that income differences are closely related to economic stability and growth, and, as a committee concerned with both stability and growth, we have had to analyze the significance and ascertain the shortcomings of the data upon which policy decisions are made. The data of the personal income distribution are useful in assessing the productivity, efficiency, and capacity of individuals in our economy, and in evaluating policies to utilize fully the potential of our human and material resources for the growth of the national economy and the advance of personal welfare.

The attached materials have been prepared for the subcommittee by T. Paul Schultz. Initial work on the study was conducted by Mr. Schultz while a consultant to the subcommittee. Further drafting and editing of the study were done since his return to the Massachusetts Institute of Technology.

In the course of his study, Mr. Schultz has had the advantage of consultation with many of the experts in the various Government agencies as well as the academic area who conduct surveys of the size distribution of personal income or use the data. The Subcommittee on Economic Statistics joins in thanking these people for their cooperation and suggestions, although clearly the responsibility for the product is that of Mr. Schultz. The subcommittee, having undertaken the study in the interest of improving understanding—including its own—of the materials, has no conclusions and no agreement or disagreement with Mr. Schultz' statements at this time.

WILLIAM PROXMIRE,
Chairman, Subcommittee on Economic Statistics.

DECEMBER 21, 1964.

Senator WILLIAM PROXMIRE,
Chairman, Subcommittee on Economic Statistics,
Joint Economic Committee,
Washington, D.C.

DEAR SENATOR PROXMIRE: Transmitted herewith is a staff analytical and statistical review of the existing economic statistics of personal income distribution. The study was prepared by T. Paul Schultz, Massachusetts Institute of Technology, for the Subcommittee on Economic Statistics.

Mr. Schultz benefited greatly through cooperation of Government agencies responsible for the several statistical programs reviewed. Academic and professional economists also gave generously of their time to read and comment critically on portions of his early drafts. M. S. Weitzman, Arno Winard, and Mitsul Ono of the Census Bureau gave invaluable attention to Mr. Schultz' inquiries and preliminary draft. Among the personnel of other Government agencies rendering valuable assistance were Milton Moss of the Bureau of the Budget, J. M. Fitzwilliams of the Office of Business Economics, Dorothy Projector of the Federal Reserve Board, H. H. Lamale of the Bureau of Labor Statistics, L. A. Epstein of the Social Security Administration, Nathan Koffsky of the Department of Agriculture, and M. Farioletti of the Internal Revenue Service. Economists outside Government who provided helpful guidance and valuable comments were Margaret G. Reid, Edward F. Denison, Simon Kuznets, Dorothy Brady, James N. Morgan, Jacob Mincer, Charles P. Kindleberger, Morris A. Adelman, Franklin M. Fisher, Robert M. Solow, Paul G. Bradley, Milton Friedman, Gary S. Becker, and Irving B. Kravis. The paper is presented as prepared by Mr. Schultz.

JAMES W. KNOWLES,
Executive Director.

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By T. Paul Schultz

CHAPTER I

INTRODUCTION

The improvement in economic statistics following the great depression and the Second World War has changed the nature of research in certain fields of economics from speculative judgments premised on a paucity of evidence to strong scientific analyses programed to utilize the many new data. With this proliferation of economic data, it is wise to take stock of this new-found plenty to assemble and evaluate the various sources of information and to venture recommendations on how future statistical programs might be designed to add to our useful stock of knowledge. In the last two decades the statistical materials on the U.S. size distribution of income by persons and by family units have been both greatly improved and diversified. The primary objective of this staff study is to survey these income statistics within the framework of a rudimentary theory of personal income distribution. If the unanswered questions seem more prominently displayed in the chapters that follow than the confirmed hypotheses, this is because the transition from impressionistic generalization to an integrated theory in this field of personal income distribution has only begun. Further research is required before the loose ends and inconsistencies will be significantly reduced. The existing wealth of statistical data on the size distribution of income in the United States may yield many answers but, for some basic questions relating to the distribution of income and wealth over the lifetime of individuals and families, new data and statistical programs will be needed.

Before the First World War, one could not find information in the United States to construct even an approximate estimate of the size distribution of income.[1] This unfortunately remains the situation in most other countries today. Even in the United States, until the end of the Second World War, there were few official statistics in this field and no annual series of estimates. Though estimates of the size distribution of income in the United States among families have recently been extended back to include several prewar benchmark years, including 1929, the principal detailed data sources are the annual series which were initiated in 1944–46. In addition to these annual estimates based on sample surveys, there have been occasional special income surveys and, of course, the decennial census, which began collecting limited information on wage and salary money income in 1940, and then broadened its scope in 1950 and 1960 to include self-employment income and income from sources other than earnings.

Empirical and theoretical interest in the personal distribution of income has fluctuated widely between historical periods. The clas-

[1] Frank H. Streightoff concluded in 1912, after a thorough discussion and analysis of the statistical materials, that he was unable to construct a size distribution of income for the United States, "The Distribution of Incomes in the United States," Studies in History, Economics, and Public Law, vol. 52, No. 2, Columbia University Press, New York, 1912, pp. 152–153. "From the foregoing discussion two facts should be clear: First, that up to the present time there has been no satisfactory study of the distribution of incomes in the United States; and, second, that the material for such a study is not now available."

sical political economists attached much importance to the functional distribution of income; that is, the distribution of national income receipts among the factors of production—land, labor, and capital. This traditional tripartite functional distinction had more appeal in the 18th and 19th centuries than it has today, for then the returns to these three factors, whose ownership was concentrated in the hands of distinct social-political classes—landowners, workers, and capitalists—were indicative of the personal distribution of income in the society. But as the concept of capital became more complex, and factor ownership became more diffused and mixed through the population, the tripartite division became less meaningful as a reflection of the personal distribution of income.

The first data collected on the distribution of personal income by size were typically based on surtax schedules, which included only a fraction of the upper income units in the society, that fraction which could not easily conceal its large sources of income. Using these limited tax data from several countries and historical periods, Pareto observed [2] that the size distribution of incomes appeared to conform to a simple logarithmic relationship, and that the "Pareto" parameter of inequality statistically estimated from this relationship was approximately equal for each set of data. The aggregate size distribution was thereafter analyzed both by the statistician who relentlessly sought a convenient generalization of and generating mechanism for the income data, and by the social scientist who sought for political and even economic significance in a summary measure of inequality. Quantitative research was rare, as were the data for such research. The aggregate relative distribution of personal income appeared to be remarkably stable and even this qualified conclusion may have been spuriously generated by the crude state of the income distribution data. One could not then probe beneath the surface of the aggregate distribution, for the data did not permit separate analysis of demographic and economic groups—e.g., age, occupation, industry, unemployed. These, when lumped together, tended to neutralize each other and to obscure the influences that changes in the structure of the population and the economy had on the size distribution of income.

In the United States the great depression stimulated a resurgence of interest in the field of personal income distribution. This trend was reinforced by the subsequent Keynesian controversies which revolved around the distribution of income as a factor influencing the fraction of national income earmarked for private consumption. Consequently, the Keynesians contended, the distribution of personal income was a determinant of the level of employment.[3] During the 1930's, the data on the size distribution of income were still not accurate or comprehensive enough to support empirical research on the distribution of income among and within socioeconomic groups in the population. Most discussion flourished on a purely theoretical or abstract social plane. With the improvement in U.S. data following the Second World War all this changed. The first major postwar discovery was that between 1929 and 1945–47 a major change had occurred in the pattern of income distribution in the United States; [4]

[2] Vilfredo Pareto, "Cour d'Economie Politique," Lausanne, 1897, vol. II.

[3] Assuming that some rigidities in the economic system resist instantaneous price-wage adjustments downward.

[4] For example, see "The Economic Report of the President," January 1949, p. 91: "The distribution of income in 1948 was more equal than before the war." Also, see Selma F. Goldsmith, "Appraisal of Basic Data Available for Constructing Income Size Distribution," Studies in Income and Wealth, vol. 13, NBER, New York, 1951, pp. 299–301.

the inequality of aggregate income distribution among family units had decreased markedly, particularly during the war years, when the U.S. economy operated at full employment and the general shortage of unskilled labor contributed to a narrowing of wage-skill differentials. The absence, on the other hand, of any significant change in the aggregate size distribution of income since the late 1940's is perhaps the explanation for the relative neglect of these income data in the 1950's. Inconclusive but disquieting evidence of a "retrogressive" increase in the overall inequality of personal income distribution among families since the mid-1950's has been cited as a cause for new interest in the equity of income distribution and income policy, and the fundamental causes of persisting poverty in an otherwise affluent society.

Two developments have had an influence upon the direction of current research on the personal distribution of income in the United States. First, though the debate on the significance and usefulness of the concept of human capital is not yet settled, this concept in the hands of its advocates has provided them with a unifying principle for ordering and examining empirical evidence on the contribution of, and returns to, investment in the human productive agent. Second, in the opinion of some observers the "social revolution" in the United States, associated with our personal distribution of income, has stagnated, and this has spurred both polemics and factual research on the problem of poverty, and the specific groups which find themselves most often among the poor; e.g., aged, nonwhite, farmer, unemployed, and the female-headed income unit. Both of these developments will be considered in later chapters.

The second chapter of this staff study will deal with the close relationship which exists between the scope and method of determining the size distribution of income statistics, and the use to which these data are to be put. Special emphasis will be placed on the distinction between income data relating to the distribution by size of factor earnings received by individuals, and data relating to the distribution by size of disposable income received by consumer-welfare units. The first type of data deals with factor income, and is more tractable to "pure" economic analysis. The second type of data pertains to the consumer-welfare unit, the family, whose size and structure depend not only on economic forces, but also on political, social, and psychological forces molding the institutions of the society. At this stage in our discussion, it will be necessary to outline a rudimentary, theoretical framework within which to analyze these alternative distributions of personal income, so that the actual limitations of existing statistics for the purposes of research in income and wealth are more fully understood.

The third chapter will enumerate, describe, and briefly evaluate the several statistical programs that provide size distribution of personal income data for the United States. After the survey of each statistical program in this chapter, there follows a short bibliography of recent data sources.

The fourth and final chapter will summarize the general conclusions and specific recommendations of this staff study.

Following the concluding chapter, appendixes will (1) explain some of the elementary statistical sampling techniques and terms referred

to in the study; (2) present the actual costs associated with a few statistical programs; and (3) discuss the comparability and sources of size distribution of income statistics for countries other than the United States.

At the end of the study a bibliography cites selected theoretical, empirical, and evaluative works relating to the analysis and statistics of the distribution of personal income.

CHAPTER II

ANALYTICAL FRAMEWORK

The size distribution of personal income refers to the frequency distribution of income-expenditure units ranked according to the size of their personal income. The frequency distribution of personal incomes by size, or the size distribution of income, depends on the concept of personal income adopted, the definition of income-expenditure unit used, and the length of time over which the income flow is measured. In addition to these objective differences, arising from the underlying concepts and dimensions of the size distribution of income, there are also differences that arise from statistical error. Statistical error can vary with the way in which the actual size distribution of the population is estimated from potentially biased information acquired from a sample of the population. Statistical error in income distribution data is of at least three types: (1) Sampling variability, which can be mathematically estimated; (2) bias due to nonreporting of particular sample units, which can be analyzed by matching the reporting sample with other sources of data; and (3) errors of response, which can be evaluated by reinterviewing more thoroughly a sample of respondents, and performing controlled audit checks. Other technical problems complicate the task of eliciting accurate information from respondents and reducing computational errors in any system of editing, processing, and tabulating survey data. Although each of these aspects of sampling theory and practice contributes to the final quality and reliability of income data, they are regarded as beyond the scope of this staff study.*

The final use of income distribution statistics determines what form and scope they should optimally take. Income is a flow concept; income circulates through the financial channels of the economy and can be alternatively quantified as the sum of receipts to factors of production or as the disbursements for produced goods and services. At the same time, the distribution of personal income can also be measured as personal income payments for factor services rendered to the economy and as personal income placed at the disposal of family units. Seen from the perspective of U.S. national income accounts, at least four distributions of income can be distinguished: (1) National income by function, or by the classically distinguished broad factor shares—land, labor, capital, and entrepreneurship; (2) national income by type of income (employee compensation, proprietors' income, rental income, corporate profit, etc.) and by size; (3) personal income by type of income (wages and salaries, rental income of persons, dividends, etc.) and by size; and (4) disposable personal income by size.

In this study, the distinction is drawn between the distribution of gross factor income to persons (item 3 exclusive of transfer payments), and the distribution of disposable income to families (item 4) as

*In general, the tables referred to in this chapter appear at the end of the chapter, beginning p. 43.

modified by public and private transfers. In considering the distribution of factor income to persons it will be necessary to confine our attention to the distribution of factor payments to labor as reward for current effort. In the United States today factor income to labor constitutes somewhat more than three-fourths of national income and personal income. The lack of reliable and detailed statistics on the distribution of nonlabor factor income to persons [1] poses a distinct limitation to this study and to our general understanding of the mechanism distributing factor incomes in our economy. Although the distribution of factor earnings by persons is amenable to economic analysis, the distribution of disposable income by family or consumer-welfare units is much less susceptible to analysis. The combination of individuals into family or consumer units does not have its roots in the productive process, even though the economic environment may influence markedly the pattern of family formation and development. The purpose of this chapter is to assemble from the scattered literature in this field an elementary framework within which to analyze these two size distributions of personal income.

The first section of this chapter investigates the general determinants of a factor's earnings. A general equilibrium system is outlined in which several secular forces can be identified as determining the longrun supply of, and demand for, a particular factor's services, and consequently the equilibrium level of the factor's earnings. To treat all labor income as a stream of earnings to a single and homogeneous and undifferentiated factor ignores the complexity of reality and the qualitative diversity of labor's services. To divide all labor into somewhat more homogeneous factor-skill groups, we distinguish three characteristics that are significantly associated with the levels of labor earnings: sex, years of schooling, and age. An analysis of inter-skill-group earnings differentials and within-skill-group size distributions of earnings provides statistical evidence on the importance of these various qualities of the labor force in generating the overall inequality of labor earnings.

The second section of this chapter attempts to set forth a framework for an analysis of welfare, using data on the distribution of disposable income by families. As with discussion of interpersonal comparisons in traditional welfare economics, we emerge from this section with many qualifications to the use of existing data and analyses, but few

[1] Table 13, p. 52, reveals that existing statistical programs account for little more than half of "income other than earnings" as estimated by OBE. The Census and the CPS do not distinguish by income-type among the aggregate "income other than earnings," so even if data from these programs were tabulated and published for income other than earnings they would have little analytical interest in the study of various factor incomes. Although the IRS income data are presently without the demographic information that would make them valuable for economic analysis, they do distinguish income other than earnings by type. In 1952 the IRS accounted for 63 percent of the OBE estimate of income other than earnings, 85 percent of dividend income, and 36 percent of interest income. But such large margins of income unaccounted for even in the IRS data could make a substantial difference in estimating the distribution of income to the high-income group. Simon Kuznets estimated that in 1946–48 the upper 1-percent-income group in the United States received about half of the dividend income, and about one-seventh of the aggregate total of interest income in the country. These two sources of income represented more than one-fourth of this 1-percent group's total income in these years. See "Shares of Upper Income Groups in Income and Saving," NBER, New York, 1953, table 124, p. 657, and table 125, p. 669. See ch. IV recommendations to this study.

Another shortcoming of all realized money income data is that it fails to measure today the real accretion of economic power. First, businesses can charge off business expense accounts as sales costs, while these accounts provide monetary benefits to their employees. Executive stock options, retirement plans, and other tax dodging fringe benefits add far more to the incomes of the upper income groups than our data reveal. We have little reliable information regarding the distribution of interest income derived from untaxable State and local government bonds. Unrealized capital gains can be transferred by means of trust funds to heirs and nonprofit organizations to great tax advantage. But without comprehensive data on these income transfers there is nothing quantitative we can set forth. Richard M. Titmuss contends that these factors are important in the British economy. "Income Distribution and Social Change," George Allen & Unwin, London, 1962.

comprehensive or constructive conclusions. First, the inadequacies of current money income as a measure of long-term economic means are enumerated and discussed. Given information on a person's material wealth, education, and age we might derive a person's expected lifetime income profile and thereby estimate his long-term economic means. But the lack of personal material wealth data forces us to accept a proxy variable, consumption, as a slightly better indication than current income of long-term means. The variable size, structure, and wants of the family unit make up the second complication of any analysis of welfare based on the distribution of disposable income by families. Adjustment for the approximate welfare wants of consumer units of different size and structure is imperative but difficult to perform. In this regard the "undoubling" of composite family units in the United States since the Second World War has contributed to the relative increase in small households of young and old persons whose current income status is relatively low compared to their average lifecycle income. Another development has influenced the distribution of income and leisure in the United States, that of the increasing importance of part-time and part-year employment for young and old persons and married women. The impact of these two demographic developments on the composition of the family unit is observed by analyzing the relationship between the size distribution of income and the age of head, number of earners, and size of family unit. When the characteristics of the family unit experience substantial change, intertemporal comparisons of the inequality of the distribution of personal income become hazardous, if not impossible.

SECTION A. THE DISTRIBUTION OF FACTOR EARNINGS BY PERSONS

1. The determination of factor earnings

The distribution of gross factor personal income by size is dictated by the "ownership" of productive factors (labor and property), and their relative scarcity in the market economy. In the short run, the supply and distribution of factor ownership is fixed within a narrow range by institutionalized traditions and past fortune; but in the long run, the supply of productive factors is subject to change. Investment in the development and transformation of material and human resources may occur in response to changes in the rates of return to particular factors of production.[2] Shifts in either the demand for, or the supply of, a factor can cause a change in the rate of return to the factor, just as reciprocally a change in the rate of return to a factor can induce adjustments in the demand for or supply of the factor.

In most circumstances, economic tools of analysis do not clearly distinguish between the influence of demand on a factor's earnings and the concurrent influence of supply. Nor is there yet a precise or comprehensive theory of factor supply and demand, one which prescribes the relationship between the structural changes associated with modern economic growth and the observed changes in the rates of return to particular investment activities. The determination of earnings to the factors of production (factor prices) occurs within a general equilibrium system that encompasses all acts of production, exchange, and consumption in the economy. In a somewhat simplified framework, however, we can distinguish at least four economic forces that contribute to secular shifts in factor supply and demand, and consequently to the equilibrium level of factor prices and the personal distribution of factor earnings.

Influencing the secular supply of factors is, first, investment activity which develops and transforms human and material resources into more valuable factors; and, second, demographic change in the population which impinges upon the ultimate supply of human resources to the economy. The secular derived demand for factors, on the other hand, depends on the preferences of consumers for final output as transmuted by the state of technology into demand for various factors of production. Superimposed on these secular shifts in factor demand and supply schedules is the shortrun influence of the changing relative level of aggregate demand for and aggregate supply of resources. The cyclical fluctuation of the level of unemployment is the most obvious sign of the shortrun impact of the aggregate

[2] For example, if machines reduce the demand for, and hence the relative wage for, the labor services of coal miners two adjustments in factor supply will ensue over time. Youth entering the labor force will seek jobs in other more remunerative industries and develop their skills to satisfy the employment needs of these industries. The experienced coal miner, however, will not be able to transfer his old skills so readily to a new trade. With time, however, the miner may acquire new productive skills for which the market's demand is stronger and wages higher.

imbalance between demand and supply on the distribution of personal income, but other, more subtle, shifts in the factor distribution of personal income can also be traced to the business cycle.

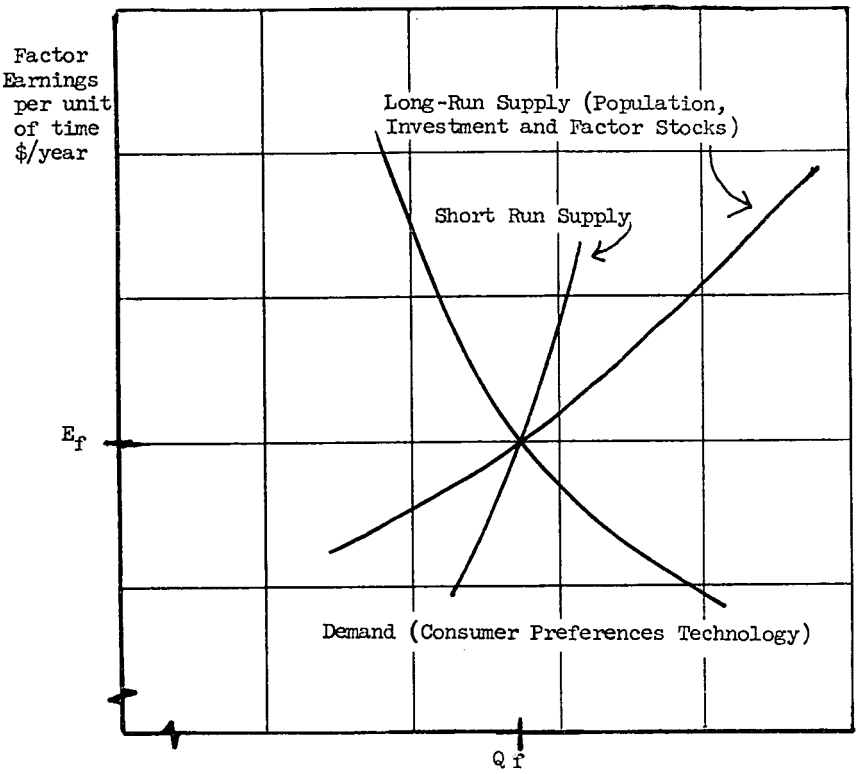

FIGURE 1.—The determination of factor earnings.
Quantity of factor service demanded and supplied per unit of time.

If we assume that the rates of return for net-investment activity in developing and transforming resources were reduced to zero, and the size and composition of the labor force were fixed, and consumer preferences and the state of technology were unchanging—then we could imagine a stationary economic state in which there would be no disequilibrium in the factor markets requiring net investment activity. In this equilibrium state the distribution of expected [3] lifetime labor earnings would correspond to the distribution of natural abilities, individual application, and tastes for uncertainty. Everyone with comparable abilities and motivations would tend to have the same financial incentive to invest in the training and development of his own skills. For such investment in skills to occur impartially wherever the rate of return was greatest, we must further assume that all persons have equal opportunity to secure the needed investment funds through a perfect capital market, and that all persons seek to maximize

[3] Random or chance variations about the expected lifetime income profile would generate a measure of current or realized inequality or dispersion of incomes even if all persons were equally able. However, the expected present value of each person's lifetime income profile hypothetically would be the same.

only the present value of their expected lifetime income profiles.[4] In this artificial state of equilibrium and perfect markets the *premium* expected lifetime earnings received by persons of extraordinary ability would correspond to a "pure" rent on a naturally scarce and superior productive factor.[5] If factor ownership were not subject to change in this stationary state, the stability of factor earnings would dictate an invariant distribution of expected lifetime factor income to persons through time.

But the normal state of affairs in no way resembles this stationary equilibrium state. Growth in per capita income, however uneven, is today almost taken for granted in the developed countries, and is accompanied by net investment and substantial signs of disequilibrium in specific factor markets. Changes in the quantity and quality of labor seeking employment occur. Consumer tastes may be fairly stable in the short run, while in the long run with rising per capita income the entire structure of consumer preferences is reshaped as people seek to satisfy new wants. Research and development expenditures are strong inputs for improving the existing state of the productive arts. In reality, each of the four economic variables we distinguished appears to be subject to change. To gain even an elementary understanding of the secular and cyclical mechanisms which both generate and change the distribution of factor earnings to persons we must wrestle with the subtle relationships among these four primary determinants as they can be observed in a dynamic situation of growth. This chapter does not provide an integrated approach to the determinants of factor demand and supply, but concentrates on the analytic framework within which one could analyze the importance of particular supply shifts and associated changes in the distribution of factor earnings to persons. Consequently, in the discussion that follows we will be limited to a partial equilibrium analysis.

2. Systematic differences in the distribution of participation earnings

Approximately three-fourths of personal income in the United States is paid to labor for its current services. Although the distribution of nonlabor factor income is important, we lack the reliable and detailed data needed to investigate it here.[6] In the remainder of this section, therefore, we will deal exclusively with the distribution of labor earnings or participation earnings to persons. To regard labor as a homogeneous factor supplying an undifferentiated service to the economy is to disregard reality. But there is no one obvious hierarchical order of labor services. Nor would it be reasonable to con-

[4] If it is assumed that the variance about the expected lifetime income profile differs between occupations or activities, then the existence of differences in personal preferences toward risk and uncertainty would lead to differences, other factors held constant, in the expected present value of lifetime income profiles. Relaxing our assumption that all persons maximize only the present value of their lifetime income profiles, and allowing for differences in individual attitudes toward, and tastes for, risk and uncertainty, we discover that equally gifted persons would choose occupations or lifetime income profiles in such a way that interoccupational differences in the expected present value of their income profiles would not be eliminated by the mobility of persons between occupations. A modicum of inequality in the expected present value of lifetime incomes would arise, therefore, even among equally able and dedicated persons in a perfect market system. See Milton Friedman, "Choice, Chance, and the Personal Distribution of Income," Journal of Political Economy, vol. 61, August 1958, pp. 277–290.

[5] Alfred Marshall cogently investigated this complex problem of analyzing the importance of various factors in the variation in labor incomes. "* * * how much of the income of successful men is due to chance, to opportunity, to the conjuncture, how much to the good start that they have had in life; how much is profits on the capital invested in their special training, how much is the reward of exceptionally hard work; and how much remains as a producer's surplus or rent resulting from the possession of rare natural gifts." Principles of Economics, 8th ed., Macmillan & Co., London, 1959, book V, sec. v, pt. 7, p. 480.

[6] See table 13, p. 52.

clude if such an order were found, that a particular "grade" of labor could perform usefully only one task and no other, regardless of efficiency or allowance for adjustment. To distinguish the most meaningful [7] factor-skill grouping of the labor force we must investigate the systematic differences in labor force earnings received by particular groups of the population classified by characteristics other than income. Such an investigation can raise certain questions: What characteristics in the labor force "explain" statistically and economically the differences in real earnings levels? [8]

One might consider occupational groups as representing identifiably homogeneous skill groups in the labor force.[9] If an occupational group had experienced a deterioration (or improvement) in its relative income position, could this change be attributed to the type of skills possessed by the group relative to the demand of the economy for those skills? If such a conclusion were reached, an immediate and practical use for such knowledge would be to direct incentives and information to workers caught in declining sectors of the economy, to facilitate both their acquisition of new skills and their migration to communities where employment opportunities would be more promising. The 1963–64 Manpower Development and Training Act might use this type of information to allocate its funds chiefly to persons in occupations where earnings have faltered and show signs of further deterioration. But before we can conclude from a cursory analysis of earnings data by occupation that there is a shortage or a surplus of skills in one occupation or another, we must ascertain the other characteristics and qualifications which systematically influence the level of earnings of persons in particular occupations.

Sex appears to be a characteristic that goes far in explaining the worker's level of earnings. The median wage and salary level of the female in the experienced U.S. labor force was about two-thirds that of the male in 1939, and that fraction had fallen to about one-half by 1959, notwithstanding the female's comparable age and superior educational qualifications.[10] Since the female worker is more often

[7] At least two criteria may be employed in deciding what constitutes a "meaningful" factor-skill group. The first is purely statistical, the second economic. Transforming the frequency distribution of income into the frequency distribution of the logarithms of income produces a variate that is approximately normally distributed. Analysis of variance techniques may then be applied to this normal variate to provide us with a test as to the confidence level with which we can accept the hypothesis that the mean income level of the factor skill groups is significantly different from that of the whole population. Applying another statistical method, one can calculate the correlation ratio or correlation coefficient to estimate what fraction of the relative dispersion of income (or variance of the logarithms of income) can be attributed to, or "explained" by, the characteristic used in grouping the population into the skill groups. See C. E. Weatherburn, "A First Course in Mathematical Statistics," Cambridge University Press, Cambridge, England, 1961, pp. 207–217, and pp. 89–92. The second criterion is economic in nature. We desire to select characteristics that should reasonably influence the intrinsic productivity or value of a particular worker and not a characteristic that reflects an imperfection in the market system. For instance, if there were no barriers to labor mobility from North to South and from rural to urban places of residence and work, and the cost of living and value of public goods were equal in all locations, then even if the North-South and rural-urban distinction in the labor force statistically explained some fraction of the relative inequality of total (money and nonmoney) incomes, we would still prefer to regard this regional factor in income levels as arising from noneconomic forces; i.e., the immobility of labor. This assumes we have already standardized the population for the various characteristics we regard as being associated with skill levels. If we could specify perfectly homogeneous factor-skill groups in the labor force, and make allowance for transitory dispersion of incomes, the remaining dispersion or relative inequality of income distribution could be attributed to imperfections in the labor market, such as immobility of factors, discrimination among laborers, etc.

[8] See footnote 7.

[9] William Lee Hansen starts with this assumption in his dissertation that analyzes from cross-sectional data for 1951. He estimates what fraction of the inequality of earnings can be traced to interoccupational differences, and what remains to be explained within occupational groups. Hansen also introduces age and the life cycle, as well as making an investigation of experience levels of persons in the various occupations at different ages. The use of occupation, age, and education groups is now feasible with the 1960 census published tabulations, and should soon receive analytical attention. Hansen, "Life Cycle Earnings Patterns and Intra-Occupational Differences in Earnings," unpublished dissertation, John Hopkins University, 1958.

[10] U.S. Census of Population, subject report, "Sources and Structure of Family Income," PC(2)-4C. Census Bureau, Washington, D.C., 1964, table 24, p. 223.

than the male, a part time and irregular participant in the U.S. labor force, her median earnings are accordingly reduced. In 1963 female median total money income was about 30 percent that of the male, but among year-round full-time workers the female median was about 59 percent that of the male worker.[11] But the difference remains between the earning levels of the sexes, and this fact alone would imply that in an occupation employing more than the national average proportion of women the level of earnings would tend to be below the national average, assuming other factors were held constant. Because the pattern of female participation in the labor force is so different from that of the male, and has substantially changed over time, the remainder of our analysis will be limited to a discussion of male earnings, thus relieving us of the task of standardizing earnings data for the sex composition of each occupational, age and educational group.

Educational attainment, or years of schooling, is another characteristic which closely correlates with earnings and income in most occupational groups and components of the population. For our purposes it is not wholly relevant whether we interpret this highly significant correlation as an indication that education is an investment in human capital, a quantifiable act of training which pays later dividends in the form of raising one's economic productivity and earnings, or as a useful proxy for innate intelligence, which is incidentally reflected both in terms of greater schooling and greater productivity in later work.[12]

Age is another obvious, but crucial, factor systematically influencing the level of individual earnings. Again, a complex causal relation may underlie this statistical correlation; age may be a proxy for experience and training on the job, maturity, strength, and many other characteristics which boost the net contribution made by persons in certain economic situations, enhancing their value to their employer.

Although it might be fruitful to proceed in our consideration of all of these labor characteristics simultaneously—occupation, sex, part-time or full-time worker status, years of schooling, and age—we will here confine our analysis to only three characteristics: sex, years of schooling, and age. Occupation and education of workers are closely correlated, that is to say, both of these factors "explain" similar differences in the distribution of earnings to persons. We suspect that education is the more powerful explanatory variable. The factor-skill groups distinguished by age and education should account for most of the differences in earnings received by occupational groups, to the extent that workers are free to move among occupational groups, and to the extent that their skills, acquired through formal education or years of on-the-job experience, can be transferred between occupational tasks without great sacrifice of efficiency or earnings.

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[11] Current Population Report—Consumer Income, "Income of Families and Persons in the United States: 1963," series P–60, No. 43, Sept. 29, 1964, table 20, p. 36.

[12] The available empirical evidence under controlled situations indicates that most of the increase in income and earnings that is statistically associated with educational attainment is due to the education itself. See the survey of the literature in Gary S. Becker, "Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education," NBER, Columbia University Press, 1964, pp. 79–90; and also J. Morgan and M. David, "Education and Income," Quarterly Journal of Econo nics, vol. 77, August 1963. But it should also be noted that recent developments in Europe may raise some doubts about the hypothesis that ascribes causal significance to the entire education-income correlation. Germany, for example, will soon be employing a million foreign workers; nearly 1 in 22 members of the German labor force have come to Germany from Mediterranean countries of Italy, Greece, Spain, Yugoslavia, Turkey, etc. The remarkable advances in German labor productivity have continued of late despite this massive influx of workers with much lower educational attainments and skill levels than are possessed by the indigenous labor force.

By neglecting the part-time and part-year status of workers we are omitting from our analysis a powerful tool in explaining the size distribution of labor earnings.[13] But given the general objective of our analysis, the argument for the inclusion of this significant variable is not compelling. If part-time or part-year employment is not voluntarily sought by the worker, then he is in fact partially unemployed, and his limited contribution to the economy over the year is a valid reflection of the shortage of demand in the economy for his particular skills. If the hourly earnings of the partially employed person's factor-skill group were to fall to the point where all who desired full-time year-round employment could find it, then this hourly rate converted to a full-time yearly rate would represent the hypothetical equilibrium earnings level for that particular factor-skill. In combining full-time and part-time workers in our analysis of earnings we are assuming that all persons would voluntarily accept full-time year-round work at the lower equilibrium earnings level,[14] if this work were made available to them. In an analysis of the distribution of female earnings in the U.S. labor force, this assumption appears to be peculiarly inappropriate because an increasing proportion of females is motivated to find *only* part-time employment. This assumption is somewhat more tenable, because we are here analyzing only male earnings, but this limitation to our analytical framework again underscores the need for a wholly different approach in dealing with the determinants of the size distribution of female earnings.

Although these three characteristics—sex, educational attainment or years of schooling, and age—may explain a large part of the variation in earnings among individuals and groups in the population, the unexplained "residual" variation in earnings is attributable to three possible sources: (1) random variations in annual earnings; [15] (2) more subtle qualifications for particular employment than those associated with these three characteristics; and (3) imperfections in the market system which we have more or less ignored up to this point: regional and occupational immobility of labor, reinforced by ignorance of opportunity and discriminatory barriers, and a less-than-full employment economy.[16]

3. *Analysis of relatively homogeneous factor-skill groups in the population*

The earnings of factor-skill groups tend to differ by our definition of the concept, but these differentials are not necessarily invariant

[13] Jacob Mincer uses the distinction between full-time and part-time workers to assist in his investigation and explanation of earning behavior. See "A Study of Personal Income Distribution," unpublished Ph. D. dissertation, Columbia University, 1957; and also "Investment in Human Capital and Personal Income Distribution," Journal of Political Economy, vol. 66, August 1958.

[14] We are also assuming a unitary elasticity of demand for labor, or a simple wage fund theory. In reality all we want to emphasize is that part-time employment among males, particularly in the prime working ages, is chiefly due to underemployment of their skills, and should be recognized in our analytical framework as such.

[15] Annual earnings (and income) of individuals are subject to random variations. After factor-skill groups are distinguished, some fraction of the residual variation or variance within each of these groups is undoubtedly due to the existence of random or transitory components in annual earnings, that would be reduced if individual earnings were averaged over a longer period of time than a year. This point is developed by Friedman in "A Theory of the Consumption Function," NBER, Princeton University Press, 1957, pp. 209–210. According to Friedman's "Permanent Income Hypothesis" the "income elasticity of consumption expenditures is a measure of the fraction of the total variance of income attributable to the permanent component;" or to translate this into our terms, the income elasticity of consumption is an estimate of the variance of income attributable to average longrun annual income levels, or what we will later distinguish as the real economic means of the individual. Friedman's data and regression estimates presented in table 1, p. 41, show that 35 percent of the variance of measured income of nonrelief farm families, and 18 percent of that of nonrelief nonfarm families in 1935–36 are accounted for by random or transitory variations in family annual incomes.

[16] See footnotes 7 and 13 above and 17 following.

over time nor similar between countries.[17] Local demand and supply of a given factor are the immediate determinants of that factor's earnings. Our objective in this section is to present some U.S. statistics on the labor earnings of factor-skill groups to gain an impression of the orders of magnitude and significance of the earning differentials among the groups in the United States. No discussion is possible in this study of the determinants of the residual distribution of labor earnings within factor-skill groups. Before proceeding with an empirical investigation into the size distribution of personal income, it is important to recall the objective differences in the concepts of "income," "income unit," and "time period" which determine the scope of income distribution statistics, and consult first those data that most nearly conform to the specific needs and objectives of our inquiry.

Economic statistics of the size distribution of personal income would for our purposes ideally relate to gross labor earnings going to individual workers cross classified by sex, age, educational attainment, and other socioeconomic and demographic characteristics of the population. Earnings would be measured over a period of time long enough to eliminate or to reduce substantially the random variation component in measured earnings. But the available data necessitate a skillful compromise of our idealized requirements. We lack separate detailed data on the earnings to labor as a factor of production, or returns solely to current effort. Although it is feasible to single out wage and salary income as returns to the labor force, self-employment income raises a very difficult analytical problem.

Self-employment income is predominantly a joint and undifferentiated product of labor services rendered and capital services ventured in private professions and businesses. Several equally plausible estimating procedures have been developed at the national level to determine the proportion of self-employment income that should be allocated to labor earnings,[18] but no entirely adequate scheme has

[17] There is no reason for expecting that the structure, the demand, and the supply of factors should be similar or, consequently, why a similar structure of factor-skill earnings differentials should evolve among different countries, or within a single homogeneous country over time. Two examples will clarify how such differences in earnings differentials might come about. The distributions of education in the labor force in the United States and, say, Great Britain are quite different. Among the male labor force in Britain in 1951, about three-fourths had 8 or 9 years of schooling, while only one-twentieth had more than 12 years of schooling. Among the male labor force in the United States in 1957, the distribution of schooling was less compressed into one plateau level, and ranged from 17.8 percent with more than 12 years, and 19.2 percent with less than 8 years of schooling. One would expect that if the structure of demand for various factor skills were similar in the U.S. and the British economies, the earnings differentials between those workers with more than 12 years and those with 8 or 9 years of schooling would be greater in Britain than in the United States. Unfortunately, no earnings or income data are available by educational attainment for Britain to test this hypothesis. An example of changes over time in the supply of factor-skill groups, influencing their earnings level, can be seen in our economy today. The current surge of teenagers into the U.S. labor force has and will probably continue to have a depressing effect on the average (or median) earnings to members of this youngest age cohort. Between 1950 and 1960 there was a net gain of 300,000 teenagers in the U.S. labor force, while the anticipated increase in 1965 is 600,000. The unusually high rate of unemployment among teenagers has stabilized at about 15 percent of their share of the civilian labor force since 1958, and reflects a change in the earnings enjoyed by this age group. See table 3 for evidence of the same phenomenon.

One might justifiably argue that the incidence of involuntary unemployment (partial or full) reduces the usefulness of average or median earnings data, since these data then cease to represent the net factor contribution which this unemployed group is *capable* of offering to the economy. However, it is difficult to distinguish between the many factors that conspire to keep the national economy at less than full capacity: failure of public policy, general economic conditions at home and abroad, institutional inflexibilities built into the modern economy. If these many factors contributing to our underutilization of particular labor skills are at least periodically an integral part of our economic environment, should we adjust earnings data to reflect full employment estimates? And, although it would always be desirable to investigate skill-earning differentials at full-employment levels, this would appear to place an unusually severe restriction on possible U.S. data in recent years.

Sources: Distribution of education in the United Kingdom and the United States: from Preliminary Research on Qualitative Changes in European Labor Inputs, by Edward F. Denison. Teenage labor force component data, New York Times, Dec. 5, 1964, p. 21, and Manpower Report of the President, U.S. Department of Labor, 1964, table A–19.

[18] Irving B. Kravis, "The Structure of Income," University of Pennsylvania, 1962, table 5.1, p. 124.

been formulated, to our knowledge, to estimate the size distribution of labor earnings from self-employment income. In 1963, according to Commerce Department's national income estimates, self-employment or proprietors' income accounted for less than 11 percent of total personal income. Two-thirds to three-fourths of the proprietor's income is usually allocated on the national aggregate level to labor earnings. Consequently, the total of wage and salary and *all* self-employment incomes, which is used here as a first approximation for labor's "earnings," probably exceeds the return to current effort by about 5 percent.[19]

Earnings, defined as wage and salary income plus self-employment income, are used for statistical tabulations in a subject report of the 1960 Census of Population, Occupation by Earnings and Education. Figure 2 is derived from tabulations of this 1960 census publication which provides male earnings cross classified by color, age, education, and occupation. Income data from the 1940 and 1950 censuses of population are less well designed than the 1960 data for our immediate needs. The 1940 census provides median wage and salary data to persons by sex, race, age, and education. In 1950, median total money income to persons was published according to sex, color, age, and education classifications.

Our discussion will be framed primarily in terms of the median income level of groups of persons, as a measure of the central value of the size distribution of income.[20] The median level is that amount of income that divides the size distribution of income to persons with income (or the particular type of income) into two equal groups, one having incomes above the median, the other having incomes below the median. When we seek to relate median levels between census years we are confronted with different divisions of the population and different concepts of income. With regard to aggregate males the median wage and salary incomes in 1950 and 1960 are approximately equal to the median total incomes.[21] But median "earnings" in 1960 systematically differ from median total income for various age and education groups.[22] (See table 1 at end of this chapter.) In constructing intercensus comparisons, we have restricted ourselves, therefore, to data which are based on the greatest possible conceptual continuity. (See tables 1 and 2, and fig. 3.) Data are also derived in the next part of this chapter from the published tabulations of the current population survey. This annual sample survey is the source for published estimates of median wage and salary income to persons by sex, and total money income to persons by color, age, education, and other classifications.

There are essentially two ways to estimate from income data the systematic relation between age and income: a cross-sectional analysis

[19] Kravis, *op. cit.*, and "Survey of Current Business," July 1964. At most, one-third of proprietors' income is reckoned as returns to material capital. Since proprietors' income constituted 13.5 percent of "earnings" (wage and salary, other income, and proprietor's income) in 1963, it may be estimated that not more than about 4.5 percent of "earnings" is returns to nonlabor factors of production.

[20] See more complete discussion of median, mean, and dispersion measurements on p. 41 of this study.

[21] See table 20, p. 70. In 1950 median wage and salary income of males in the census was remarkably close to the median total income of males, 0.1 percent. In 1950, according to other sources the median income of males was $2,699 and the median wage and salary income $2,637, still only 2.3 percent more. According to these sources, the 1960 census median male wage and salary income was some 18 percent greater than the median male total income. U.S. Census of Population: 1950, special report, "Education," table 13, p. 5B-128; U.S. Census of Population: 1960, subject report, "Educational Attainment," PC(2)-5B, table 6, p. 88; U.S. Census of Population: 1960, subject report, "Sources and Structure of Family Income," PC (2)-4C, Bureau of the Census, Washington, D.C., table 24, p. 223.

[22] If we had wage and salary, and total income medians broken down into age and education groups, we might discover a similar systematic bias introduced into our intercensus comparisons of median wage and salary and median total income levels.

of data from one time period, and time series analysis of data from several time periods. It is often asserted that cross-sectional data from the population reveal that the income profile of an individual tends to rise to a peak when he reaches 40 to 50 years of age, and gradually declines thereafter until the worker's final retirement from the labor force. This is not, however, a wholly valid description of the income profile of workers in our society, because such an interpretation of cross-sectional data ignores two factors. The *first* is the secular improvement in the quantity and quality of education acquired by each new generation. This secular development has meant that each age group or age cohort benefits from more and probably better formal education than its predecessor when it enters the labor force. Each age cohort, therefore, tends to find better jobs and earn more than the preceding one. The *second* development is the secular growth of per capita real income that is taken for granted in our society, and which benefits all persons to a greater or lesser extent. Per capita real personal income has increased in the United States between 1939 and 1959 at an average annual rate of about 3.14 percent, or per decade this would mean a rise of 36.2 percent.[23] If the increase in per capita real personal income were to continue over each decade at this rate, and were to accrue equally to all age and educational groups, it would then be possible hypothetically to construct the earnings profile of any group, projecting earnings levels forward and backward by inflating and deflating the cross sectional data by 36.2 percent per decade. In other words, it is now expedient to assume what we previously had shown was an unnecessary condition,[24] that is, that the relative differences in earnings among age and educational groups are invariant over time, and hence from one set of cross sectional earnings data we may derive the implicit life earnings profiles by merely imposing on the data a secular growth rate.

Such an exercise is performed [25] on 1959 cross sectional median earnings data for white males in the experienced U.S. labor force,[26] and graphically presented in figure 2 on a logarithmic scale. The 25 to 34 year-old age cohort is arbitrarily chosen as the base group, and the median earnings of older cohorts inflated to represent the projected earnings that the 25 to 34 age group (in 1959) might expect to receive under our assumed conditions when they were 10, 20, and 30 years older. For example, the median earnings reported in 1959 by the 45 to 54 age cohort were inflated by a factor of 1.86 [27] to approximate the median earnings that would be received by our base cohort 20 years hence, in 1979.

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[23] The choice of end dates probably overstates the secular rate of increase of per capita real personal income but these are the end dates of our time series comparison. Dropping back a decade to 1929, the decade rate of increase falls to 23 percent. However, the arbitrary nature of such an estimate is obvious, and the influence of the great depression is not something most of us want to project into the future. More precise adjustments could be attempted, but the use of the technique here is meant to be illustrative, rather than quantitative.

[24] See footnote 17 p. 14.

[25] This exercise is also performed with other data by Becker, op. cit., ch. 2, p. 140. Although this exercise is suggestive of the actual shape of income profiles, as will be tentatively confirmed with time series data in the second part of this chapter, the procedure avoids facing the real problem of functionally allocating the secular rise in per capita income among factor inputs. If this increment to income were imputed to investment in plant and equipment, then much of the secular rise in incomes would accrue to the owners of these factors or the "capitalists," while conversely if this increment to income were imputed to improvements in the labor input the benefits would principally accrue to the "laborers." In adjusting earnings for the secular trend in per capita income we are assuming a neutrality in the functional distribution of this secular trend among the earnings of various age and educational groups of the labor force. Ignorance of how otherwise to specify the functional sources of this secular growth in per capita income is the only defense for our procedure.

[26] Original unadjusted earnings data presented in U.S. Census of Population: 1960, subject report "Occupation by Earnings and Education," PC(2)-7B, Bureau of the Census, Washington, D.C. (1964).

[27] 1.86 equals about 1.36 times 1.36.

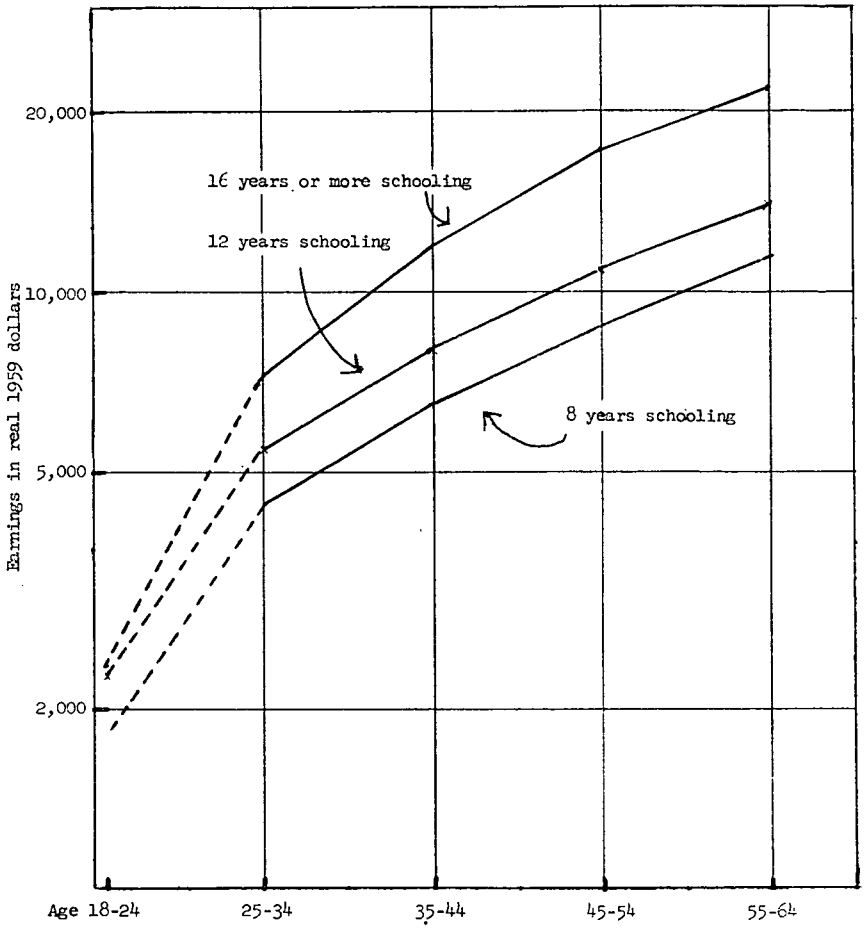

FIGURE 2.—Projection of earning profiles throughout working lifetime for white males by educational attainment (based on earnings data for age 25 to 34 group in 1959, from census of population).

Source: See the text for a full discussion of the procedure used to derive the projections made in this figure, and their validity. See footnote 25, p. 16. Original data drawn from the U.S. Census of Population: 1960, subject report, "Occupation by Earning and Education," PC(2)-7B, Bureau of the Census, Washington, D.C., 1963, table 1.

The results of this exercise suggest that median real earnings levels of males in each educational group experience roughly similar relative increases with advancing age (see part 2 of table 2), though at a decreasing rate, throughout the worker's active years in the labor force.[28] We may observe from comparing income and earning medians for 1959 in table 1, that income from sources other than

[28] From other direct evidence we might conclude that total income of *family units* appears to continue to increase even beyond retirement age. The BLS Survey of Consumer Expenditures in 1950 revealed that even in the group of families with heads over 75 years of age, a larger proportion of them reported incomes greater in 1950 than in 1949 than reported less. The fraction of families that reported the same income in both years increased consistently with the age of the family head, from 25 percent in the under-25 age group, to 65 percent in the over-75 age group. Since there was relative price stability in the period 1948–50, these data on money income are probably a good indication of real income changes. The Survey of Consumer Finances reported the same pattern on the average from 1947 to 1955, with more unit's income rising than falling even in the oldest age bracket, over 65 years of age. See Kravis, op. cit., table 8.8, p.284.

earnings tend to increasingly supplement the individual's total income receipts with advancing age and education. Several additional characteristics may be noted in regard to these hypothetical projections. The youngest age group, that between the ages of 18 and 24, is a most heterogeneous group of workers, including many voluntary part-time and part-year workers, as, for example, college students. It is estimated that in 1962 only 6.8 percent of the males 14 to 19 years old and 45.5 percent of the males 20 to 24 years old who reported income were full-time year-round workers. In the next older age cohort, 25 to 29, the fraction of year-round full-time workers increased to 72.9 percent, a level that was approximately maintained throughout the active labor force years.[29] For this reason the reported increase in median earnings during the first 9-year period in figure 2 should not be regarded as a reliable measure of the increase in earnings per full-time year-round man-year, and the same argument probably explains a substantial part of the unusually large relative rise in earnings of the college graduate group over the 30 to 40 age decade. Two further characteristics seem interesting: first, the elementary school graduate experienced a larger relative rise in earnings in the 40 to 50 age decade than did the high school graduate; second, the earnings status of the college graduate increased at a much accelerated pace only during the 30 to 40 age decade.

The second method of estimating the income differentials associated with age and education factor-skill groups in the United States relies on median income data from different time periods. Median real income data for the designated factor-skill groups are presented in table 1, derived from the 1940, 1950, and 1960 Censuses of Population.[30] These income data may be linked, decade by decade, to estimate the median real income profile over time of particular factor-skill groups. For example, the median real income level reported by the 35 to 44 year-old males in 1949 is linked in figure 3 to that of the "same" 45 to 54 year-old males in 1959, and so on. The percentage increase in median real income by decades for factor-skill groups is shown in part 1 of table 2; there are many shortcomings.

In these estimates, there is no apparent way to determine how the shift from median wage and salary income in 1939 to median total income in 1949 may affect the various age and education group medians. Furthermore, the fraction of some age groups that voluntarily seek part-time or part-year employment has probably changed between 1939 and 1959, influencing the medians as a general measure of income received by fully employed workers. Several patterns emerge from table 2. *First,* the relative rise in median real income

[29] Full-time, year-round worker is defined as one who worked primarily at a full-time civilian job (25 hours or more per week) for 50 weeks or more during 1962. See source "Current Population Reports—Consumer Income" Income of Families and Persons in the United States: 1962, series P-60, No. 41, Oct. 21, 1963, Bureau of the Census, Washington, D.C., table 18, p. 40. The importance of working less than full time in the youngest age cohort is documented by James Morgan as the probable explanation for such great dispersion of incomes among young age groups, and the general low level of this group's earnings and income compared to the rest of the population. From the survey of consumer finance data for the year 1957, the sample of 18- to 24-year-olds turned up 44 percent which had not worked a full 50 weeks. This part-year and part-time employment was due to either voluntary choice, such as continuing education during part of the year, or involuntary acceptance of unemployment which has such a high incidence among the younger workers. In the next age cohort, 25 to 34, the proportion of income earners with less than 50 full weeks of work fell to one-fourth. See Morgan, "Anatomy of Income Distribution," Review of Economics and Statistics, vol. 44. August 1962.

[30] Current median income data were converted with the aid of the Consumer Price Index to represent constant 1959 dollars. Comparative rates of increase in median real incomes were calculated for the most comparable income concepts and universes. This made it imperative that we use "total money income" and "wage and salary income" since only the 1960 census tabulated the more appropriate measure of "earnings".

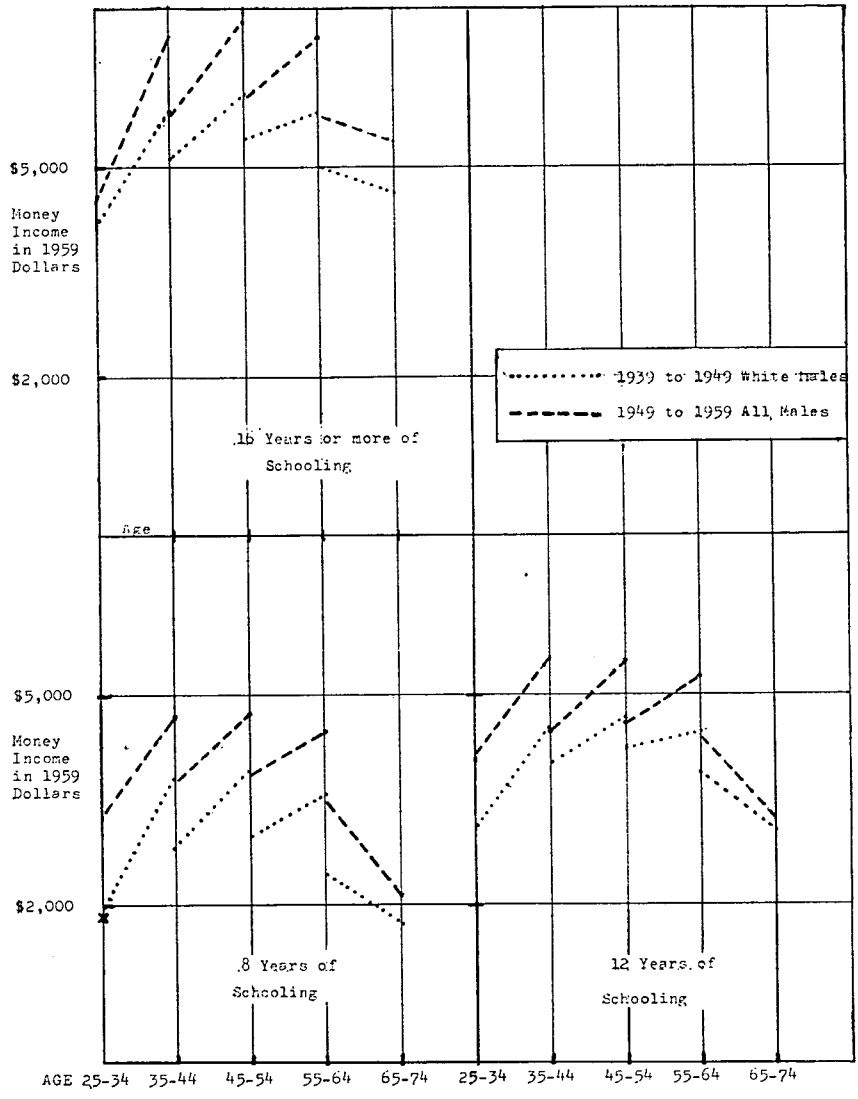

FIGURE 3.—Median income levels of males in the United States by years of schooling: 1939, 1949, and 1959 (in constant 1959 dollars).

Source: Table 1, p. 43.

received by males with only an elementary education (8 years of schooling) was greater during the 1940's in all age groups, than that received by males with either a high school education (12 years of schooling) or a college education (16 years or more of schooling). In other words, the relative income differences associated with these three levels of education narrowed at every age level.[31] *Second*, this

[31] The exception is in the age 65-to-74 group, where the college-educated group experienced a smaller relative decline in its total income than the less educated. This is not very significant, since we wished to analyze labor earnings, and the approximation of total income is poor when the rate of full-time participation declines after age 65.

narrowing of education differentials was reversed in the 1950's, with the elementary and high school educated male receiving very similar relative increases in their income while, on the other hand, the college graduate experienced the greatest relative increases in total income among all age groups. The relative rise in median real income for college graduates in the first age group probably overstates in the 1950's the rise in full-time income of this group, since many of the 25 to 34 year-old college graduates were involved in only part-time or part-year work. Furthermore, to the extent that general on-the-job training is most common among the college graduates in this 25 to 34 age group, the college graduates would probably carry some of the cost of this advanced training and hence report a somewhat lower than full-time earnings level as would have occurred had they continued their formal education on a part-time basis.[32]

One last source of time series data, derived from the annual current population survey, is assembled in part 3 of table 2. These data report by age groups the percent rise in median real total income of males (with all levels of education combined) between overlapping postwar decades. Without breakdowns by educational level, these data are compared only to the projected cross sectional 1959 earnings data for all males by age.

Several hypotheses can be advanced to explain some of the disparities between the cross sectional and time series estimates of income differential rates of increase over the life cycle.

(1) Since our assumption that the relative differentials were invariant among overtime factor-skill groups was not confirmed by the census time series data, no precise agreement between the projected cross sectional estimates and the time series estimates should be expected.

(2) The persisting disparity between the estimated increase between the 45 to 54 and 55 to 64 age cohort might be due to the lasting effect of the great depression. Between 1929 and 1939 per capita real personal income did not increase at our secular rate; on the contrary, it actually declined 2.5 percent over the decade. This contraction in personal income must have been borne disproportionately by the young and less experienced members of the labor force. If this decade of stagnation were the cause for the low rate of increase in income noted among these older members of the labor force, then we would expect the depression's effect to diminish with time. The census time series data are consistent with this hypothesis, for although overall per capita real personal income increased in the 1950's at about half the rate it maintained in the 1940's, the older age group (45 to 54 and 55 to 64) experienced greater relative increases in median real income in the 1950's than in the 1940's in every educational group.

(3) The use of "earning" data for the cross sectional projection, and "total income" and "wage and salary income" for the time series comparisons probably systematically overstates in the time series data the increases of labor earnings associated with advancing age in the higher educational groups.

(4) Finally, the cross sectionally projected estimates ignore the influence of secularly improving quality of education, not adequately

[32] See Becker, "Investment in Human Capital: A Theoretical Analysis," Investment in Human Beings, supplement Journal of Political Economy, vol. 70, No. 5, pt. 2, October 1962, pp. 9-49.

measured in terms of "years of schooling." [33] Because of this secular development in the quality of education, lifetime income profiles projected from cross sectional data would tend to underestimate the rate of increase in income expected to one age cohort through time. But the importance and incidence of qualitative changes in the economic value of years of schooling are difficult to estimate and adjust for.

From our analysis of the factor distribution of personal income, we noted that labor earnings are systematically distributed among factor-skill groups distinguished here by age and education. The increases in median income level associated with age of male workers are quite predictable, but the rate and structure of growth in the national economy appear to influence substantially the estimates of income profiles traced out by time series data and estimated from cross-sectional data. The relative inequality of the distribution of labor earnings can be usefully summarized in terms of the inequality of such estimated profiles of lifetime earnings, thereby standardizing for the age of the income earner. Much of the inequality of lifetime labor earnings is associated with, or perhaps determined by, the years of schooling completed. We have assumed that the income differentials we statistically observed were a valid reflection of the differences in the marginal productivity of various factor-skill groups in the U.S. economy.

If it were a policy objective of the society to promote a change in the distribution of lifetime labor earnings, the policy instruments would have to influence one or more of the four factors we discussed earlier in the chapter, which determine the demand for, and supply of, factor services in the U.S. economy. It is difficult to conceive of a practical method of channeling the advance of technology to utilize relatively redundant skills [34] or of molding consumer preferences in a free society to demand more goods and services derived from particular skills. On the supply side of the factor earnings relationship we must further concede our limited understanding of, and our impotence to alter greatly, the underlying determinants of the rate of natural increase of the population, or the pattern of participation in the labor force. The remaining determinant of factor earnings, to which we now turn our final attention, is the act of allocating investment in developing the level and distribution of skills in the labor force. What economic objectives should guide the formation of social policy in this sphere?

Abstracting from discounting procedures, uncertainty, and dynamic considerations, we may describe an economically efficient scheme of allocating a society's investment resources as one that maximizes the social rate of return on these investment resources. An efficient manpower investment policy would have a similar objective. Assum-

[33] We mean by "quality" all subtler specifications of formal education that are missed by our measure of "years of schooling completed." For example, Denison estimated that from 1930 to 1960 the average number of years of school completed increased by 33.6 percent among males 25 years of age and over while, in addition, the average number of days of school attended per year of school completed increased by 34.2 percent. More than half, therefore, of the increase in average total number of days of school completed among males 25 years of age and over between 1930 and 1960 is not accounted for by our measure of education; that is, years of schooling completed. (See Denison, "The Sources of Economic Growth in the United States, and the Alternatives Before Us," Committee for Economic Development, New York, 1962, table 9, p. 72.)

[34] Clarified in the discussion below, p. 22. The only economic meaning we can attach to the term "relatively redundant skills" is those skills for which the private or social rate of return to individuals having acquired the skills is unusually low. Alternatively, it would be possible to fashion a welfare standard that would designate a gross earnings level, below which would fall, by definition, only the earnings of "relatively redundant skills," without deducting for the returns to investment in training and investment.

ing, for simplicity, that the educational process involving the acquisition of skills is solely an act of investment,[35] for which the private returns can be estimated from differentials in income profiles, then costs may be weighted against returns in the acquisition of educational skills to derive rates of return to these acts of educational investment. A relative shortage or redundancy of particular skills in the economy would be related to unusually high, or low, rates of return received by persons investing in particular skills. The rate of return could be calculated on three bases: private costs and private returns; public and private costs and private returns; and, with much greater difficulty and uncertainty, social costs, and social returns.

In this light, it is clear that changes in private income differentials associated with various factor-skill groups are not in themselves an indication of relative scarcity. For example, the increase in relative income differentials between high school and college educated males between 1949 and 1959 does not necessarily indicate that the rate of return to the acquisition of a college education has risen compared to the rate of return to the acquisition of a high school education. The cost of a college education may have risen more than that of a high school education, and have therefore offset the widening of income differentials between these two factor-skill groups. According to estimates made by Becker, the private rates of return to a male's high school education appear to have risen from an estimated 16 percent (per annum) in 1939 to more than 28 percent since 1958. On the other hand, Becker's estimates of the private rate of return to a male's college education declined slightly from 14.5 percent in 1939 to 12.4 percent in 1956, and began to rise, thereafter, reaching 14.8 percent in 1958.[36] The social rate of return to a male's college education was estimated as somewhere between 13 and 25 percent.[37]

Returning to our original question, what economic objectives should guide the formation of social policy on the level and distribution of public (and private) investment in human resources? An efficient allocation of social investment in developing the *distribution* of skills in the population would tend to equalize the social rates of return accruing to all levels of educational investment. The optimal *level* of public (and private) investments in the development of human resources would be determined by the alternative social rates of return associated with investment activity in the development of material resources elsewhere in the economy. From this perspective, Becker's estimates imply that the great expansion of expenditures on high school education since 1940, and the consequent doubling of the percentage of the population with a high school education, did not drive down the private rate of return to this investment in educational skills; on the contrary, in the interim the private rate of return to males with a high school education appears to have risen by about three-fourths. One must infer as Becker does, that "advances in

[35] If the fraction of the costs of education allocated to investment (or consumption) were constant, then all rates of return to various levels of schooling would be simply adjusted proportionately. However, if high school education is recognized as including a greater consumption component than advanced technical training, then a smaller proportion of the costs of high school education would be charged off against the income increment associated with the completion of high school, and a larger proportion of costs in the technical training would be charged off against the income increment associated with the completion of the advanced technical education program. Such an adjustment would tend to raise the rate of return to high school education compared to advanced technical education.

[36] Becker, "Human Capital: A Theoretical and Empirical Analysis With Special Reference to Education," NBER, Columbia University Press, 1964, table 14, p. 128.

[37] Ibid., ch. V, p. 120.

technology and other forces increasing the demand for educated persons must have * * * more than offset the increase in high school graduates." [38] Although we do not now have the empirical estimates of the social rates of return associated with the acquisition of various educational levels, the need to extend our knowledge in this direction is clear.

In this section we have derived the broad outlines of an analytical framework which needs much further development and elaboration, but which shows promise of being useful in systematically organizing data on the distribution of labor earnings to persons. Explicitly recognizing the nonhomogeneity of labor as a factor of production, we distinguished several relatively homogeneous factor-skill groups of comparable sex, age, and educational attainment. Concentrating our attention on male labor earnings, we examined the earnings differentials among these factor-skill groups in the U.S. economy, using both cross sectional and time series data. We noted that the data were in several ways deficient for our purposes and many severe assumptions were therefore inescapable. Returning to the determinants of the distribution of labor factor income, we analyzed the act of education as an investment activity that contributed to the level and distribution of factor-skills in the labor force, and how it has functioned as a determinant of the distribution of labor earnings. To formulate the conditions for efficient economic allocation of educational investment among the various skill levels we introduced the concepts of the social and private rates of return to investments in the acquisition of skills.

[38] Ibid., ch. VI, p. 131.

SECTION B. THE DISTRIBUTION OF DISPOSABLE INCOME BY FAMILIES

1. The composition and usefulness of concept of disposable income

The size distribution of personal income can be conceived alternatively as the distribution of factor income by the market to owners of capital and labor skills in return for factor services rendered to the economy, or as the distribution of disposable income, that is, the distribution of economic resources at the disposal of the income-consumer-welfare units for the provision of their consumption and saving. This second conception of the distribution of personal income pertains to a different concept of income from that we considered in the first section of this chapter, one which includes both factor income and the net receipt of transfer payments which together make up total disposable personal income of consumer-welfare units.

Public transfers may take the form of contributory transfers such as social security, unemployment compensation, and veterans benefits, and noncontributory transfers such as welfare payments and free medical care. If the concept of income adopted for analysis is disposable income, that is, income after the payment of specified taxes, then the transfers from public to private sector are netted from the counterflows of private tax payments to the public sector. Private transfer payments may take the form of alimony, inheritance, inter- or intra-family gifts, or charity, and are essentially a supplement to private income which does not represent a payment for productive services rendered.[39]

Economic statistics on the distribution of disposable personal income serve two distinct though interrelated purposes: (1) they provide the empirical foundation for analyzing consumer behavior, and (2) they give us clues to the distribution of welfare in the society. In the first case, household data on income, expenditures, and savings are used to test empirically theories of consumer behavior and to extrapolate their implications. One application of these data would be the estimation of consumer demand for a particular product in a specified market area, and another would be the prediction of aggregate demand for the Nation's output of goods and services. In the same manner these data would be needed for an investigation of savings in the aggregate and of a particular group of individuals. In micro- and macro-economic investigations of consumer behavior not only is the aggregate magnitude of personal income a variable, but also the exact distribution of that personal income among classes in the population for which economic behavior significantly differs. The limited scope of this staff study does not permit us to investigate the

[39] Private transfers can lack the symmetry of simple transfers of income and welfare because both the beneficiary and the benefactor can derive satisfaction from the transfer. Though the beneficiary of a private transfer simply receives a payment not related to a productive service rendered, the person (or business) who consigns some part of his income or wealth to such a private transfer may *not* face a commensurate reduction in his welfare. Can an analytical distinction be drawn between the voluntary decision to distribute one's net worth and the decision to save some portion of one's current income? Life insurance and pension plans are voluntary acts of saving to assure there will be a reliable source of support for a person and his dependents in the future. When does this form of saving become a private transfer? If a person derives satisfaction from a particular disposition of his net worth, then should this private transfer be described as partially an act of consumption for the benefactor?

many avenues of research concerned with utilizing income distribution statistics in the analysis of consumer behavior.[40]

Empirical examination of consumer behavior has made scant progress in integrating personal wealth data into a general theory. It is widely agreed that the net worth position of consumers must be incorporated with current realized income in order to fathom the mechanism determining expenditure and saving behavior of the consumer over the life cycle. The Federal Reserve Board's 1963–64 reinterview Survey of Financial Characteristics of Consumers is an important first step in the direction of collecting the comprehensive data on income, wealth, and savings for a representative sample of consumer units, as will be needed to test an income-wealth theory of consumer behavior.

In the second case, data on the distribution of disposable income to families are used to study the causes for and consequences of the distribution of welfare. There is a consensus that money income is a grossly inadequate measure of welfare. It is, therefore, useful to specify at the outset exactly how this most frequently used measure of welfare is deficient, so we guard ourselves against too simple conclusions. Although it is recognized that nonmonetary sources of satisfaction contribute much to the welfare and happiness of individuals, there is no simple alternative statistic by which we might estimate this distribution of "real" welfare among persons. The narrower defects we will investigate relate to the adequacy of realized current income as even an approximate reflection of economic command over present and future goods and services—in other words, "economic" welfare.

Welfare is essentially a measure of the adequacy of economic means to satisfy specified wants. To detail the shortcomings of income data as a measure of what we commonly call welfare, we will *first* investigate the weaknesses of realized money income as a measure of economic *means*. It is here suggested that lifetime average annual income is a superior measure of economic means, and that current consumption is a useful proxy for this more complex estimate of lifetime expected means. *Second*, we will investigate the characteristics and factors of consuming units which systematically affect their economic *wants*. Since most personal income statistics are available only on an annual realized income basis, it becomes doubly important that we recognize the factors that influence wants and are associated with age and phases of the life cycle. The distribution of personal income by consumer units arranged according to these influential structural factors has undergone considerable change in the United States since 1935–36. These structural changes in the relation between current wants and means of consumer units imply that there has perhaps occurred a greater shift toward less inequality in the distribution of welfare than the aggregate size distribution of personal income by consumer units would show. These structural changes in the composition of low and high income units also provide a clue to the changing characteristics of and causes for poverty in our affluent society.

[40] For evaluation of survey of consumer finances program see "Consumer Survey Statistics," report of consultant committee on Consumer Survey Statistics, Chairman Arthur Smithies, organized by the Board of Governors of the Federal Reserve System at the request of the Subcommittee on Economic Statistics of the Joint Committee on the Economic Report, July 1955. Reprinted in "Reports of Federal Reserve Consultant Committees on Economic Statistics," Joint Economic Committee, U.S. Congress, Government Printing Office, 1955.

2. Welfare and means

(a) Current versus lifetime economic means

Current realized money income is deficient as a measure of welfare: *first,* because means and wants (and hence welfare) are not solely confined to the current moment but rather extend in a somewhat predictable fashion over the lifetime of the individual, and *second,* because basic wants of an individual may not be satisfied in every location or occupation for the same money outlay. Command of adequate present and future means to meet present and future expected wants is a much improved yardstick of economic welfare. For example, if low income individuals were promised a rich inheritance tomorrow, they would not suffer the woes of poverty today. They would face neither the prospect of a hopeless future bound to poverty, nor the prospect of denial of current credit to finance present consumption. Both the psychological and material burden of poverty would have been relieved by this promise of future means. But income tomorrow, like the proverbial birds in the bush, is not quite the same thing as money in hand. Though liquidity and risk in an uncertain world complicate greatly our analysis, still, command over a future income stream can, in general, be transformed through the capital market to fetch its present discounted value.[41] If a life insurance policy or home is entirely paid for, it takes on the nature of an unencumbered asset which renders service to you or your beneficiary. As a future source of income, even an actuarially uncertain income, this asset commands a positive present cash value. An asset can also be held in the form of one's own training, which yields returns throughout one's working life, by raising one's productivity and earning profile. In figure 2 the estimated earnings profiles show a large difference between the accumulated lifetime earnings of the high school graduate and the college graduate. But if we confine our attention to the earnings of these two educational groups between the ages of 18 and 24, the college graduate, continuing his education or training while working part-time or part-year, reports about the same median earning level as the high school graduate. There is no essential difference between the low income individual who was relieved of poverty by the promise of tomorrow's inheritance, and the struggling student who prefers to live on a pittance while completing his education; neither individual should be classified as impoverished. The student has been investing heavily in his own future productivity, so that for the remainder of his working life he can look forward to a more ample standard of living than can the average individual who has invested less in his training.

[41] There appear to be prominent shortcomings in the assumption that the asset composition of family units adjusts itself fully to the needs of the family unit; homeownership by the elderly appears to be such an example. Most Americans own their own home and therein lies much of their tangible net worth. For the elderly and low-income family unit the home is the most important single type of asset. According to the Federal Reserve Board's Survey of Financial Characteristics of Consumers in 1962 (Federal Reserve Bulletin, March 1964), families with an annual income of less than $3,000 held 42 percent of their net worth in the form of their home. For all families with heads over the age of 65, the home constituted 24 percent of their net worth. The home probably constituted something like half of the tangible net worth of low-income elderly family units. This home may not generate the imputed services to the elderly family that we credit them with because its nonliquidity as an asset may not be best designed to meet the portfolio needs of the elderly for, say, unexpected medical bills, and the large size (number of rooms per person exceeds that for any other family age group) of these homes must surely exceed the conceivable needs of the elderly family. See paper prepared for the use of the President's Council on Aging, July 1964, by George W. Grier and Joan Heifetz, "Housing Older People: The Needs, the Federal Programs," and James N. Morgan, "Measuring the Economic Status of the Aged," a paper presented at the Sixth International Congress on Gerontology, Copenhagen, August 12, 1963.

In general terms, the expected lifetime profile of total income of a person can be estimated with some precision from data on his material wealth, education, age, and current income. Consumption would tend to require a redistribution of the lifetime profile of income to best satisfy the changing consumption needs over the life cycle which do not necessarily coincide with changes in current income. The student, in our example, might prudently decide to borrow money to finance a more comfortable standard of living in his college days, and plan to repay the loan from his much improved income status in later years. But one suspects that there may be a substantial underinvestment in this human form of capital both on the private and social level because of the imperfections in the market for investing in human capital: an ignorance of the rates of returns, and a great awareness of the nonliquidity and risk involved in this form of investment in oneself.

(*b*) *Transitory variations in economic means*

Superimposed on the lifetime profile of personal income are random and short-run variations in income which because of this very transitory nature do not reflect changes in expected lifetime means, and consequently have little effect on welfare and current consumption. The existence of such random changes in current income would exaggerate the dispersion or inequality of income estimated from income data collected for a relatively short period. To minimize this source of bias in income distribution data, a longer measurement period than a year, over which incomes might be averaged, would seem optimal. But what little empirical evidence has been derived from time series sources on personal income, this evidence does not ascribe much significance to this source of bias. Panel income data collected from representative or regional samples of consumer units and taxpayers for several consecutive years do not confirm the existence of a major upward bias in estimates of income inequality arising from the use of annual income data rather than income data averaged over several years. Frequently, the changes in the dispersion of income that accompany the business cycle overshadow the effect of averaging the yearly income data.[42] But it is difficult to say a priori how much bias is introduced into the time series income data by the inevitable exclusion of the more mobile members of the community, who tend to move out of the sample frame before being reinterviewed. It is self-evident that this source of bias in the findings of panel surveys increases with the length of time over which annual incomes are averaged. Logically, random variations in personal income should systematically bias income distribution data derived from annual information, but fragmentary evidence suggests this bias is not large.

The business cycle is another source of short-run variability in the distribution of personal incomes by size. We are not yet able to specify the functional mechanism that relates changes in the distribution of personal income to the changing phases of the business cycle, but particular empirical regularities are noted if not integrated into a general theory. First, changes in the factoral composition of national income that are associated with the business cycle appear

[42] Kravis, op. cit., ch. VIII, pp. 268–298. The hypothesis of permanent income (and transitory income) is classically set forth with its implication for income distribution in Friedman's, "A Theory of the Consumption Function," Princeton University Press, NBER, 1957.

to have distinguishable effect on the distribution of personal income among upper income units. Proportionately, profits fluctuate more over the cycle than does national income, so that the share of national income going to profits tends to rise and fall in phase with the cycle. Nonfarm (and farm) entrepreneurs who derive much of their income from profits, experience greater income variability than does the average individual.[43] Furthermore, nonfarm entrepreneurs tend to be more than proportionately represented among the upper income strata. This sequence of observations leads us to a plausible hypothesis to explain the empirical phenomenon that the relative inequality of incomes among upper income units increases in periods of cyclical expansion, and decreases in periods of depression. Early investigations which were based on income tax data gathered from the upper income units understandably concluded, therefore, that the *aggregate* relative inequality of the distribution of personal income tended to increase in years of prosperity and decrease in years of depression.[44]

Improved income data on lower income units suggest that among wage and salary earners there is an opposite tendency for the relative inequality of the distribution of personal income to decrease in years of prosperity and increase in years of depression. Two factors could be responsible for this phenomenon. First the incidence of increasing unemployment and underemployment, despite the moderate increase in labor's share in periods of depression, contributes to greater relative inequality in the functional distribution of wage and salary income. The least productive or socially desirable[45] workers are the first made jobless in the cyclical downturn. They experience greater variability in their factor income over the cycle than do the workers whose skills are in short supply, and who therefore command greater job security. Although unemployment compensation may cushion the changes in disposable income of cyclically unemployed workers, it does not eliminate large fluctuations in their disposable income. Movements in wage-skill differentials hint that there may also be a tendency for the distribution of income among fully employed persons to become more unequal in periods of slack demand and depression, and more equal in periods of prosperity. In the United States and the United Kingdom, for example, the wage differentials between unskilled and skilled workers decreased markedly during the period of the Second World War, when aggregate demand was pressing against the economy's resource potential. Since the mid-1950's aggregate demand in the United States has not fully utilized the available labor force or plant capacity, and concurrently wage-skill differentials have widened. This interpretation of the causes for changes in wage differentials neglects the influence of changes in the structure of demands in the economy for particular skills, and supplies of the same. The separation of secular shifts in demand and supply schedules from cyclical forces is difficult. The scattered evidence, however, confirms the

[43] Friedman, op. cit., pp. 227–228. Other research has not always confirmed this contention of Friedman's that entrepreneurs have greater income variability than the average individual.

[44] Gibrat, "Les inegalites economiques," Paris, 1931, and Prokopovitch, "The Distribution of National Income," Economic Journal, vol. 6 (1926).

[45] This was noted in the first section of this chapter in regard to the nonwhite worker. Nonwhite unemployment rates have increased relative to white rates since 1954. During the same period total unemployment has idled a larger fraction of the labor force than in the earlier postwar decade. We do not have the annual data needed to examine unemployment and income differentials between comparably educated and skilled white and nonwhite workers. Such data would probably confirm that the nonwhite has relatively more to gain than the white from a higher rate of growth and resource utilization.

original notion that in a period of expansion and prosperity, when aggregate demand is fully utilizing the economy's supply of resources, the income of low-income persons and families tends to be relatively higher than in periods of high unemployment. This rise of the low-income individuals tends to overshadow in importance the increasing inequality of income among the upper income units. It seems reasonable to conclude, therefore, that for the society as a whole the welfare inequality decreases in periods of extended prosperity, and the aggregate income inequality also decreases in most periods of prosperity, and conversely increases in periods of cyclical or sustained depression.[46]

Of these three sources of variability in personal incomes—the life-wealth cycle, random short-run fluctuations, and systematic cyclical income changes—the longer run interplay between personal net worth and the lifetime income profile of an individual is probably of greatest importance in interpreting and analyzing the available annual income data. It is once again regrettable that the economic data on the distribution of material and human capital (wealth) by persons and consumer units are so inadequate and fragmentary. With the present state of these data we will not attempt to integrate into our further empirical discussions the notion of life-wealth cycle.[47]

(*c*). *Money as a measure of purchasing power*

A new set of problems is raised when one inquires about the adequacy of money income to reflect even immediate command over goods and services needed to meet wants. The exclusion of nonmoney income is a serious shortcoming of most income distribution statistics. Only the 1941 Survey of Family Spending and Saving in Wartime, and the Office of Business Economics' estimates include nonmoney income in their size distribution of income data. Although money and nonmoney income are not homogeneous or interchangeable, nonmoney income continues to constitute a major source of food, fuel, housing, and housekeeping materials for particular strata of the population. Any comparison, for example, of farm and nonfarm family income must recognize a differential benefit derived by farm families from nonmoney income sources.[48]

Regional differences in price level may also influence the purchasing power embodied in the same amount of money income. On the one hand, the average price of food, paid by the consumer unit of large cities in 1950 and of urban regions in 1955, was positively correlated with the average income of the consumer unit.[49] In terms of food purchases this would suggest that the distribution of money income would overstate the inequality of distribution of purchasing power for this commodity. On the other hand, it might be the case that for certain durable goods the competitive range of products available in urban regions of higher average income produce a negative correlation between prices paid for these goods and income of consumer unit. If, as seems reasonable, prices do not move together, the

[46] Mendershausen, "Changes in the Income Distribution During the Great Depression," Studies in Income and Wealth, vol. 7, NBER, New York, 1946.

[47] Again, it might be noted that the Federal Reserve Board's survey of financial characteristics of consumers was designed to provide complete data on the net worth of family and individual units and to record educational attainment of income earners. All the data are available on the master tape to test many of the hypotheses set forth in this staff study. See chapter III, sec. C of this study.

[48] Reid, "Distribution of Nonmoney Income," in Studies in Income and Wealth, vol. 13 NBER, New York, 1951.

[49] Reid, ch. 2, p. 23 of draft of manuscript on the determinants of food consumption.

region that would permit the family with a $3,000 annual budget to live most comfortably might not be the same region that would permit the family with a $30,000 annual budget to live most comfortably. Social, cultural, and climatic characteristics of a locality would also tend to influence the regional income level and price level in inverse directions. Where the climate provides a valuable free good to the residents (e.g., California) one would expect that labor could be attracted for a lower pecuniary income, while on the other hand, the material cost of living would tend to be somewhat higher, offsetting the value of the "free" good. Although the approximate adjustment of money income for purchasing power parity by region would probably improve marginally the accuracy of income distribution data in representing purchasing power, no such adjustment of money income for variations in regional prices has been undertaken on the data reviewed in this study.

(d) Summary and conclusions

The economist draws our attention to several remediable shortcomings of current realized income as a measure of economic "means" to satisfy "wants," or what we defined as our first approximation of economic "welfare." Regional differences in the prices of consumer goods and services affect in a complex way the real purchasing power of money income. The final consumption of many families and individuals is further influenced by nonmoney sources of income which are neglected in most income data. Because of the variation of personal income from year to year, at least three difficulties arise in estimating from annual income data the distribution of economic "means." *First,* since the annual variance of income exceeds the variance of income flows averaged over more than 1 year, estimates of the real relative inequality of income derived directly from annual income data tend to be biased upward. Although this source of bias does not appear to be a very significant factor in measuring the relative inequality of the aggregate size distribution of income, random transitory income changes are in all probability more important in any analysis of savings or expenditures derived from and compared to annual income data. *Second,* over the business cycle the variance of personal incomes of the entire population and of particular segments of the population appear to change systematically. Our knowledge of this phenomenon is scant, and more empirical and theoretical work is justified in this area. *Third,* and most important for an analysis of welfare, annual income data are not a complete or true reflection of an individual's lifetime means. An analogy from the physical sciences would perhaps illustrate the point made here. In recording the position of a projectile in flight, the height at one instance in time is not a sufficient datum to estimate the distance the projectile has gone, or will go, or the integral of its path. Further information is needed to estimate these characteristics of the projectile's course. Correspondingly, in the case of an individual's income profile, annual income data are not sufficient to evaluate an individual's means or income over his lifetime compared to other individuals. Information is required to construct and project his average lifetime income. We have contended here that age in conjunction with the wealth position of the individual, measured as the sum of material net worth and human capital invested in his education and training, permits us to

estimate the expected lifetime income of the individual.[50] The inequality of income distribution in a society is, we suggest, most meaningfully summarized in terms of the size distribution of such reconstructed lifetime income profiles or average annual incomes.[51] Research on the welfare implications of income distributions should, consequently, direct its central focus toward developing an integrated understanding of personal income, wealth, and age.[52]

The lack of adequate personal wealth data today makes unfeasible this most appropriate estimating procedure for reconstructing the distribution of lifetime incomes and welfare. As a second best solution, many economists argue that consumption is more closely correlated to average lifetime income than is current annual income and, therefore, consumption is a better approximation for our idealized measure of welfare.[53] The individual's profile of earnings and consumption does not perfectly coincide over his lifetime; there are distinct periods in his life when net saving (an excess of earnings over consumption) tends to occur and other periods when dissaving behavior is most prevalent. On the average, dissaving marks the early years of rearing a family, when persons incur debt to meet current family expenses, acquire a stock of durable consumer goods, and even acquire a home. If marriage and the start of a family are postponed till several years after the head has entered the labor force, these younger years may be associated with net saving, but such saving will often take the form of the purchase of consumer durables. After

[50] The estimation of expected lifetime income is fraught with all the qualifications (ceteris paribus) found in investment theory applied to material capital. First, there is the actuarial chance that the material capital will meet with some form of destruction (fire, theft, etc.) or in the case of human capital with some form of disability or death. Obsolescence for material capital might be interpreted as encompassing all changes in the rate of return to the investment that can be traced to unforeseen changes in the demand for, or supply of, the services provided by the material capital. Analogously for human capital, an unforeseen "advance" in technology might curtail sharply the economy's demand for a particular person's skill, depressing the income of the person and rendering his labor services "obsolete." The obsolescence factor in capital theory is the obverse of technical change and the "residual," a valid measure only of our ignorance about the sources of real economic growth. For a brief discussion and critique of a current contribution to capital theory, see Denison's review article, "Capital Theory and the Rate of Return," American Economic Review, vol. 54 September 1964 pp. 721-725, on Solow's book by the same title, Amsterdam: North-Holland Pub. Co., 1963. For a survey and discussion of literature on measuring technical change and the residual, see Domar, "On the Measurement of Technical Change," Economic Journal, December 1961, pp. 709-729.

[51] The only study known to us of the size distribution of lifetime income was undertaken by Robert Summers in a monograph prepared for the Office of Naval Research, "An Econometric Investigation of the Size Distribution of Lifetime Average Annual Income" (technical report No. 31, Stanford University, March 1, 1956). Summers reconstructs lifetime annual average income from age cohort income data collected for consecutive years 1947-48 and 1951-52 by the Federal Reserve Board and the Survey Research Center of the University of Michigan in conjunction with their survey of consumer finances. Summers made the restrictive assumptions that the population and the aggregate real income were stationary. He took no consideration of the educational attainment of the individual or his material wealth position. Income dynamic relationships were specified to explain the decade-by-decade advance in real income of urban spending units as a function of age and previous income level, linear in the logarithms of income. The degree inequality of income received by households in his model over the 4 decades of active income seeking was significantly less than that estimated from annual data for households headed by persons of the same age, and far less than that estimated from annual data for the entire sample of urban households. Robert Solow in "On the Dynamics of Income Distribution" (unpublished Ph. D. dissertation at Harvard University, 1951) dealt with a similar problem in a different manner. Using old-age survivors' insurance (social security) data from 1937-41 on wage and salary income of workers, he estimated transitional probabilities which represented the likelihood that a person would move from, say, the "i" income class in period 1 to the "j" income class in period 2. Multiplying the resulting transitional probability matrix by the original vector of the relative income distribution yields, by definition, the 2d year's distribution. Utilizing new mathematical tools of limit theory, Solow derived the ergodic distribution for several pairs of years from the estimated matrices. The ergodic distribution is the stable distribution gradually approached as a limiting state when the matrix multiplication is repeated a large number of times, as in infinite markoff processes. Two ergodic distributions of wage income generated from transitional matrices for a recession 2-year period (1937-38), and for a prosperous 2-year period (1939-40), closely approximated the lower and upper bounds of the Lorenz curve in this period standardized for age. These empirical investigations worked within very different mathematical frameworks, but raised similar, and as yet unanswered, questions about the mechanism determining the distribution of income over the business cycle and over the life cycle.

[52] Pioneering work in the systematic investigation of lifetime income profiles of workers by age and education was done by Mincer in his Ph. D. dissertation at Columbia University. See "Investment in Human Capital and the Personal Distribution of Income," Journal of Political Economy, vol. 66, August 1958.

[53] Consumption is defined to exclude current expenditures on consumer durables and occupational expenses, and include consumption in kind, and the imputed services derived from the stock of consumer durables.

the offspring leave the family and become self sufficient, a second, longer period of net saving follows. After retirement the unit enters into the final phase of dissaving. To clarify the argument for viewing consumption as a useful proxy for average lifetime income, a concrete example will suffice.

A retired couple living on an annual money income of $2,000 tend to consume more than their current income by drawing upon their stock of liquid savings and by allowing the home they occupy and own to deteriorate and depreciate in value. Both of these forms of net dissaving are statistically associated with elderly low-income units.[54] For this elderly couple, a comprehensive measure of consumption provides a more adequate estimate of average annual lifetime income than does current annual income. In the Bureau of Labor Statistics Survey of Consumer Expenditures of 1960–61, there was reported a negative net change in the asset level, on the average, for 45.6 percent of the urban family and single consumer units. All classes of consumer units with aftertax annual incomes of less than $5,000 reduced, on the average, their net worth and dissaved during the year. (See table 7, p. 46.) The 1950 Survey of Consumer Expenditures also reveals this same pattern of net dissavings.[55] The consistent magnitude of net dissaving among the lower half of the income classes is a strong sign that many of these consumer units were accustomed to a higher average lifetime income than they were then currently enjoying, and either borrowed on their future expected income or depleted their past savings to bring their current consumption more nearly into accord with their wants and their expected lifetime average annual income. The poor, with meager assets, find their consumption pattern less insulated from the effects of changes in current income level.

If we are interested in the average lifetime welfare status of persons and not their current productive contribution to the economy, consumption rather than current income should be consulted. If consumption is adopted as a more reliable proxy for lifetime average annual income than current realized income, we find ourselves halfway in our pursuit of a measure of economic welfare. The welfare of a consumer unit is judged by the adequacy of its economic "means" as reflected in consumption to satisfy the unit's wants. In the next section of this chapter, we will deal with the structural characteristics of the consumer unit, or typically the family, which systematically influence its wants and its earning ability.

3. *Welfare and wants*

(*a*). *Standardization for size and structure of family*

In this section the economic wants of the consumer unit will be discussed. These wants are themselves a function of the unit's size and composition, its geographic location, and a host of other social and structural factors. *First,* we will argue that in a static analysis

[54] Although table 8, p. 46, which distinguishes the income expenditure characteristics of urban consumer units by age, does not report net dissaving for the elderly cohorts of family and single consumer units, the comparable data for the 1960 half of the Consumer Expenditure Survey of 1960–61 do. It must be stressed that if the low income elderly consumer unit was tabulated separately, its pattern of dissaving would be perhaps more striking. But as the data are for all income classes together, only the very oldest and youngest cohorts show consistent signs of dissaving.

[55] Lamale, "Methodology of the Survey of Consumer Expenditures in 1950." University of Pennsylvania, 1959, app. J, p. 348. All net income classes up to $6,000 dissaved, and for all consuming units together net worth declined on the average $74, but in 1960–61 urban survey, the aggregate net worth increased $177. BLS Report 337–38, April 1964, Consumer Expenditure and Income, "Urban United States, 1960–61."

of welfare, the distribution of disposable income by consumer unit must be adjusted to approximate the distribution of welfare by standardizing the income data for family structure and location. *Second,* we will show that in an intertemporal or interregional comparison of distributions of disposable income, no quick conclusions about the relative distribution of welfare can be deduced unless the "structure" of consumer units by income size does not differ between periods or regions. Such invariance of the structure of consumer units is uncommon, even when the lapse of time is short, and the uniformity among regions compared appears complete. Several demographic developments have played a major role in the secular changes we will observe in the structure of consumer units ranked by income size in the United States. The compound family unit that spanned several generations has, since the Second World War, tended to separate into additional family units. The single generation household has in turn contributed to a trend for young parents to have their children born close together at an early stage in their marriage. Consequently, the middle-aged wife is substantially freed of responsibilities in the home associated with the presence of elder and younger generations, and more often enters the labor force. Rising per capita incomes have facilitated both this "undoubling" of families and, by reducing the economic constraints placed on young parents, the early concentration of childbearing. The web of psychological and economic factors influencing the structure and formation of households is too complex a social phenomenon for us to unravel here with only economic analysis.[56] This section will merely sketch the principal trends without ascribing causal significance, and then turn to an analysis of the changing relationships between the distribution of income by size and three selected "structural" characteristics of the consumer unit: the size and number of children, the number of earners and the age of the unit's head.

The level and composition of the wants of a family [57] are in large part a function of the structure and characteristics of the family unit—the number and age of its members are of primary importance. Geographic location, occupation, and social status also contribute toward the determination of the wants of a family unit consistent with any given level of welfare. Welfare may be interpreted in an absolute sense, as real "economic" means or purchasing power, or alternatively in a relative sense, as the secularly rising level of means needed to sustain a "socially acceptable" standard of living. The selection of exactly what constitutes an adequate budget must be somewhat arbitrary. But a cautious adjustment for the family's structure of wants is better than none. The Bureau of Labor Statistics estimated [58] welfare adjustment factors for families of various sizes,

[56] A research unit under the direction of Dorothy S. Brady is investigating this complex problem for the Social Security Administration. When this report was drafted, the materials of this project were not available. Much econometric and theoretical work has sought to develop explicit models for explaining the demographic composition and formation of households. See Guy Orcutt, et al., "Microanalysis of Socioeconomic Systems," Harper & Bros.: New York, 1961. See Morgan, and others "Income and Welfare in the United States," McGraw Hill: New York, 1962, ch. 14 discusses the economies of living with relatives. The annual survey of consumer finances is probably the best source of U.S. postwar data on the structure of consumer units.

[57] *Family* refers in this paragraph to two or more persons related by blood, marriage, or adoption, living in the same household, but similar adjustment procedures should be applied to different age and sex single consumer units. For example, men and women have different needs for medical care and hospitalization at different ages. Though men have shorter life expectancies than women, in any given age bracket more women than men are sick and in need of special consideration in housing.

[58] Monthly Labor Review, vol. 67 (February 1948), p. 179, and the more recent series of adjustment factors cited here in Monthly Labor Review, vol. 83, November 1960, pp. 1197–1200.

ages, and locations. For example, an urban family of four, with its head less than 35 years of age, living in Washington, D.C., would require an annual income of $4,250 in 1959 dollars to be maintained at an "adequate" standard of living. Estimates of the welfare budget will vary from generous to subsistence, as will all judgments. It is not the objective of this study to contribute to this dialogue on the selection of a boundary of poverty, or a definition of a welfare ratio,[59] but only to emphasize the need for standardization to account for the size and composition of the consumer unit and whenever feasible for location.[60] In one of its subject reports, "Sources and Structures of Family Income," the 1960 Census of Population adjusted urban family income to reflect more adequately material well-being of the members of the family unit.[61] The census adjustment procedure distinguished 20 classes of families by size and age of head. (See table 14, p. 55.) Any thorough research on the socioeconomic characteristics of distinct welfare groups in the population, whether it be low- or high-income units, should squarely face the need for adjusting income data for the composition of the income unit.[62]

(*b*). *Change in the U.S. family structure and labor force participation*

Before we attempt to explain the changing structure of the consumer unit seen in terms of a single factor, we must grasp the significance of several major and interrelated developments in the American society, which have changed the outward character and the inward economic behavior of the consumer unit over the lifecycle. The composite family that bridged several generations has tended to "undouble" since the Second World War. Increasing real incomes for the young and increasing means of self-support for the retiring elderly have permitted the young and old secondary family units to set up housekeeping for themselves, with the blessing, if not at the urging, of their respective parents or offspring. The annual survey of consumer finances estimated that between 1950 and 1961 the proportion of related secondary family units living in the household with the primary family unit decreased 50 percent, from 13.1 percent of the spending units to 6.6 percent. (See table 21, p. 76.) The findings of the current population survey, on which tables 3 through 6 are based, enumerate together primary and secondary related consumer units living in the same household, even though their finances may be entirely separate. This "undoubling" of family units since the war is certainly one plausible explanation for the decline in the relative income status of the family with seven or more persons (see table 4), and the decline in the relative income status of the young and old family units.

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[59] See technique used in the recent study by James Morgan, Martin David, Wilbur Cohen, and Harvey Brazer, "Income and Welfare in the United States," McGraw-Hill: New York, 1962. They define a welfare ratio as a ratio of gross disposable income to the value of a "poverty" budget. Margaret Reid in her review article in the Journal of the American Statistical Association, vol. 58 (September 1963), pp. 825-829 raises some objections to the choice of the basic "poverty budget," and the need for adjustment for equity other than housing, nonmoney income, region, variability of annual income data, etc.

[60] For discussion of this problem of standardization of family income for family composition see: "Income Size Distribution in the United States," Studies in Income and Wealth, vol. 5, NBER, New York, 1943; William Vickrey, "Resource Distribution Patterns and the Classification of Families," Studies in Income and Wealth, vol. 10, NBER, New York, 1947; Friedman, "A Method of Comparing Incomes of Families Differing in Composition," Studies in Income and Wealth, vol. 15, NBER, New York, 1952. Multivariate analysis employed by Morgan, op. cit.

[61] Table 4 of Census Subject Report PC (2)-4C, Washington, D.C., 1964. See table 14 of this study.

[62] See Robert J. Lampman, "The Low-Income Population and Economic Growth," Study Paper No. 12, prepared for the Joint Economic Committee in connection with its Study of Employment, Growth, and Price Levels, 1959, p. 5. Kuznets, "Shares of Upper Income Groups in Income and Saving," NBER, New York, 1953.

(See table 3.) This decline in the relative income status of the old and young in all probability reflects greater independence and a rise in the welfare of both the primary and secondary family units, contrary to the inference drawn from the unadjusted income data. One expects that this marked postwar development, which we have called "undoubling," will continue as less viable economic units establish their own separate economic identity as "consumer units."

A second demographic trend of major import is the changing pattern of labor force participation. The most striking characteristic of this change has been the increasing participation of married women in the labor force. In 1962 about 7 out of 10 families and unrelated individuals consisted of a male head with wife present in the household. In these husband-wife consumer units, one-third of the wives were participants in the paid labor force [63] (see table 8). This fraction of married women in the labor force has risen in 13 years from 21 to 32 percent, or an increase of about a half. Between April 1951 and April 1961 married women in the U.S. labor force increased by 4.2 million, contributing about 45 percent of the total increase in the labor force over this decade.[64] Although the median size of the family unit did not rise appreciably until after 1954,[65] the number of income earners per family rose some 18 percent, from 1.19 in 1948 to 1.40 in 1959.[66] How is the economist to analyze this new pattern of labor force participation, its causes and consequences?

One might assume that there had been a shift in the mores regarding the participation of members of the family other than its head in income earning activity. Many psychological, sociological, and economic factors take a hand in influencing the patterns of labor force participation; only a few of these can be pointed out here. Educated women residing in urban locations enter the labor force most often. Thus, the rising level of education and the increasing urbanization of the U.S. society play a role in this phenomenon. The "undoubling" of families into single generation households and the concentration of childbearing within a relatively brief span of time provide the married

[63] The participation rate of married women changes considerably, depending on their place of residence, education, and age, and on the presence and age of children in the family unit. For example, only 18 percent of those married women with children less than 3 years old held paid employment in 1962, while 36 and 41 percent of the married women with no children (under 18) or children of school age (6 to 17) held a job during 1962, respectively. Jacob Schiffman, "Marital and Family Characteristics of Workers in March 1962," Monthly Labor Review, January 1963, table G.

[64] Morgan, et al., "Income and Welfare in the United States," op. cit., p. 106. See chs. 9, 10, and 11 for a thorough discussion of the participation, hours, and earnings of wives.

[65] The "undoubling" of composite family units counterbalanced through about 1954 the effect of the increasing postwar birth rate, manifest by the number of children per family unit under the age of 18, and held the median size of U.S. family fairly constant for the first postwar decade. Since 1954, according to the current population survey, the median family size has continuously grown.

Year	Median size of family	Average (mean) number of children per family with children
1948	3.22	2.09
1950	3.18	2.10
1955	3.27	2.23
1959	3.32	2.37
1962	3.37	2.39

See "Current Population Reports—Consumer Income," series P-60 annual issues. Bureau of the Census, Washington, D.C.

[66] Cited by Kuznets in "Income Distribution and Changes in Consumption" (from Goldsmith, "Impact of the Income Tax on Socio-Economic Groups of Families in the United States," tables 2-5) in The Changing American Population, Hoke S. Simpson, ed., Institute of Life Insurance, New York 1962, table 5, pp. 34-35.

women with a larger range of choices, and thereby make possible more labor force participation. The economy, and particularly the urban economy, offers more opportunities for part-time and part-year employment, so that secondary members of the consumer unit can more readily find employment and a source of supplementary income whenever there is felt to be a shortage of current income or full-time male employment.[67] However one interprets these demographic developments, they have markedly influenced the distribution of income and leisure in the society. A recognition of these general social and economic developments contributes to our understanding of the changing composition of the consumer unit, and how these compositional characteristics, which are associated with economic wants, have become redistributed by income size since 1935–56.

(c) Systematic differences in the distribution of family income

In the static discussion of welfare, we noted that the size of the consumer unit is germane to designing a measure of the adequacy of the economic means of the unit. In essaying an interregional or intertemporal comparison of income distributions it is essential that we analyze the correlation between size of consumer unit and its economic means in each distribution. The BLS 1960–61 Survey of Consumer Expenditures reveals a strong and positive relation between the size of the urban unit and its disposable money income or economic means. (See table 7.) The lowest third of the urban consumer units, ranked according to disposable money income, contained about 23 percent of the persons in the surveyed universe, and the highest fourth of the urban consumer units contained nearly a third of the persons. This correlation between family size and income suggests that the distribution of welfare is not as unequal as the distribution of disposable income among consumer units. In other words, the poorer urban consumer unit tended consistently to provide for fewer persons. Those urban consumer units with less than $1,000 of annual disposable money income contained on the average only 1.3 persons, and 0.2 children under the age of 18, while at the other extreme of the income spectrum, the consumer units with between $10,000 and $15,000 annual disposable money income contained 4 persons, and 1.5 children. Although income, age, and family size are understandably related, the strong correlation between the size of consumer unit and its income is not an intrinsic feature of nature, but a complex product of social tastes, mores, and the distribution and level of real income itself.[68]

[67] Research into the determinants of female labor force participation has been done by Mincer, "Labor Supply, Family Income, and Consumption," American Economic Review, Papers and Proceedings (vol. 50, May 1960, pp. 474–483). Mincer's model is extended and elaborated by Glen G. Cain in "Labor Force Participation of Married Women," preliminary draft of research, Nov. 27, 1963, Social Systems Research Institute, University of Wisconsin, Madison. Cain distinguishes the white from nonwhite married women in his regression analysis of several different bodies of data. The nonwhite participates more than the white married women in the U.S. labor force. Both white and nonwhite participation rates appear to respond positively to wage level, educational attainment, and absence of dependent children in the home. However, the much higher participation rates among nonwhite married women, despite their lower wage and educational status in the labor force suggests other factors are relevant. One hypothesis Cain advances tentatively to explain the significantly higher participation rate among nonwhite married women relative to white is the less stable family relationship and higher male unemployment rate among nonwhites, which generate the need for greater financial security and independence among nonwhite married women in comparison to their white counterparts in the United States.

[68] For example, in Atlanta, Ga., in the 1935–36 Consumer Expenditure Survey, though the universe sampled explicitly excluded families on relief, the typical pattern between income size and family size was reversed among Negroes, with large families reporting lower incomes on the average than small families. See Gunnar Myrdal, and others, "The American Dilemma," Harper & Row, New York, 1962 (original edition, 1944), pp. 364–367.

To make any time series comparisons on the strength of this relationship between the income size and the size of consumer units in the United States, we will shift to a broader universe of all rural and urban families, excluding unrelated individuals. In the United States such a correlation between size and income of families was not as evident in 1935–36 as in the postwar period. The lowest fifth of the family units according to money income contained 3.7 persons in 1935–36, and the highest fifth of the family units contained 4.0 persons. By 1959 the average family size in the lowest fifth, by money incomes, was 3.2, while the highest fifth contained 3.9 persons.[69] This reveals a factor working for a more equal distribution of welfare between the two periods, even if the family income distribution among the fifths had not shifted toward less inequality.

The relationship between the final size distribution of income and the number of income earners per consumer unit helps us in understanding the welfare consequences of the changing pattern of labor force participation, or more precisely what has been the effect of the changing labor force participation on the size distribution of final income and leisure among consumer units. Are we to expect that low-income consumer units send a larger fraction of their wives and relatives into the labor force than do the high-income consumer units? Tables 5, 6, and 7, which draw upon postwar U.S. data, tend to discount this hypothesis. Apparently, the probability that a married woman will enter the labor force increases systematically with the level of her family money income, up to the $7,000 level in 1949, and up to the $10,000 level in 1955 and beyond $10,000 in 1962.[70] The number of full-time income earners per consumer unit in the BLS 1960–61 urban survey is also strongly correlated with the size of the consumer unit's disposable money income (see table 7). The slight deterioration in the relative income status of family units with more than one earner since 1946, as documented in table 6, is probably a consequence of the "undoubling" of composite families which reduced the frequency of family units with several adult male income earners. Although tables 5 and 6 suggest that there has been rather little change in the general pattern of participation by income size since the Second World War, a change in this pattern of participation distinguishes the pre- from the post-war U.S. data. In 1935–36 the lowest fifth of the family units, ranked according to money income, contained 1.1 income earners on the average, while the highest fifth contained 1.5 income earners. This general relationship was much strengthened after the war, and by 1959 the lowest fifth of the families, ranked by money income, contained 1.0 income earners and the highest fifth of the families contained 2.0 income earners.[71] In the mid-1930's it would seem that the members of upper income families participated less in the labor force than today. This is indeed evidence of a redistribution of leisure by income classes, an unheralded change that accompanied the more publicized reduction in the aggregate inequality of the

[69] Kuznets, op. cit., table 5.

[70] Of course we must not ignore the circular cause-and-effect relationship, since the married women who work tend to contribute as well to the higher income of their family unit. But the contrast made between pre- and post-war reversal in the relation between supplementary earners and family income indicates the postwar change was dramatic. See multivariate analysis of this relationship between wife participation, hours, and earnings, and other variables. Morgan and others, op. cit., ch. 9, 10, and 11.

[71] Kuznets, op. cit., table 5.

distribution of personal income. In our pursuit of a measure of economic welfare, we have up to now neglected the contribution of leisure to the welfare of individuals.

The value and distribution of leisure are certainly important facets of the distribution of welfare, but can leisure be regarded in the same way as money income as an "economic means" sought after without a threshold of satiation? J. M. Keynes, writing in 1930, caught sight of the benefits and the boredom of leisure in a future but foreseeable world where the "economic problem" would be solved. Keynes depicted the "wives of well-to-do classes" in the United States and England as "unfortunate women, many of them, who have been deprived by their wealth of their traditional tasks and occupations—who cannot find it sufficiently amusing, when deprived of the spur of economic necessity, to cook and clean and mend, yet are quite unable to find anything more amusing." The moral is clear. "To those who sweat for their daily bread leisure is a longed-for sweet—until they get it."[72] Nevertheless, leisure *per se* is positively valued, regardless of secular improvements made in working conditions and increases in personal satisfaction derived from productive work. The choice made by the secondary member of the consumer unit is more subtle: he must decide whether the value of leisure (full-time) outweighs the value of net psychic and pecuniary gains to be earned in the labor force. Moreover, since leisure is increasingly consumed with other products and services, income level may play a constraining role in the consumption of leisure. Thoreau could consume his leisure by simply retiring to Walden Pond, but to enjoy leisure in vogue on the Riviera requires not only the free time (leisure itself) but also the economic means to afford the necessary complementary goods and services. In the final analysis, all we can conclude here is that the implicit value placed on leisure by secondary members of consumer units in the United States appears to have fallen *relative* to the net social and pecuniary gain implicitly associated with active participation in the labor force. This conclusion does not invalidate our observation above, that since 1935–36 changes in the distribution of leisure among consumer units would seem to have contributed to a reduction in the inequality of the distribution of welfare, measured in terms of income or consumption of economic goods and services.[73] There are perhaps instances, as for example with the elderly and the unemployed young workers, where involuntary leisure may not be positively valued, but in the overwhelming majority of cases leisure from income-earning activity is a valuable, if difficult to quantify, act of consumption.

The amount of time persons spend in economically productive activities should be the subject of broad economic research, for though we know a good deal about money earnings of individuals, we know relatively little about the factors motivating persons to perform economically productive activities, whether they take the form of do-it-yourself work around the home, participation in community government, donation of personal effort to philanthropic organizations, or paid employment, etc.

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[72] "Essays in Persuasion," Harcourt, Brace & Co., New York, 1932, p. 367.

[73] "Even when work hours are adjusted to include time spent in housework and child care, which tends to reduce the welfare ratio and increase the work hours of units which include children, units with the highest welfare ratios still tend to have the least leisure." James Morgan, and others, op. cit. p. 327, ch. 21, of general interest and bearing on the discussion made here.

The age of the head of the consumer unit is the third and final structural characteristic of the consumer unit which we will investigate in connection with the size distribution of disposable income. The age of the head of the consumer unit is subtly associated with the unit's income, consumption and savings, wealth position, education, size, participation in the labor force—in short, age is interrelated in some fashion to all the attributes that change across generations, and over the life cycle. It is worth our while to view age from several points of vantage.

Our first investigation into the influence of age on welfare will link together annual income data into time series for different generations, and then contrast these time series data to adjusted cross-sectional data which tell a somewhat different, though consistent, story of the relative disparities of income between age groups at one moment in time. The adequacy of one's income today is judged against both the real income he enjoyed yesterday, and the real income his peers enjoy today. According to figure 4, which is derived from annual CPS estimates of real family money income, the median level of family income tends to rise over each decade of the family's life cycle, until the watershed is reached at age 65, and thereafter real income declines rather abruptly. Of note is the fact that the rate of increase in median income level decreases consistently with increasing age (seen in figure 4 as the slope of the income profile plotted on logarithmic paper).

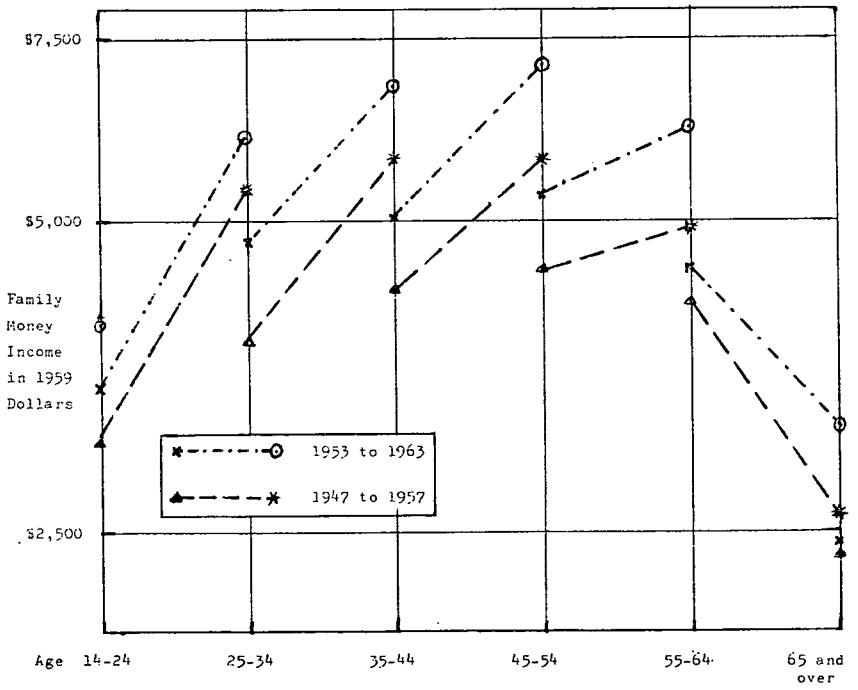

FIGURE 4.—Median money incomes of families over time by age of family head (in constant 1959 dollars).

Source: "Current Population Reports—Consumer Income," series P-60, annual, Bureau of the Census, Washington, D.C., current median income data for all U.S. families adjusted by Consumer Price Index to represent 1959 constant dollars.

There appears to be a systematic difference between the two overlapping decades of time series estimates. The survey reported that during the more recent decade, 1953–63, the rate of increase in median family income was greater after the age of 35 (or the decrease less) than was reported in the earlier decade, 1947–57. (See table 2, pt. 3.) The cross-sectional reading of the data indicates that the cohort over the age of 64 reported about the same real median family income level in 1947, 1952, and 1957, but 1962 brought this group a real improvement in family income.[74] On the other hand, the two youngest cohorts experienced consistent and substantial increases in their real income level between 1947 and 1952, and between 1952 and 1957, but only a marginal increase in the last 5-year period, as the number of young entrants to the labor force increased substantially. This phenomenon can be better understood in comparison to further cross-sectional income data.

As the reader will recall, white male earnings were projected in figure 2 from 1959 cross-sectional data, by specifying assumptions regarding the secular rate of growth and distribution of real factoral earnings.[75] The rate of growth of the adjusted cross-sectional earnings (slope of profile in figure 2) between corresponding age cohorts for all males are roughly similar to those we derived directly from the time series data on family income in figure 4. We can offer several possible causes for a disparity between the rates of increase of family income and individual male earnings between age groups. Increasing participation of married women in the labor force tends to supplement the male earnings of the head of family, boosting the family's total earnings with advancing age. A second factor would be the changing composition of the total income, in other words, the increasing fraction of income which comes with advancing age from sources other than earnings, i.e., property and transfers.

Approaching the age factor from yet another point of view, table 3 shows the median income level of families with heads in six age groups for the selected years, 1947, 1950, 1955, 1960, and 1962. In the second half of the table the relative income position of the age groups is computed for each of the 5 years. Families with heads over 65 and under 25 years of age experienced a decline in their relative income status between 1947 and 1960, which was only slightly reversed in 1962. This phenomenon, which we noted before in figure 4, can be plausibly traced to the changing structure of family units in the postwar period. The "undoubling" of composite families tended to give separate identity to "low income" old and young consumer units which had heretofore been sheltered from the survey enumerator by the existence of the multigeneration family unit. Furthermore, an increasing proportion of young Americans have extended their education, so that among those enumerated in the youngest age cohort are an increasing number of part-year and part-time workers

[74] Since the over-65-age cohort is about one-third over the age of 74 (in 1960), these elder members of this open-end cohort probably bias downward the estimate of the income level of the over-65-age cohort for our purposes of time series analysis. This assumes, realistically, that in the past income tended to decline after age 74.

[75] For a discussion of the estimating procedure and methodology see pp. 16, 17 of this study.

and part-year students. Unemployment may also be responsible for some of the decline in relative income status of the old and young family units. During periods of high unemployment the old are obliged by their employers to retire when they reach 65, and the teenagers seeking employment are accorded the least seniority and are hence most frequently unemployed.

(d) *Need for comprehensive income, wealth and demographic data*

In this chapter on the economic statistics of the distribution of personal income, we have often referred to the median income level of particular groups in the population.[76] Such a single parameter, central value, description of the size distribution of income omits all information regarding the dispersion of incomes about the central value. The mean and median level in two distributions could be identical, while in one distribution every unit enjoyed the same amount of income, and in the other distribution half the units received nothing and half received everything. The welfare implications of two such distributions of personal income would be somewhat better reflected by the extent to which the incomes were dispersed by size. Many second parameters have been proposed to "best" summarize or describe the dispersion of incomes about the central value. In tables 9 (column 2) and 10, we have chosen the simplest, and therefore perhaps not the most precise measure of skewness, dispersion, or relative inequality of the size distributions of income and wealth for various groups. We have defined the ratio of the mean to the median of the size distribution as a measure of the distribution's skewness. The marked variability of the ratio between the mean and median warns us that these two measures of the central value do not necessarily vary together, or even in the same direction, when ordering income (and wealth) levels between groups.[77]

From the evidence presented in table 10, and in other empirical researches on the personal distribution of income,[78] we can conclude that the relative inequality of the size distribution of earnings (or income) tends to increase with the age and education of the group, other things held constant. In table 10, for every level of education, except for the group with less than 8 years of schooling, the mean-median ratio of male earnings increases systematically with age. When education is allowed to change and age held constant, a similar systematic increase in the mean-median ratio of male earnings is noted with increases in the educational attainment of the group. Although

[76] The median income (earnings) level derived from sample data is a more reliable statistic than the mean income level. This is because high income units, which influence disproportionately the estimation of aggregate income and the mean income level, are a small group, and hence subject to great statistical variability. Furthermore, those types of income (dividends, interest, and entrepreneurial income) that constitute most of the high income unit's income are subject to more serious underreporting than other types of income in most sample field surveys and decennial censuses. See further discussion of this problem in ch. III and app. A.

[77] See footnote 76, and footnote 2 in table 10.

[78] The same systematic ranking of inequality is noted in other more comprehensive empirical analyses. See calculation of Gini ratios of concentration for age groups in Miller, "Trends in the Income of Families and Persons in the United States: 1947-60." Technical Paper No. 8, Bureau of the Census, Washington, D.C., 1963, table 3. For discussions of age and education see Kravis, "The Structure of Income," University of Pennsylvania, 1962.

the mean-median ratio of male earnings in 1959 was, on the average, only 1.15, table 9 reports that the estimated mean-median ratio of the size distribution of personal material net worth was 2.99. It is a recognized fact that the size distribution of material net worth is more unequal than that of personal income,[79] but how the two distributions of wealth and income interact in the long and short run is not fully understood.

4. Conclusions

The aim of this chapter has been to survey some empirical materials and try to assemble the basic elements of an analytical framework that would prove useful in a systematic study of personal income distribution statistics. The reader was forewarned that a precise and elegant theoretical structure had not yet been formulated for the analysis of the distributions of factor or disposable personal income. The reason for this situation should now be obvious; it is not a general lack of data, but a particular lack of economic theory. An integrated theory of the determinants of the distribution of personal income has lagged behind our capacity to collect and process vast amounts of relevant, if not always the most relevant, data.[80]

To make use of these income statistics and, more important for the purposes of this study, to specify the general types of new statistics that are needed, we require the implicit application of organizing economic principles, or what we have called an analytical framework. The analysis of factor earnings is tractable to economic analysis, and can provide the general framework for study of the distribution of factor income to persons. Data on the distribution of labor earnings present an opportunity to empirically study what characteristics appear to influence the productivity or earnings of this important factor of production. We have contended that at least two economic criteria, age and education, can be fruitfully employed to partition the labor force into more meaningful and more homogeneous factor-skill groups. An analysis of the distribution of labor earnings within these factor-skill groups will provide a clue to the significant determinants of the residual distributions. An analysis of the earning differentials between these factor-skill groups can contribute to our understanding of the social rates of return to investment activity in upgrading the skill level of the labor force.

The distribution of disposable income to family units is not yet amenable to comprehensive economic analysis. Countless forces have a role in determining the size, composition, and economic contribution of families or consumer units in a society. These forces are not all economic and those that are, are not always easily quantified because of the complex interrelationships that permeate any socio-economic environment. The application of economic analysis

[79] The major contribution to the empirical study of the distribution of material wealth in the United States, Lampman, "The Share of Top Wealth-Holders in National Wealth, 1922-56," NBER, Princeton University Press, 1962.

[80] See George Stigler, "The Early History of Empirical Studies of Consumer Behavior," in the Journal of Political Economy, April 1954.

to the task of "explaining" the progress of family formation and development has not yet met with substantial success.

For the discussion of the distribution of welfare, we are usually dependent upon the statistics of the distribution of disposable income among families. These data, however, contain many faults for this purpose. Some of these shortcomings are remediable, others are not. Wealth data, in this regard, are a necessary adjunct to income, age, and education data for any complete study of the distribution of welfare. The importance of changes in the structure of family units in the United States is documented by investigating the size distribution of disposable income to families by several characteristics: size, number of earners, and age. More qualifications than conclusions must unfortunately stem from our evaluation of the distribution of disposable income data. Current comparisons over time and between regions of the distribution of welfare are of limited analytical value because of our ignorance of the complex relationship existing between family money income and the economic welfare of family members.

TABLE 1.—*Median real income of males by age and years of schooling for 1939, 1949, and 1959*

[In 1959 constant dollars] [1]

Years of schooling and year	Age 25 to 29	Age 30 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 64	Age 65 to 74
Elementary, 8 years:						
1939 wage and salary of native white	1,722	2,140	2,579	2,688	2,300	----------
1949 total income:						
White	2,828	3,200	3,501	3,617	3,207	1,863
All males	2,751	3,120	3,420	3,553	3,173	1,836
1959 total income of all males	3,683	4,293	4,541	4,609	4,278	2,095
Earnings [2] of all males	4,197		4,730	4,904	4,840	(3)
High school, 12 years:						
1939 wage and salary of native white	2,470	3,093	3,704	3,938	3,593	----------
1949 total income:						
White	3,571	4,082	4,347	4,554	4,242	2,795
All males	3,528	4,036	4,298	4,424	4,192	2,760
1959 total income of all males	4,745	5,452	5,848	5,806	5,413	2,969
Earnings [2] of all males	5,849		6,398	6,691	6,824	(3)
College, 16 years or more:						
1939 wage and salary of native white	3,291	4,196	5,177	5,626	5,030	----------
1949 total income:						
White	3,612	5,218	6,364	6,863	6,365	4,471
All males	3,572	5,157	6,273	6,770	6,273	4,388
1959 total income of all males	5,301	7,315	8,751	9,381	8,773	5,636
Earnings [2] of all males [4]	6,265		8,692	9,108	8,566	(3)

[1] 1939 and 1949 income data inflated to 1959 dollars by use of the Consumer Price Index.
[2] Earnings defined as wage and salary income and net self-employment income.
[3] Not available for 10-year elderly cohort.
[4] Earning medians given for 4 and 5 or more years of college. They were combined by weighting the 2 medians by the number of persons in that category.

Sources: (1) 1939 median income wage and salary data for native white males: H. P. Miller, "Income of the American People," John Wiley & Sons, New York, 1955, table 31, p. 67.
(2) 1949 median total income data for white males: Ibid., table 30, p. 67.
(3) 1949 median total income data for all males: U.S. Census of Population: 1950, special report, "Education," 5B, Bureau of the Census, Washington, D.C., 1953, table 13, p. 5B–128+.
(4) 1959 median total income data for all males: U.S. Census of Population: 1960, subject report, "Educational Attainment," PC(2)–5B, Bureau of the Census, Washington, D.C., 1963 table, 6, p. 88+.
(5) 1959 median earnings data for all males: U.S. Census of Population: 1960, subject report, "Occupation by Earnings and Education," PC(2)–7B, Bureau of the Census, Washington, D.C., 1963, table 1, p. 2–3.

TABLE 2.—*Several sources of data on the percent change in real median income levels over lifetime of males in the United States*

Years of schooling and years	Decade increase in all male income	Age 20–24 to 25–34	Age 25–34 to 35–44	Age 35–44 to 45–54	Age 45–54 to 55–64	Age 55–64 to 65–74
1. Age cohorts between censuses (see fig. 3)—White male income: [1]						
Elementary: 8 years—						
1939–49 (white males)	------	------	[2] 81.3	40.0	19.3	−19.0
1949–59 (all males)	------	------	[2] 54.7	34.8	20.0	−34.0
High School: 12 years—						
1939–49 (white males)	------	------	[2] 56.3	22.9	7.7	−22.2
1949–59 (all males)	------	------	[2] 54.6	35.1	22.4	−29.2
College: 16 years or more—						
1939–49 (white males)	------	------	[2] 70.0	32.6	13.1	−11.1
1949–59 (all males)	------	------	[2] 104.8	49.5	29.6	−10.2
All males:						
1939–49	[3] 54	------	------	------	------	------
1949–59	[3] 42	------	------	------	------	------
2. Projection from 1959 cross sectional (see fig. 2)—White male earnings,[1] inflated 36.2 percent per decade to adjust for secular growth:						
Elementary: 8 years	------	[4] (140)	46	37	30	
High School: 12 years	------	[4] (140)	47	34	30	
College: 16 years or more	------	[4] (201)	67	43	28	
All males	------	[4] (174)	42	28	23	
3. Age cohorts—Current population survey—All male income:						
1947–57	31	[4] (123)	53	26	9.4	[5]—52.0
1953–63	22	[4] (134)	47	28	12.0	[5]—47.0

[1] 1939 wage and salary; 1949 total money income; 1959 earnings defined as wage and salary income and net self-employment income. Median of those with income.

[2] For census age 25 to 34 cohort no median published, so simple average of 2 group median given (age 25 to 29 and age 30 to 34) was used as approximation.

[3] Percentage change in real median wage and salary income of all males between decennial census years.

[4] Not exactly comparable because cohorts are of different size: 4 and 10 years.

[5] Includes those over 74, and therefore probably overstates decade decline in individual income.

Sources: (1) Census medians by age and years of schooling. See table 1. Median wage and salary income for all males—1960 Census of Population subject report, "Sources and Structure of Family Income," PC(2)-4C, Bureau of the Census, Washington, D.C., table 24, p. 223. Graphically presented in fig. 3 of this chapter.

(2) Derived from table 2, ch. III of this study. White male income data inflated 18.4 percent per decade in each educational category to approximately adjust for secular rise in per capita income. Graphically presented in fig. 2 of this chapter.

(3) Derived from Current Population Reports—Consumer Income, Series P-60. Annual issues, Bureau of the Census, Washington, D.C. Consumer Price Index used to adjust income medians to 1959 dollars.

TABLE 3.—*Median income of families in the United States by age of family head*

[In constant 1959 dollars]

	1947	1950	1955	1960	1962
All families	3,957	4,036	4,817	5,547	5,736
Ages—					
14 to 24	3,075	3,185	3,622	3,965	4,118
25 to 34	3,831	4,099	4,899	5,618	5,684
35 to 44	4,307	4,373	5,372	6,334	6,574
45 to 54	4,505	4,474	5,574	6,385	6,780
55 to 64	4,186	4,078	4,767	5,507	5,989
65 and more	2,398	2,308	2,552	2,862	3,085
	RELATIVE MEDIAN INCOMES				
All families	100	100	100	100	100
Ages—					
14 to 24	78	79	75	71	72
25 to 34	97	102	102	101	99
35 to 44	109	108	112	114	115
45 to 54	114	111	116	115	118
55 to 64	106	101	99	99	104
65 and more	61	57	53	52	54

Source: H. P. Miller, "Trends in the Incomes of Families and Persons in the United States: 1947 to 1960." Technical Paper No. 8, Bureau of the Census, Washington, D.C., 1963, table 3, and Current Population Report—Consumer Income, series P-60, No. 41, "Income of Families and Persons in the United States, 1962," Oct. 21, 1963, table No. 3. The 1962 median income data were deflated by the Consumer Price Index to be equivalent with rest of series in 1959 constant dollars. These estimates are from annual consumer price surveys and are subject to errors of sampling variability, nonresponse, and inaccurate response.

TABLE 4.—*Median incomes of families in the United States by number of persons in family unit*

[In constant 1959 dollars]

	1947	1950	1955	1960	1962
All families	3,957	4,036	4,817	5,547	5,736
Families with—					
2 persons	3,233	3,406	3,925	4,347	4,490
3 persons	3,978	4,184	5,039	5,722	5,993
4 persons	4,308	4,466	5,367	6,208	6,503
5 persons	4,635	4,477	5,297	6,359	6,459
6 persons	4,473	4,309	5,004	6,047	6,295
7 persons or more	4,274	3,884	4,419	5,081	5,404
	RELATIVE MEDIAN INCOMES				
All families	100	100	100	100	100
Families with—					
2 persons	82	84	81	78	78
3 persons	101	104	105	103	104
4 persons	109	111	111	112	113
5 persons	117	111	110	115	113
6 persons	113	107	104	109	110
7 persons or more	108	96	92	92	94

Source: H. P. Miller, "Trends in the Incomes of Families and Persons in the United States: 1947 to 1960." Technical Paper No. 8, Bureau of the Census, Washington, D.C., 1963, table 3, and Current Population Report—Consumer Income, Series P-60, No. 41, "Income of Families and Persons in the United States 1962," Oct. 21, 1963. Table No. 4—the 1962 median income data were deflated by the Consumer Price Index to be equivalent with the rest of series in 1959 constant dollars. These estimates are from the annual consumer price surveys and are subject to errors of sampling variability, nonresponse, and inaccurate response.

TABLE 5.—*Wives in paid labor force as percent of husband-wife families by total family income*

	1949	1955	1962
All husband-wife families	22	26	32
By family income, in current dollars:			
Under $999	11	11	17
$1,000 to $1,999	17	15	15
$2,000 to $2,999	17	20	19
$3,000 to $3,999	19	21	25
$4,000 to $4,999	30	22	26
$5,000 to $5,999	33	26	27
$6,000 to $6,999	36	36	32
$7,000 to $9,999	27	44	39
$10,000 and more	17	29	44

Source: Current Population Reports—Consumer Income, Series P-60, No. 24, Apr. 1957, table E; and derived from No. 41, October 1963, table 2.

TABLE 6.—*Median family income by numbers of earners*

[In current dollars]

	1947	1950	1955	1960	1962
Number of earners:					
None	983	923	1,294	1,797	1,931
1	2,738	3,128	4,069	5,192	5,429
2	3,750	3,912	5,250	6,438	6,910
3 or more	5,332	5,268	6,496	8,002	8,821
	Relative median incomes with 1 earner equal to 100				
None	35.9	29.5	31.8	34.6	35.6
1	100.0	100.0	100.0	100.0	100.0
2	137.0	125.1	129.0	124.0	127.3
3 or more	194.7	168.4	159.6	154.1	162.5

Source: Current Population Reports—Consumer Income, series P-60, annual issues. Bureau of the Census, Washington, D.C.

TABLE 7.—*All urban families and single consumers, 1960–61, distribution by aftertax income size, and selected characteristics*

Money income after taxes	Percent of urban family units	Size of family unit	Change in net assets and liabilities in year	Number of full-time earners	Education of head (years of schooling)	Number of children under 18
Under $1,000	2.4	1.3	−$617	0.1	7	0.2
$1,000 to $1,999	8.7	1.7	−208	.1	8	.3
$2,000 to $2,999	9.9	2.3	−197	.4	9	.7
$3,000 to $3,999	11.4	2.6	−260	.6	10	.9
$4,000 to $4,999	13.2	3.1	−56	.8	10	1.2
$5,000 to $5,999	13.1	3.4	18	.9	11	1.4
$6,000 to $7,499	16.3	3.6	131	1.1	11	1.5
$7,500 to $9,999	14.9	3.8	420	1.2	12	1.5
$1,000 to $14,999	7.7	4.0	868	1.4	13	1.5
$15,000 and over	2.4	3.7	4,774	1.2	14	1.1
Average of total	100	3.1	177	.8	11	1.2

NOTE.—Estimated number of families in universe, 40,132,000.

Source: Bureau of Labor Statistics Rept. No. 237-38, April 1964, Consumer Expenditures and Income, "Urban United States, 1960–61," table 1 A, p. 10.

TABLE 8.—*All urban families and single consumer units in 1961 by age and income selected expenditures and characteristics*

[In dollars]

Income and expenditure	Under 25	25 to 34	35 to 44	45 to 54	55 to 64	65 to 74	Over 74
Before-tax income	4,618	6,660	8,110	8,452	6,843	4,543	2,955
After-tax income	4,181	5,990	7,187	7,318	5,835	4,126	2,706
Change in net assets	−130	143	280	305	316	162	110
Total current disbursements [1]	4,603	6,239	7,264	7,284	5,679	4,081	2,671
Personal insurance	191	315	424	465	305	144	60
Food	930	1,316	1,644	1,540	1,233	907	645
Housing	1,315	1,779	1,860	1,751	1,443	1,205	858
Clothing	426	574	756	746	493	275	150
Medical care	241	340	385	393	381	352	321
Education	40	40	82	126	39	13	3
Value of items received without expense	292	273	206	190	122	118	129
Other characteristics:							
Family size	2.7	3.8	4.1	3.4	2.3	1.9	1.6
Education of head in years of schooling	12	12	12	11	9	9	8

[1] Current disbursements is defined as total disbursements less increase in assets and decrease in liabilities.

Source: Bureau of Labor Statistics, Rept. No. 237-38, April 1964, Consumer Expenditures and Income, "Urban United States, 1960–61," table 3-C, p. 22.

TABLE 9.—*Size and composition of net worth Dec. 31, 1962, of U.S. families and unrelated individuals by selected characteristics*

	Mean net worth	Ratio of mean to median [1]	Mean value own home	Mean value own automobile	Mean value of life insurance [2]	Mean value liquid and investment assets
1962 income:						
0 to $2,999	$8,875	3.22	$3,752	$149	$190	$3,458
$3,000 to $4,999	10,914	3.29	3,544	412	635	4,663
$5,000 to $7,499	15,112	2.03	4,973	643	1,135	5,426
$7,500 to $9,999	21,243	1.58	7,499	868	1,879	7,500
$10,000 to $14,999	30,389	1.48	9,527	1,346	2,975	11,202
$15,000 to $24,999	74,329	1.74	15,188	1,816	5,196	39,880
$25,000 to $49,999	267,996	1.67	32,215	2,875	10,819	111,761
$50,000 to $99,999	789,582	1.68	45,961	2,803	19,559	387,573
$100,000 or more	1,554,152	1.78	85,634	4,011	32,309	1,058,672
Age of family head:						
Under 25	762	2.82	248	297	125	381
25 to 34	7,661	3.68	2,300	498	678	1,566
35 to 44	19,442	2.43	5,244	708	1,496	6,061
45 to 54	25,459	2.13	7,645	912	2,241	8,144
55 to 64	34,781	2.33	8,465	741	1,789	16,647
65 or more	30,718	2.94	7,474	372	873	18,452
Employment, housing status:						
Nonfarm homeowner	31,478	2.08	10,148	848	1,827	12,778
Self-employed	96,385	2.52	16,403	1,292	3,883	37,148
Employed by others	22,026	1.67	8,974	928	1,884	8,067
Retired	29,752	1.84	10,952	335	603	16,991
Nonfarm renter	8,092	11.24	48	335	753	5,239
Self-employed	73,691	3.59	415	882	2,298	23,890
Employed by others	5,268	6.93	28	367	803	3,813
Retired	10,827	16.40	75	85	212	10,183
Farm operation	43,973	1.68	5,501	681	1,278	10,138
Region (census definition):						
Northeast	23,980	2.79	6,611	530	1,708	10,833
North central	23,632	2.33	6,728	726	1,312	9,153
South	18,318	3.95	4,571	597	1,128	8,112
West	26,192	3.42	6,219	723	1,408	11,300
All families	22,588	2.99	5,975	637	1,376	9,642

[1] See footnote 1 of table 10 for explanation of this ratio.
[2] Or annuities or retirement plans.

Source: Federal Reserve bulletin, March 1964, tables 1 and 2, pp. 291–293.

TABLE 10.—*Estimates [1] of the relative inequality or dispersion of earnings [2] of males in 1959, by age and education*

Educational attainment	Age 25 to 64	Age 25 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 64
All levels of education	1.150	1.057	1.146	1.212	1.242
0 to 7 years elementary	1.076	1.075	1.068	1.074	1.079
8 years elementary	1.056	1.024	1.038	1.058	1.086
1 to 3 years high school	1.068	1.026	1.050	1.093	1.152
4 years high school	1.107	1.036	1.098	1.162	1.247
1 to 3 years college	1.210	1.068	1.177	1.292	1.386
4 or more years college	1.315	1.123	1.252	1.463	1.528

[1] Relative inequality is summarized in terms of the simple ratio of mean-to-median earnings level for each cell. There are many measures of inequality and parameters which are cited to summarize the class of skew distributions of which the frequency distribution of incomes (and wealth) by size is one: Pareto's parameter; Gini's concentration coefficient; Pearson's coefficient of variation; the variance of the logarithms of income. The ratio of mean to median used in table 9 (col. 2) and table 10 is a simpler expression of inequality. The size distribution of income appears to approximately conform to the lognormal distribution. If this were the case, then the mean-median ratio could be directly converted by tables into several of the more sophisticated measures of inequality: the variance of the logarithms of income or the dispersion of incomes, the Gini concentration coefficient, and Pearson's coefficient of variation. The mean-median ratio is cited here both because of its intuitive simplicity, and because of its wide variation between groups, which should caution the user of income and wealth data from shifting from mean to median measures of central value. Because the size distribution of incomes of any large sample of individuals (as in this case a 5-percent sample of the 1960 census) tends to smoothly conform to a unimodal skewed function such as the Pareto or lognormal distribution, the ratio between the mean and median is a justified ranking estimate of the inequality of the distribution in various cells of the sample. If the mean-median ratio were 1, the distribution would be symmetrical about the mode and probably be approximated by a normal bell-shaped cuve. Ratios in excess of 1 indicate increasing skewness of the distribution, and are associated with increasing relative inequality and dispersion. (See J. Aitchison and J. A. C. Brown, "The Lognormal Distribution," Cambridge University Press, 1963, table A–1, pp. 154–155 and pp. 8–13.)
[2] Earnings are defined as wages and salaries and net self-employment income. Data based on 5-percent sample of 1960 Census of Population.

Source: U.S. Census of Population, 1960, "Occupation by Earnings and Education," subject report, PC (2)–7B, Bureau of the Census, Wasnington, D.C., 1963. Table 1, p. 2.

TABLE 11.—*Family income in 1959 for urban areas, unadjusted and adjusted for size and age of head, by selected characteristics*

	Total number of families (in thousands)	Percentage of families with unadjusted income less than $3,000	Percentage of families with adjusted [1] income less than $3,000
All urban families	31,958	16.3	11.9
Husband-wife families	27,744	12.7	8.9
Age of head:			
Under 25 years	1,544	24.3	13.7
25 to 34 years	6,029	8.1	6.8
35 to 54 years	12,878	6.4	6.5
55 to 64 years	4,153	12.5	8.8
65 and over	3,140	41.7	20.6
Education of head:			
Less than 8 years	4,916	29.4	21.5
8 years	4,274	16.7	10.7
1 to 3 years of high school	5,689	10.3	7.6
4 years of high school	6,682	6.7	4.7
1 to 3 years of college	2,920	6.8	4.3
4 years or more of college	3,263	4.1	2.8
Number of earners:			
None	1,545	75.7	46.9
1	13,229	12.2	9.0
2 or more	12,970	5.7	4.3
Female-headed families	3,300	45.2	36.4
Nonwhite-headed families	3,233	39.4	35.1

[1] Adjusted for 5 size and 4 age-of-head groups to measure relative income requirements. A family of 4 with head age 35 to 54 was taken as the base for the relative adjustment of other classes of families. (See census report for complete description.)

Source: U.S. Census of Population, 1960, "Sources and Structure of Family Income," subject report, PC(2)-4C, Bureau of the Census, Washington, D.C., 1964, table 4, p. 98. (For methodology, see p. XI of census report.)

CHAPTER III

SURVEY OF U.S. PERSONAL INCOME DISTRIBUTION STATISTICS

This chapter will review some of the statistical materials available for analysis of the size distribution of personal income in the United States.[1] The scope and objective of this study do not permit a comprehensive report on the methodology underlying each set of statistics. The reader is referred, however, by citations in the text and references in the bibliography at the end of each section in this chapter to more complete discussions of the various statistical programs surveyed in these pages. The summary statement presented here will be limited to a general description of the statistical program's design, its definitions of "income" and recipient "income-expenditures unit," and an evaluation of the strengths and shortcomings of the data for the purposes of research in the income and wealth. The following programs will be reviewed: The Office of Business Economics estimates of the size distribution of personal income; the Bureau of the Census annual Current Population Survey and decennial Census of Population; the Federal Reserve Board's Survey of Consumer Finances and the Survey of Financial Characteristics of Consumers; the Bureau of Labor Statistics Survey of Consumer Expenditures; the Social Security Administration's Survey of the Aged, etc.; the Internal Revenue Service's Statistics of Income; and sundry publications of the Department of Agriculture.

SECTION A. OFFICE OF BUSINESS ECONOMICS

The Office of Business Economics (OBE) of the U.S. Department of Commerce estimates annually the size distribution of personal income for families and unattached individuals. Estimates have been prepared for 1944, 1946, 1947, and since 1950 on an annual basis. Selma Goldsmith has published estimates of the size distribution of personal income for 1929, 1935–36, and 1941, using other sources but adjusting them to approximate the later official OBE series.[2] Because the aggregate size distribution is constructed by OBE from separate estimates of several different groups in the population, these subaggregate size distributions are also published separately on a pre-Federal income tax base for all families, unattached individuals, nonfarm families, and farm operator families. Federal income tax liability is estimated by family to provide a further size distribution

[1] For a readable and comprehensive survey of the statistical materials on the size distribution of income in the United States before 1943, most of which are not discussed in this chapter, see "Income Size Distributions in the United States", Studies in Income and Wealth, vol. 5, NBER, New York, 1943.

[2] For an account of how these earlier size distributions were derived from the source material, see "Size distribution of income since the midthirties," by Goldsmith, et. al., in the Review of Economics and Statistics, February 1954, tables 3 and 4; and the "Relation of census income distribution statistics to other income data," by Goldsmith in An Appraisal of the 1950 Census Income Data, Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, 1958, tables 7 and 8, and pp. 102–107.

according to an aftertax income base. The primary sources of information for the current OBE series of size distribution estimates are: the Federal individual income tax return tabulations, the 1950 decennial census, and sample field surveys conducted by the Bureau of the Census and the Federal Reserve Board-Michigan University Survey Research Center. These integrated estimates are adjusted to control totals based on the independent OBE measures of various types of personal income as distinguished in the national accounts. Accordingly the size distribution estimates have been integrated statistically and definitionally with the income totals for families and unattached individuals embodied in the OBE personal income series.[3]

The OBE estimates are probably the most reliable and comprehensive aggregate statistics on the size distribution of income in the United States. They are compiled from the independent sources of information used in the national accounts—records from business and government, employment and tax records, industrial and population censuses—and they are judiciously adjusted to benefit from other sample survey information discussed later in this chapter. But at present, the estimates are severely limited to broad and diverse aggregates of the population. Because the estimates are chiefly dependent on Federal income tax return data, until revised, the series cannot be broken down according to either behavioristic and demographic characteristics of the consumer units or the type (source) of income going to families at different income levels.

Estimation procedure and definitions [4]

The definition of families and unattached individuals coincides with that established by the Census Bureau for the current population surveys. Families are units of two or more individuals related by blood, marriage, or adoption, and residing together. Unattached individuals are persons, other than institutional inmates and members of the U.S. Armed Forces on post, who are not living with any relatives. The estimation of the number of families and unattached individuals in the population at the end of each calendar year is derived by extrapolating the Census Bureau's Current Population Survey figures collected in March or April of the preceding and following years.

Family personal income includes current income received after the deduction of social security contributions by all members of the family unit including wages and salaries and other labor income, proprietor's and rental income, dividends, personal interest income, and transfer payments. Nonmonetary income flows are also included in family income by imputation. The OBE concept of personal income includes such items as wages in kind, the value of food and fuel produced and consumed on farms, the net imputed rental value of owner occupied houses, and imputed interest.

These imputed incomes are not included in money income as defined by the Census Bureau, and they probably account for a substantial part of the differences in the size distributions estimated by OBE

[3] Family personal income used in the size distribution series of the OBE is slightly less than personal income, because it excludes income received by institutional residents (including military personnel not living with their families) and incomes retained by nonnatural persons (nonprofit institutions, trusts, pension, and welfare funds).

[4] For a fuller account of definitions and estimating procedures, see the technical note to "Income Distribution in the United States, 1950–53," Goldsmith, March 1955, Survey of Current Business; and to "Size Distribution of Personal Income," Goldsmith, April 1958, Survey of Current Business; and the basic statement of the methodology of the OBE series which is found in "Income Distribution in the United States by Size, 1944–50," a supplement to the Survey of Current Business, 1953.

and other agencies. (See table 12 for comparisons of income concepts used by various Government agencies). As a measure of welfare, this more comprehensive OBE concept of personal income is perhaps the most satisfactory. But for particular purposes, money and nonmoney income are not homogeneous or equivalent in their contribution to the welfare of individuals.

Capital gains and losses, whether they are incurred by businesses or individuals, are excluded from the OBE concept of personal income. This exclusion of capital gains and losses is undesirable from the standpoint of measuring welfare, but it is apparently determined by the logical and statistical difficulties associated with the task of consistently incorporating capital gains and losses into the income accounts. To take account of both realized and unrealized capital gains, much further data would be required on the distribution and composition of personal net worth in this country.

TABLE 12.—*The coverage of income concepts used in the preparation of personal income statistics of the Office of Business Economics (OBE), Bureau of Labor Statistics (BLS), Current Population Survey (CPS), and the 1960 decennial Census of Population*

Types of income	1960 census	CPS	BLS	OBE
1. Wages and salaries, including commissions, bonuses, and tips before payroll deductions.	Includes...	Includes...	Includes, but net of occupational expenses such as tools and union dues.	Includes, but net of employee contributions to social security.
2. Net income from self-employment in business or profession.	Includes..	Includes..	Includes.....	Includes, but net of self-employed contributions to social security.
3. Income other than earnings: income from rent, interest, dividends, social security, pensions, disability insurance, trust funds, private and public assistance or other governmental payments, and regular contributions from persons outside the family.	Includes..	Includes..	Includes.....	Includes, except for interpersonal transfers, such as alimony, contributions to support from persons outside the family, etc.
4. Other money receipts, such as inheritances, lump-sum settlements, gifts, receipts from sale of assets, such as house, car, etc., and withdrawal of bank deposits or money borrowed, etc.	Excludes..	Excludes..	Excludes.....	Excludes.
5. Nonmoney items.....	Excludes..	Excludes..	Includes food and housing received as pay.	Includes wages received in kind, the net rental value of owner occupied homes, an allowance for the return on the value of a person's equity in life insurance, and the value of the services of banks and other financial intermediaries rendered to persons without the assessment of specific charges.

Source: Interagency Task Force report on Family Income Distribution Statistics Published by Federal Agencies, prepared for Office of Statistical Standards, Bureau of the Budget, Washington, D.C., September 2, 1964, p. 6.

The personal income size distribution estimates of OBE are developed on the basis of consolidated accounts, making use of many different sources of demographic and financial data. See table 13

for coverage of various data sources. Only an outline of the elaborate estimation procedure used by the OBE is given here:

1. Federal individual income tax (IRS) returns are adjusted to exclude capital gains and losses while preserving the identification of different types of returns, i.e., joint for husband and wife; separate for husband and wife; single; and head of household. Tax returns from members of the Armed Forces living overseas or on posts without families are excluded from the universe at this stage.

TABLE 13.—*The percentage of family money income as estimated by OBE reported on Federal income tax returns (IRS) and covered in the current population survey (CPS) and Bureau of Labor Statistics study (BLS), and decennial census in selected years*

	1941 BLS	1945 IRS	1946 CPS	1949 CPS	1949 census	1951 IRS	1952 IRS	1954 CPS	1959 CPS	1959 census
Wages and salaries	90	95	91	93	97	------	96	91	94	99
Nonfarm business and professional incomes	131	87	59	85	99	85	71	72	89	91	114
Farm income	99	36	67			41			73		
Total earnings	------	------	84	------	------	------	92	90	93	------
Interest and dividends	24	65	23	------	------	------	36+85	------	------	------
Rental incomes	88	45	63	------	------	------	59	------	------	------
Military payments	------	------	68	------	------	------	------	------	------	------
Social Security and others	86	------	66	------	------	------	------	------	------	------
Transfer payments and other labor income	------	------	------	------	------	------	------	------	------	------
Total income other than earnings	47	------	53	43	54	------	63	50	54	62
Total personal income	[1] 89	86	78	84	91	------	90	84	87	[1] 94
Sum of absolute differences ("error")	18	14	22	16	9	------	10	16	13	9

[1] Reservations on these totals are made in text, pp. 64, 65.

Source: 1941 BLS data from U.S. Bureau of Labor Statistics, "Family Spending and Saving in Wartime," Bulletin 822 (1945), p. 43; and for the 1945 IRS adjusted data, see table 8, p. 302, "Appraisal of Basic Data for Size Distribution," Goldsmith; Studies in Income and Wealth, vol. 13, NBER, New York, 1951; and for 1951 and 1952 IRS adjusted data, see table 3, pp. 79–80, and for 1946 and 1954 CPS adjusted data, see table 2, pp. 76–77, "The Relation of Census Income Distribution Statistics to Other Income Data," Goldsmith, "An Appraisal of the 1950 Census Income Data," op. cit., and 1949 and 1959 data, Conrad Taeuber and Morris H. Hansen, "A Preliminary Evaluation of the 1960 Census of Population and Housing," table 1, p. 12, paper presented before the meeting of American Statistical Association, Sept. 5, 1963.

2. Returns are then allocated by family membership, classified by adjusted gross income brackets, and cross-classified by family relationship. The grouping of returns into family units is accomplished with the aid of a matching study. The matching study provides a bridge from census family units to their counterpart IRS returns. This pattern is kept current by observing changes in the Current Population Survey family pattern. In 1950 a sample of census files was selected and an effort was made to locate the IRS files for each income earner in the census sample. The procedure was reversed in the 1960 matching study in the hope of increasing the proportion of the sample positively matched.

With substantial changes in the structure of family units and the composition of IRS returns, these matching studies can become dated. For instance, when the IRS code was revised in 1948, allowing income splitting, a simple extrapolation of outmoded matching study figures would have given rise to downward bias in the family income estimates, by overestimating the number of family units in the universe

This most sensitive and demographically weak link in the OBE estimation procedure will be bridged with greater accuracy by 1967–68 when the 1959 matching study will have been fully incorporated in the estimates, providing a new bridge between IRS returns and the decennial 1960 Census of the Population.

Advances in the field of electronic data processing and storage have increased our capacity to deal with vast quantities of data. The increasing use of the social security account number to identify returns and individual information collected by the IRS, CPS, and the decennial census raises the question whether it is not now feasible to consolidate and summarize these sources of demographic, income, and wealth information on an individual file basis. Such a consolidation of data sources would greatly enhance the analytical value of each set of data.

Much thought should be directed to the problem of how best to capitalize on the "data processing revolution" and the superabundance of statistics collected and tabulated by the various agencies of the Government. A consolidated data processing scheme would, in this regard, provide the OBE with a cheap and accurate bridge between CPS and IRS data on an annual basis, thereby eliminating the potential dangers inherent in OBE's present methodology of extrapolating aggregate accounts by demographic groups. An innovation of this magnitude will require years of planning and coordination, and must be undertaken *now* if the 1970 Census of Population materials are to be collected and processed in the most valuable form for later incorporation into the consolidated data scheme.

3. Farm and nonfarm family income distributions are estimated by different procedures. Although IRS return tabulations are a satisfactory primary source for allocating nonfarm income, they underestimate by a substantial margin farm enterpreneurial income, and are therefore superseded by other sources of information in distributing farm income. (See table 13, line 3.)

4. Estimation of nonfarm family personal income distribution:

a. Nonfarm family personal income is adjusted to include income flows that are not taxable, such as those income payments received by family members who are not required to file tax returns. Sample surveys are used to estimate the distribution of these supplementary untaxed income sources.

b. Control totals are derived from independent information on the number of consumer units and on the amount of each type of personal income. Those family units unaccounted for in the population are distributed primarily below the $2,000 income level according to the Census Bureau's annual Current Population Survey. Much of the income received by these low-income units consists of untaxed old-age benefits and transfer payments.

c. Nonreported incomes—that is, the difference between the control total and income accounted for in the above outlined procedure—are distributed according to evidence collected from many and varied sources. It is standard procedure to derive the relative distribution of each type of income payment among families from the most reliable source, and then proceed to extrapolate the relative distribution upward (or downward) to account for changes in the control total of that income type in each successive year. As more recent and better

information becomes available to OBE it is adopted as a new benchmark distribution and gradually phased into the procedure of estimating the personal income size distribution. Revision of the methodology that underlies the OBE consolidated estimates is a perennial occupation. The need for, and the cost of, a major expansion and improvement in the OBE estimating procedure will be discussed later in this section.

Methods of distributing residual incomes by type

Proprietors' income and several types of reportable property-type income are allocated among income units in accordance with IRS audit studies conducted in 1949. The 1959 audit study will not be available to OBE before 1967.

Tax-exempt interest income is distributed according to the findings of a special study of incomes in the State of Wisconsin. The Federal Reserve Board's survey of the financial characteristics of consumers (1963–64) will probably become the primary source in distributing tax-exempt interest income in the near future.

Sick pay and dividend exclusions are estimated with the aid of tabulations provided by the IRS for 1954 and 1956.

Imputed incomes from owner-occupied houses and U.S. savings bonds are now allocated among income units by adjusting the findings of the Federal Reserve Board's survey of consumer finances, which collected sample information on the amount of equity held by spending units in the form of their own homes, as well as the size and composition of their liquid assets, including U.S. savings bonds. The survey of financial characteristics of consumers (1963–64) will also update these estimates.

The distribution of old-age benefits is now based on the findings of the Census Bureau's 1951 survey of the incomes of aged economic units. The 1963 survey of the aged will soon become a new benchmark source for distributing this type of income.

Veterans' payments are allocated with the assistance of information supplied by the President's Commission on Veterans' Pensions.

5. Estimation of farm family personal income distribution: Benchmark distributions for farm family personal income were constructed for 1947 based primarily on data collected in the 1950 Census.[5] For current year estimates, the relative distribution in the benchmark year has been retained, but the distribution adjusted to take account of changes in the number of farm family units and the aggregate amount of farm family income. Benchmark data on the distribution of personal income to unattached individuals were also obtained for 1947 using procedures similar to those used for nonfarm families. The statistical basis for distributing income to these two groups is less satisfactory than that used for nonfarm families. The groups represent 26.5 percent of the income units in the 1962 OBE totals, and they received 14.2 percent of personal income in that year (see table 14). The share of farm families in the national total of income units as well as in national personal income has declined in the postwar period. On the other hand, the importance of unattached individuals in numerical and income totals has increased slightly since the end of the Second World War.

[5] According to Goldsmith's article in the April 1958 Survey of Current Business, the farm family income series on which the OBE estimates of size distribution of personal income are based was revised back to 1953, but the earlier series was not put on an exactly comparable basis, and may, therefore, be a source of minor error in the OBE time series for farm family income distribution.

TABLE 14.—*Composition of OBE consumer units and their share of personal income*

	1946		1962	
	Consumer units	Personal income (millions of current dollars)	Consumer units	Personal income (millions of current dollars)
Nonfarm families	29,970	$137,042	42,578	$360,590
Farm families	5,890	19,628	4,312	21,625
Unattached individuals	7,470	14,035	11,000	38,197
Total consumer units	43,330	170,705	57,890	420,412
	Percent consumer units	Percent personal income	Percent consumer units	Percent personal income
Nonfarm families	69.2	80.3	73.5	85.8
Farm families	13.6	11.5	7.5	5.1
Unattached individuals	17.2	8.2	19.0	9.1
Total	100.0	100.0	100.0	100.0

Source: "Income Distribution in the United States, 1944–50," Supplement to Survey of Current Business (1953), tables 9–13; and "Size Distribution of Income in 1963," Survey of Current Business, April 1964, tables 4–8.

6. Income tax liability estimates: The OBE estimates of Federal income tax liability [6] by income class appear to imply effective tax rates which exceed those estimated by IRS. This is due to the inclusion of many types of nontaxable income flows in the OBE concept of personal income, and their exclusion from IRS statistics. The high-income classes in OBE estimates encompass many divergent tax rates and represent, therefore, only broad average rates. Thus, these estimates of income tax liability by income class should be approached with caution and not cited out of context.

Conclusions and evaluation

The OBE estimates of size distribution of family personal income have limited usefulness because they cannot be separated into component socioeconomic groups or into types of income payment, nor can they be reconciled quantitatively with other distributions. These limitations of OBE estimates are inherent in the present estimating procedure and persist despite the collection of much new and detailed source material, because the program is under a severe budget restraint. Unless these new data are processed and tabulated in a usable form and personnel provided to analyze them, they cannot be incorporated into the OBE size distribution estimates. For several years an appropriations request has been made by OBE for $60,000 on a continuing basis to finance a thorough reform and modernization of the procedures used in the size distribution of personal income estimates. This expansion and reformation of the OBE series would make it more flexible and yield, among other benefits, accurate subaggregate size distributions for personal income according to socioeconomic groups and income types.

The major revision of OBE estimating procedures financed by this additional appropriation would permit a greater use of both IRS

[6] Estimated, starting with 1950.

and CPS source material. The proposed new methods would attempt to fully exploit more data from both primary sources. It is our understanding that rather than working from IRS tabulations to CPS field survey data, and in the process losing most demographic characteristics of the family unit, the new methodology would try to incorporate much new demographic information on the family unit from CPS data, and greater detail on type of income payments received from IRS returns. Under present plans the use of electronic data processing equipment will allow OBE to move from the present consolidated procedure of estimation and extrapolation to one that makes needed adjustments on a unit rather than an aggregate basis. This important procedural change would make the entire OBE program better adapted to accommodate the new and more comprehensive taped source material becoming available from IRS and the Census Bureau on an individual unit basis. The revised estimation procedure ultimately would allow OBE to derive many analytically meaningful component income distributions for major groups in the population. Such groups could be defined by demographic characteristics and/or by type of income receipts. Distributions could be estimated for units primarily dependent on wages and salaries, self-employment income, property income, or transfer payments. With somewhat greater difficulty, this revised statistical program could provide more accurate personal income distributions than presently are available for such groups as the aged, the retired, or the poor.

In summary, the size distributions of personal income estimated presently by OBE are perhaps the most reliable estimates available, but unless extensively revised to provide needed breakdowns, they are too aggregative to provide answers to questions which are relevant to a full understanding of the determinants or consequences of the distribution of personal income.

Selected Bibliography and Data Sources of the Office of Business Economics

Size distribution series of personal income by family and unattached individuals

Available for the years 1944, 1946, 1947, and from 1960 annually to the present. Aggregate estimates also available from other sources adjusted to OBE base for the earlier years 1929, 1935–36, and 1941. (See April 1964 Survey of Current Business for earlier year estimates.)

Fitzwilliams, Jeannette M. "Size Distribution of Incomes in 1962," Survey of Current Business, April 1963, pp. 14–20.

———. "Size Distribution of Income in 1963," Survey of Current Business, April 1964, pp. 3–11. (Aggregate data for 1929, 1935–36, 1941, 1944, 1946–1961 and preliminary extrapolated estimates of size distribution for 1962–63; also, 1929–1963 distributions given for before-and-after tax income in real terms (1954 dollars), tables 13-14.)

Goldsmith, Selma F. "Income Distribution in the United States, 1952–55," Survey of Current Business, June 1956, pp. 9–16.

———. "Size Distribution of Personal Income," Survey of Current Business, April 1958, pp. 10–19. (Includes family distribution 1953–55 and preliminary estimates of 1956–57, and important methodological technical note giving detailed account of definitions and estimating procedures.)

———. "Income Distribution by Size 1955–58," Survey of Current Business, April 1959, pp. 9–16.

———. "Size Distribution of Personal Income 1956–59," Survey of Current Business, April 1960, pp. 8–15.

Jaszi, George, and Selma F. Goldsmith. "Income Distribution in the United States by Size, 1944–1950," Supplement to the Survey of Current Business, Office of Business Economics, U.S. Government Printing Office, Washington, 1953. (Initial OBE publication in series giving size distribution data for 1944, 1946, 1947, and preliminary estimate of 1950. This publication discusses in detail the methodology of the series, how the terms are defined and estimates made. There is also included a textual interpretation of the many facets of the series for the years 1944–50.)

Liebenberg, Maurice, and Jeannette M. Fitzwilliams. "Size Distribution of Personal Income 1957–60, Role of Capital Gains, Earnings, and Supplementary Incomes," (revised 1957–58 size distribution estimates and preliminary 1959–60 estimates.) This article also discusses the importance and distribution of capital gains and losses, wage and business incomes in 1958. Survey of Current Business, May 1961.

———. "Size Distribution of Income in 1961," Survey of Current Business, April 1962, pp. 9–16.

U.S. Department of Commerce, 1958. "U.S. Income and Accounts." (Detailed discussion of postwar and prewar changes in size distribution of family income.) Chapter 3, pp. 40–46, and brief tables II–11 to 13, p. 161.

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SECTION B. BUREAU OF THE CENSUS

The Bureau of the Census of the U.S. Department of Commerce is responsible for two major statistical programs that provide information on the size distribution of money income—the decennial Census of Population and the annual Current Population Survey (CPS). Additional programs are undertaken by the Bureau of the Census to evaluate the income data collected in various statistical programs, and special surveys are conducted at the behest of other governmental groups.

The money income estimates derived from the annual CPS are published as part of the Current Population Reports, entitled "Consumer Income." In most years two reports are issued; one in June summarizes the preliminary findings from the preceding year, and another follows in 3 to 4 months with more complete tabulations of the annual survey's findings. The Bureau of the Census Technical Paper No. 8 by H. P. Miller, "Trends in Income of Families and Persons in the United States: 1947–1960," brings together and summarizes the CPS income distribution estimates through 1960, and converts them to a constant 1959 dollar base.[7]

Selected data of the decennial Census of Population are tabulated and published in several series of reports. The 1960 census reports on incomes and earnings of families and persons are cited in the bibliography up to mid-1964. Some comparative and evaluative studies on the 1960 census materials are not yet available and, consequently, in the appraisal portion of this section we will draw upon research and analysis of both the 1950 and the 1960 census materials whenever feasible.[8]

1. Current population survey (CPS)

The CPS is a sample survey conducted monthly by the Bureau of the Census to obtain information on the labor force. In March of each year the CPS collects additional material on individual and family income from a subsample of its rotating monthly sample. The CPS grew out of an effort in 1937 by the Works Progress Administration to estimate U.S. unemployment by means of a national probability sample. When the survey program was transferred to the Bureau of the Census in 1942, the sample design was thoroughly revised and thereafter conducted monthly. The CPS consumer income estimates

[7] This technical paper also presents some estimates and data not before published. For example, the mean income levels are estimated, for the population and component groups. To estimate the overall mean income level Miller had to estimate the mean of the upper, open-ended, income class. He assumed for this purpose that the frequency of income units fits a logarithmic relationship with income size, as noted by Pareto. This extrapolation technique appears to be defensible for the estimation of the upper tail of the income size distribution for large and diverse groups of the population. However, it is less obvious how adequate the Pareto relationship is in describing the distribution of incomes in specialized occupational (age, industry, region, family size, etc.) groups; in particular, in groups where a disproportionate number of persons are reported in the highest income class. This extrapolation technique for estimating the overall mean is more suspect when applied to finer occupational categories, as it is in the derivation of mean earnings estimates in the 1960 Census of Population, subject report, "Occupation by Earnings and Education," PC(2)-7B, Bureau of the Census, Washington, D.C., 1963. See also footnote 40, p. 72.

[8] Primary collection of papers on 1950 census evaluation studies, "An Appraisal of the 1950 Census Income Data," Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, 1958.

have been published each year since 1944. While the survey periodically adopts new features into its design, these changes do not seriously impair the overall comparability of the series of annual income estimates. In 1961–63, the CPS interviewed 35,000 households, giving the income supplement to a 26,000 subsample, selected from 357 primary sampling units (and strata) in clusters of about 6 households each.[9] The distribution of families and unrelated individuals was estimated among as many as 17 money income classes, and cross-classified by farm, nonfarm, color, age, marital status and family size, occupation and industry of head, sources of income, work experience, region, and educational attainment (periodically).

Sample design

In general, the size of the CPS sample and its degree of stratification have increased in the last two decades as improvements in sampling theory have been incorporated into the survey's methodology.[10] The following description of the sample design will deal primarily with the current status of the CPS program. In 1945 the CPS interviewed a sample of 21,000 households selected from 68 primary sampling units (PSU) representing a cross section of the entire civilian noninstitutional population in the United States.

The PSU is defined as the county or group of counties selected so that the PSU is relatively homogeneous in respect to particular characteristics of the labor force.[11] In 1954 the number of PSU's was increased to 230, with no modification in overall sample size. In May 1956 the sample size was increased from 21,000 to 35,000 households, selected in turn from 330 new PSU's. Incorporating the 1960 Census of Population findings into the survey procedure required the Bureau to redesign the sample to include 357 PSU's and strata in 1961–63.

Stratification of the PSU's was based on several characteristics, among which were the following:

a. Whether or not the PSU was a standard metropolitan statistical unit.
b. The rate of population change.
c. The percentage of population in urban areas.
d. The percentage of population in manufacturing.
e. Principal industries.
f. Average value of retail trade.
g. Proportion of nonwhite population.

With constant variance within strata, stratification is designed so that each stratum is of approximately the same size. Hence, new census findings and the redefinition of several standard metropolitan statistical areas required substantial restructuring of the strata in 1961–63.

Balancing cost considerations against increasing the reliability of statistical estimates, it was judged optimal to sample dwelling units within the PSU by clusters containing, on the average, six dwelling units. Whenever possible, a small geographic cluster with well-defined

[9] The practice of cluster sampling has been supplanted by address list procedures in the 1960's.
[10] "The Current Population Survey—A Report on Methodology," Technical Paper No. 7, Bureau of the Census.
[11] Essentially all survey sample income data are collected by surveys designed to minimize the variance of other characteristics than income in the PSU. Hence the CPS selects the PSU on criteria to minimize the variance of participation characteristics in the labor force, not to minimize the variance of income or earnings distributions. No evidence is collected on how the design of the PSU might bias income estimates.

boundaries was designated and entirely enumerated. When this was not possible, other random techniques were applied. A separate sample of large institutions and large special dwelling places was taken. Enumeration districts, as used in the 1950 Census of Population and Housing, are the basic intermediary unit between the PSU and the sampled cluster of dwellings. These last two stages of sampling are executed at rates of subsampling that will produce a self-weighting sample. Since there was considerable variance in the number of households enumerated in the sampled clusters of dwellings, the final stage of sampling has been shifted to a procedure based on address lists. Since 1961 the majority of sampling within enumeration districts has been accomplished by using the address lists of the 1960 Census of Population, supplemented by a sample of permits for new construction.

Definitions and concepts [12]

The definition of income-expenditure unit adopted by the Bureau of the Census is the "family and unrelated individual." The definition is comparable to that used by the Office of Business Economics (OBE) in its estimates of the size distribution of personal income.[13] Primary and secondary family units living in the same household, not related (by blood, marriage, or adoption) to each other, are counted by the census as distinct income units. Up to and including the 1940 decennial census, the distinction was not drawn for the purpose of tabulations between a family and an unrelated individual. Therefore, all consumer units are combined together as "families." The universe covered by the census is slightly greater than that sampled by the CPS today because it includes, in addition, institutional inmates and military personnel residing on base.[14] Another difference between the procedural definitions of the two census programs involves the college student living away from home, who is enumerated in the CPS as a family member, but in the census at his college residence usually as an unrelated individual.[15]

The money income concept used in the CPS is the same as that used in the 1950 and 1960 censuses.[16] Inquiries are made on the amount of money income received in the preceding year by members of the family (over 14 years of age in the CPS) at the time of enumeration (March to April). In the decennial census, money income is defined as the sum of the three amounts reported for wage and salary income, self-employment income, and other income.[17] The CPS, on

[12] For a complete discussion of the terms used in the CPS and grounds for comparability of CPS income data with other data, see the P–60 series of "Current Population Reports on Consumer Income." The latest report is No. 43, issued Sept. 29, 1964.

[13] See p. 50.

[14] Quasi-households—that is, persons living in hotels, YMCA's, fraternity houses, trailer camps, houseboats and ships, logging camps, etc.—were excluded from the CPS sample universe in 1944–45. Also, residents in rural-farm areas were omitted in 1946. From 1947 to the present the coverage of the CPS has remained constant.

[15] Project C of the 1960 census reverse record check was concerned with tracing down a subsample of students to obtain all possible addresses and places where they might have been enumerated. See series ER–60, No. 1, Census report, "Background, Procedures, and Forms," Washington, D.C., 1963.

[16] See table 12, p. 51.

[17] The 1960 census broadened the three income questions to read: (1) How much did this person earn in 1959 in wages, salary, commissions, or tips from all jobs? Before deduction for taxes, bonds, dues, or other items? State amount, or none. (2) How much did he earn in 1959 in profits or fees from working in his own business, professional practice, partnership, or farm? Net income after business expenses? State amount, or none. (3) Last year (1959) did this person receive any income from: social security; pensions; veterans' payments; rents (minus expenses); interest and dividends; unemployment insurance; welfare payments; any other sources not already entered? Answer yes or no. If yes, state amount. Earning are defined as the sum of the amount reported for the first two sources of income. Earnings by occupational group are published since 1959 in the CPS reports, and by occupation, education, and age in the 1960 census, subject report, "Occupation by Earnings and Education", series PC (2)–7B.

the other hand, asks explicitly for seven sources of money income: (1) Money wages or salary; (2) net income from nonfarm self-employment; (3) net income from farm self-employment; (4) social security, veterans' payments, or other Government or private pensions; (5) interest on bonds or savings, dividends, and income from annuities, estates, or trusts; (6) net income from boarders or lodgers, or from renting property to others; (7) all other sources such as unemployment benefits, public assistance, alimony, etc. This census concept of money income *excludes* imputed payments which are part of the OBE personal income concept and *includes* social security contributions, regular support received from persons who do not reside in the same living quarters, and income received from roomers and boarders residing in households.[18] Although the concept of money income is identical in the CPS and the census, the use of seven detailed questions in the CPS interview, rather than the three used in the census, is likely to improve the accuracy of the responses and perhaps reduce the underreporting of income in the CPS as compared to the census.

2. Census of population

In 1940, the 16th Decennial Census of Population gathered the first official income information for the entire population and was thereby the object of much controversy. The 1940 census asked all persons to report the amount of their money wages and salaries, and whether or not they had received income of $50 or more from sources other than money wages and salaries. If respondent received more than $5,000 in wages and salaries, the exact amount was not requested. Only 2 percent of wage and salary workers did not report their wages and salaries. Confidential self-enumeration forms were made available to the respondent, but few were used. In the 1950 census a sample was obtained of 20 percent of the persons 14 years old or over. If the person sampled was the head of a family, the income questions were repeated for all other members of the family as a group. It was discovered later that the 1950 census underestimated the aggregate income of families and unrelated individuals by a greater margin than income of all persons.[19] It was hypothesized that the 1950 census procedure had a tendency to underreport or miss altogether the income received by persons in the family other than the head. The procedure adopted for the 1960 census was altered, therefore, to enumerate separately each member of the household and his income sources. The much improved results of the 1960 census supported this explanation of the 1950 census bias.[20]

[18] Income from roomers and boarders is part of the imputed rental value of owner-occupied houses included in the OBE personal income estimates, and thus excluded from money income to prevent double counting.

[19] In 1950 the census accounted for 91 percent of a person's income as OBE estimated it, but only 81 percent of the income of families and unrelated individuals. In 1960 the two proportions were raised to 94 and 95 percent of OBE adjusted estimates. Miller, "Trends in Income Distribution in the United States" (mimeographed), app. A, p. 12. See also table 13 of this study.

[20] Ibid.

TABLE 15.—*Size distribution of personal income 1962 among families and unrelated individuals*

	1962 [1] CPS family	1962 [1] CPS unrelated individuals	1962 [2] SCF family	1962 [3] OBE family	1962 [3] OBE unrelated individuals
Total	46,998	11,013		46,890	11,000
0 to $999	4.2	28.9	4	6.9	33.8
$1,000 to $1,999	7.4	25.9	9		
$2,000 to $2,999	8.3	12.1	9	6.2	18.4
$3,000 to $3,999	9.2	8.8	8	8.2	16.5
$4,000 to $4,999	9.9	7.0	10	9.8	12.1
$5,000 to $5,999	11.5	6.7	12	10.8	7.5
$6,000 to $6,999	10.9	3.2	14	[4] 16.0	[4] 5.9
$7,000 to $7,999	8.6	2.8	16	[4] 18.6	[4] 3.2
$8,000 to $9,999	12.3	2.2			
$10,000 to $14,999	12.8	1.7	12	14.8	1.6
$15,000 to $24,999	4.0	.6	6	8.7	1.0
Over $25,000	.9	.1			
	100	100	100	100	100
Median income	$5,956	$1,753	[5]	[5]	[5]
Mean income	[5]	[5]	$6,800	$8,151	$3,472

Sources:

[1] Series P-60, Current Population Reports, "Income of Families and Persons in the United States: 1962," No. 41, Oct. 21, 1963, table I, p. 25.
[2] 1963 Survey of Consumer Finances, table 2-2, p. 21.
[3] "Size Distribution of Income in 1963," Jeannette Fitzwilliams, April 1964, Survey of Current Business, tables 5-6, p. 6.
[4] OBE income brackets extend from $6,000 to $7,499 and from $7,500 to $9,999.
[5] Not available.

3. *Evaluation and quality checks between the CPS and the Census of Population* [21]

The CPS and the decennial census provide money income data of different quality and scope. Fundamentally, the Census data, with their greater potential for detailed cross-classification, lend themselves to investigations limited at a small region, or a small demographic group in the population, where, for example, the distribution of income is to be examined at a county- or city-wide level, or where the objective is to standardize the size distribution of income for education and occupation. Alternatively, the size of the CPS sample of households may preclude such fine breakdowns, but because the program is conducted with greater thoroughness and quickly tabulated on an annual basis, the estimates are reliable and useful statistics for a short-run investigation of national patterns. Several characteristics of the Census Bureau data can be summarized:

a. Persons are arranged in households in the CPS and in the 1960 census, making family income tabulations more accurate for these programs than for the 1950 census.[22]

b. Greater care in training CPS enumerators and detail in the CPS income questionnaires are presumed to elicit more accurate and less biased responses in the CPS findings than are reported in the census.

c. Fewer households are sampled by the CPS, which permits more editing and checking for internal consistency ot the CPS schedules. These procedures are thought to improve substantially the CPS estimates.

[21] Several of the disparities and comparisons noted in this section are presented and analyzed more thoroughly in a monograph prepared by Miller, op. cit.
[22] See footnote 19.

d. Two quantitative disparities between the income estimates of the CPS and the 1960 census suggest that there may be identifiable bias in the 1960 census income data:

(1) There are relatively more high income units in the 1960 census than in the CPS estimate for 1959 (see table 16).

(2) The 1960 census accounted for substantially more self-employment income than the total estimated by OBE (see table 13).

TABLE 16.—*Size distribution of personal income in 1959 from census, CPS, and OBE* [1]

[In millions]

Income class [1]	Families and individuals			Families		
	1960 census	1960 CPS	1959 OBE [1]	1960 census	1960 CPS	1959 OBE [1]
Under $2,000	13.6	12.1	7.5	5.9	6.0	3.5
$2,000 to $3,999	10.9	11.1	11.4	8.0	8.8	7.5
$4,000 to $5,999	12.1	12.6	12.4	10.5	11.2	10.6
$6,000 to $9,999	14.7	14.3	15.6	13.9	13.6	14.9
$10,000 to $14,999	4.9	4.3	5.3	4.7	4.1	5.2
$15,000 to $24,999	1.5	1.1	2.3	1.5	1.1	2.3
$25,000 and over	.6	.3	.8	.6	.3	.8
Total	58.3	55.8	55.3	45.1	45.1	44.8

[1] Concept of personal income used in OBE estimates is not exactly comparable to that used in the census and CPS.

Source: CPS data from Current Population Reports—Consumer Income, Series P-60, No. 35, table 5. 1960 census data from U.S. Census of Population: "1960, General Social and Economic Characteristics United States Summary," final report, PC(1)-1C, table 95. OBE data from Liebenberg and Fitzwilliams "Size Distribution of Personal Income 1957-60," Survey of Current Business, May 1961.

Several procedures are employed in evaluation and quality checks performed on the decennial census and the CPS income statistics in an attempt to judge their reliability A review of the conclusions of these evaluation programs will contribute to our understanding of the relative merits of the two sets of data. Evaluation studies have commonly taken several forms:

a. A comparison can be made between the CPS and the censuses of 1950 and 1960, both by the juxtaposition of median incomes and size distributions for selected groups in the population, and by matching studies which analyze the disparities between the census and CPS responses elicited from an identical or comparable sample of persons. (See table 7.)

b. A reinterview survey can approach a sample of respondents from the original census, and more thoroughly and carefully interrogate them in the hope of gathering the most accurate, and least biased information on this small, randomly chosen sample. Comparisons of the original responses to the confirmed reinterview responses provide one method for estimating the reliability, coverage, bias, etc., of the original census income data. (See table 8; also footnote 31 on p. 67.)

c. The CPS and census data can be compared to other independent sources of personal income information, both in terms of aggregate totals by income type (table 13) and the median incomes and distributions of family personal income by group (tables 19 and 20). This third type of comparison has been performed with OBE estimates, Survey of Consumer Finances, Federal income tax returns, old-age

and survivor insurance wage records, and other data.[23] Only the comparisons with OBE estimates will be dealt with in this section; discussions of other matching studies will be taken up in other sections of this chapter.

CPS-census matching study

Comparisons between the CPS and the census were conducted by the Bureau of the Census in both 1950 and 1960. The results of the two statistical programs are first compared to the adjusted OBE estimates of personal money income by income type. Such a comparison is made in table 13 for the census in 1949 and 1959 and for the CPS in 1946, 1949, 1954, and 1959. The 1960 census accounted for 94 percent of the total of money income as estimated and adjusted by the OBE, a gratifying, if, as we will note later, an ambiguous improvement over the 91 percent showing in the 1950 census. The CPS accounted for only 78 percent of the OBE adjusted estimates of money income in 1946, but this overall total has consistently risen and has reached 89 percent in the past few years, while for money wages and salaries the CPS has accounted for 97 percent of the OBE total.[24]

However, the census overall showing in 1960 is a combination of overestimating one type of income and underestimating the others. Therefore the improvement in the 1960 census total coverage may be, in large part, a statistical illusion, for adding together algebraically negative and positive errors to derive a total error is like adding two wrongs to make a right. An alternative statistical procedure for calculating the difference between the amounts of income accounted for by the 1960 census [25] and the OBE adjusted estimates of personal income indicates that the average margin of census error has not diminished markedly between 1949 and 1959. Implicit in the calculation performed in table 13 to derive the "total money income" figures is the notion that overaccounting one type of income, self-employment income, compensates for underaccounting the other types of income. Unless it can be shown that, say, self-employment income is distributed in the same fashion as other types of income, the aggregate total of income accounted for in a census or survey that overreports certain types of income and underreports others is not an appropriate measure of the reliability of the size distribution statistics derived from the aggregate findings.

A preferable measure of the accuracy or coverage of a program is the sum of the absolute values of the differences between the total of each income type reported in the statistical program and the OBE total for that income type. Following this procedure, the sum of absolute differences of reported and estimated income types in the 1960 census would be about $31.1 billion, or 8.85 percent of the OBE estimate of total personal income in 1959, contrasting to the algebraic sum of the differences as cited by the Bureau of the Census, $19.7 billion, or 5.6

[23] The personal income estimates of OBE are available only for State and National levels. For county-by-county comparisons Miller used the Commerce Department compilation of local and State estimates for county personal income available in the report, "Personal Income: A Key to Small-Area Market Analysis" (1961). Miller concluded that the county estimates were in very close agreement with the percent distribution of aggregate census personal income among counties within a State. In 80 percent of the counties for which estimates were available, the proportion of State personal income distributed to the county by the sales management estimate differed from the census by no more than one-tenth of a percentage point. In three-fourths of the 187 standard metropolitan statistical areas that coincided with counties, the census totals were within 10 percent of the sales management estimates.

[24] "Current Population Reports—Consumer Income," Series P-60, No. 41, p. 19, Oct. 21, 1963.

[25] This is also a valid criticism of the overall figure for the BLS 1941 survey in which one type of income was overreported, also *presumably* because entrepreneurs tended to report gross income of their farms and businesses rather than the requested net income. Table 20 also confirms that the median male income level in the 1950 census for self-employment income fell about one-tenth when the identical PES sample was more thoroughly reinterviewed. In 1960 it declined almost 9 percent in the reinterview.

percent of the OBE total. Using this alternative measure of "error," what progress has been made toward reducing the differences between the census and the OBE estimates? The absolute sum of the differences was about 9.32 percent in 1949 and has fallen to 8.85 percent in 1959. A similar calculation was required for the 1941 BLS survey, which also overestimated the total of self-employment income (see table 13, bottom row).[26]

The modest and consistent margin of underreporting wage and salary and self-employment incomes in the 1950 census may have had a less serious distortionary influence on the census estimate of the size distribution of family income in that year than did the reporting errors pulling in opposite directions for the two types of income in the 1960 census size distribution. In using the 1950 census data, analysts have made adjustments, however crude, for the underreporting of incomes in the census. This adjustment usually takes the form of a uniform 9-percent inflation of the size distribution or the median or mean income levels to approximate the overall OBE personal income estimates.[27] This type of rough adjustment is less justified in working with the 1960 census data. To gauge the extent of the bias introduced into the 1960 census data by the overestimation of self-employment incomes, one must determine how differently distributed among families were wage and salary incomes from self-employment incomes in the year 1959. If the difference is substantial, we should expect the distinguishing features of the self-employed income distribution to be exaggerated in proportion to the overall size distribution, and to contribute to a divergence between the census and the OBE and the CPS size distributions.

The OBE data are not available for recent years on the separate distributions of wage and salary income and self-employment income. The differences in the two distributions are hinted at in the 1946 intermediate tabulation presented in table 17. Since the OBE size distribution of family income is estimated separately for farm and nonfarm families, the data in table 17 do not include farm self-employment earnings. The salient difference between the two distributions of individual earnings by income level is the greater relative frequency of upper income individuals in the self-employed income category. Some of the dramatic difference between the wage and salary distribution of incomes and the nonfarm self-employed distribution of incomes would be eliminated if farm self-employment incomes were also included, for farm family units are heavily concentrated in the low-income levels.

TABLE 17.—*Number of individual civilian earners by type of earnings and individual civilian money-earning level, 1946*

[In percent of total earners with each type of earnings [1]]

Civilian money-earning level	Wages and salaries	Nonfarm entrepreneur
Under $999	31.9	31.8
$1,000 to $1,999	28.7	21.5
$2,000 to $2,999	22.4	12.3
$3,000 to $4,999	13.9	14.1
$5,000 or more	3.1	20.4
Absolute total of earners (in thousands)	52,523	5,433

[1] Because of rounding the sum of distribution may not equal 100 percent.

Source: Exhibit 8, p. 47, "Income Distribution in the United States, 1944-50," U.S. Government Printing Office, Washington, D.C., 1953.

[26] See footnote 25.
[27] See, for example, Becker, op. cit., p. 163.

Consulting the CPS data for 1959 (table 18), the evidence is both timely and conceptually consistent with the data collected by the census. Using the approximation [28] for all self-employment incomes in column 2 of table 18, there are three times the proportion of self-employed income units in both the highest and the lowest income classes than there are wage and salary units. On the other hand, there is only about one-half the proportion of self-employed income units compared to wage and salary income units in the middle income range; that is, between $4,000 and $8,000 annual money income.

TABLE 18.—*Size distribution of families and unrelated individuals by type of income, 1959 (CPS data)*

[In percent of those with specified type of income]

Money-income class	Wages and salaries	All self-employment income [1]	Nonfarm self-employment income	Farm self-employment income	Income other than earnings
0 to $999	10.5	(37.5)	29.1	52.2	60.8
$1,000 to $1,999	8.3	(13.0)	10.4	17.6	23.7
$2,000 to $2,999	9.1	(9.6)	8.1	12.2	8.6
$3,000 to $3,999	10.8	(8.2)	9.2	6.4	3.0
$4,000 to $4,999	12.8	(7.2)	8.5	4.6	1.3
$5,000 to $5,999	12.6	(6.2)	8.2	2.8	.7
$6,000 to $6,999	10.3	(4.0)	5.6	1.1	.3
$7,000 to $7,999	7.7	(3.0)	4.3	.6	.3
$8,000 to $9,999	9.2	(2.7)	3.9	.6	.3
$10,000 to $14,999	6.9	(5.4)	7.8	1.3	.5
$15,000 to $24,999	1.4	(2.1)	3.0	.4	.1
$25,000 plus	.3	(1.1)	1.6	.2	.2
Number with specified type of income (in thousands)	43,580	9,713	6,187	3,526	25,835

Total number of families and unrelated individuals, 55,764,000.

[1] This approximation is derived by combining the class totals for nonfarm and farm entrepreneurs. To the extent that units receive both types of income, they are double counted at a lower income level than their combined farm and nonfarm entrepreneurial income would prescribe.

Source: "Current Population Reports, Consumer Income," series P–60, No. 35, Jan. 5, 1961, table 18, p. 35.

The overestimation of self-employment income compared to other types of income in the 1960 census would, it is suggested, contribute to an overestimate of low and high income level family units, and, conversely, an underestimate of middle income family units. To test this hypothesis one might examine the divergence between census size distributions of family income and other sets of data. Unfortunately, the OBE size distribution estimates of family personal income cannot now be adjusted to a comparable income base for comparison with census data.[29] The CPS data for 1959 are available and are found to be consistent with our hypothesis (see table 16). The 1960 census distributes more of the family and unrelated individual income units than the CPS to the two extreme income ranges—under $2,000 and over $6,000. It must be noted, however, that the universe sampled by the CPS is not identical to that encompassed by the census. The census includes civilian institutional inmates and military personnel living on base, which the CPS excludes. The census, therefore, enumerates 58.3 million income units in contrast to the

[28] See footnote 1 to table 18 for explanation of derivation.

[29] Because of the present estimation procedures used in constructing the OBE size distribution estimates it is very difficult and hazardous to attempt to adjust the estimates to reflect alternative concepts of personal income. For differences in income concept see table 12. H. P. Miller has made an effort to reconcile census with OBE size distributions of family income. But the procedures are proximate and no adjustment is attempted for the census overestimation of self-employed incomes. (See paper by Miller, "Trends in Income Distribution in the United States" (mimeographed), Bureau of the Census, app. A.

55.8 million estimated by the CPS. The difference appears to consist overwhelmingly of unrelated individuals. The number of families covered by the two programs is about the same, 45.1 million. For these 45 million family units the CPS and the census prescribe a similar size distribution according to money income levels up to the $10,000 level. Families with incomes in excess of $10,000 are represented 23 percent more often in the 1960 census than in the CPS sample.

The significant disparity between the relative frequency of upper income units in the two programs may be due to the overestimation of self-employed income in the 1960 census. Data published from the reinterview survey that ascertained the margin of error in census estimates confirm our hypothesis.[30] The 1960 census counted 16 percent more males with self-employment incomes of $10,000 or more than were counted in the more thorough reinterview of the identical sample of persons. This margin of overreporting of high self-employed income recipients in the census does not extend to other income types, for the number of males with total incomes of $10,000 or more fell only 2 percent in the reinterview survey.[31]

Other explanations offered for the excess of high income units in the census data or, alternatively, the shortage of high income units in the CPS sample cannot be verified with the available evidence. Sampling error could explain such an underestimation of high income units in the CPS sample for 1 year, but not a persisting bias in the sample over the years. The intricate controls applied to the sampling procedure in the CPS program work against the introduction of any systematic bias of the magnitude noted above. An identical sample drawn from CPS records was 93 percent matched with 1960 census files, but the matching study did not provide any working hypothesis for explaining the marked disparity in the two size distributions of income. It was hoped that checks on nonrespondents would provide a clue to the systematic differences in the two sets of data. However, the results were inconclusive; about 90 percent of the persons who failed to report their income in one interview program reported it in the other. Male nonrespondents in the CPS reported in the census somewhat higher median incomes than the average ($4,900 compared to $4,300), while the male nonrespondents in the census reported in the CPS a substantially lower than average income ($3,200 compared to

[30] See pp. 68, 69 for more complete discussion of the reinterview program associated both with the 1950 and 1960 census evaluation program.

[31] Change in number of persons reporting incomes of $10,000 and over in the 1960 census and in the 1960 content evaluation study for population characteristics (RS).

Income type	Male			Female		
	Census	RS [a]	Census as a percent of RS	Census	RS [a]	Census as a percent of RS
Total income	3,891	3,825	----------	223	151	----------
Self-employment income	995	857	----------	18	17	----------
Income from sources other than earnings	152	292	----------	152	115	----------

[a] Reinterview survey used in content evaluation study of population characteristics. Identical sample of respondents as in the census.

Source: "Evaluation and Research Program of the U.S. Census of Population and Housing—Accuracy of Data on Population Characteristics as Measured by Reinterviews," series ER-60, No. 4, tables 17-23, Bureau of the Census, Washington, D.C., 1964.

$4,400). This evidence is also consistent with our hypothesis for the Census CPS male income distribution disparity. Consistency among responding and nonresponding females was somewhat greater than for males in both programs.[32]

The CPS-census matching study also permits comparisons of median income by income type (see table 19). It is noteworthy that despite the fact the CPS accounted for only 91 percent of the OBE estimate for self-employment income and the census accounted for 113 percent, the median income of self-employment incomes was greater in the CPS sample than in the census. In other words, though the mean census self-employment income exceeded the CPS, the median self-employment income fell below the CPS estimate. Although the census tended to overestimate consistently the amount of self-employment income,[33] it also enumerated relatively more low self-employment income units than did the CPS, depressing the census median income level. This is not surprising since we noted earlier from table 16, that the census enumerated a larger proportion of unrelated individuals in its universe than did the CPS, and many of these individuals were concentrated in the lowest income class. The cause and incidence of these disparities between the CPS and census income statistics should receive more attention. Was the use of self-enumeration census materials responsible for the overreporting of self-employment incomes in 1960? Future reports from the Bureau of the Census evaluation and research program (series ER–60) should investigate thoroughly these differences in income estimates between the census and the CPS, and analyze how these differences are likely to influence the census income data cross-classified by other characteristics.[34]

TABLE 19.—*Median incomes by sex and income type in the 1960 census and CPS*

[In current dollars]

Median money income	Census, male	CPS, male	Census as percent of CPS	Census, female	CPS, female	Census as percent of CPS
Total income	$4,406	$4,327	101.8	$1,524	$1,508	101.1
Wages and salaries	4,630	4,552	101.7	1,938	1,926	100.6
Self-employment income	2,855	2,959	96.5	961	1,056	91.0
Income other than earnings	732	746	98.1	715	739	96.8

Source: H. P. Miller. "Trends in Income Distribution in the United States," app. A (Census Bureau mimeographed paper) table 20, p. 78 and table 19, p. 72.

The Post Enumeration Surveys

The object of the post enumeration surveys (PES) [35] is to detect forms of response bias in the original census data by conducting inten-

[32] Male nonrespondents in the CPS reported 90 percent of the time to the census, while females reported 92 percent. Male nonrespondents in the census reported to the CPS 88 percent of the time, and, again, the females bettered them, reporting 94 percent. Miller, op. cit., table 20, p. 78.

[33] Comparing the State OBE estimates to the 1960 census State totals for self-employment income, the margin of overestimation is remarkably consistent. The States for which the 1960 census total did not account for 95 percent of the OBE estimate of self-employment income were mostly in agricultural belts, and the census and CPS have usually underestimated farm self-employment income by a wider margin than nonfarm self-employment income. These States were South Dakota, 79 percent; Mississippi, 81 percent; Arkansas, 84 percent; North Dakota, 94 percent; and North Carolina, 94 percent.

[34] There is a need for a detailed and comprehensive study of response and nonresponse error to follow up the tentative, but suggestive, hypotheses investigated here in explaining the disparities between the census and CPS income data.

[35] For a fuller treatment of 1950 findings, see "The 1950 Census and the Post Enumerator Survey," Leon Pritzker and Alfred Sands, in "An Appraisal of the 1950 Census Income Data" Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, 1958. For a brief description of objective and design of 1960 PES distinguished as the renumerative study (RS), see p. 7 of "Evaluation and Research Program of U.S. Census of Population and Housing, 1960—Background, Procedures, and Forms," series ER–60, No. 1, Bureau of the Census, 1963.

sive interviews with a small sample of households and comparing these results with census returns. Specially trained and supervised interviews were conducted with 25,000 households in 1950, of which 5,000 households were in the 20-percent census sample to whom the full income questionnaire had been given. In 1960, about 5,000 households were selected, all from the 25-percent complete questionnaire census sample. Two methods were used in comparing the PES findings to the 1950 census data: First, the PES were matched with the identical census sample's returns, then the PES sample results were inflated to represent the census universe and compared a second time to the census totals. The 1950 PES and its counterpart in the 1960 census evaluation program, the reinterview study (RS), were in general agreement with the original census findings. It was presumed that any difference between the PES/RS and the census findings for identical samples should be interpreted as a margin of error in the census, because of the added care and expense involved in the PES/RS.

The major discovery in the 1950 PES and the 1960 RS was that a more intensive interview tended to turn up a relatively large number of persons with small amounts of income—usually income from sources other than earnings—who had not been credited with such income in the original census enumeration. The two sets of income estimates were tabulated for 1950 by urban, rural nonfarm, and rural farm types, and by income classes and income types. Using both the identical sample and inflated totals methods for comparison, urban and rural nonfarm families had a median income level about $300 higher in the PES than in the 1950 census, which tended to shift the size distribution of these units up the income ladder. Rural farm median family income was $50 higher on the basis of identical samples, and $130 higher on the basis of inflated totals in the PES than in the 1950 census.[36] No systematic upward shift was evident in the rural farm family size distribution of income.

Median incomes and size distributions were also tabulated for the identical sample from PES and the 1950 census by type of income. The median income for males in the PES was slightly higher in terms of wage and salary income, and lower in self-employment income and in income from sources other than earnings (see table 20). For females, the median income in all three types of income was lower in the PES than in the census, because of the PES's enumeration of additional small sources of female income from all three types. For males, 0.4 percent more reported wage and salary incomes, 1.3 percent more reported self-employment income, and 9.5 percent more reported income from sources other than earnings to the PES than to the census.[37] There was no systematic bias introduced by the underreported income by type into the size distribution except in that it augmented the number of persons in the lowest income class (below $500). In sum, the evidence from the 1950 PES would indicate that the census underestimation of persons with self-employment and wage and salary incomes was not serious, but that a relatively large number of persons with typically small income sources other than earnings were overlooked in the 1950 census.

[36] Pritzker and Sands, op. cit., p. 228.
[37] Ibid., tables 18–20, pp. 229–331.

TABLE 20.—*Median incomes by sex and income type in the 1960 census and PES/RS*[1]

[In current dollars]

	Male			Female		
	Census	PES/RS	Census as percent of PES/RS	Census	PES/RS	Census as percent of PES/RS
1. Total money income, 1960	$4,507	$4,501	100.1	$1,501	$1,578	95.1
2. Total money income, 1950	2,575	2,511	102.5	1,083	1,146	94.5
3. Total money income, 1950 [2]	2,430	2,450	99.2	1,030	960	107.3
4. Wages and salaries, 1950	2,460	2,540	96.9	1,200	1,130	106.2
5. Self-employment, 1950	1,920	1,760	109.1	930	760	122.4
6. All other income, 1950	470	460	102.2	450	420	107.1
7. Total money income, 1960 [3]	4,435	4,346	102.1	1,369	1,265	108.2
8. Self-employment income, 1960	3,129	2,676	108.8	949	879	108.0
9. Income other than earnings, 1960	639	491	130.1	625	593	105.4

[1] 1950 post enumeration survey (PES); 1960 reinterview survey, or renumeration study, or content evaluation study of population characteristics (RS).

[2] Based on actual 1950 census tabulations and projections of PES results to universal level, adjusted for persons not reporting income and age. Medians were defined in source to exclude persons "with no income."

[3] Based on arithmetic extrapolation of data published in evaluation and research series by the Bureau of the Census. Median is defined to include all persons of correct sex, and with income, and age reported.

Sources: Rows 1 and 2 from H. P. Miller, "Trends in Income Distribution in the United States," app. A, table 21, p. 82 (mimeographed paper of Bureau of the Census). Miller's medians are defined for the universe of persons who reported $1 or more income in both the census and the reinterview survey.

Rows 3, 4, 5, and 6 from L. Pritzker and A. Sands, "The 1950 Census and the Post Enumeration Survey," in "An Appraisal of the 1950 Census Income Data" Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, Princeton, N.J., 1959, table 17, p. 229.

Rows 7, 8, and 9 derived (see footnote 3 above) from "Evaluation and Research Program of the U.S. Census of Population and Housing—Accuracy of Data on Population Characteristics as Measured by Reinterview," series ER-60, No. 4, Bureau of the Census, Washington, D.C., 1964, tables 18-23, pp. 18-21.

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[38] Available in the "Evaluation and Research Program of the U.S. Census of Population and Housing, 1960—Accuracy of Data on Population Characteristics as Measured by Reinterviews," series ER-60, No. 4, Bureau of the Census, 1964.

[39] See footnote 31, p. 67.

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Series PC(2)–7B: Occupation by Earnings and Education. This report shows earnings of males 18 to 64 years of age, cross-classified by educational attainment, age, and color, for major occupation groups and selected occupations. Regional breakdown for South and the other three geographic regions of the U.S. combined. Median, mean,[40] and earnings distribution is provided for each category.

Series PC(2)–8B: Income of Elderly Population. Data reported for families in which the head or the wife is 65 years old or more, cross-classified by combined income of head and his wife, the income of the head, and the income of relatives (other than wife) 65 years old or more. Data presented by sex and family status, for the 50 States and the District of Columbia, and standard metropolitan statistical areas of 250,000 or more.

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A complete list of U.S. Census Publications may be found in Quarterly issues and Annual Volumes of the Bureau of the Census' Catalog of Publications.

[40] Great caution should be exercised in the use of "mean" estimates for the fine occupational categories, particularly those with a disproportionate number of high incomes reported. The overall mean estimate is dependent on the estimated mean of the earnings group $25,000 and over. It is assumed for this purpose that the frequency distribution of upper earnings persons is distributed according to the Pareto distribution, and extrapolated from a Pareto curve fitted to the data for the upper earnings range. See footnote 7, p. 58.

SECTION C. FEDERAL RESERVE BOARD

1. Survey of consumer finances

The Survey of Consumer Finances (SCF) provides an annual source of information on private households in the coterminous United States (Alaska and Hawaii are excluded), including financial and demographic characteristics, past spending and saving behavior, and consumer expectations, intentions, and attitudes. The Federal Reserve Board and the Survey Research Center of the University of Michigan conducted annual surveys from 1947 to 1959. The findings of these surveys were published in the form of a series of articles in the Federal Reserve Bulletin. The Survey Research Center, financed by business concerns, private foundations and the center's own funds, has continued the survey from 1960, publishing its tabulations in the form of an annual monograph. In January and February of each year a sample is selected and interviewed. The size of the sample was held at approximately 3,000 interviews from 1947 to 1960, but has since been reduced to about 2,000 interviews. Foundation support has assisted in the preparation of a library of microfilms and IBM cards from the survey findings to make the full spectrum of survey data more accessible to research workers.

The SCF originated with the Federal Reserve Board's postwar interest in the size and distribution of consumer liquid assets, which, it was feared, could contribute to an inflation. Since 1945 the surveys have dealt with a wide range of questions and topics from consumer asset preferences, to price expectations, to the consumers's own evaluation of his financial progress and prospect. Though experimentation and change have distinguished this survey program from others, the SCF has consistently gathered information on income, on consumer purchases of durable commodities, on acquisition of other assets, and on borrowing.

Sample design

The general design of the SCF has not changed appreciably since its inception under the direction of the Division of Program Surveys of the Department of Agriculture.[41] The sampling frame consists of the occupied dwelling units of the coterminous United States, excluding transients, residents of institutions, and persons living on military reservations. The civilian noninstitutional population of dwellings is divided into 66 primary sampling areas.[42] The 12 largest metropolitan areas are included as sampling areas, and the remaining counties are stratified or grouped according to criteria designed to increase the homogeneity of the sampling areas. Counties or county groups

[41] A detailed discussion of sampling and other procedures used in the Survey will be found in "Methods of the Survey of Consumer Finances," Federal Reserve Bulletin, July 1950, pp. 795–809. Changes introduced in the 1956 survey are described in Leslie Kish and Irene Hess, "On Noncoverage of Sample Dwellings, Journal of the American Statistical Association, June 1958, pp. 509–24; for further methodological comments see ch. 14, 1960 Survey of Consumer Finances, Survey Research Center, University of Michigan Press, 1961, and Family Living Studies: A Symposium, International Labor Office: Geneva 1961. ch. XI.

[42] Now 74 primary sampling areas are used in the SCF.

are selected from each strata in a controlled fashion to improve the distribution among States and the degree of urbanization. Systematic and area sampling techniques are then used within each country, clustering the interviews to reduce the interview costs. Adjustments have been made in the survey so four regions of the country can be analyzed separately in later years.

The overall response rate in the 1950's ranged between 83 and 88 percent, but fell slightly to 77 percent in 1962 and to 78 percent in 1963. Through the 1958 survey three different sampling rates were used according to the value and type of residence. Interviews were selected for a smaller fraction of lower rent or lower value dwellings and a larger fraction of higher value dwellings. This type of nonproportional sampling according to value of residence reduced the sampling error for high income households, a relatively small group in the total population, but one that is noted for greater variability in incomes, assets and saving behavior.[43] Since 1959 this use of "oversampling" techniques for upper income groups has been abandoned, presumably on account of the additional costs associated with the nonproportional sampling procedure.

In the early surveys a new sample was drawn each year, but on occasion, as in 1953, a portion of the old sample was reinterviewed to study problems and bias connected with a repeated interview program. The 1961 and 1962 survey samples, however, were selected to include about three-fourths reinterviews of respondents from the 1960 survey,[44] and including all dwelling units with "high" incomes, to thereby "oversample" upper income units.

In each survey the spending units enumerated are grouped by dwelling units and weighted so that all dwelling units have equal probability of selection, subject to the controls and stratification indicated. Finally, the representative (weighted) sample is inflated to agree with an independent estimate of the number of occupied dwelling units in the United States.

Definitions and concepts

The fundamental income-expenditure unit of the SCF is the spending unit, defined as all related persons living in the same dwelling who pool their income to meet major expenses. Secondary spending units within the same dwelling (but not owning it) are categorized as "related" (i.e., by blood or marriage to the primary unit) or "unrelated'. (e.g., roomers, and servants). See table 21 for evidence of the postwar change in distribution of primary and secondary spending units in the United States. Survey results can be tabulated on a "family basis". by combining with the primary spending units related secondary spending units. This concept of family is quite

[43] Rural farm dwelling units were also oversampled through 1950 because they are subject to more than average income variability. In 1950 the sampling rates in the Survey of Consumer Finances were as follows: "If occupants of urban dwelling units were believed to have annual incomes of at least $6,000, then units were sampled at 6 times the basic rate (1 in 16,500); if between $3,000 and $6,000, at twice the basic rate. Rural farm dwelling units were also sampled at twice the basic rate." "The Survey of Consumer Finances and the Census Quality Check," by Monroe G. Sirkin, E. Scott Maynes, and John A. Frechtling, in An Appraisal of the 1950 Census Income Data, Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, 1958, p. 128. Oversampling among farmers was discontinued after 1950.

[44] The monograph discussing the panel built into the 1960–62 Surveys of Consumer Finances was published in 1964. The panel consisted of 1,059 spending units. Preliminary tabulations from the panel survey findings are cited in James N. Morgan and Charles A. Lininger, "The Anatomy of Income Change," paper presented to the Econometric Society meetings, Boston, Dec. 29, 1963. Richard Kosobud and James Morgan, editors, Consumer Behavior of Individual Families Over Two and Three Years, Monograph 36, Survey Research Center, Ann Arbor, 1964.

comparable, if not identical, to that used by the Census Bureau.[45] The SCF "spending unit" is, on the other hand, not exactly comparable to the "consumer unit" distinguished by the Bureau of Labor Statistics in its expenditure surveys, for the SCF requires that the members of the spending unit are "socially" related by blood, marriage, or adoption, and the BLS is concerned only with the "economic" requirement that they are financially interdependent.[46]

The definition of income used in the SCF is different from the definition of personal income used by the OBE, but similar to that used by both the Census Bureau and the Bureau of Labor Statistics. The two most important differences between the SCF and the OBE concepts of income are the former's exclusion of nonmoney income flows, and its smaller sampling universe of income units which excludes incomes received by persons in institutions and quasi-households such as hotels, YMCA's, etc. In greater detail, the SCF income excludes several items that OBE includes: the income of nonnatural persons (trusts, nonprofit institutions, estates); the income of U.S. residents abroad employed by U.S. organizations; changes in farm inventory; and imputed rent and interest. The SCF tabulates and publishes distribution statistics for spending units according to both before- and after-tax money incomes.

Evaluation

A serious shortcoming of the SCF for the purposes of analyzing the distribution of income is the modest size of the survey sample (see table 21), consisting of 2,000 to 3,000 interviews. A sufficiently fine breakdown of income classes by age level or occupational status could reduce the sample size of the component groups to around 200 to 400 interviews. With such a small sample, any annual income distribution is open to large sampling error (variability), particularly hazardous in an analysis of size distribution of income, where most relationships at the aggregate and subaggregate level are quite stable. Sampling error in such cases may exceed the likely change between years in the income distribution of a component group.[47]

However, for data to test a hypothesis not requiring extensive cross-classification of demographic and financial characteristics the SCF remains an adequate annual source. Response and nonresponse errors are, of course, more difficult to measure and evaluate, and are probably of equal or greater importance in most survey data.

Many tests and evaluation studies have been conducted to assess the reliability of the SCF findings. In the late 1940's there were persistent differences between the findings of the SCF and the census and CPS. The census quality check conducted in 1950, 7 months after the regular SCF sample had been interviewed, was a resurvey

[45] Only related secondary spending units consisting of a married couple or a parent with one or more children are called "subfamilies" by the Census Bureau. Such units of other composition are considered in the census as part of the main "family." The census categories of "unrelated individuals" and "secondary families" include a substantial number of people living in "quasi-households" excluded in the SCF sample. In general, combining the census "families" and "unrelated individuals" gives total of units comparable to SCF "spending units".

[46] These differences in concepts are probably of minor importance.

[47] For example, an income analyst would ask how great a difference in a given sample estimate would arise by chance (sample variability) in 5 cases out of 100. In concrete terms, what sort of change would satisfy this statistical standard regarding the distribution of farmers' income? The size distribution of income among spending units headed by farmers would be derived from a subsample in the survey consisting of only 72 farm operators in 1963 and 99 in 1962. It would be very hazardous to construct a size distribution from such a small sample. Even the estimation of the mean income for farm operators would be subject to a large sampling error when derived from such a small sample.

TABLE 21.—*Survey of consumer's finances—Distribution of spending units and size of interview sample*

Distribution of spending units	1946	1947	1950	1953	1956	1959	1960	1961	1962	1063
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Primary	82	83.5	82.5	85.7	88.6	89.9	91.4	91.6	91.4	89.4
Related secondary	18	12.4	13.1	10.9	8.3	7.6	6.6	6.6	6.6	7.7
Unrelated secondary		4.1	4.4	3.4	3.1	2.5	2.0	1.8	2.0	2.9
Total	100	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of interviews		3,058	3,512	3,097	3,014	3,100	2,972	1,981	2,117	2,036
Reinterviews								1,441	1,678	

Source: Annual data from the Survey of Consumer Finances published in the Federal Reserve Bulletin and annual monographs by the University of Michigan, Survey Research Center.

of a portion of the SCF sample, using in the second interview census questionnaires, techniques, and enumerators. The findings of the control check confirmed the disparities observed earlier between the two surveys, but did not reveal any remediable biases:

"In brief, the census quality check enumerators, working from the same list of addresses and open-county segments, found more families and unrelated individuals, more adults and income receivers per family, and more first-quality respondents than the SCF enumerators did. On the other hand, for the units unaffected by these differences, the SCF interviewers obtained reports of more sources of income and, for most types of income, a higher mean or median income. Both results are consistent with the known emphasis placed by the Census Bureau on enumeration and by the SCF on financial information."[48]

The SCF with its orientation overlooked a larger fraction of low income spending units than the census enumeration. But since the SCF located more and larger sources of income in interviewed spending units, it accounted for 89 to 95 percent of adjusted personal income as estimated by the Office of Business Economics. The CPS taken by the Census Bureau accounted for only 82 to 87 percent of the personal income (see table 13).[49]

Furthermore, the sample frame of the SCF may exclude a disproportionate number of the high income group. If these high income units live in private clubs, or in hotels, or abroad during January and February of the survey year, they are thus excluded from the sample universe of residents in ordinary dwelling units in coterminous United States. Though this group of high income units may be numerically small, they may account for a substantial fraction of personal income receipts, savings, and personal net worth. It seems likely, therefore, that the SCF is biased downward somewhat more than other larger and broader surveys in its estimate of both "tails" of the size distribution of personal income. On the other hand, it is these two extreme groups that receive most attention in an analysis of the distribution of personal income. When using the SCF estimates, it is wise to focus on the median, rather than the mean, whenever possible, as a measure

[48] Sirkens, and others, "The Survey of Consumer Finances and the Census Quality Check," An Appraisal of the 1950 Census Income Data: Studies in Income and Wealth, vol. 23, NBER, Princeton University Press, 1958, pp. 165–167.

[49] From 1947 to 1954 Selma Goldsmith calculated the SCF accounted for between 89 and 95 percent of the Commerce Department's estimate of personal income, while the CPS accounted for 82 to 84 percent in the same period. (See Goldsmith, "The Relation of Census Income Distribution Statistics to Other Income Data," in "An Appraisal of the 1950 Census Income Data," op. cit.) Miller cited in "Rich Man, Poor Man," p. 229, table A-2, a paper of Conrad Taeber and Morris H. Hansen, "A Preliminary Evaluation of the 1960 Census of Population" that reports the CPS accounted for 84 percent of Commerce Department's personal income estimate in 1949, and 87 percent in 1959. These figures are slightly higher than Goldsmith's.

of the central value of the size distribution, because the median is less sensitive than the mean to bias and errors of sampling variability in the estimation of the extremes of the distribution.

The recent Surveys of Consumer Finances have been accompanied by a methodological appendix that gives an indication of the sampling errors associated with different statistics drawn from the survey, and the size of component groups in the survey sample. Greater information might yet be provided on the incidence of nonresponse among component groups, a possible source of bias in a survey. Interim surveys which are presently concerned with consumer expectations, attitudes, and intentions should be designed to include some of the same basic financial questions used in the annual survey, and thus provide a link with the more complete annual survey findings. The interim surveys might also use a sample that overlaps the annual survey to assist in functionally relating purchasing intentions to completed acquisitions, and expected savings to realized changes in net worth.

There is, however, no doubt that the SCF provides one of the most useful sources of general information on the distribution of disposable income to families. For an analysis of postwar trends in the formation and structure of family units, the SCF is, in all probability, the best source of detailed information. The archives of the findings of the SCF are maintained at the Survey Research Center of the University of Michigan, and are currently stored on an individual file basis rather than on the basis of selected tabulations. For this reason, the annual SCF is a flexible and singularly well designed source of income data for socioeconomic research on the distribution of disposable personal income.

The Survey Research Center of the University of Michigan and the Brookings Institution with the aid of funds from the National Science Foundation are in the process of completing a special survey study of upper income individuals in the United States. The objective of this survey program is to sample investment attitudes and behavior, broad recent portfolio shifts, and the effects of taxes on work effort, rather than to collect detailed financial information on the upper income respondents.[50]

2. The survey of financial characteristics of consumers, 1963–64

The survey of financial characteristics of consumers (SFCC), conducted for the Federal Reserve Board by the Bureau of the Census in the spring and summer of 1963, provides data on the assets, debts, and net worth of the population, as well as income and other socioeconomic characteristics. The reinterview survey of changes in family finances, by reinterviewing the same families 1 year later, provides data on saving. The objective of these surveys was to provide detailed financial information from a cross section of U.S. civilian noninstitutional population, and an analysis of the financial behavior of those with large wealth holdings. These objectives called for oversampling of upper income families. Only preliminary findings are now available from the first interview program. These preliminary findings were

[50] See James Morgan, Harvey Brazer, and Robin Barlow, "Some Results of a National Survey of High Income People's Asset Management," paper given at the Chicago meetings of the American Economic Association, Dec. 28, 1964, and to be published in American Economic Review, papers and proceedings, vol. 54, May 1965.

summarized in an article in the March 1964 Federal Reserve Bulletin, pages 285–293 (see table 9, p. 47). Further information on the two-stage survey will be given in an article in the Federal Reserve Bulletin in mid-1965.[51]

The Federal Reserve Board, in response to a request from the President's Council of Economic Advisers, arranged with the Bureau of the Census to repeat the two-stage survey of families in mid-1964 and mid-1965 with an independent sample, to examine the impact of the 1964 tax cut on consumer finances. The sample design is similar to that used in the SFCC, except that there is less oversampling of upper income strata. The findings of this reinterview survey should be of value in preparing and implementing future economic policy.

Sample design

Methods used in the SFCC were designed to meet some of the problems encountered in past surveys. After experimentation with different methods in pilot projects, it was decided to encourage respondents to consult records and report their financial position in detail. Family units with annual money income greater than $15,000 were requested to complete at their convenience a detailed balance sheet statement of family income, assets and liabilities. They were also asked to provide historical and demographic information, together with attitudes toward saving and investment alternatives. The self-enumeration questionnaire and a followup interview allowed for numerous checks on the internal consistency of answers provided by the respondent. A single interview was used, and the self-enumeration questionnaire dispensed with, in the case of family units with less than $15,000 annual money income. Despite the length and comprehensive nature of the sample questionnaire and interview, the response rate in the SFCC was 86 percent. This compares well with response rates in other consumer financial surveys.

The sample design of the SFCC was basically new. It incorporated greater variability of sampling rates than had been used before in consumer surveys. The Federal Reserve Board recognized the need to oversample the upper income levels for accuracy and reliability of national saving and investment information, and hence designed a graduated sampling rate for nine levels of income, sampling more frequently the upper income units in the population. A sample of about 400 families and unrelated individuals was selected from each of the 7 income strata designated by the Census Bureau from the 1960 Census of Population, brought up to date by including units constructed after 1960. This sample of the census universe was supplemented by about 800 additional income units selected from Federal individual income tax returns for 1960, 400 of which were drawn at random from the $50,000-to-$100,000 class and 400 from the $100,000-and-over adjusted gross income class. Adjustments were made to take account of the fact that units with 1960 adjusted gross income of $50,000 or more had a probability of selection in both the census and the IRS sample frames.

The 1963 SFCC yielded a useful sample of about 2,600 units. Although the exact range of sampling rates for various income classes

[51] Additional discussion of the findings in "Some Results of a National Survey of Financial Asset Holdings," Dorothy Projector and Gertrude Weiss, paper given at the Chicago meetings of the American Economic Association, Dec. 28, 1964, and to be published in American Economic Review, papers and proceedings, vol. 54, May 1965.

is not published, and approximations derived indirectly in table 22 give one some indication of the extremes, though they apparently underestimate considerably the real range of sampling rates. The income unit with an income in excess of $100,000 per year had, according to direct information supplied by the Federal Reserve Board, at least 440 times the chance (sampling probability) of being selected in the survey sample than had the family unit with an income of less than $3,000 per year. The SFCC is, therefore, designed explicitly for an analysis of the upper tail of the income distribution, and uniquely well designed for an analysis of the net material worth position and composition of these upper income units and their attitudes toward saving and investment opportunities.

Definitions and concepts

The survey unit employed in the SFCC was equivalent to the Census Bureau's concept of "families and unrelated individuals." The following components of income are distinguished: Salaries; commissions; net income from unincorporated businesses or professions, partnerships, and farms; dividends; interest; net income from rent; pension and social security payments; and any other periodic payments received by family members. Net worth is broken down into assets and debts. Assets consist of the following: Net worth of own home and automobile; business interests (farm and nonfarm); equity in life insurance, annuities, and retirement plan; liquid assets in the form of checking and saving accounts and U.S. savings bonds; stocks; marketable bonds; and other miscellaneous assets. Personal debt consists of consumer installment debt other than that on automobiles, such as home repairs and medical expenses. Total net worth for the purposes of the SFCC is then defined as the various asset components of net worth less personal debt.

TABLE 22.—*Distribution of sampling for SFCC, 1963*

Annual money income of families and unrelated individuals	Unweighted sample percentage	Weighted sample percentage	Approximate relative sampling rate [1]
Below $2,999	16	28	1.0
Between $3,000 and $4,999	13	20	1.1
Between $5,000 and $7,499	16	22	1.3
Between $7,500 and $9,999	13	15	1.4
Between $10,000 and $14,999	14	11	2.2
Between $15,000 and $24,999	9	3	6.5
Between $25,000 and $49,999	8	1	[3] 30
Between $50,000 and $99,999	7	([2])	[3] 90
Above $100,000	4	([2])	[3] 200
Total	100	100	

[1] Relative sampling rate is derived from dividing the unweighted sample percentage by the weighted sample percentage, and choosing on arbitrary base equal to 1.

[2] Less than ½ of 1 percent.

[3] Because of the small numerical importance of the income classes above $25,000, the relative sampling rate had to be estimated from other sources than the Census Bureau's Survey of Current Population. The upper income classes were estimated from the 1961 Statistics of Income, Internal Revenue Service, but since these data are not based on a family unit, but are rather a composite of joint, separate, and individual tax returns, we deflated the total of returns above $25,000 gross taxable income uniformly to correspond with the census total of families and unattached individuals with incomes greater than $25,000. These deflated estimates of families and unattached individuals in the upper 3 income classes were then used to calculate their relative sampling rate. These sampling rates are approximate and may be in error due to the indirect procedure used to calculate them.

Source: "Survey of Financial Characteristics of Consumers," Federal Reserve Bulletin, March 1964, p. 289. Relative sampling rates were calculated by the process outlined in notes 2 and 3 above, with the use of "Income of Families and Persons in the United States: 1962," Consumer Income, Bureau of the Census, series P–60 No. 41, Oct. 21, 1963, and Statistics of Incomes, 1961, Individual Income Tax Returns, Internal Revenue Service, 1963, table 1, p. 32.

Evaluation and quality checks

Preliminary reports are encouraging on the quality and usefulness of the data collected in the 1963 SFCC and the 1964 reinterview survey. An evaluation, of course, must await fuller disclosure of the SFCC findings. Although the SFCC was undoubtedly designed to answer specific questions of particular interest to the Federal Reserve Board, the wider analytical value of the SFCC findings can hardly be minimized. It would be hoped that the tabulation tapes from the SFCC, with their wealth of data, will be promptly edited, summarized, and made accessible to private research workers while, of course, preserving the anonymity of respondents. The Federal Reserve Board should be urged to assign additional personnel and resources to the task of processing the results from these related survey programs so that these collected materials are allowed to play an immediate role in testing many controversial theories and hypotheses regarding the interplay of wealth, income, savings, education, age, and so forth.

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September, Distribution of Consumer Saving in 1950.
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August, Purchases of Durable Goods and Houses in 1951 and Buying Plans for 1952.
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June, the Financial Position of Consumers.*
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August, the Financial Position of Consumers.*
1958: Survey of Consumer Finances:
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From 1960 the Surveys of Consumer Finances are published in separate book form by the Survey Research Center, University of Michigan, Ann Arbor, Michigan:
1960 Survey of Consumer Finances.
1961 Survey of Consumer Finances, G. Katona, C. A. Lininger, J. N. Morgan, and E. Mueller. 1962.
1962 Survey of Consumer Finances, G. Katona, C. A. Lininger, R. F. Kosobud. 1963.
1963 Survey of Consumer Finances, G. Katona, C. A. Lininger, E. Mueller. 1964.

Survey of Financial Characteristics:
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SECTION D. BUREAU OF LABOR STATISTICS

The Bureau of Labor Statistics (BLS) of the Department of Labor and its predecessor, the Bureau of Labor, have from time to time conducted multipurpose statistical programs which have collected data on the size distribution of personal income.[52] In these surveys, the objective has been to investigate the cost of living and the expenditure and saving behavior of consumers. A primary objective of the surveys in 1950 and 1960–61 was to provide data to revise the weights of the consumer price index to correspond with the changing patterns of consumer expenditures. The first such investigation among wage earners in selected industries was made in 1888–90, in conjunction with studies by five European countries. However, not until the 1935–36 Consumer Purchases Study was a sample survey designed to represent a cross section of family units in the United States. The wartime survey of 1941–42, though conducted on a more modest scale, used a stratified sample and included in the sampled universe single consumer units. The 1950 and 1960–61 Consumer Expenditures Surveys are today the most comprehensive bodies of data on the spending and saving behavior of the U.S. urban civilian noninstitutional population. In the following brief discussion, only a few lines can be allotted to each program.

Consumer purchase study, 1935–36

With the cooperation of the U.S. Department of Agriculture's Bureau of Home Economics and others,[53] the BLS designed and executed this first large-scale sample survey of U.S. families representing almost the entire population. A three-stage sample was designed which in the first stage selected 700,000 families, from which 300,000 were chosen to provide answers to the income questionnaire. From these 300,000 about 60,000 were selected under controlled conditions to answer the consumption questionnaire. Area sampling was followed in 140 villages and 66 farm county units, while New York and Chicago families were sampled with the aid of real property inventory lists. The 49 intermediate-sized cities and towns were sampled by means of city directories. Only husband-wife family units were included in the income sample, but no upper limit to family size was imposed. Farm families had to have received some money income from the sale of farm produce to qualify for the income sample. Net family income was defined as the sum of nine money income items and inventory adjustments on farm produce and livestock over the preceding year, plus nonmoney income, which included the imputed value of owned or provided housing, household furnishings, and food and fuel which were home produced and consumed. For the purposes of the survey the "economic" family unit was defined as a group of

[52] The following discussion is based in large part on the comprehensive treatment of BLS consumer survey programs from 1888–90 to 1950, in Lamale, Study of Consumer Expenditures, Incomes, and Savings: Methodology of the Survey of Consumer Expenditures in 1950, University of Pennsylvania, 1959.

[53] The National Resources Committee, the Works Progress Administration, and the Central Statistical Board also participated in the design and execution of this study.

persons belonging to the same household and dependent on a common income.

However, several limitations in the universe sampled in the Consumer Purchases Study reduce its usefulness. Except in the South and a few other regions and cities, only white families were sampled, and in all regions the white families were confined to those with native-born husband and wife. Families receiving any relief during the year of the survey were in addition excluded. The universe sampled was, therefore, not representative of all economic levels in all areas of the United States.

Family spending and saving in wartime, 1941–42

This survey of spending and saving in wartime was conducted jointly by the BLS and the U.S. Department of Agriculture—Bureau of Human Nutrition and Home Economics. About 3,060 family units and unattached individuals were sampled from 3 census distinguished strata of the civilian noninstitutional population: 1,300 units from urban areas, 1,000 units from rural nonfarm areas, and 760 units from farms. Area sampling was used in each of the three strata. The family unit was defined somewhat more broadly in this survey to be a group of persons dependent on a common or pooled income for the major items of expense, and usually living in the same household. Where there was doubt the household criterion was given priority. The single consumer unit was enumerated for the first time. Income was defined as, first, the sum of eight distinct money income sources, plus transfer payments and military compensation. Farm families' net income was adjusted for depreciation on farm buildings other than dwelling and, also, for changes in inventory of crops and livestock over the preceding year. Nonmoney income included the value of food, housing, fuel, ice, clothing, and household furnishings received by the unit without direct money outlay. Income-expenditure schedules were edited and accepted only if the difference between current receipts plus decrease in net worth and expenditures plus saving did not exceed 5.5 percent of nonfarm (9.5 percent of farm) disbursements or receipts, whichever was larger. This editing procedure was used in the 1950 and 1960–61 surveys as a criterion for reinterviewing a unit in the interest of reconciling the schedules, but schedules were not automatically rejected solely on the basis of a persisting imbalance between receipts and expenditure.

Survey of consumer expenditures, 1950

This survey collected detailed reports on incomes, expenditures, and savings from about 12,500 consumer units, representing a cross section of the urban [54] civilian noninstitutional population of the United States. Ninety-one urban areas were selected as representative of the universe to be sampled, and were arranged according to selected criteria [55] and sampled by random stratified techniques. From the BLS dwelling unit survey and 1950 census address listings, the cities were divided into block units and further stratified by dwelling type, race of occupant, etc. There were 16,352 consumer units [56] living

[54] Cities and incorporated places with 2,500 inhabitants or more, and other areas classified as urban in character in the 1940 census and in current population surveys conducted, 1944–47.

[55] Criteria were selected to correlate with expenditure patterns and price changes; city size, region, climate, income, population density, city type, distance to market, rate of change of population were among the characteristics used to stratify the sample. See Lamale, op. cit., p. 45.

[56] With each primary address chosen there was also selected an alternative address. This sampling procedure is discussed as a possible source of bias in the 1950 survey. See Lamale, op. cit., p. 54.

at the 15,180 addresses selected; 15,676, or 96 percent, were found to be eligible for scheduling; and 12,489, or 80 percent of those eligible, were acceptable and tabulated.

The income-expenditure unit in the survey of consumer expenditures (1950) is defined as the reconstructed "economic" family or single consumer unit; i.e., persons dependent on a common or pooled income for their major items of expense and usually living in the same household. This definition of the income-consumer unit is essentially the same as that employed in the 1941–42 wartime survey, and similar to the spending unit used in the survey of consumer finances (SCF), with one exception. The BLS assumes that the household more or less defines the family unit, while the SCF is inclined to enumerate separately secondary family units whenever the children 18 years or older, though living in the primary family household, are not contributing more than half of their income to the primary family's finances. In the BLS definition of income-expenditure unit, "economic" interdependence of persons in the household unit is a determining factor. In the decennial census and the CPS the "social" interdependence is emphasized; all persons in the household related by blood, marriage, or adoption are included in the income-expenditure unit without regard to their financial interdependence. For example, a two-person household of, say, two unrelated working women who pool their incomes and share expenses would be classified as one economic family unit by the BLS survey, but as two unrelated (by blood, marriage, or adoption) individuals by the CPS. More important, perhaps, the BLS survey enumerates the "reconstructed" family unit as it existed throughout the survey year, not as it existed in the week of the interview. It is perhaps because of this subtle difference between the duration of the reconstructed family unit that the BLS survey enumerates more families and fewer single consumer units than does the CPS,[57] and far fewer consumer units in the lowest income class (see table 23). This hypothesis would also help to explain why the remaining year-round single consumer units in the BLS tend to have a higher income level than all unrelated individuals in the CPS sample.[58]

In the BLS surveys the sources of annual money income before taxes and occupational expenses are essentially the same as those used by the Bureau of the Census. Money income before taxes is defined as the sum of net wages and salaries (net of occupational expenses), net self-employment income, and other sources of income and periodic transfer payments. Two nonmoney items, food and housing received as pay, were counted as money income and as expenditures. Money income after taxes was measured in the 1950 survey after deduction for all income taxes, poll taxes, and personal property taxes. Large and nonperiodic income transfers, such as bequests, were called other money receipts in the survey tabulations. There are no comparable official sources of data on the aftertax income distribution of urban consumer units against which to evaluate the BLS size distribution. The estimates made by Hyman Kaitz provide a tentative measure of confirmation.[59]

[57] The BLS survey covered 27.3 million families and 4.2 million single consumer units. The 1950 CPS estimated that in March there existed 25.8 million families and 6.9 million unrelated individuals in its sample universe. (Lamale, op. cit., table 7, p. 108.)

[58] Average before tax money income of unrelated individuals in the 1950 CPS was $1,745, and of the single consumer unit in the 1950 BLS survey, $2,069, or some 19 percent greater. (Lamale, ibid.)

[59] In "America's Needs and Resources: A New Survey," Dewhurst & Associates, for 20th Century Fund, New York, 1955, pp. 94 and 961–962, compared in Lamale, op. cit., p. 112.

TABLE 23.—*Size distribution of personal income in 1950 from BLS, OBE, SCF, and CPS*

Annual money income before taxes	BLS urban consumer unit	OBE nonfarm families and individuals	SCF urban families and individuals	CPS urban families and individuals [1]
0 to $999	6.2	8.3	7	14.8
$1,000 to $1,999	11.5	14.4	13	12.4
$2,000 to $2,999	16.6	16.2	15	16.6
$3,000 to $3,999	21.7	17.8	18	20.4
$4,000 to $4,999	17.1	14.5	14	13.4
$5,000 to $5,999	10.5	17.5	11	8.7
$6,000 to $7,499	8.2		10	
$7,500 to $9,999	5.0	5.8	7	10.7
$10,000 and over	3.2	5.5	5	3.1
Average (mean) income	$4,237	$4,438	$4,510	[2] $3,826
Median income	[2] $3,724	[2] $3,624	$3,800	$3,269

[1] Using census definition of "social family."
[2] Estimated from distribution by Lamale.

Source: Lamale, "Study of Consumer Expenditures, Incomes, and Savings: Methodology of the Survey of Consumer Expenditures in 1950," University of Pennsylvania, 1959.

Survey of consumer expenditures, 1960–61

Published reports from the 1960–61 survey of consumer expenditures provide size distributions of income by aftertax money income and only an average of before-tax money income. The BLS reports, available at this time,[60] present summary figures on income, expenditures, and savings for the urban United States and the major regions according to aftertax income class, age, family size, type of occupation, status of homeownership, education of head, family type, race, number of full-time earners, and location and size of place.

A three-stage sample of urban, noninstitutional living quarters (including hotels and roominghouses) yielded a final sample of about 12,000 living quarter addresses in 66 urban places. One-half of the representative sample was interviewed in 1961 and the other half in 1962 about the preceding calendar year's finances. Usable schedules were tabulated from 75 percent of the first half of the sample, and 77 percent of the second. The U.S. Department of Agriculture cooperated in surveying a further sample of rural living quarters to supplement the 1961 BLS survey findings to cover the entire noninstitutional population of the United States in 1961. Information was collected for the family unit, defined as the reconstructed economic family unit, or consumer unit, employed in the 1950 survey of consumer expenditures. [61]

The same definition of income before and after taxes and other money receipts as that used in the 1950 survey was employed in the 1960–61 survey.[62] No evaluation of the 1960–61 survey data is available at this time.

[60] 1960–61 survey of consumer expenditures, BLS Report 237, 1–38, "Consumer Expenditure and Income Summary, Urban United States, 1960–61," BLS Reports Nos. 237–238, and supp. 1.
[61] See p. 85.
[62] See p. 85.

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Family Expenditures in the United States: Statistical Tables and Appendices, Washington: National Resources Committee, 1941.

1941–42:

Family Spending and Savings in Wartime, 1941–42, U.S. Department of Labor, Bureau of Labor Statistics, published in the form of BLS Bul. 822.

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Rural Spending and Saving in Wartime and Family Food Consumption in the United States, U.S. Department of Agriculture, miscellaneous publications Nos. 520 and 550.

Survey of Consumer Expenditures in 1950:

Family Income, Expenditures and Savings in 1950, U.S. Department of Labor, Bureau of Labor Statistics Bul. 1097 (rev.), June 1953.

Study of Consumer Expenditures, Incomes, and Savings, 18 volumes—the first 17 cover data by individual cities and non-city classes; Vols. I and II summarize family accounts (income, expenditure for current consumption, saving, and other receipts and disbursements); Vols. II–X show further data for major groups and sub-groups of goods and services; Vols. XI–XVII, detailed items; Vol. XVIII presents a number of selected tabulations for all U.S. urban areas combined. University of Pennsylvania, 1956–57.

Survey of Consumer Expenditures, 1960–61:

Statistical Reports on Survey—BLS Report Series 237. The final reports in the 237 series on family expenditures and income are now in preparation and will be released as they are completed. These reports present the survey results combined to four broad census regions and the United States for the total population and for each of the population groups: Total population (urban and rural combined)—BLS Reports 237–89 through 237–93.

Urban—BLS Reports 237–34 through 237–38.

Rural nonfarm—BLS Reports 237–84 through 237–88.

Rural farm (to be published by the U.S. Department of Agriculture).

I. U.S. and regional summaries: Averages for Major Components of family accounts are classified by family income, family size, age of family head, occupation of the head, and housing tenure. Additional classifications are presented by education of the head, race, family type, fulltime earners, and location and size of place in Supplement 1 to each of the above reports.

II. Cross classification of family characteristics (Supplement 2): Data for eight family characteristics in the above summaries are cross-classified (two variables) with each of the other characteristics listed below:

1. Family size with income, age of head, family type, and location and size of place.
2. Age of head with income, occupation of head, and tenure.
3. Occupation of head with income, race, and tenure.
4. Education of head with income, and occupation of head.
5. Race with income and tenure.
6. Number of full-time earners with income.
7. Tenure with income.
8. Family type with income and occupation of head.

III. Detail of Expenditures and Income (Supplement 3): These supplements present in detail the components of consumer expenditures and income which were summarized in the reports noted in (I) above. These detailed tabulations show consumer units cross-classified by family size and income after taxes and by family size and the location of the family's residence inside or outside Standard Metropolitan Statistical Areas.

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Lamale, Helen H. "Workers' Wealth and Family Living Standards," reprint, Monthly Labor Review, June 1963, BLS Report No. 238–1.

Lamale, Helen H. "The Impact of Rising Prices on Younger and Older Consumers," Paper, International Gerontological Seminar, Markaryd, Sweden, August 6–9, 1963, BLS Report No. 238–2.

Chase, Arnold E. "Changing Patterns of Consumer Expenditures, 1950–60," Paper, Annual meeting of the American Statistical Association, Cleveland, Ohio, September 4–7, 1963, BLS Report No. 238–3.

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Webb, Laura Mae. "Changing Patterns of Consumer Expenditures," Paper, 41st Annual National Agricultural Outlook Conference, Washington, D.C., November 18–21, 1963, BLS Report No. 238–5.

Chase, Arnold E. "Consumer Expenditures and Income, With Emphasis on Low-Income Families," Summary of Remarks, 22d Interstate Conference on Labor Statistics, Miami Beach, Fla., June 16–19, 1964, BLS Report No. 238–6.

Tibbetts, Thomas R. "Expanding Ownership of Household Equipment," reprint, Monthly Labor Review, October 1964, BLS Report No. 238–7.

Murphy, Kathryn R. "Contrasts in Spending by Urban Families," reprint, Monthly Labor Review, November and December 1964, BLS Report No. 238–8.

A list of the advance reports on this survey, presenting area data classified by selected family characteristics, is available upon request. All reports are listed, when released, in the BLS Catalog of Publications.

SECTION E. SOCIAL SECURITY ADMINISTRATION [63]

The Social Security Administration (SSA) of the Department of Health, Education, and Welfare oversees the operation of the old-age, survivors, and disability insurance program (OASDI), compiles earning and employment data, and initiates occasional survey programs which provide income statistics on particular groups in the population.

Since 1937 earning [64] reports have been filed on most workers. The principal advantage of these reports is that they are compiled continuously on an individual basis, so that for each worker covered in the program there is an unique history of his earning record (up to the tax limit) for each year. The principal disadvantages of these cumulative records are their incomplete and changing coverage of the labor force and their tax base ceiling. The social security program has been expanded and amended in 1939, 1950, 1952, 1954, 1956, 1958, 1960, and 1961. Many of these changes extended the coverage of the program to new segments of the labor force, and others increased the wage and salary or earning ceiling, above which no OASDI tax is paid, and on which, therefore, the OASDI records have no information. Although these limitations are severe ones, this source of time-series data is still valuable in the study of income distribution and useful for cross-evaluation and confirmation of other income data.

Samples of the population of OASDI account holders provide the analytical data from the social security program. The primary source of data for income distribution analysis is the 1-percent Continuous Work History Sample. This sample permits classification of earnings (and benefit status) by age, sex, and race. The earnings information is primarily on the amount of taxable earnings each year since 1951, and on cumulative earnings credits since the start of the program in 1937. Tabulated data are available in published form, in the various editions of the *Handbook of Old-Age, Survivors, and Disability Insurance Statistics*, or in unpublished form from the Division of Research and Statistics.[65] Recent national summary data are available in a quarterly statistical report issued by the Social Security Administration, entitled "Quarterly Summary of Earnings, Employment and Benefit Data." Estimates of earnings in excess of the OASDI tax limit are included in some of the tables in these publications.

The taped records of the 1-percent sample of the OASDI population provide data on the taxable wages earned from each employer in a given year (since 1957). These data are reported both annually and quarterly, together with the employer information codes which indicate geographic location (State and county), and four-digit industry

[63] In earlier years the old-age and survivors insurance program was administered by the Bureau of Old-Age and Survivors Insurance of the Social Security Administration.

[64] Earnings covered by the program were originally limited to wages and salaries but broadened in later years to include self-employment income.

[65] Precise details on the content of this and other record tapes or punchcard files are available on request by writing to the Director, Division of Research and Statistics, Social Security Administration.

code. A derivative record reports each worker on the basis of his *major* job activity. These income data would be made more valuable for research purposes if adequate matching studies were undertaken and published to estimate the current distribution of income above the tax ceiling level and link them to family and characteristic data. For rough estimates of the early coverage of the OASDI income data, it should be noted that OASDI records accounted for about three-fourths of aggregate wages and salaries as estimated by the Office of Business Economics in the years 1944–46.[66]

In recent years, even with much wider OASDI coverage these records still omitted (in 1964) the earnings of the following groups: self-employed physicians, many government employees, some employees of nonprofit organizations, workers covered by the Railroad Retirement Act, as well as those who were not covered because of insufficient earnings or who failed to avail themselves of the benefits of the program. This latter category probably includes mostly farm and nonfarm self-employed persons, farmworkers, and domestic service workers.

The incomplete coverage of the earning base creates additional difficulties in using OASDI data in research on the distribution of wage and salary or earnings income. For example, in 1949 wage and salary income in excess of $3,000 was not taxed and therefore went uncovered and unestimated in the OASDI records. Today, the tax base for the program is $4,800.

To make efficient and precise use of the potentially valuable OASDI data on earnings profiles of workers in studies on income and wealth, bridge data are required to link these incomplete but detailed records to more complete cross sectional data for periodic benchmark years. Several types of bridge data would be of great value. *First* some estimation of the distribution by several cross-classified characteristics (age and education) of earnings income in excess of the tax base would advance our knowledge greatly on the lifetime annual income distribution among workers. *Second,* to generalize conclusions drawn from an analysis of OASDI records to the population or the entire labor force, bridge data are needed between income survey samples of the entire universe and the more limited frame of the OASDI records. A matching study with the annual CPS survey, which currently records the respondent's social security account number, would seem to be the next logical step. *Third,* it would be desirable to analyze the final distribution of income by family units for which further detailed bridge data would be needed on the combination of earners and consumers into family units. Although it is reported that data links are being planned on a pilot basis by the SSA, the IRS, and the Census Bureau, no such materials are now available. The comparative advantage of the OASDI records lies in their potential contribution to our understanding of fluctuations in earnings over the lifetime of workers. But until matching studies of at least the first type are undertaken, OASDI records are of limited value.

A matching study of OASDI wage and salary records against the findings of the census Post Enumeration Survey of 1950 did not produce, in published form, the needed bridge materials to make fuller use of the OASDI data.[67] Tabulations of the CPS by social security

[66] Goldsmith, "Appraisal of Basic Data Available for Constructing Income Size Distributions," Studies in Income and Wealth, vol. 13, p. 306.

[67] Benjamin J. Mandel, "Coordination of Old-Age and Survivors' Insurance Wage Data With Those From Other Sources," Studies in Income and Wealth, vol. 13, NBER, New York, 1951.

account number make it feasible to match for a meager outlay a portion of the CPS annual sample with their OASDI past records. Despite the analytical need for such a matching program none is known to us at this time.

National family economic and social surveys—1963 Survey of the Aged

The SSA has undertaken a program of national family economic and social surveys to obtain basic information on the characteristics and circumstances of the OASDI beneficiaries and other groups with which the SSA is concerned.

The 1963 Survey of the Aged was the first nationwide survey of a representative sample of all persons aged 62 and over, including those in institutions. The comprehensive data collected in this survey are being published in a series of articles in the Social Security Bulletin, beginning in March 1964. Reports have been issued on income, earnings, work experience, medical care costs, hospital utilization and hospital insurance coverage, and retirement patterns. Additional reports on assets and on living arrangements are in preparation. A monograph summarizing the findings and the methodology of the survey are to be completed within the next year.

Sample design [68]

The cross sectional field survey sample for the Survey of the Aged took as its universe all aged units in the United States, defined as a married couple living together, either member of which is age 62 or more, or a nonmarried person age 62 or more. Of the 8,500 aged units selected, representing about 11,000 aged persons, usefully completed questionnaires were tabulated for 7,515 units, a final response rate of 88 percent. The sample design was a composite of one-half the CPS sample and all the Quarterly Housing Survey sample. These programs stratify their primary sampling units according to socioeconomic characteristics into 357 and 333 strata, respectively. Social security account numbers were reported so that matches could be performed with the SSA's national employee index and other records to see if the respondent had an account number or claim status. The estimation procedure from the sample returns first involved adjustments for instances of nonresponse. This was accomplished by double counting an interviewed unit with comparable characteristics for each nonresponse unit. Next, ratio estimation was used to inflate the sample within age and race groups. Finally, independent totals of civilian population, age 62 and over, by race, sex, and age groups were used to weight the final distributions published from the Survey of the Aged. Data from the survey include the income, age, color, sex, net wealth position, etc., of the aged income unit.

Other specialized survey programs are being planned by the SSA. A national survey of disabled persons is scheduled for early 1966 to cover 1965 incomes. In conjunction with this survey, a study will be made of aged persons (and those under age 65 who are disabled) in nursing homes and other long-stay institutions. The field collection of the data for each of these SSA survey programs is conducted by the Census Bureau. Though these various programs are designed to serve the needs of the SSA, they may yield valuable data for the purposes of general analysis of the distribution of personal income.

[68] The methodological note on the 1963 survey of the aged, from which these comments were drawn, is published in the Social Security Bulletin, July 1964, pp. 26–28.

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(Published in installment articles. See "Notes on Source and Reliability of the Estimates for the 1963 Survey of the Aged" in the July 1964 issue for a complete methodology of the Survey and its results.)

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3. Longford, Elizabeth A. "Medical Care Costs for the Aged," July 1964.
4. Rice, Dorothy P. "Health Insurance Coverage of the Aged and their Hospital Utilization in 1962," July 1964.
5. Palmore, Erdman. "Retirement Patterns among Aged Men," August 1964.

The 6th Report on the 1963 Survey of the Aged will be concerned with the asset position of the aged, and the later reports will analyze further income and wealth data of the aged, converting them to a common annuity measure of income potential, and finally a discussion of the housing and food status of the aged individual who lives alone.

SECTION F. INTERNAL REVENUE SERVICE

The Internal Revenue Service (IRS) of the U.S. Treasury Department publishes on an annual basis, and evaluates periodically, income statistics derived from a sample of Federal income tax returns. The summary tabulations of this stratified systematic sample of nearly one-half million returns (in 1961) are published annually in the *Statistics of Income, Individual Income Tax Returns*. An audit control program was undertaken in 1948–50 to estimate the type and size of tax errors, to allocate future audit workloads among types of returns, and to provide a sounder basis for initiating changes in regulations or legislation to reduce tax errors.[69] In addition, matching studies were designed and executed to evaluate the accuracy and reliability of decennial census findings for 1949 and 1959.[70] These census-IRS matching studies also serve as bridge material for the construction of OBE estimates of the size distribution of family income.

Statistics of income

In 1961 the IRS Statistics of Income, Individual Income Tax Returns was based on a sample of 460,450 returns (forms 1040 and 1040–A) representing about 0.75 percent of the 61.5 million returns filed in that year. The stratified sample systematically applied different sampling rates to returns of different combinations of adjusted gross income (AGI) and form type. To reduce the sampling variability in cells of fewer and less uniform returns, higher sampling rates were applied. For example, all of the 13,177 returns with AGI over $150,000 were selected for the sample, while at the other extreme, only 0.3 percent of the some 19 million brief standard deduction (form 1040A) returns were sampled. Prior year delinquent returns were also sampled as a proximate indicator of current year delinquent returns. Several control measures were imposed to minimize processing and tabulating errors and to reduce taxpayers' reporting errors. Over 90 percent of the returns were mathematically verified, and quality and consistency tests were performed on the return data at several stages.[71] The totals of each strata were assigned a "weighting factor" which was equal to the number of sample returns selected from the strata divided by the total number of returns from that strata. Tables are provided with the published data to estimate the margin of statistical error from sample variability, but no current information is available to the users of these

[69] M. Farioletti, "Some Income Adjustment Results from the 1949 Audit Control Program," An Appraisal of the 1950 Census Income Data, Studies in Income and Wealth, vol. 23, NBER, 1958. See also Farioletti. "Some Results from the First Year's Audit Control Program of the Bureau of Internal Revenue," National Tax Journal, vol. V (March 1952), pp. 65–78.

[70] Miller and Paley, "Income Reported in the 1950 Census and on Income Tax Returns," *op. cit.* 1960 census-IRS matching study has not yet been completed.

[71] The lengthy chain of data communication and processing is open to bias and error at each link: statistics of income forms, instructions, interviews, taxpayers understanding, mathematical verification, editing, code punching, and tabulations. See for details, W. Edward Deming report for IRS, "Review of the Sampling Procedures Used by the Internal Revenue Service To Produce Statistics of Income From Individual Tax Returns, With Special Emphasis on Achievement of Quality," Washington (mimeographed paper), June 16, 1963.

statistics on the approximate margin of underreporting of AGI at different levels of income, or by different types of income.

Evaluation

The income statistics derived from Federal income tax returns possess several weaknesses for the purposes of analysis of the size distribution of personal income. These data deficiencies are not easily remedied, for the data are designed primarily to answer questions relating to revenue policy. To gather the additional demographic and financial information on the tax form that would add to the value of income tax data for other analytic purposes would involve costs and complicate further the taxpayer's job of filing his return. The income concept and the recipient return unit in the income tax data are not the most meaningful for general economic analysis, and the data are not cross-classified by the most useful characteristics for personal income analysis.

As with field surveys, the IRS returns account for less than the total of personal income as estimated by OBE (see table 13). This shortfall in IRS personal income measured against the OBE total is due in part to the prevalence of small income recipients, say, less than $600, who are not legally required to file returns, and also to the systematic underreporting of taxable incomes. Estimates made by Selma Goldsmith indicate that the margin of underreporting in IRS totals is not uniform among income types. IRS returns are a poor source of information on farm entrepreneurial income, for example, but are demonstrably superior to most field surveys for information on interest and dividend income. On the overall score, IRS returns accounted for 86 percent of the adjusted OBE total of personal income in the years 1944–46, and about 90 percent in 1952.[72]

The audit control program selected a sample of 160,000 individual income tax forms, type 1040 and 1040A, from the 52 million filed in 1948 to estimate the dimensions of the individual income tax enforcement problem.[73] Tabulations of the results of the 1948 audit control program are summarized in table 24. The preliminary results strongly confirm the fact that unaudited tax returns, as used for the Statistics of Income sample data, understate AGI or, more precisely, in 1948 it was estimated that tax liability was unreported, on the average, by 9.8 percent. The reported tax liability of about one return in four was found to be in error by $2 or more. Of these returns, 9 out of 10 had underreported the correct tax liability, while the final one had overreported his tax liability.[74]

To evaluate the nature of the bias introduced into the size distribution of income statistics derived from tax returns as a result of this systematic underreporting of income, one needs information on the margin of underreporting of AGI by income class, and by other distinguishing regional and socioeconomic features. The five classes of return types distinguished in table 24 are the best approximation we have for income classes. Column 4 of table 24 reports the tax change disclosed by the audit survey as a percent of the voluntarily reported tax liability. Underreporting of tax liability would appear to be relatively greatest for the two middle-income classes. Our interest in underreporting of tax liability is solely limited

[72] Goldsmith, "Appraisal of Basic Data for Constructing Income Size Distributions," Studies in Income and Wealth, vol. 13, NBER, New York, 1951.
[73] M. Farioletti, op. cit., p. 65.
[74] Ibid., p. 66.

to that which is due to a comparable understatement of AGI, and not that which is due to procedural errors committed by the taxpayer in the process of determining exemptions and deductions. Therefore, it is important to consult column 6 and note that for the lower income classes only about one-half of the tax errors are related to an understatement of AGI, while for the higher income classes the understatement of AGI constitutes closer to three-fourth of the tax errors. Multiplying column 4 by column 6 we derive column 7, and note that the largest relative tax liability change due to underreporting of AGI was 9.9 percent for returns with AGI under $25,000. Since the tax liability on an increment in AGI is greater than the average tax liability on total AGI,[75] these relative tax liability changes must exceed the relative changes in AGI disclosed by the audit control program. These estimates of the relative margin of underreporting of tax liability by approximate income classes in column 7, therefore, set an upper limit to the relative margin of underreporting AGI in the respective income classes. These imperfect estimates of underreporting in 1948 income tax returns are the only data we have to evaluate the reliability, coverage, or bias of Statistics of Income. A taxpayer compliance measurement program is in progress for analyzing 100,000 IRS returns, guided by objectives similar to those of the 1948–50 audit control program, but the preliminary results of this current program will not be available to Government agencies before late 1966.[76]

TABLE 24.—*Preliminary estimates of 1948 individual income tax returns, errors in tax liability as disclosed by the audit control program*

Type of return and income size	Percent of returns filed	Tax liability voluntarily reported (millions)	Tax change disclosed by audit (millions)	Change as percent of tax reported	Average amount of tax change	Percent of error from adjusted gross income error	Change in tax liability due to error in adjusted gross income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Collectors' returns:							
1040–A [1]	37.1	$2,439	$138	5.7	$7	47.7	2.7
1040 [2]	57.4	5,458	747	13.7	25	52.7	7.2
Revenue agents' returns [3] with adjusted gross income:							
Under $25,000	5.1	3,299	432	13.1	163	75.9	9.9
$25,000 to $100,000	.5	2,800	158	5.6	659	69.9	3.9
$100,000 and over	(4)	1,439	43	3.0	2,632	67.5	2.0
All returns	100.0	15,436	1,518	9.8	29	54.9	5.4

[1] 1040–A form may be used if adjusted gross income is less than $5,000, not more than $100 of which is from wages not subject to withholding and from dividends and interest. Standard deductions are incorporated into this short form.

[2] 1040 collectors' returns are those with less than $7,000 adjusted gross income and with gross receipts of less than $25,000 from business or profession.

[3] Agents' 1040 forms are those with $7,000 or more adjusted gross income with gross receipts of $25,000 or more from business or profession.

[4] Less than ½ of 1 percent.

Source: Marius Farioletti, "Some Results from the First Year's Audit Control Program of the Bureau of Internal Revenue," National Tax Journal, vol. V, March 1952, tables 1, 2, and 5.

[75] This is the same as observing that the marginal tax rate exceeds the average tax rate on income.

[76] The results of the taxpayer compliance measurement program will be used by IRS to allocate workloads within the audit section and, therefore, if released to the public, might be used to guide private tax evasion. Hence the findings of this new program may not be made public. See Conclusions IV, pp. 111, 112.

The second weakness of IRS income statistics is inherent in the income concept used for AGI. The concept of AGI is not comparable to that used by the Census Bureau, or by other field surveys, and has been periodically changed with revisions in the Revenue Act. For example, in 1963 AGI excluded such items as social security benefits, unemployment compensation, interest income from State and local government bonds, employer-financed payments in lieu of wages during periods of illness ("sick pay"), subsistence allowances of members of the Armed Forces, scholarships and fellowship grants, imputed income, income earned abroad (within limits), and the first $100 of dividends received from a domestic corporation. Furthermore, AGI is affected by the exclusion of one-half of the excess of net long-term capital gains over short-term capital losses and deductions for percentage depletion.[77] On the other hand, the IRS statistics of income are often broken down more finely by constituent types of income and by region than either the census or the CPS income data.

The third drawback to the IRS income statistics is the noneconomic nature of their income recipient unit. It is difficult to reconstruct from IRS returns either the reassembled family or household with all its income earners, or break all returns down into individual earners. The IRS returns are a mixture of joint, separate, and single returns. To evaluate census coverage of personal income, there was initiated a census-IRS matching study in 1949 that was to have bridged the gap between IRS data and census family units, but, as it turned out, a large fraction of the 1949 census files selected in the matching study could not be located in IRS records, and, therefore, went unmatched. For this reason the 1959 census-IRS matching study was reversed with IRS returns sampled and then matched to their census files. This 1959 census-IRS matching study has not yet been completed.

The development of electronic data processing and storage technology has made it feasible recently for IRS to place at the disposal of business and economic researchers, analysts, legislators, and Government officials the complete and unsummarized data from the full sample of Federal income tax returns which underlie the IRS Statistics of Income publications. To meet the research needs of those outside of the IRS, the agency will prepare, on an actual cost basis, requested tabulations and manipulations of the full taped sample of returns.[78]

Smaller representative samples of returns have been prepared and placed on tape, and may be used or purchased by research organizations. These smaller tax model samples contain a cross sectional sample of between 100,000 and 200,000 returns, and serve as a quick and accurate tool in the analysis of revenue and yield implications of alternative tax structures and, also, developments in the overall level and distribution of income in the economy. Such tax model samples have been efficiently designed to summarize the information from the complete income tax return, to retain only the data selected as essential. The impact of computers on income tax statistics will increasingly make this once cumbersome operation a more flexible source of research data.

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[77] For a detailed discussion of the complex problems involved in constructing even an aggregate size distribution of personal income by family units from tax return data, see the early work for 1935–36; Enid Bairdand Selma Fine, "The Use of Income Tax Data in the National Resources Committee Estimate of the Distribution of Income by Size," Studies in Income and Wealth, vol. 3, NBER, New York, 1939.

[78] Requests to use the master tapes or to acquire tax model tapes should be addressed to the Assistant Commissioner (Planning and Research), Internal Revenue Service, Washington, D.C.

The laudable progress made by the IRS in introducing automatic data processing, and promoting the dissemination of tax model sample data for research in fiscal policy, also enhances the potential value of gathering additional demographic information on the income tax form. Minor modification of the tax form would transform the Statistics of Income sample into an invaluable source of annual data on the personal distribution of income and wealth in the United States. For example, if the tax form required the taxpayer to enumerate the names and ages of other individuals in his immediate family or household, whether or not he claimed them as dependents for the purposes of income tax exemption, it would be possible to more easily and more accurately assemble the earning records of entire family or household units and to derive from the computer revolution in IRS data processing a much improved set of income statistics on the distribution of personal income by family or household unit.

The IRS should be urged by the Bureau of the Budget, Office of Statistical Standards, to conduct a thorough investigation of the costs associated with various alterations in the tax form to gather additional demographic information. It would then be the responsibility of the Bureau of the Budget along with Congress to decide whether such changes in the tax form justified the estimated expenditure.

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SECTION G. U.S. DEPARTMENT OF AGRICULTURE

The U.S. Department of Agriculture (USDA) contributes to the literature on the size distribution of personal income in several capacities. First, the Economic Research Service publishes occasional bulletins and statistical abstracts on the distribution of personal income among farm, rural nonfarm, and urban families.[79] These publications are based chiefly on the findings of the Census of Population and the Census of Agriculture.[80] Both programs have been conducted by the Bureau of the Census. Matching studies are designed and executed by the USDA to provide a bridge between the Census of Agriculture data and other sources of income-census information. The matching study for the 1960 Census of Agriculture should be forthcoming in late 1964, providing a new benchmark evaluation of reliability and differences of various sets of data on the farm population. In a second role, the USDA cooperates with the State agricultural experiment stations in the preparation and publication of regional studies. These regional studies touch on the many characteristics associated with, and perhaps contributing to, the observed size distribution of personal incomes among the region's farm families as, for example, the level of resources, education, and employment opportunities.[81]

In its third capacity, the USDA, through the Agricultural Research Service, Statistical Reporting Service, and Economic Research Service, conducts occasional surveys of households to collect information on the marketing and utilization of farm products, especially of the kinds and amounts of food used by households, and on the income, expenditures, and savings of farm families. Household food consumption surveys were conducted by the USDA as part of nationwide income and expenditure surveys in 1935–36, and the spring of 1942. Surveys of food consumption, only, were made in 1948 of urban households, and in 1955 of urban, rural nonfarm, and rural farm households. A survey similar to that of 1955 is being planned for the year 1965. USDA's household food consumption surveys cover only "housekeeping" households. Although these surveys are primarily concerned with the food consumption and dietary levels of households, they also provide a useful supplementary source of information on the family income of housekeeping units.

[79] Urban, rural nonfarm, and farm distinction drawn by the U.S. Bureau of the Census: Urban people are defined as those living in cities or towns with a population of 2,500 or more. Rural farm people are defined, on the one hand, to include those living on places in rural (nonurban) areas of 10 acres or more if as much as $50 worth of agricultural produce is sold from the place in the reporting year. On the other hand, those living on places of less than 10 acres, but selling as much as $250 worth of agricultural produce in the reporting year, are also classified as rural farm population.

[80] The U.S. census of agriculture has been conducted every 10 years since 1840, concurrently with the census of population. Starting with 1920, the census of agriculture has been taken every 5 years because of the heightened rate of change in the agricultural sector. The census is a nonproportional sample of farms, including all farms with an estimated gross sales of $100,000 or more, or 1,000 acres of land, or more. The remaining farms are sampled at a 20-percent rate, stratified and reweighted with control totals according to 10 levels of gross sales. The purpose of this stratification procedure is to improve the reliability of the estimates based on the sample, and reduce the effects of possible biases introduced by the enumerators who might deviate from the prescribed sample selection procedure. For a more complete discussion of sampling techniques see app. A.

[81] Poverty as typically defined in terms of money income designates some 30 to 35 million persons in poverty and almost half of these are living in rural areas. Approximately 6 million of these reside on farms. Therefore, the low-income problem is the central theme of most of these regional studies of rural income distribution and resources. Recent studies are cited in the bibliography.

The 1955 Survey of Household Food Consumption

The 1955 Survey of Household Food Consumption was based on a sample of 6,010 interviewed households. The universe sampled excluded about 4 percent of the U.S. population living in institutions and in quasi-households. The sample was taken in two parts. A 4,555 household sample was selected to represent a cross section of the population with stratification controls by income class, urbanization, specified region, and type of household. The second part of the sample consisted of 1,455 farm-operator households selected by a similar procedure. The appropriate weights were applied to the estimates from the two parts of the sample (and strata) to produce a representative sample of the population. Of the households in the United States, 93 percent were eligible for this survey's purposes—that is, they had served at least 10 meals to one or more persons during the preceding 7 days—and 89 percent of these provided the requested schedules. Bias due to nonreporting of income has not been investigated for the 1955 survey, but it should not be significantly different from that analyzed in the 1948 survey of food consumption of urban families.

Definitions and concepts

The family unit used in the 1955 Survey of Household Food Consumption is defined as a person living alone or a group of persons who live together and draw from a common fund for major items of expense. Dependents away from home are included in the family unit. The household is defined as all persons who share the family food supply, including primary and secondary family units, boarders, guests, household help, and farm help. Food consumption is tabulated for the United States and for four geographical regions of the United States and three places of residence (urban, rural nonfarm, and rural farm), as distinguished in the census of population, by disposable income classes and by several socioeconomic factors thought to affect food consumption: size and age of household, education, and employment of homemaker. Disposable income is money income after deduction of State and Federal income taxes. The 1955 survey records only one source of nonmoney income: the value of household food received without expense.[82]

The 1961 Survey of Consumer Expenditures

The 1961 Survey of Consumer Expenditures was made in cooperation with the U.S. Bureau of Labor Statistics (BLS) as part of a nationwide survey of family incomes, expenditures, and savings. The USDA collected and is publishing data from almost 2,000 consumer units living on rural farms. The USDA also collected data from about 1,900 families in rural nonfarm areas outside standard metropolitan statistical areas (SMSA) that are being published by BLS in combination with data from rural nonfarm families within SMSA. The BLS is combining farm, rural nonfarm, and urban data and publishing U.S. totals.

The farm population was oversampled in relation to the other segments to permit analysis by region and selected family characteristics. In concepts and definitions the farm data parallel the data published by the BLS.

[82] Further discussion of the earlier food consumption surveys may be found in Lamale, "Study of Consumer Expenditures, Incomes, and Savings: Methodology of the Survey of Consumer Expenditures in 1950," University of Pennsylvania, 1959; in the individual survey publications; and in a forthcoming study on the determinants of food consumption by Margaret G. Reid.

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CHAPTER IV

GENERAL CONCLUSIONS AND SPECIFIC RECOMMENDATIONS

This final chapter draws together the analytical conclusions and implications of chapter II and sets forth a number of specific proposals for changes and innovations in the existing statistical programs reviewed in chapter III.

It is of paramount importance that statistical programs are guided by carefully and explicitly formulated analytical objectives. This is of particular significance in statistical programs concerned primarily with personal income distribution statistics, where the combination and permutation of possible data arrangements are endless, and where the inertia of programs tends to perpetuate the collection and tabulation of data which have decreasing value for the purposes of analysis. A single modest field survey, for example, cannot contribute to our understanding on all economic and psychological relationships impinging on consumer economic behavior, expectations, and intentions. Data collected and tabulated should be selected to answer important analytic questions. As we make progress, new hypotheses will need examination, and different data will be required for their testing. There appear to be several general areas where the statistics of income distribution need redirection and improvement:

1. The distinction drawn in chapter II between the gross factor and the disposable distributions of personal income is a useful one in the objective design and presentation of statistical materials.

   A. If the object of a survey or census is to contribute to the study of the distribution of factor income, say, labor earnings (or rental income or capital gains), as dictated by the market forces of supply and demand in the U.S. economy, then the income data should be collected for individuals, and tabulated by gross labor earnings (or pretax property income or capital gains), and cross classified by total annual income.

   B. If the central focus of a survey or census is to evaluate the longrun welfare implications of the distribution of disposable income, then the income data should be collected for family (consumer) units, and tabulated by current consumption,[1] or some other proxy for average lifetime annual income, as well as by total current annual income. Data on the level of net material wealth is essential for comprehensive analysis of welfare, just as is the structure of the family unit.

2. The statistics of the factor or the disposable distributions of personal income acquire analytic value to an investigation when the income data are cross-classified by characteristics thought to be significantly related to the distribution of income and welfare, and hence

[1] Consumption involves one in many of the conceptual difficulties discussed in relation to current income in ch. II. Consumption should include income in kind, and exclude job-related expenses, and be adjusted for variations in consumer prices, and perhaps even for environmental conditions affecting needs.

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useful in testing structural economic hypotheses concerning the determinants of the income distribution and its relationship to other economic variables. The statistical variability of income estimates derived from small samples places a severe restraint on simultaneous cross-classification of the income data by more than one or two characteristics. But this is not solid grounds for expanding the size of annual samples, but rather for selecting more judiciously the relevant characteristics, and tabulating and cross-tabulating more diverse aspects of the same manageable sized sample. Generally speaking, the following characteristics are the most useful for tabulation and analysis of personal income distribution data:

A. Age and sex of head and other members of the family unit.

B. Education of head and, if feasible, that of other members of the family unit. Also, if the location of schooling were recorded we would be better able to estimate the extent to which "inferior" schools contribute to the low-income status of their graduates, and whether the graduates who migrate to regions of higher average income continue to suffer relatively low-income status compared to other persons with the same quantity but better quality education.

C. Race, including possibly Indian-American, Mexican-American, Puerto Rican-American categories, where it is thought that these characteristics are the basis of discrimination in the labor market.

D. Occupation, industry, work experience, and extent of involuntary unemployment.

E. Hours and weeks worked by head during annual period for which earnings data are reported, and also for other earners in family unit.[2]

F. Net material personal wealth (see 1–B above) and its net distribution between, say, liquid and nonliquid assets.

G. Other factors which might be either the source of variation in factor incomes, or the sign of special welfare needs.

3. Several supplementary types of information should be assembled to contribute to the analysis of the distribution of personal income.

A. Better data are needed on income in kind: imputed value of owner occupied housing, in particular, its relation to asset and income position of elderly persons; income in kind on farms for, although of decreasing national importance, it still is a significant factor affecting farm consumption and welfare.

B. There is no integrated source of data on the magnitude or distribution of publicly financed consumer products, such as medical care, housing, welfare payments, food stamp plan, etc.

C. Interregional consumer price indexes are a prerequisite for adjusting money income data to more adequately reflect purchasing power and the welfare derived from money income.

4. Intensive studies are needed to estimate the direction and magnitude of biases in statistical programs and procedures and, in particular, how they may systematically distort the size distributions or personal income by characteristics of the population. More resources should be allocated to new specialized data programs, and somewhat less to reconciliations of aggregate size distributions which

[2] The specification of the respondent's allocation of time during the day, week, and year with detailed earnings, income, and consumption data would provide a valuable tool for more precise analysis of the determinants of income-consumption behavior.

typically differ because of the diversity of definitions, concepts, and procedures employed. Incidentally, only a small part of this diversity in methodology can be justified on the grounds of the range of objectives motivating the various statistical programs.

5. There is an urgent and extraordinary need today for a survey specially designed to collect and analyze income and wealth data from low-income persons and family units. First, we must learn to identify and characterize the person or family unit that experiences *temporary* low-income status, either due to the annual variability of income or due to the systematic increase and eventual decrease of current income over the individual's lifetime. Our analysis in chapter II of the determinants of lifetime income leads us to believe that to distinguish between *temporary* and *permanent* low-income status we could utilize data on age, net material wealth, and educational attainment or, alternatively, data on current consumption. Although the person or family unit that reports a temporary low income as, for example, the student, the retired couple, or the speculator, may not represent a chronic welfare problem to the society, this person does pose a problem for the tax-transfer system. A person who experiences temporary low income tends to redistribute his lifetime income to achieve a more stable level of consumption over his lifetime. This requires intertemporal transfers of income or capital. If society judges that the economic activities giving rise to erratic year-to-year income streams are not to be particularly discouraged, then the tax-transfer system should be equitably designed not to inhibit activity associated with greater variability of annual income, such as wildcat oil drilling in contrast to coupon clipping. A tax on current consumption of comparable progressivity to the income tax, for example, would achieve this neutrality with regard to the variability of annual income payments.[3]

But even after we have identified and eliminated from our consideration those persons who show signs of reporting only temporarily a low income status, we are still left, probably, with a large group of the population who are impoverished. The persistent existence of these "poor" in the midst of our affluent society indicates that our socioeconomic system has failed to provide satisfactorily for the welfare of its citizens or the efficient employment of all its labor resources. Although some of the "poor" are disabled or inherently unemployable, the vast majority are able-bodied persons who are (1) not equipped, (2) not motivated, or (3) cannot find an opening where they may make a *functional* contribution to the economic system. We must discover the causes for this inhumane and wasteful form of poverty. One approach is to analyze existing data and new sample data drawn from this "poor" segment of the population. Another is to collect and analyze demographic and economic data from those aided in programs for rehabilitation and retraining, and thereby estimate which programs transformed at the least cost these less productive indi-

[3] A shift from a current income to a current consumption tax would have other economic consequences. It would increase the rate at which present consumption would be traded for future consumption, and in a growing economy this would tend to raise the aggregate rate of saving out of current income. The current effort rendered to the labor market would tend to increase under a consumption tax if either the supply of effort were fixed, or if the supply were variable and current effort were complementary with future consumption, and current effort were competitive with current consumption. For a more comprehensive treatment of these and other consequences of a consumption tax see R. A. Musgrave, "A Theory of Public Finance," McGraw-Hill, New York, 1959, pp. 249, 262, and 439.

viduals into self-sufficient and self-respecting members of our society. The "war on poverty" provides us with a practical opportunity to apply our analytic tools and collect systematically from the outset of these new programs the data needed to evaluate their relative "economic" success. Let us digress for a moment on the contribution income distribution statistics could make in guiding the course of the "war on poverty."

The human suffering and degradation that accompany poverty cannot be fully appraised or assigned an adequate price tag. But it is not without regard for nonpecuniary or psychic costs borne by the individual immersed in poverty that the economist and legislator are obligated to inquire as to the alternative "economic" benefits gained by the individual and the society as a whole from allocating funds among the many promising antipoverty programs. How are we otherwise to decide among the many programs, each of which is aimed at a different facet or manifestation of the common social malady, poverty and the less productive individual?

The choice in allocating and appropriating public and private funds for the elimination of poverty and the extension of individual opportunity should not necessarily be determined only on the basis of the "economic" costs and benefits associated with the different projects. The allocation decision is sometimes better influenced by nonpecuniary and psychological factors which resist incorporation into the framework of economic analysis. Nevertheless, our analysis of the factor distribution of personal earnings can be profitably extended to assist in project evaluation and shown to yield particularly important welfare implications. For example, it should be explicitly understood how important the age of the beneficiary is in economic and welfare terms before deciding between the expansion of one program which works with preschool children and another program which works with illiterate adults. In the former program the benefits that accrue to the individual and society through the beneficiary's greater productivity and receptivity to later educational opportunities will continue for 50-odd years while he is a participant in the labor force.[4] On the other hand, the adult helped by the latter program will be able to contribute sooner as a more employable and productive member of the labor force, but for considerably fewer years before he retires and, moreover, he will probably not have the opportunity, flexibility, or financial incentive to augment further his skills or education. As in allocating scarce public revenues between alternative defense systems or harbor development projects, economic cost-benefit analysis is needed even on an approximate basis to assist in planning active manpower policies, or in appropriating funds in the country's strategy against poverty.

When new programs are initiated, such as the Economic Opportunity Act of 1964, a concerted effort should be made to collect data from the diverse programs to facilitate economic evaluation of the success and payoff associated with each program's approach. Sample case data from a rehabilitation program might include such information as follows: Previous work force experience, previous year's earnings level, age, race, sex, plus followup data on the type of new job obtained, new annual earnings level, and approximate private (realized and opportunity) costs and public costs incurred because the

[4] Females helped in such a program would tend to contribute fewer years to the labor force than males.

individual participated in the program. Much experimentation lies ahead in this relatively new field, but the benefits from years of experimentation will not be wholly ours unless evaluation procedures are designed *now* to insure that as the program expands careful attention will be paid to the problem of measuring results. These evaluative procedures would require small outlays if initiated at an early stage in the poverty programs, and would pay great and continuing dividends, first, in improving our understanding of the roots of poverty, and, second, in maximizing the longrun impact of public and private funds to ameliorate the consequences of poverty, and to control its seminal causes.

* * *

Improvements and changes in statistical programs usually require in their execution additional expenditures, either on a once-and-for-all basis when, say, limited methodological changes are made, or on a continuing basis when, say, new materials are collected and/or tabulated. Where additional costs are involved, the advisability of the particular changes depends both on the estimated costs and benefits. Therefore, the specific recommendations made below are offered with the understanding that final action on their execution should await the preparation of marginal cost estimates to be made by the various agencies involved.[5]

1. It would be advisable that the Interagency Technical Committee on the Size Distribution of Income Statistics be reestablished under the direction of the Office of Statistical Standards of the Bureau of the Budget. This Committee could function within the Government to facilitate coordination and communication among the several agencies involved in the preparation of income distribution statistics. It could also serve as a wider forum for Government and non-Government researchers to confer periodically and outline the analytical nature of their statistical requirements, thereby subjecting the existing statistical programs to continuous review and reevaluation. An annual conference of this sort might be jointly sponsored with private research organizations, such as the National Bureau of Economic Research, Inc.

2. Recent improvements in the field of electronic data processing have tremendously increased our capacity to deal with vast quantities of data. Much thought should now be devoted to the problem of how best to capitalize on these recent developments and the almost universal use of the social security account number as an identifying code. It is hoped that these new techniques of data processing and storage will be utilized to consolidate the basic data collected by the CPS, IRS, HEW, and the decennial census. Such a consolidated data scheme would provide OBE with a cheap and accurate bridge on an annual basis eliminating possible weaknesses in its size distribution estimates. With Census, IRS, and HEW data consolidated by social security code number, it should be feasible to reduce the collection of redundant information by overlapping data sources. Since IRS and OASDI records will have income data and wage histories, the duplication of these data might be avoided by a special sample survey, and merely read out of the consolidated data files. What is today an intricate and time-consuming job of matching studies

[5] See app. B, p. 115.

to evaluate one set of income data against another could be simplified and shortened with the aid of a consolidated data-processing system. Such a flexible and efficient data-processing system will require much planning and coordination *now* if it is to be operational for the returns of the 1970 Census of Population, and even this may be too optimistic a projection. Investigation of the possibilities of such a consolidated data-processing system for personal income and wealth data should be undertaken by the Office of Statistical Standards of the Bureau of the Budget.

3. The Office of Business Economics of the Department of Commerce should be appropriated its budget request of $60,000 on a continuing basis to proceed with the needed revisions in its methodology, which would gradually change the nature of its personal income size distribution estimates from a consolidated account basis to an individual file basis. This revision and reformation of the estimating procedure used by the OBE would make this body of data more accurate and flexible, and ultimately yield, among other benefits, direct tabulations of size distribution estimates by analytically significant socioeconomic groups and by income types.

4. The decennial census and the Current Population Survey conducted by the Census Bureau should collect and tabulate additional information on personal income and wealth. *First*, a finer breakdown of personal income is needed, as between farm and nonfarm self-employment income and the various types of property income and transfers. *Second*, personal material wealth data are needed to complement current income data for improved analysis of the distribution of income in the United States. The proliferation of statistics into every aspect of American life has left its mark on the average citizen and survey respondent, and he does not construe a survey's inquiry into his net wealth position as a violation of his privacy. He appreciates the need for national statistics and has learned to place his trust in statistical anonymity. A serious threat to progressive revision of survey and census programs is posed by the development of a mythology without scientific support regarding the sort of questions that can and cannot be put to a respondent successfully. Much greater information is needed in this country concerning the distribution of personal material wealth, but surveys and censuses have repeatedly shied away from this necessary line of inquiry. Special forms might be provided in requesting this information so that the respondent could assure himself of privacy in this disclosure, but it is doubtful if the majority of persons would avail themselves of this procedure, since the comparable income disclosure forms in the 1950 Census of Population were mostly unused. The Federal Reserve Board's Survey of the Financial Characteristics of consumers conducted in 1963–64 not only requested personal wealth data, but also presented the respondent with a request to fill out a detailed balance sheet statement of all assets and liabilities. These statements were then cross-checked in an oral interview. We contend that net wealth data should and can be included in the 1970 Census of Population program, and incorporated in the near future into the Current Population Survey program.

5. The Federal Reserve Board is urged to allocate more current resources to the evaluation and analysis of the results from its 1963–64

Survey of Financial Characteristics of Consumers. It is most important that the summarized full sample file be made accessible to nongovernment research workers with the least possible delay, for the survey's design shows promise of being a rich source of valuable statistical materials. This accessibility should, of course, be achieved without sacrificing the anonymity of the sample respondents. The summary tape, therefore, would have to be devoid of such identifying characteristics as the exact composition of individual investment portfolios.

6. The Survey of Consumer Finances (SCF), which is now conducted privately by the Survey Research Center of the University of Michigan, has contributed much to our understanding of the distribution of personal income in the United States. Because of its flexible objectives and relatively small sample size (about 2,000), the SCF is singularly well designed to concentrate on special studies into the distribution of disposable income and wealth. We urge that the SCF maintain its annual focus, on specific sets of issues, so that the data it collects will have direct and dovetailed analytical value in testing significant hypotheses. It is probably still necessary for the SCF to continue to oversample upper income strata to reduce the statistical variability of estimates with respect to this small, but important, group from the point of view of the income and wealth of the population. Although the 1960 SCF discontinued this policy of oversampling, we are encouraged to note that in the 1961–63 panel survey some system of nonproportional sampling was reintroduced.[6]

The need is great for time-series data on income-consumer units. We have learned from past errors that it is hazardous, to say the least, to draw time-series conclusions from annual cross sectional data. Overlapping of annual survey samples, or complete reinterviews of annual samples would add greatly to the analytical value of the materials collected and tabulated by the SCF. The recent monograph based on 1961–63 SCF panel data may go far in providing new and better time-series data on the incomes of a representative sample of consumer units.

Finally, to belabor our basic contention, the SCF should collect data on the net material worth of consumer units. Although liquid assets may be a significant variable in explaining short-run spending behavior, the total wealth position of the units is required for an analysis of welfare. In connection with repeated surveys, this would also permit the direct estimation of net realized saving of the consumer unit between interview dates.

7. The individual income tax form of the Internal Revenue Service could become a more valuable source of analytical information for research in income and wealth, if additional demographic or financial data were requested of the taxpayer.[7] We recommend that the IRS conduct a thorough investigation of the costs associated with various alterations in the tax form which would be required for the collection of additional information and the marginal cost of processing and tabulating this information in its Statistics of Income sample.

[6] 1960 Survey of Consumer Finances, University of Michigan, 1961, p. 246.

[7] In this regard, it is interesting to note that several European countries collect, cross-tabulate, and publish supplementary information on socioeconomic characteristics of taxpayers with their income tax as statistics. See app. C, p. 117.

8. It is also recommended that the IRS tabulate and publish the margin of error (underreporting) of adjusted gross income in unaudited tax returns by income size, class, and income type. These data could be a byproduct of its taxpayer compliance measurement program which is currently in progress. Such information would not be a significant help for tax dodgers and would facilitate the evaluation and use of the statistics of income sample data, which are based on unaudited return reports of adjusted gross income.

APPENDIX A

Sampling Techniques and Sampling Error

Stratified sampling decreases one source of sampling error. Each stratum, group, or component in the population is assigned a weight in the overall survey sample proportional to its frequency in the whole population, rather than to its frequency in the sample, itself. The independent sample weights given to strata are, therefore, not open to sampling error and are more efficient than the estimated weights implicitly used in a simple random sample.

Nonproportional sampling is typically used, if an objective of the sample survey is to estimate the frequency of a given characteristic in the population with the least possible overall sampling error. Strata of equal size in the population are optimally sampled in proportion to the standard deviation of the characteristic being analyzed in each stratum. This is particularly clear when the survey's objective is to estimate the frequency of a characteristic with equal statistical accuracy within each stratum. For instance, if cross sectional incomes of farmers vary more than incomes of postal clerks due to vagaries in climate, and differences in size and productivity of farms, the sampling rate among farmers should exceed their numerical proportion in samples of these two occupational groups. Unfortunately, when a sample is drawn by chance the characteristics used to stratify the sample are not always apparent. It cannot be determined whether the occupant of 1234 Maple Street is a farmer or a postal clerk. A multistage sample may be employed in this case, where a large preliminary sample of units is interviewed to establish the strata characteristics of the units, and then a smaller stratified sample with the desired pattern of nonproportional sampling is chosen and interviewed with the complete questionnaire.

Cluster sampling is an additional technique useful in reducing the cost of gathering survey information. Clusters of units are grouped by some relevant criteria, and frequently a geographic area or demographic unit like the family is used. If the clustered units were perfectly homogeneous then there would be no need to sample more than one unit per cluster or sampling area. But the reduction in cost of obtaining information from several units in each of the randomly chosen sampling clusters is only partially offset by the loss of statistical reliability of the estimates, in comparison to a purely random sampling from a nonclustered population. Survey sampling is a constant battle between better and more sophisticated sampling techniques and the associated costs of the better survey programs.

The sample design of a survey should be constantly open to reevaluation and revision. An equilibrium is sought between the cost of more accurate and sophisticated sampling techniques and the value of the improvement in data that the marginal expenditure "buys." This is a continuing debate that cannot always be optimally under-

taken wholly within the statistical agencies. The users of the survey data, business concerns, labor organizations, and research organizations, should participate in the dialogue. The costs of improving each set of data and each aspect of a survey should be estimated. Those that make use of the income statistics might then be given the opportunity to judge the value of different programs, and to make recommendations for allocating the scarce expenditures in this field of Government statistics.

APPENDIX B

The Cost of a Few Statistical Programs

It is no simple task to estimate the costs associated with the design, testing, collection, tabulation, and presentation of a particular set of statistical materials. This is particularly difficult with income distribution statistics which are often only one set of statistics to develop out of a multipurpose field survey or census program. How can the costs for a complex multipurpose statistical program be allocated among the various derivative statistical materials? Most relevant is the marginal cost incurred by such a multipurpose statistical program with the addition of one inquiry to the questionnaire, and the processing and tabulation of this one additional datum. But, although such an estimate of marginal cost satisfies the economist searching for an efficient guide to decisionmaking, it is also understandably not a wholly satisfactory basis for allocating actual costs for the agency responsible for the statistical program. If the agency should charge to each statistical series only the marginal cost associated with its inclusion in the present-sized survey program, and if, as is likely, the marginal cost is less than the average cost, the sum of its charges would not cover the total costs of the multipurpose statistical program. It may be for this reason that the Census Bureau does not offer an estimate of the actual marginal cost associated with expanding the annual Current Population Survey to include an additional question and data series. Regardless of the agency's reluctance to provide an estimate of marginal cost, it is this estimate that is needed for enlightened allocation of the scarce and marginal funds among various statistical programs, and this estimate should be prepared for the Bureau of the Budget. For similar reasons, the Internal Revenue Service should prepare estimates of the costs involved in altering its income tax forms (1040 and 1040A) for the collection of additional financial or demographic information, and the inclusion of this information in the processing and tabulation of the Statistics of Income sample. At this time, actual costs can be connected to only a few survey statistical programs, and they are summarized in the following table, B–1. These figures do not include labor costs incurred by the agencies that initiated the programs and analyzed the results. The Survey of the Aged collected much information that could not be considered relevant to any analysis of the distribution of income of the elderly. Only a few general observations can be drawn from the data in table B–1.

First, much time is needed to successfully undertake a new survey program. The Survey of Financial Characteristics of consumers was undergoing testing and pilot project work for at least 2 years before the first full-scale sample was collected in mid-1963. Second, greater outlays are required in the initial years of a survey, due to testing and research which contribute to the formal methodology finally adopted

and to rationalization of procedures which tend to reduce the routinized cost of annual surveys.

TABLE B–1.—*The cost of income survey programs conducted by the Bureau of the Budget*

Survey—Contracting agency	Fiscal year 1961	Fiscal year 1962	Fiscal year 1963	Fiscal year 1964	Total 1961–64	Estimated fiscal year 1965
1. Survey of the aged—Social Security Administration: National survey of persons 62 years of age and over, and a smaller survey of widow-child beneficiaries	----------	----------	$375,559	$132,965	$508,524	----------
2. Survey of financial characteristics: 1963–64 Federal Reserve Board:						
Research and testing of methods	$37,840	$26,039	10,058	----------	73,937	----------
Phase I—Planning; income statement and balance sheet as of Dec. 31, 1962	268	13,609	190,297	161,806	365,980	----------
Phase II—Income statement and balance sheet as of Dec. 31, 1963	----------	----------	----------	114,315	114,315	$247,685
3. Survey of financial characteristics: 1964–65 Federal Reserve Board:						
Phase I—Measurement of savings 1964; income statement and balance sheet as of Dec. 31, 1963	----------	----------	----------	5,595	5,595	180,705

Source: Provided upon request of the author by the Budget Office of the Bureau of the Census.

APPENDIX C

Statistics of the Distribution of Personal Income in Countries Other Than the United States

Statistics of the distribution of personal income in countries other than the United States are few and, in general, are not as well designed for the purpose of analyzing either the determinants of the functional distribution of factor income by persons or the welfare consequences of the distribution of disposable income by families. To venture beyond the limits of one country and compare and contrast the data from different countries immediately involves one in the intricacies of adjusting for methodological differences in the dimensions and procedures underlying the various sets of national statistics.[1] As yet there is no consensus on the scope or the function of international income distribution statistics. One is also confronted with a morass of differences in economic and social institutions between countries, a thorough understanding of which is essential to an interpretation of the welfare implications of personal income statistics in a particular environment.

The relatively poor state of the international data in this field of economics is, however, no alibi for neglecting their analysis. Writing over a decade ago, Kuznets pointed out the special need for further study of international data on the size distribution of personal income: "A review of current works leaves us with the impression that the relative emphasis on data limited to the United States is even greater than in the past, * * *. While such increased provincialism of our research effort, if true, can perhaps be easily explained, its disadvantages remain." [2] We will omit in this appendix any attempt to alert the researcher to the particular problems embodied in the various sets of national data, and only briefly enumerate the general shortcomings and strengths of the international data, which are peculiar to each source of data. Three sources of statistics of the distribution of personal income will be dealt with in this appendix: income tax data, censuses, and sample field surveys.

[1] Three studies of international income distribution statistics are of particular value, one a methodological review of existing international statistics by the U.N., and two analytical studies of various sets of international data. They are (1) "Statistics of the Distribution of Personal Income" United Nations, Statistical Commission, New York (Sept. 17, 1957) E/CN.3/L.42; (2) Economic Survey of Europe in 1956, ch. IX, Economic Commission for Europe, United Nations, Geneva (1957); (3) Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations: VIII. Distribution of Income by Size" in Economic Development and Cultural Change, vol. XI No. 2, pt. II (January 1963). Both of the latter analytical studies compare and contrast international data, and cautiously draw several conclusions and generalizations from the data they examine. All three studies provide additional source citations for international statistics on the distribution of personal income. Kuznets concentrates on the size distribution of family unit income, or what we would distinguish as the distribution of disposable income. He pools and refines a wide array of data from many countries at all stages in their economic development, and from many different periods in a particular country's development. On the other hand, the Economic Survey of Europe in 1956 employs only income tax data from 5 rather similar European countries in the immediate prewar and postwar years. This U.N. investigation focused on what we called the factor distribution of income among income recipients, and studied each body of data (where possible) by income type, economic sector of origin, social status of recipient, and age of recipient. Even among these rather homogeneous European countries the data failed to uniformly support any new conclusions.

[2] "Directions of Further Inquiry," Studies in Income and Wealth, vol. 15, NBER, New York (1952), pp. 204–205.

1. International income tax statistics incorporate most of the defects we noted in reference to U.S. Statistics of Income,[3] plus or minus a few peculiar to each legal, revenue, and social system. The tendency among developing countries to rely increasingly upon the income tax as their principal source of public revenue promises to extend the coverage of income tax data, and improve the reliability of unaudited income data reported to the tax authorities. The obvious weakness of such data for our purposes is their incomplete coverage of low-income persons and units, and the analytically inappropriate conception of "income" and "income unit" which are designed for legal-revenue purposes and not for the use of an economist. But in the more developed countries table C–1 shows that the income tax data cover between about 60 and 90 percent of the total population, and between 60 and 80 percent of personal income as estimated from national accounts. Estimates of the underreporting of income in income tax data by income type, and by income-size classes is not, to our knowledge, available in this country or abroad. Since wage and salary income are reported and frequently taxed at their source, the coverage of these sources of labor income are probably the most satisfactory. Self-employment, property, and transfer incomes are then the chief source of underreporting.

TABLE C–1.—*Estimate of coverage of income tax data in selected countries* [1]

Country	Year of data	Tax return population as a percent of total population	Income reported as percent of personal income estimate
Australia	1951–52	80	68
Canada	1951	[2] 45	65
Denmark	1952	([3])	61
Finland	1952	88	83
West Germany	1950	83	73
Netherlands	1950	97	77
New Zealand	1951–52	([3])	75
Norway	1950–51	64	73
Sweden	1952	([3])	80
United Kingdom	1952–53	90	80
United States	1950	89	77

[1] Based on official publications and where necessary estimates were derived for the number of children and dependents and total tax return population.
[2] Based on dependency data for taxable returns which indicate 1.27 dependents per taxpayer. This ratio is applied to all filing returns. The tax population is 9,300,000, or 66 percent of total population in 1951. In 1952 the total number of personal income tax returns represented 80 percent of civilian labor force.
[3] Not available.

Source: "Statistics of the Distribution of Personal Income," United Nations Statistical Commission, New York. (E/CN.3/L.42) limited distribution (mimeographed), Sept. 13, 1957, table 1, p. 13.

The concept of income as reported in income tax data is typically current income, net of losses, and some occupational expenses. Several countries take account of capital gains, others specifically exclude them. Some countries permit a degree of averaging of annual "abnormal" income receipts as, for example, those received through the liquidation of a business. With the changes in the real value of currency and the revision of legislation fixing the exemption and deduction limits, the coverage of income tax data will vary between countries and, over time, within the same country. Differences occur between countries in the treatment of inventory valuation ad-

[3] See ch. III, sec. F.

justments; imputed rent on owner-occupied dwellings; and imputations for own produce consumed, depreciation, and interest on Government bonds. Pensions from the military, and for the old and disabled, as well as family allowances, are included in some countries as reported income, and excluded in others.[4] The precise concept of reported tax income is determined, in the last analysis, at the level of the local tax court.

The income recipient unit for the purposes of income tax data is usually the family unit, except for Sweden where the married woman's earnings are treated separately. The differing treatment of (dependent) children is of significance with the greater frequency of multigenerational households abroad. Thus, for a country like the Netherlands, where postwar employment income of children is tabulated separately for income tax purposes, the number of income recipients (almost no married women included) is about 50 percent greater than the estimated number of households and single consumer units in the country.[5] The Netherlands and Sweden have utilized the tax returns as a sample frame for drawing a random sample and then, with the aid of census returns of family membership, located the income tax files of other "reassembled" family members in the cross-sectional sample.[6] The procedure appears comparable to the IRS-Census matching study being currently performed on 1960 census-IRS data.

Several European countries levy a tax on personal wealth; e.g., Finland, Norway, Sweden and the Netherlands. In Sweden these data are cross-classified by income and other characteristics.

Many of the European countries cross-classify their income tax statistics more finely than does the United States. Information on occupational, industrial, and some demographic characteristics of the income recipient, which is used for cross-classification of income tax data for the Scandinavian countries, is not collected on the U.S. income tax form, and is consequently absent from U.S. statistical tabulations of these income data.[7] Since the analytical usefulness of these income distribution statistics derives from their cross-classification by significant social, economic, and demographic groups, it would seem fair to say that in this field U.S. statistics are less usefully refined than those collected by several European countries.

2. In the postwar period the census of population has become a useful means of collecting personal income information from an entire population, or a sizeable fraction thereof. Income questions have been included in many censuses in many different types of countries.[8] The quality and reliability of data derived from these programs differ greatly. In general, the family unit, or household, is the income recipient unit, and a broad concept of income is adopted as the most meaningful.

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[4] "Statistics of the Distribution of Personal Income" U.N. op. cit., table 2, p. 16.

[5] "1899–1959, Zestig Jaren Statistiek in Tijdreeksen," Central Bureau voor de Statistiek, Zeist, Netherlands, 1959, table B, p. 10, for the number of households and consumer units in 1946 and 1957. "Inkomesverdeling en Vermogensdeling" (for selected years) extrapolated for tax units in the above 2 years. Prewar income tax data in the Netherlands included income as (dependent) children with that of their parents, and in this period the number of income units was marginally smaller than the number of households. Same sources cited above.

[6] "Statistics of the Distribution of Personal Income" U.N. op. cit., pp. 17–20.

[7] Ibid, table 4, p. 25. (See recommendation of this study, Chapter IV.)

[8] Before 1957 income questions were included in censuses in the following countries: Colombia, Denmark, Dominican Republic, Mexico, New Zealand, Panama, Venezuela, Ceylon, Pakistan, Philippines, Union of South Africa, Canada, and the United States, cited ibid.

3. Sample field surveys have been conducted in several countries during the postwar period on a family or household basis, but the differences in conceptual definitions deter precise comparisons of the final distribution of income and welfare among countries.[9] One method of increasing the reliability or statistical significance of international comparisons, and the tentative conclusions they may give rise to, is to pool country data into groups of countries according to a selected characteristic which is thought to systematically vary with a particular aspect of the distribution of personal income.[10] But to go further and read into the observed differences in international data implications about the functional causes and welfare consequences of a particular factor in the development of an economy is a hazardous game to say the least. We noted above, in chapter II, that substantial changes in the structure and demographic character of the family unit occurred in the United States between the prewar and postwar periods, and contributed to the major change in the distribution of individual welfare between the two periods. But these structural changes and their impact on individual welfare could not have been identified in the aggregate data on the distribution of disposable personal income. The magnitude of these structural changes in the U.S. family unit must be dwarfed beside the differences which exist between countries at different stages in their development.

Several other factors, which we have contended had a relatively minor, but nevertheless noticeable, influence on the distribution of welfare derived by individuals from the disposable distribution of income in the United States, demand much more serious attention in an analysis of income and welfare in a less developed country. Regional price variation is probably more important in determining the purchasing power of income in a less developed country than in our own, for in the United States a larger proportion of private consumption is satisfied by the purchase of goods and services for which the U.S. market is unified and prices vary little on the average. Nonmoney income, furthermore, is a more important component of total income in a less developed economy, where the agricultural sector accounts for a larger fraction of total output, and barter trade is more prevalent. Variation in annual incomes may also be more pronounced in less developed countries, and material and human net worth may be less adequate for persons to dissave from in order to maintain current consumption levels during transistory shortfalls in current income.

On the other hand, the extended family institution may act in the less developed economy to cushion the effect of such individual fluctuations in final consumption and welfare. The positive relation between income and age of the family head, which was so marked in the U.S. data, may be less so where primarily manual skills are supplied to the economy. The individual income profile would presumably start to decline earlier for less skilled and less healthy individuals, and this factor may partially explain the persistence of the extended family structure, which assures the elderly a means of subsistence after their physical strength and economic productivity have failed. The extended family structure has other repercussions on the socioeconomic system; it tends to fetter the young person and prevent him from shifting to the occupation and location where his skills are in greatest

[9] Sample surveys have been conducted in at least 27 countries according to sources cited in bibliography ibid. Some, however, relate to cities or states within the country, ibid, table 5, p. 40.
[10] Kuznets, op. cit., technique used frequently in his study.

demand and where his contribution to the economy would be greatest. Occupational and regional mobility appears to be a prerequisite for modern economic growth, but is often stifled by the extended family structure, which in turn may hinge on the distribution of income and the health and skills of the population. It is not our objective to contend that this is the actual causal relationship between these social and economic factors, but rather to argue that before juxtaposing the statistics of the distribution of personal income in different countries and drawing conclusions, however tentative, one should also make an exhaustive analysis of cultural, social, economic, and demographic factors which are simultaneously determining the distribution of income as well as being determined by it.

* * *

Finally, one may speculate that the increasing use of implicit or explicit planning procedures among the developed countries will markedly increase the need for better income distribution statistics. Norway, for example, has been committed during the postwar era to positive Government planning to achieve, among its major goals, the equalization of incomes.[11] Norway is only beginning to publish at several years' intervals the results of a sample drawn from her income tax returns. "The basis for calculation of current income distribution will, therefore, be weak [in Norway]. The lack of adequate information in this field will continue to raise problems, not only for determination of consumption and investment, but also for the realization of an incomes policy." [12]

In France, where the turnover tax has in large part replaced the income tax, there are no official published data on the postwar size distribution of personal income. According to John and A. M. Hackett: "It has been recognized from the beginning that the relative paucity of systematic data on income distribution in France would be an obstalcle in the way of reaching an agreement in income policy." [13] In the summer of 1962 the Commissionaire General was assigned the task of taking an inventory of the existing income and wage statistics and proposing what basic data would be required to implement an effective income policy in France. Italy may also find itself in need of much improved income distribution data, if its Government should decide to articulate some form of incomes policy.

These pressures for change and improvement in income and wealth statistics abroad should be constructively guided while in a state of flux. The U.S. Government should support an international effort to evaluate and adopt a more uniform statistical methodology in regard to statistics on the distribution of personal income. The U.N. Statistical Commission's report of 1957 [14] could serve as a useful starting point for such a discussion within the OECD, but once statistical programs are designed and initiated, inertia is likely to have the upper hand.

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