INEQUALITY OF WHAT AMONG WHOM?: RIVAL CONCEPTIONS OF DISTRIBUTION IN THE 20TH CENTURY☆

Robert S. Goldfarb and Thomas C. Leonard

ABSTRACT

Distribution concerns who gets what. But does "who" refer to the personal distribution of income among individuals or the functional distribution of income among suppliers of productive factors? For nearly 150 years, Anglophone distribution theory followed the Ricardian emphasis on functional distribution – the income shares of labor, land, and capital. Only beginning in the 1960s, and consolidated by a research outpouring in the early 1970s, does mainstream economics turn to the personal conception of distribution. This essay documents Anglophone (primarily American) economics' move from functional to personal distribution, and tries to illuminate something of its causes and timing.

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> The produce of the earth – all that is derived from its surface by the united application of labour, machinery, and capital, is divided among three classes of the community; namely, the proprietor of the land, the owner of the stock or capital necessary for its cultivation, and the labourers by whose industry it is cultivated. . . . To determine the laws which regulate this distribution, is the principal problem in Political Economy . . .
>
> David Ricardo (1821, p. 5).

> The traditional 'theory of income distribution' is concerned exclusively with the pricing of factors of production . . . It has little to say about the distribution of income among the individual members of society, and there is no corresponding body of theory that does. This absence of a satisfactory theory of the personal distribution of income and of a theoretical bridge connecting the functional distribution of income with the personal distribution is a major gap in modern economic theory.
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> Milton Friedman (1953, pp. 277–290).

Student: "I have not learned anything in my graduate economics courses thus far about the distribution of income across individuals and families. What courses would address that?" Professor: "Economists study functional distribution of income. If you want to study size distribution, go to the sociology department . . ."

Paraphrase of an actual conversation[1] between a faculty member and graduate student at a leading Ph.D. program in Economics, circa 1968.

1. INTRODUCTION

Few questions in economics are more venerable than "who gets what?" Aristotle worried about the distributive consequences of exchange, as did Aquinas. Ricardo saw the division of the wealth of nations as more important than its causes.[2] Marx is unimaginable without distribution, as are the Progressive-Era (roughly 1890–1920) American economists who dared to imagine the state as an agent of progressive redistribution.

But does that "who" refer to the personal distribution of income across individuals or the functional distribution across suppliers of productive factors? For nearly 150 years, Anglophone economics followed David Ricardo (1815) and conceived of distribution as referring to the functional role in economic production. Moreover, functional roles were identified with membership in one of the three great socioeconomic classes of early 19th-century Britain – workers, landlords and capitalists. The functional approach to distribution survives the marginal revolution in economics, an industrial revolution, the development of welfare economics, the Great Depression, the advent of macroeconomics, the creation of welfare state, the mathematizing of neoclassical economics, several generations of prominent economists arguing that economics should rightly be concerned with

the distribution of well-being across individuals, and the erosion of the sharp class divisions that for Ricardo gave his distribution theory a social reference.

Beginning only in the 1960s, and consolidated by a research outpouring in the early 1970s, does the Anglophone profession turn to distribution across persons (and families and households). The new emphasis on the size distribution of income (SDI) also seems to coincide with a decline in research dedicated to distribution by productive function. By the late 1970s, mainstream economics is no longer comparing the income of labor with that of capital; it is comparing a poor family's (or a minority family's) income with the income of more fortunate families. Both this shift from a functional to a personal conception of distribution, and its timing have gone largely unexplored in the literature of 20th-century economics. This essay documents Anglophone (primarily American) economics' move from functional to personal distribution, and tries to illuminate something of its causes and timing.

The paper divides into two parts: Part I presents a time-line of the development of interest in, and research on, the size distribution of income, while Part II analyzes why the development took so long in coming. Section 2 provides a bare sketch of distribution circa 1900, as a way of setting the "initial conditions" for our history. Section 3 sets out some aspects of distribution research over the period 1900–1946. Section 4 considers an important strand of research developed in the annual volumes of the Conference on Research in Income and Wealth, an NBER-associated institution, from 1939 through the late 1950s. One focus is upon the evolving responses in these volumes to the question "for what purposes do we want personal income distribution data?" Section 5 of the paper considers the (mostly unheeded) contributions of Friedman and Kuznets in calling for greater attention to the personal distribution. Section 6 discusses the development of human capital theory and its advancement of theorizing about size distribution. Section 7 documents the eruption of size distribution articles and books, circa 1970, culminating with Sahota's (1978) Journal of Economic Literature (JEL) survey of theories of size distribution, which documents the arrival of personal distribution research. Section 8 of the paper offers some speculation on the causes and timing of the move to a greater focus on the size distribution of income, considering factors that promoted and hindered the change.

1.1. Some Preliminaries: Questions of Interest

This essay considers the "who" of "who gets what," but distribution concerns four other questions that bear on our inquiry. First, "what do they get" asks a mostly empirical question about what is being distributed, and statistical techniques

for characterizing its dispersion.[3] Second, "why do they get what they get" is a theoretical question, an attempt to explain the economic (and sometimes legal) causes of a given distribution. Third, "does the dispersion of what they get have real economic consequences of its own," treats distribution as a cause, rather than just an effect. It asks whether too much inequality causes adverse economic outcomes, as when the inability of the poor to borrow decreases the rate of economic growth (Aghion & Bolton, 1997).[4]

Ultimately, all of these lines of inquiry are joined to the fourth and ancient question of distributive justice – who *should* get what. More than any subject in political economy, distribution entangles matters of fact with ethical judgment. Surely all economists who have considered the question "who gets what?" have a view of "who *should* get what?" The confusion of "what is" with "what should (or should not) be" is a special occupational hazard for scholars of distribution.

2. INITIAL CONDITIONS: RECEIVED VIEWS OF DISTRIBUTION CIRCA 1900

To set the stage for our story, which focuses on 20th-century developments, we offer a sketch of distribution theory circa 1900, a moment when marginal productivity theory is building upon classical distribution theory.[5]

In classical political economy, the product is divided among three claimant groups, the suppliers of productive factors whose functional roles are identified with membership in the laboring, landowning or capitalist classes. Ricardo effectively models distribution as a kind of division, with the three shares determined by different processes. Landlords pay capitalist-tenant farmers their marginal products, and retain what is left of output as rent. The wages portion of payments to tenant farmers is determined "exogenously"; wages above subsistence increase worker fertility, which increases population hence labor supply, which, in turn, lowers wages toward subsistence, with opposite effects when wages fall below subsistence (Ricardo, 1821, p. 94). Thus are payments to capital the residual after farmers get their wages and landlords get their rent? With growth, the diminishing marginal productivity of labor and capital applied to (increasingly less productive) land ensures that payments capital and rent are antagonistic – the landlords' share increases at the expense of the capitalists' share.

In the 1890s the marginal productivity theorists, John Bates Clark (1891), John A, Hobson (1891), Knut Wicksell (1893), Philip Wicksteed (1894), and others made Ricardian diminishing marginal productivity into a general principle for determining the value, hence the income shares, of *all* productive factors.

What workers and capitalists get is determined by the value of their respective contributions to output. Thus, did marginal productivity theory more closely join value theory – the determination of price – to the theories of production and distribution. Marginal productivity theory also recast the question of who should get what: a general theory of factor pricing, which regards all inputs as contributing value to output, tends to make all productive factors commensurate.

However, key elements of Ricardo's distribution scheme remained intact. In particular, marginal productivity theory carried over the Ricardian emphasis on distribution as a matter of productive function, and the identification of suppliers of productive factors with membership in the laboring, landowning or capitalist classes.[6] Clark, for example, insisted that, though "the issue [of unfair distribution] is personal . . . it is settled by a knowledge of purely functional distribution" (1899, p. 7). The emergence of the marginal productivity theory of distribution did little to change the tradition of "submerg[ing] the theory of personal income distribution within the grander themes of Labour, Capital and Land" (Shorrocks, 1987, p. 824).[7]

This one-sided emphasis on functional distribution did not pass without prominent criticism. Edwin Cannan (1905) argued that "poverty is a question of persons rather than of categories" (1905, p. 362). Irving Fisher's *Elementary Principles of Economics* (1912) argued that, with respect to the personal distribution of income, "no other problem has so great a human interest as this, and yet scarcely any other problem has received so little scientific attention" (cited in Dalton, 1920, p. 147). Hugh Dalton (1920, p. vii) wrote:

> While studying economics at Cambridge in 1909–1910 . . . I gradually noticed that most 'theories of distribution' were almost wholly concerned with distribution as between 'factors of production.' Distribution as between persons, a problem of more direct and obvious interest, was either left out of the textbooks altogether, or treated so briefly, as to suggest it raised no questions. . . .

Equally trenchant protests can be found in Allyn Young (1917, p. 484) and Thomas Carver (1901).[8]

Europe, with its longer history of income taxation, its broader income tax base, and a more fully developed welfare state, offered American distribution scholars a somewhat more established literature on which to draw.[9]There was Pareto's (1897) pioneering empirical work on personal income distribution, and his famous inference – which he ultimately called a "loi naturelle" – that income inequality was stable across time and place.[10] And there was an established literature proposing alternative (to Pareto's slope coefficient) statistical measures of income inequality, such as Corrado Gini (1912) and M. C. Lorenz (1905). Even so, U.S. personal income distribution data were fragmentary and slow to be developed.

3. ASPECTS OF DISTRIBUTION RESEARCH, 1900–1946

3.1. Division of Labor Between Empirical and Theoretical Researchers

Early on, there emerges a kind of professional division of labor in American distribution scholarship. The economists and statisticians who first heeded the call for more study of the personal income distribution were empirical researchers – their mandate was measurement.

The empirical scholars were concentrated in government statistical offices, and in the emergent private research organizations – the Conference Board, Brookings Institution, and, above all, the National Bureau of Economic Research. Their published work mostly appeared in government publications (such as the *Monthly Labor Review* and *Survey of Current Business*), statistical journals (such as the *Journal of the American Statistical Association*), and the house journals or series of the private organizations.

The National Bureau of Economic Research, founded to supply empirical evidence on leading economic issues, was the principal organization in and around which the empirical distribution scholars gather. The National Bureau made the two volumes of *Income in the United States: Its Amount and Distribution* (King et al., 1922; Mitchell et al., 1921) its very first publications: Frederick Macaulay wrote the distribution section, and Willford I. King, a pioneering distribution scholar, wrote the section on income by source of production.[11]

The National Bureau study emphasized the challenge of early work in personal income distribution – the difficult problems of definition (e.g. what counts as income, what is the appropriate income-receiving unit) and of measurement, especially data collection, data comparability across heterogeneous primary sources, and techniques for measuring and characterizing income dispersion.[12] The lack of reliable primary data proved especially challenging. There were good data from the new Federal personal income tax, but tax-return data were, until the second World War, confined to the upper reaches of the income distribution. In 1918, the last year covered in the National Bureau study, over 90% of those with income paid no Federal income taxes (Mitchell et al., 1921, p. 134).[13]

Thus, when in 1939, C. L. Merwin produced a monograph-length survey of the (American) field for the National Bureau's Conference on Income and Wealth, he found only eight previous studies of the personal distribution of income and wealth worth evaluating: King's (1915) earlier work, two quite rudimentary precursors, Macaulay's section of the National Bureau Study, some unpublished work by King, two studies by Maurice Leven that were part of a large Brookings (1933–1934) survey (discussed below), and the vast 1935–1936 Study of Consumer Purchases,

supervised by Hildegaard Kneeland of the BLS and sponsored by the National Resources Planning Board.[14]

After a careful evaluation, and an acknowledgment of the empirical challenges faced by these pioneers in the empirical study of personal income distribution, Merwin judges the literature "too crude and inaccurate to allow measuring temporal and spatial differences in the inequality of distribution- differences that must be known if changes in the relative welfare of different social groups, in tax burden and in taxable capacity, in the volume of savings and in the pattern of consumer demand are to be analyzed." Merwin even questions whether "existing distributions give a true picture of the relative welfare of the different strata in society," and he concludes by asking, why "do we not have better and more adequate data?" (1939, p. 74.) Simon Kuznets's discussion of Merwin, which offers some conjectures on why the personal income distribution data are so poor, took it as given that there was "no information collected during these decades on a sufficiently comprehensive scale to make possible an acceptable distribution of income or wealth by size among individuals or families" (1939, p. 85).

Merwin's survey ignored a related if now obscure empirical literature on the income and expenditures of poor families. This "family budgets" literature was heavily empirical, had a strong Institutionalist character, and much of the research was carried out by women economists (Kyrk, 1923; Peixotto, 1929; Reid, 1934).[15] It certainly belongs in the category of empirical work with a distributional emphasis.

But the family-budgets literature differed from empirical distribution scholarship "proper" in both focus and motive. The family-budget scholars did not study income dispersion per se, but focused on low-income families (and on consumption expenditures in particular). The family-budget scholars' motivation was to document poor families' standards of living because Progressive and Institutionalist theories of wage determination tended to regard wages as determined more by a worker's need or standard of living, than by, as per the neoclassical view, the value of a worker's productivity. Cost-of-living studies were thus deemed essential to the policy task of setting minimum wages or determining mothers' pensions. These different emphases may or may not explain the relative neglect of the family-budgets literature by the protagonists at the National Bureau, but it is clear that, even among distribution scholars well disposed to empirical work and to Institutionalist themes, the family-budgets work was seen as occupying an intellectual space somewhat outside empirical distribution scholarship proper.

With respect to the *theory* of distribution, the family-budget literature was all but invisible. As the evidence presented later in the paper suggests, contemporaneous distribution theory essentially ignored all work in personal income distribution in favor of the functional distribution.

3.1.1. Depression-Era Distribution Theory, Seen from 1946

Distribution theory, which then constitutes the bulk of mainstream American concerned with distribution, remained almost entirely functional in orientation. In 1946 the American Economic Association gathered prominent papers in distribution for its *Readings in the Theory of Income Distribution*.[16] The volume reprints articles originally published from 1929 through 1946, and represents a who's who of Depression-Era luminaries in economics: Simon Kuznets, J. M. Clark, Kenneth Boulding, Chamberlin, Kalecki, Cassels, Stigler, Joan Robinson, Oscar Lange, Dennis Robertson, Lionel Robbins, A. P. Lerner, Lorie Tarshis, John Dunlop, Hayek, Frank Knight, Keynes, Hicks, and R. A. Gordon.

What is notable for our purposes is that 31 out of the 32 papers conceived of distribution as functional. Mary Jean Bowman's article on the graphical analysis of personal income distribution is the only exception. Simon Kuznets's contribution, "National Income," devotes 10 of its 40 pages to the personal distribution, and argues, in a lonely voice, that the personal income distribution is "an indispensable complement of national income estimates if they are to throw any light on the welfare of the nation" (p. 34).[17,18] Though the editors, Bernard Haley and William Fellner, concede that personal income distribution "gives rise to problems of great significance" (p. xi), they flatly state that "distribution theory in the usual sense relates mostly to the functional income distribution." Thus, when the editors argue that "the present state of the theory of income distribution is generally considered unsatisfactory, and it is rightly so considered," they are not referring to the paucity of work on personal distribution. They refer, rather, to the weakness of the theoretical link between the marginal productivity theory of factor pricing and the marginal productivity theory of income distribution, a weakness due especially to the lack of an adequate theory of labor supply.

The only *Readings* contributors who even consider the personal distribution, Bowman and Kuznets, emphasize its empirical, "what do they get" aspects. Kuznets's (1933) paper laments "the gap between what . . . is measured and what ought to be measured" (pp. 42–43), while, in 1945, Bowman looks forward to the better data that will arrive with the 1945 sample census.

Several years later, at an AEA session on income distribution, Fellner (1953) reiterated: "by contemporary distribution theory we presumably mean a qualified marginal productivity theory. . . ." (484). "Distribution theory," George Garvy said at an AEA session the following year, "deals with functional shares in national income" (1954, p. 236). "[E]conomic analysis provides a reasonably good theory of the functional distribution of income," writes D. Gale Johnson in 1954, "and nothing that can be called a theory of the personal income distribution . . ." (249).

The intellectual division of labor among distribution scholars thus persists well into the 1950s. The study of the personal income distribution remains the province

of the measurement-oriented researchers organized around the NBER and in the government agencies, while distribution theory remains entirely functional, and, within neoclassical economics, essentially an adjunct of marginal productivity theory.

Distribution scholars become less specialized in the late 1950s. This change comes from better data, a concomitant evolution in the view of what personal distribution data are for, and, perhaps most conspicuously, from the development of a new theory of why persons get what they get – human capital theory. We examine this change by considering, first, the empirical work of the NBER's Conference on Research in Income and Wealth, and second, the development of human capital theory.

4. THE CONFERENCE ON RESEARCH IN INCOME AND WEALTH, 1939–1958[19]

The Conference on Research in Income and Wealth, a collaboration of the NBER and several leading universities, was founded in 1936 to advance the cause of measurement in economics. In 1937 the Conference began publishing an approximately annual series entitled *Studies in Income and Wealth*, still in publication today. The Conference was a major force in developing and analyzing income distribution data, and the *Studies* series provides a remarkable record of how data availability and analyses progressed over the mid-century period. Many of the annuals from the 1940s through the 1960s include papers, and sometimes entire volumes, about the personal distribution of income. Two themes interweave throughout the *Studies*: what income distribution data are available, and what the data should be used for.

4.1. Data Availability

In its early years, the Conference was concerned principally with the quality and meaning of national income accounting data. Its 1939 survey of personal income distribution information echoes Kuznets's lament of 1933 about data quality. Recall Merwin's (1939) summary of the literature as "too crude and inaccurate," even unable to offer "a true picture of the relative welfare of the different strata in society, even at a given moment" (p. 74), a judgment seconded by Kuznets (1939).[20]

The fifth volume of the *Studies*, entitled *Income Size Distributions in the United States* (1943) states that the Conference has, since its inception, "considered one of its major objectives to be the improvement of basic data on income and its

distribution . . . Because the need for more data was especially pressing in the field of the distribution of personal income by size, the Conference has centered attention on this field." Attention notwithstanding, however, "It has . . . become increasingly clear that the failure to coordinate the various studies made the data far less useful . . . (due to) differences in concepts, coverage, and methods of . . . presentation."

The data on income and its distribution gradually improve, on three fronts especially. First, the decennial U.S. Census began asking income questions in 1940.[21] It is intriguing to note that, as Kuznets reports, the advocacy for income questions in the 1940 Census came not from economists, but from population statisticians interested in economic effects upon differential fertility (Kuznets, 1939, p. 91, Note 1). The 1950 Census provides still higher quality and more extensive income data than any previous source.[22] Second, beginning in 1948, income questions were permanently added to the Current Population Survey of households. And, third, during World War II, the Federal income tax base vastly expands, which would offer a much broader picture of the income distribution. In 1944, 47 million persons filed income tax returns, as compared with 26 million in 1941, 5 million in 1935 and 4 million in 1929 (Goldsmith et al., 1954, p. 1). Volume 23 of the *Series* (1958), entitled *An Appraisal of the 1950 Census Income Data*, documents the advances in data sophistication and quality achieved by the late 1950s. Still, as late as 1951, Dorothy Brady (1951, pp. 3–4) could write, with reason, in volume13:

> One sentence summarizes aptly and completely present knowledge of the size distribution of income: we know little more than that the data are deficient in both quality and quantity, that income is very unequally distributed, and that a high standard of living cannot be attained on the average income. This much we knew 30 and more years ago.

4.2. Why Do We Want Personal Income Distribution Data?

Different reasons for the uses of distribution data arise over time as its quantity and quality increase. Early empirical work in income distribution, influenced by Pareto, focused on characterizing the extent and stability of income inequality. During the Depression, however, American economists began to ask, "does the distribution of income have economic effects of its own," especially on savings and consumption behavior. A four-volume Brookings study argued yes. As reviewer Arthur Burns put it: "the central argument of the work is simple. The chronic retardant of economic progress is our [unequal] method of distributing income" (1936, p. 477). Influenced by John A. Hobson's (1910) underconsumption hypothesis, Harold Moulton argued in *Income and Economic Progress*, the fourth Brookings volume,

that consumer spending had not increased proportionately with the rise in national income, resulting in what Burns characterized as "persistent underconsumption."[23] What is worse, the higher savings were not finding their way into more spending on capital goods, so that business investment was also falling.

Not all distribution scholars shared this Hobsonian, proto-Keynesian view that greater inequality reduces growth by increasing savings. But the idea that important macroeconomic effects could be caused by the personal distribution itself clearly emerges in the *Series* literature (see, for example, Merwin, 1939, Kuznets, 1943, Preface, 1946, 1951). A particularly striking statement is found in Hollander's (1952) introduction to volume 15:

> We are still seeking to understand the response of consumption and saving behavior to various stimuli. We know, of course, that they are particularly sensitive to income: this, in fact, has been the reason for our interest in income and income size distribution for many years (p. 2).

The idea that distribution could be a causal variable proved important, opening a line of research that continues to this day.[24]

Dorothy Brady's (1951) paper, the same one that laments distribution data deficiencies, discusses two related policy questions. The first, which becomes central during the 1960s Great Society Era, concerns the definition and measurement of poverty. Redistributing income to the poor requires knowing who the poor are, which, in turn, raises the question of how redistribution affects economic growth. The second question, which is taken up earlier in the economics literature, concerns the relationship between economic growth and income dispersion, a relationship that Simon Kuznets influentially addressed in 1955.

There is a striking shift in the *Series* papers evident by the late 1950s. The focus is less on income inequality as something objectionable – for its injustice or for its adverse effects upon growth – and more on explaining why incomes vary in the first place. George Garvy's (1952) paper, entitled "Inequality of Income: Causes and Measurement," is one of the first to signal the coming shift in theoretical emphasis. Garvy argues against focusing on measures of inequality relative to some equality norm. He urges instead a more analytical, and less normative, focus: "the problem really is to identify, isolate, and then measure the various factors that determine relative income positions, not to 'measure' inequality" (p. 27).

Thomas Atkinson (1958) sounds a similar note in his short introductory article to Volume 23 entitled "Some Frontiers of Size-Distribution Research." Atkinson argues that economists should ask what are "the determinants of income for the individual?" (p. 36), which he views as the "the key to many of our size distribution problems." In 1958, Atkinson finds little progress on the determinants of income dispersion since Kuznets and Friedman's *Income from Independent Professional Practice* (1945, p. 36).

5. CALLS-TO-ARMS: FRIEDMAN-KUZNETS, 1953–1962

Two major figures in the profession, Friedman and Kuznets, called for greater attention to the personal distribution of income, featuring it in their own research in the 1950s.

5.1. Kuznet

Simon Kuznets is a central figure in our story. He made a important contribution to the development of income distribution statistics through his intellectual leadership of the Conference on Income and Wealth. Kuznets's work with Milton Friedman, *Income from Independent Professional Practice* (1945) was a path-breaking study of the income distributions of these groups. Gary Becker (1964) among others cites it as an important precursor to the development of human capital theory.[25]

Kuznets's third contribution came to be known as the Kuznets Curve. His 1955 Presidential Address to the American Economic Association, entitled "Economic Growth and Income Inequality," proposed an inverted-U relationship between growth and inequality. Income inequality is hypothesized to increase in the early stages of economic growth, and then decrease in its later stages. Kuznets's paper provoked a large and decades-long literature that developed to examine this hypothesis.

Several points are worth noting about the 1955 article. First, "[d]espite its name, Kuznets never actually drew such a curve. He was content to offer a verbal conjecture about how income equality might move, and to use a tale of compositional shifts and some common sense to suggest explanations" (Lindert, 2000, pp.172–173). Second, the article's major emphasis does not seem to be the existence of such a curve. Instead, it is to explain why, in the U.S., England and Germany, "the relative distribution of income . . . has been moving toward equality . . . particularly since the 1920s" (p. 4). This is a puzzle for Kuznets because "there are at least two groups of forces in the long-term operation of developed countries that make for *increasing* inequality" (p. 7). He posits factors – especially compositional shifts in population and production sectors – that might contribute to explaining the puzzle. The other part of the Kuznets Curve, that inequality widens at the early stages of development, Kuznets considers only briefly.

Third, Kuznets expresses some doubts whether the pattern of widening then narrowing income dispersion also applies to developing countries. Despite Kuznets's own qualms, the Kuznets Curve became "perhaps the dominant strand in the income distribution and development literature" (Kanbur, 2000, p. 797).

Fourth, several authors express major misgivings about the immense influence the Kuznets Curve has had on the income distribution literature. Lindert (2000) asserts that it has "to some extent tyrannized the literature on inequality trends" (p. 173), while Kanbur (2000) suggests that "in a strange way the framework . . . may have become a straightjacket which inhibits fresh thinking" (p. 800).[26]

Kuznets's conjecture was influential in part because it framed the future debate over how best to reduce income inequality – through economic growth or through government tax-and-transfer redistribution. For a full generation after WWII, the American economy grew rapidly and income inequality fell, consistent with Kuznets's hypothesis. This lent some credence to the view that growth not redistribution was the best means to reduce income inequality.[27]

The strong economic growth and decreasing income inequality of the post-War era may help explain why distribution scholars moved away from an emphasis on income distribution as a determinant of consumption and savings, and toward a new interest in explaining, theoretically, why individuals get what they do. For example, as we noted above, distribution scholars writing in the NBER volumes increasingly called for a theoretical explanation of the determinants of the personal distribution of income.

5.2. Friedman

In the second epigraph of this essay, from his "Choice, Chance, and the Personal Distribution of Income" (1953), Friedman decries the lack of a theory of the personal distribution of income, echoing his Progressive-Era antecedents. Sahota (1978) describes Friedman's (1953) paper as the opening salvo of the "individual choice" theory of personal income distribution – the theory that individuals have a say in their future incomes.

Drawing on his earlier work with Leonard Savage, Friedman explains income dispersion (and its skewness) by positing differences across individuals in their attitudes toward risk. Friedman's paper is a precursor to modern human capital theory because it sees the individual as optimizing (and doing so with known probability distributions, hence insurable risk), and because it asserts that individuals have some choice, admittedly bounded by the gifts of nature, parents, society and luck, in the determination of their future location in the income distribution.

Friedman reproduced the essay in his 1962 graduate text *Price Theory: a Provisional Text* in a chapter on the size distribution of income. In 1976, Friedman produced a new version of the text, entitled *Price Theory*, containing four new

chapters. The size distribution chapter reappears, but it is preceded by a new chapter with the title "The Relation Between the Functional and Personal Distribution of Income." This new chapter provides a broader and more thorough introduction to issues surrounding the size distribution.

5.3. But Was Anyone Listening?

Yet despite this call from two of the profession's leading figures, theoretical interest in the personal distribution of income still received relatively little attention. Some evidence is provided by Kaldor's widely-cited and reprinted 1955 article "Alternative Theories of Distribution." Title notwithstanding, the article is entirely concerned with functional distribution. There is not a single mention in the article of the personal distribution of income. In the Section 2, we examine how Kaldor's theory of distribution worked to embed the Ricardian functional emphasis.

6. HUMAN CAPITAL THEORY OF THE INCOME DISTRIBUTION EMERGES, CIRCA 1960

Why human capital theory, which has a long history in political economy, ultimately flowers only at the very end of the 1950s, and in Columbia-Chicago garb, presents an interesting puzzle in the history of economics.[28] What is indisputable is that human capital theory, when it did flower, provided a long missing *neoclassical* explanation for why persons get what they do. Human capital theory helped fill Friedman's "major gap in economic theory" by arguing that individuals could affect their income levels, and therefore their locations in the income distribution, by the investment choices they made with respect to schooling, training and so forth. In so doing, it directly spawned major analytical work on income distribution questions.[29] In his 1976 JEL survey, Mark Blaug could write: "(T)he human capital research program has . . . boldly attacked certain traditionally neglected topics in economics, such as the distribution of personal income" (p. 849).

The personal distribution and human capital are, as Jacob Mincer (1970) points out, "intimately connected," since income differentials are what measure the costs and returns to investments in human capital. Both Becker and Mincer, two of the major figures in the doctrine's development, made the personal distribution central. Mincer's (1957) doctoral dissertation was entitled "A Study of Personal Income Distribution"; his 1958 JPE paper drawing on his dissertation was entitled "Investment in Human Capital and Personal Income Distribution"; and

his 1970 JEL survey paper was entitled "The Distribution of Labor Incomes with Special Reference to Human Capital Accumulation."[30] Becker's (1967) Woytinsky Lecture, incorporated into later editions of his book *Human Capital*, was entitled "Human Capital and the Personal Distribution of Income."[31]

6.1. The Content of Human Capital Theory

Complete expository coverage of the insights of human capital analysis about the size distribution of income is far beyond the scope of this review. Instead, we provide a summary sketch, based on a number of Mincer's contributions, Becker's (1967) Woytinsky lectures and his book *Human Capital*.

The basic idea is that individuals can make forward-looking investments that enhance their future earnings power. This implies, among other things, that an individual's current income reflects investment decisions he or she made in the past, and more broadly, that an individual's current income can be affected and has been affected by that individual's prior choices.

Two things are required to put analytical and empirical meat on this basic skeleton. First, the nature of human capital investment must be conceptualized in a way that permits empirical measurement. Second, the effect of investment on earnings must be modeled. The measurement requirement was approached in several ways. Initially, years of schooling were used as a measure of formal schooling investment. Later, various measures of labor market experience, including Mincer's famous measure of experience as "age minus schooling minus six," were adopted to capture the possibility of post-school on-the-job training.[32]

The second requirement, involving the modeling of how investment might affect earnings, developed from Becker's so-called "general earnings function," which provided an algebraic expression for how past investments influence current earnings.[33] Mincer's so-called "simple schooling equation," which expressed log earnings as a linear function of years of schooling (the coefficient on schooling providing an estimate of the rate of return to schooling), could be shown to be a special case of Becker's general earnings function (Mincer, 1970, p. 9).[34]

This earnings-function-based way of proceeding, while it yields many important insights, fails to make explicit use of the typical supply-demand dichotomy so helpful in much of economic theorizing. Indeed, Sahota (1978) indicates that one objection to human capital theory has been that it is "a partial and piecemeal theory . . . until very recently, a supply theory" (p. 16).

However, an alternative formulation in Becker's Woytinsky lecture (1967) sets forth a human capital approach which is embedded in the supply-demand

dichotomy. He uses supply and demand curves for human capital investment for an individual to show how these influences interact to determine the individual's human capital investment. Differences across individuals, which generate different incomes over time, are produced by differences in the demand and supply functions facing different people. However, as Sahota (1978, p. 17) notes, the determinants of the supply and demand functions are treated as exogenous.

This approach generates both general and concrete results about the income distribution. We have already indicated the crucial premise, that size distribution was something to be explained – a dependent variable-and that the explanation should embed the idea that individuals could affect their income levels, and therefore their locations in the income distribution, by the investment choices they made. As Blaug (1976) puts it: human capital theory's original goal was to demonstrate "that a wide range of apparently disconnected phenomena . . . are the outcome of a definite pattern of individual decisions, having in common the features of foregoing present gains for the prospect of future ones."

In so doing, Blaug suggests, human capital theory also "discovered novel facts, such as the correlation between education and age-specific earnings, which have opened up entirely new areas of research in economics" (p. 850). Mincer (1976) makes the remarkable claim that as much as half of the total variation in observed earnings can be attributed to "the distribution of schooling and postschool investment" (Mincer, 1976, p. 151). The human capital approach also offered explanations for the positive skewness of the distribution of earnings (see Sahota, 1978, pp. 13–14 for a useful summary). Human-capital-theory-inspired earnings equations have become a staple of the labor economist's repertory, a standard way of "explaining" wage variation. Sherwin Rosen (1992) has referred to the ubiquitous use of a particular form of the earnings equation[35] as the "Mincering" of labor economics.[36]

6.2. The Emergence of Microdata Sets

Modern human capital theory's emergence in the 1960s generated a wave of empirical studies. Early work was limited to the use of grouped data, rather than microdata. Becker and Chiswick (1966), for example, included regressions of the log of earnings on years of schooling, using published Census table cell averages as observations (pp. 365–367). By the early 1970s, however, the data situation had changed in a big way. James Smith's "Introduction" to Volume 39 in the *Studies in Income and Wealth* series (James Smith ed., 1975) gives the following description:

> With respect to data, the decade of the sixties saw a rich harvest of microdata, reflecting the desire of policymakers to estimate in advance and measure in retrospect the consequences of social programs. Early in the sixties, the Board of Governors of the Federal Reserve System produced the Survey of Financial Characteristics of Consumers. . . . By mid-decade, the Department of Labor was at work on the National Longitudinal Surveys, and the Office of Economic Opportunity had begun work on the Surveys of Economic Opportunity (1966 and 1967). The Office of Economic Opportunity in conjunction with the Survey Research Center . . . also began collecting data (for) . . . the Panel Study of Income Dynamics. Microdata from all these studies were made available to researchers. Near the end of the decade, Internal Revenue Service . . . tapes of tax returns . . . became available to researchers (p. 1).

Smith argues that the "renewed interest in the distribution and determinants of income and wealth" is data-inspired: "In large measure, the resurgence of researcher interest in personal distributions . . . has resulted from the increased availability of microdata and the sustained methodological efforts of Orcutt and others demonstrating (its) superiority (in) the estimation of many . . . models of behavior" (p. 1).

6.3. Stigler as a Barometer

The ascendancy of human capital theory, which was fueled by the interactive benefits of new theory in conjunction with new data, marks the neoclassical conquest of labor economics, one of the last Institutionalist redoubts in American economics. American neoclassical economics now began to claim, as it could not at mid-century, that the market for people is like the market for goods.

George Stigler's revisions to his quintessentially neoclassical *The Theory of Price* text reflect these changes in the economics of distribution. The 1942 and 1946 editions have no chapter on income distribution.[37] The revised edition of 1952 adds a chapter entitled "The Distribution of Income," which signals its worthiness as a subject of study. Mirroring the distribution scholarship of the day, Stigler's chapter is empirical; one major message is a cautionary tale whose moral is that the data can mislead with respect to actual inequality.[38]

By 1960, Stigler could write, in "The Influence of Events and Policies on Economic Theory" (1960, p. 22): [O]ne can predict that certain problems will affect economic theory and others will not. The problem of personal income distribution will eventually receive much theoretical attention, since it is a problem of all economies and all times." The 1966 edition of Stigler's text revises the size distribution chapter, which now opens with an observation akin to those made by Becker and Mincer, and by Friedman before them: "of all the major topics

discussed in this book," the size distribution "has been studied least" (p. 288). The 1966 chapter also draws a figure, which plots annual net earnings against age for college vs. high school graduates, that would now be recognized as a typical human capital diagram, though there are no accompanying cites to that literature. Stigler says, "If the men in an occupation were of identical ability and worked equal periods and with equal intensity, the present value of their life time earnings would be equal (chance factors aside), but their earnings in any one year . . . would display substantial dispersion" (p. 290). Stigler's position on inequality is unchanged, but human capital, with its lifetime income focus and its stress on years of formal education, has invaded Stigler's text.

6.4. Human Capital Theory Makes Labor Productivity Endogenous

The marginal productivity theorists of 50 years prior argued that productivity determines the factor's price. But what determined productivity? For half a century, students of distribution ordinarily appealed to genetic, cultural, familial and material inheritance. Distribution scholars might emphasize different kinds of inheritance, but all took productivity to be exogenous, something one was given. So-called ability theories tried to reconcile their view that human talents are normally distributed – a view that was propounded in Francis Galton's *Hereditary Genius* (1869) – with the fact that the personal income distribution was right skewed (roughly) log-normally distributed.[39] The stochastic theories of income distribution, which regarded future outcomes as the product of luck, tried different stochastic processes to produce a given frequency distribution of income (e.g. Gibrat, 1931). But most of these traditional approaches to income distribution assumed that human capital was always and everywhere a gift. What the new theory argued was that human capital could also be acquired. It thereby made labor productivity endogenous, which not only directs attention to distribution across individuals, but also insists that a person's place in the distribution is not (wholly) an accident of birth.

6.5. Resistance to the Move to SDI

American economics gradually drags the study of labor relations under the tent of neoclassical price theory. Human capital theory and the growing availability of micro-data increase attention to personal income distribution, as manifested in the extraordinary outpouring of personal income distribution research in the early

1970s that we discuss below. At the same time, however, heterodox traditions in economics, especially the Cambridge U.K. tradition, resist the neoclassical expansion in ways that are important for distribution theory. In fact, in the 1950s, when distribution is nearly moribund in mainstream American economics, distribution enjoys something of a revival on the left, as part of its return to classical theories of growth.

The post-Keynesian and neo-Ricardian theories of distribution developed largely at Cambridge harken back to the Ricardian triad – they insist upon, by their very structure, a functional conception of distribution. An American example is Sidney Weintraub's *An Approach to the Theory of Income Distribution* (1958), a Post-Keynesian effort to connect distribution theory with contemporary developments in theory of the firm, and the macroeconomic determination of income and employment. Weintraub's book contains no treatment of the personal distribution of income, indeed, lacks any reference to personal distribution in its table of contents or index.

A more influential example, mentioned above, was Nicholas Kaldor's widely cited 1955 article, "Alternative Theories of Distribution." Kaldor does two things. First, he proposes a taxonomy of distribution theories – Ricardian, Marxian, neo-classical/marginalist, and Keynesian. The second thing his article develops is his own "Keynesian" theory of distribution. For Kaldor, distribution theory is *understood* to mean "functional distribution," just as it is in the American neoclassical tradition at this time.

But the Cambridge tradition is hostile to the marginal productivity theory of pricing, and, even more so, to the marginal productivity theory of income distribution. The Cambridge School rejects neoclassical economics' general theory of factor pricing, and instead appeals to the Ricardian tradition of different theoretical explanations for labor and capital income, respectively. Kaldor's model explains growth and functional shares by recourse, first, to different marginal propensities to save – savings out of profits are higher than those out of wages – and, second, to the assumption that investment's share of total spending is invariant (1955, p. 95).

The American neoclassicals embrace marginal productivity theory, with its microeconomic emphasis on the allocation of resources. The Cambridge School emphasizes the Keynesian macroeconomic determinants of growth. In invoking Ricardo, the English Cantabridgians revived the classical conception of distribution not as the byproduct of a factor pricing process, but as a matter of division between socioeconomic classes.[40] Thus, the American neoclassicals and the Cambridge School are fundamentally opposed in their conception of how value theory relates to distribution, and would become still more adversarial over the national

production function. Nonetheless, until human capital theory made headway in neoclassical economics, these adversaries, who disagreed on so much, agreed that distribution was a functional affair.

7. AN ERUPTION OF SIZE DISTRIBUTION RESEARCH, CIRCA 1970

After three generations of prominent Anglophone economists lamenting the paucity of research on the personal income distribution, the dam bursts circa 1970. In just a few years, more economists would write books, monographs, and survey articles on the personal income distribution than in the preceding half century. What is more, the outpouring came from many different corners of the discipline. Distribution scholars such as Anthony Atkinson (1970, 1975), Martin Bronfenbrenner (1971), Harold Lydall (1968), and David Champernowne (1973), made important contributions, but they were joined by leading figures in the profession. There is Amartya Sen's *On Economic Inequality* (1973), Jan Tinbergen's *Income Distribution* (1975), Harry Johnson's (1973) *The Theory of Income Distribution*, James Meade's *The Just Economy* (1976), Arthur Okun's *Equality and Efficiency: The Big Trade-off* (1975), James Tobin on limiting inequality (1970), Kenneth Boulding on the personal distribution (1975), Lester Thurow's *Generating Inequality* (1975), the human capital research of Becker (1967), Mincer (1970), and Barry Chiswick (1974), and early work of Alan Blinder (1974) and Joseph Stiglitz (1969).

This outpouring is not monolithic in approach, scope, or even in its emphasis upon the personal distribution. Some earlier efforts, such as Bronfenbrenner (1971) and Johnson (1973), remain more functional in coverage. Some are surveys rather than original research, and some are more philosophical in spirit. But the change in research emphasis, and its suddenness, measured in historical terms, are striking nonetheless.

While the distinction is far from iron-clad, some of these contributions are primarily surveys, while others make new theoretical or empirical contributions. Because surveys typically attempt to provide overviews of the field, it is instructive to compare those written near the beginning of the period – Reder (1969), Johnson (1973), and Bronfenbrenner (1971) – with Sahota's (1978) survey, which is published after the major 1970s outpouring of books and articles on the subject. Specifically, we will first indicate what size distribution issues are addressed in Reder-Johnson-Bronfenbrenner, to show how they view the field. We will then consider Sahota's (1978) view of the state of size distribution analysis. The contrast

between the Sahota overview and what Reder-Johnson-Bronfenbrenner present is instructive, providing an indication of how the field had developed during the 1970s.

7.1. Reder

Reder's (1969) survey appears as a chapter in the *Studies in Income and Wealth* series. He starts by quoting Stigler about the "absence of a developed theory of the size distribution of income." He then asserts the contrary proposition that "there are a good many bits and pieces of theory lying around in the literature that can . . . be fitted into a mosaic called 'The Theory of Income Size Distribution" (p. 205). The purpose of economic theory in this context is to "provide hypotheses as to the direction and, where possible, the extent to which changes in structural parameters alter the size distribution of income or some component" (pp. 205–206). Reder concentrates on the determinants of the distribution of earnings.

While Reder's discussion touches on a large number of the "mosaic's" pieces, he devotes much of his attention to a few specific topics. The most striking example is his focus on the distinction between "temporary" and "permanent" workers, and how their differential risks of unemployment might translate into differential effects on earnings concentration. This discussion which takes up more than 20% of the survey's pages, is an extension of his previous work, well-known to an earlier generation of labor economists, on factors influencing the skilled/unskilled wage differential (see, for example, Reder, 1962). Much of the rest of the survey reads like a set of interesting but diffuse comments on various literatures, especially human capital theory. Someone looking for a compact overview of the essentials of a theory of income size distribution would not find it easy to extract from Reder's survey.

7.2. Bronfenbrenner

While Reder's survey is an article, both Bronfenbrenner (1971) and Johnson (1973) produced books. Moreover, both authors devote most of their attention to functional distribution, but also discuss the personal distribution. Bronfenbrenner frames his book as a "reformulation and restatement" of the income distribution literature. He notes that "(T)he major distribution problem, for general economists (economic theorists), past and present, has been

functional. . . . The secondary distribution problem has been *personal*" (p. 27). His book contains 17 chapters. Of the 15 that follow the two introductory chapters, only one, "Topics in Personal Income Distribution," is entirely devoted to size distribution issues.

Compared to Reder's survey, Bronfenbrenner's chapter seems a more systematic and comprehensive overview of size distribution issues, as indicated by the chapter's five subsections. The first subsection "Statistical Measurement of Inequality, "reviews and criticizes various measures of the distribution, paying special attention to Pareto's "law," Lorenz curves and Gini coefficients. The second subsection, "Distribution Formulas and Their Generation," discusses how statistical processes might generate some empirical functions (distributions) that mimic certain features of actual income distributions. Bronfenbrenner notes that income and wealth distributions typically include relatively few large values; that is, they are skewed to the right or positively skewed. Among the statistical processes that can generate this are Gibrat's approach, which yields a lognormal distribution. This distribution "does in fact fit many income distributions quite closely" (p. 53). A number of ways of generating Pareto distributions, which fit upper ranges of the income distribution well, are discussed. The names here include Lydall and Herbert Simon. A "more general" Markov chain process, and how it might be rationalized, is also discussed. The next section, "Explanations for Skewness," starts by asking how, if ability is normally distributed, incomes might still be positively skewed. Besides the statistical explanations in the previous section, Bronfenbrenner mentions a number of economic explanations: Friedman's (1953) "attitudes toward risk" framework and the human capital approach each get a paragraph. Finally, the effects of inherited "income-bearing property" on skewness and the upper tail of the income distribution are considered. The final two subsections of the chapter consider poverty, and whether there has been "an income revolution," a sizable decrease in the income share of the upper 1 or 5 or 10% of the population in recent decades.[41]

7.3. Johnson

Harry Johnson's (1973) contribution is less of a systematic overview, and more of a set of simple illustrative modeling exercises and big-think critiques to give readers a sense of what the important issues about size distribution (as Johnson sees them) might be. Johnson's book is "based on the notes of the course in the theory of distribution and related matters . . . (Johnson had) been giving at the University of Chicago for some eight years" (Preface; no page number).

Like Bronfenbrenner's book, Johnson's is largely concerned with the functional distribution; "(N)evertheless, we shall touch on the theory of personal distribution of income developed especially within the last seven or eight years under the impetus of the 'War on Poverty' " (p. 1). Of the book's 18 chapters (235 pp), two chapters (30 pp) are devoted to the size distribution. The second of these two chapters focuses on "the poverty problem." Our discussion concentrates on the first of the two chapters, since it contains most of the analytical content relevant to our topic.[42]

Johnson starts by pointing out that functional distribution "may have little to do with" personal distribution, the latter involving either individual or family distributions. The two major forces determining size distribution are inheritance (broadly construed to include genetic and cultural inheritance), and investment in factor accumulation. Social concern about distribution has two distinct sources: concern about inequality (dispersion of income around the mean), and concern about poverty. Serious data problems arise, Johnson argued, when trying to "validate the demonstration of inequality or of poverty" (p. 207).

Johnson's treatment contains several simple but informative modeling exercises. The first, "A Simple Fisherian Model of Measured Inequality with Actual Equality," presents a stylized example showing that a world whose underlying characteristic is complete "over-life" equality can generate cross-section measures suggesting extreme inequality.[43] A second simple model shows the effects of allowing (probabilistic) movements between income groups. One implication of both models seems to be that simple measures of income distribution fail to reveal the true underlying characteristics of the personal distribution. Moreover, actual inequality may be far less than apparent (measured) inequality.

There is no choice behavior in either of these models. The next section incorporates choice under certainty. The focus here on the effects of individual choice, including human capital investment, on the income distribution (an aspect "frequently ignored by social critics") and how taxation affects these choices. A number of striking Chicagoesque claims about the effects of taxation are derived.[44] The final section of the chapter is entitled "Uncertainty of Income Prospects and Differing Attitudes toward Risk." It uses an analysis based on Friedman's (1953) article to explore the implications of attitudes toward risk for the earnings of occupations with different risk characteristics.

The Johnson overview treatment seems a cautionary warning about simplistic interpretations of cross-section data, and suggests some of the conceptual modeling intricacies that would be involved in deriving income distribution findings in a world in which individuals are making maximizing choices faced with uncertainty and human capital investment possibilities.

7.4. Sahota

The Reder/Bronfenbrenner/Johnson contributions provide a sense of what perceptive observers viewed as the state of personal distribution analysis in the early 1970s.[45] Sahota's (1978) survey appears on the heels of the personal income distribution outpouring Comparing Sahota to Reder/Bronfenbrenner/Johnson provides an indication of the major changes in the literature that developed during the 1970s.

One striking contrast has to do with focus. Bronfenbrenner's and Johnson's treatments of the personal distribution are embedded in discussions mainly concerned with the functional distribution. Even the Reder article, which focuses on personal distribution only, speaks of little bits and pieces of theory that need to be "assembled" into a "mosaic." By the late 1970s however, Sahota could review a vast personal distribution literature, and one rich enough for Sahota to produce a "taxonomy" of distinctly identifiable theories" (p. 2). His ten categories are: ability theories; stochastic theories; individual choice theory; human capital theory; theories of educational inequalities; inheritance theories; life cycle theories; public income redistribution theories; "more complete" theories; and theories of distributive justice.[46]

The 326-item bibliography in Sahota's article[47] suggests how rich an SDI literature has developed by the late 1970s. Table 1 below presents the distribution of Sahota's citations by time period. As the Table indicates, 189 of the 326 cites are from 1970 or later, and only 37 come from before 1955.[48]

Table 1. Sahota Bibliography Distributed by Time Period of Citation.

Time Period	Number of Citations
1975–1978	81
1970–1974	108
1965–1969	39
1960–1964	40
1955–1959	21
1950–1954	9
1945–1949	5
1900–1944	14
Pre-1900	9
Total	326

8. WHAT LED TO THE SWITCH TO SDI, AND WHY DID IT TAKE SO LONG?

Part I of this paper has presented evidence that the major blossoming of research into personal income distribution took place in the 1970s. In this second part of the paper, we ask: why did it occur when it did, and why was it so long in coming?

9. WHAT LED TO THE SWITCH TO SDI?

In speculating about the factors that promoted (or impeded) the blossoming of economic research into the personal distribution of income, we will consider state activity, theory development, data collection, and the *zeitgeist*, among other things. The relationships between these causal factors are complicated and subtle, and our conjectures, confined as they are to a fraction of a paper, must be tentative. We offer these ideas as informed (and, we hope, provocative) speculation upon the sorts of developments that influenced the trajectory of research interests among economists considering distribution.

9.1. The Welfare State and Redistribution

The American welfare state expanded significantly in the 1960s Great-Society era, and played an increasingly influential role in determining who gets what. The Federal government redistributed a greater share of national income, by design and as a byproduct of policy. Family income inequality reaches post-War lows in the late 1960s and early 1970s. To apply its view of who should get what, the state needed to know who got what in order to effect progressive redistribution via tax and transfer. On the transfer side, especially, an expanded welfare state required good personal distribution data. The "War on Poverty" demanded data on incomes in the lower tail of the income distribution. A functional distribution concept could not shed any light on poverty issues, as it had virtually nothing to say about the distribution of income by individual, family or household at its lower end.

Theory mattered too, to understand how to transfer resources to poor families while minimizing dead-weight losses, and to predict whether income subsidies, wage floors, or payments-in-kind best advance poor families' well being. Means-tested programs like Medicaid are not the only examples: universal programs like Social Security and Medicare are also mildly redistributive.

Nor is the size distribution of personal income all that mattered circa 1970. With the successes of the civil rights and women's rights movements, government

increasingly considered the income and well being of groups defined by race, sex, ethnicity, and family structure. These demographic concerns, "first cousins" to concerns about poverty per se, could not be addressed with a functional conception of distribution. To cut the data demographically, one needs to estimate a size distribution of personal income, and then aggregate by social group.[49]

On the tax side, the personal income distribution had long been of interest to public finance students of the incidence and burden of the tax system. The issue of "who pays the taxes" implies a concern with the distribution of tax burden by income class, especially with respect to the income tax.[50] Optimal taxation, the distribution of the income-tax burden, and the War on Poverty all clearly demanded knowledge of the personal income distribution.

This bare sketch can only gloss the complicated and subtle causal relationships between policy, theory and data collection. A more redistributive state creates direct demand for personal distribution data. More indirectly, the state may call upon economists to evaluate its programs, and economists witnessing the expansion of the government's attempts to redistribute might view it as important to explain why income was distributed as it was (and, perhaps, to warn against redistribution with excessively high efficiency costs). The causality can also run the other way: economic research and the collection of government statistics can, of themselves, influence government policy. We are proposing only that these interactions were especially active and mutually reinforcing during the Great Society era.[51]

9.2. The Functional Distribution No Longer Explains the Sources of Income Inequality

The economists who contributed to the personal distribution outpouring increasingly regarded the functional distribution as disguising rather than revealing the sources of inequality. The significance of factor shares for inequality is "nowadays rather limited," said Alan Blinder (1974, p. 1), given that "disparities in wages dominate all other causes of inequality" (1974, p. 125). Mincer (1970) makes the same point: there is more inequality among wages earners – those the functional approach lumps under "L" – than there is in total income. Taking the long view, economic historian Peter Lindert (1986) compares the U.K. shares of the Ricardian triad (rents, profits, wages) with those of the top 10% and bottom 90% of the personal income distribution, for 1867 and 1972–1973. Two things stand out. In Victorian England, virtually all land was owned by the top decile and land rents made up 13% of national income. A century later, the top decile gets almost no income from land rents, which also cease to be economically significant, and "the share [the top decile] gets from other property income is

not that different from the share that property contributes to the poorer 90%" (1986, p. 1155).

The classical economists simply identified wage earners with the poor. In the early 20th century, Pigou acknowledged that the functional distribution was less adequate than the personal, and felt obliged to argue that "no great error is introduced if we identify the income of the poorer classes with the receipts of the factor labor" (Pigou, 1912, pp. 78–79, cited in Dalton, 1920, p. 147). By 1970, the traditional identification of labor income with poverty was long past tenable. Because the returns to human skill had increased so much relative to other productive resources, wage differences among workers contributed more to income inequality than any other cause. "While this simple equation of factors and [income] quantile ranks had some validity back when the classical economists wrote . . . it was," says Lindert, "obsolete long before it was abandoned" (2000, p. 172). Thus, economists investigating inequality were drawn to explore the sources of wage inequality, a task the functional distribution obscured rather than illuminated.

9.3. Why Do They Get What They Get: Human Capital Theory

It seems clear that the development of human capital theory – which offered a theory of human skill acquisition – played an important enabling role in the circa 1970 blossoming of personal distribution research. Not only could income distribution questions be addressed using the human capital framework, but it actually generated, by its very logic, a focus on income distribution questions. Human capital theory offered an account of income inequality consistent with the actual sources of income differences, and created demand for more empirical work. Though human capital theory focuses on individuals, it does not say who should pay for investment in individual skills, and thus could be made congruent with the idea that government should invest in its disadvantaged citizens.

9.4. What Should They Get: The Revival of Distributive Justice

The "what should they get" question has always loomed behind interest in distribution. But in the early 1970s, distributive justice was enjoying an important revival, thanks to the influence of John Rawls's (1971) *A Theory of Justice*, and the vast literature it generated. Rawls's book almost single-handedly revived distributive justice within political philosophy, and, moreover, did so in a recognizably economic language.[52] Rawls was an egalitarian, but he wrote within a Liberal/contractarian framework that made the individual – not his productive

class – the unit of appraisal. Rawls, as with the vast majority of his interlocutors, was concerned with distribution across persons. His principles of justice rested upon the notion that individuals devising a social contract would have no knowledge of the productive resources – human and tradeable – that they would in fact individually possess. Distribution was thus in the intellectual air, and many leading scholars conceived of distribution as applying to individuals not groups, and certainly not groups defined by productive function.

10. WHY DID THE SWITCH TO SDI TAKE SO LONG?

Why did this blossoming of personal distribution research occur as late as it did, three generations after Pareto's pioneering work, 50 years after the NBER's maiden publication, and following decades of prominent lamenting over the functional conception's inadequacy? We cannot provide a definitive answer, but we do offer some suggestive conjectures in two categories: first, factors that slowed the impact of the SDI-promoting trends just identified, and, second, factors that worked to maintain and interest in the functional approach to distribution.

11. FACTORS SLOWING SDI-PROMOTING TRENDS

11.1. Why Did the Development of Good Data Take So Long?

The inexorable improvement of the data combined with large reductions in calculating costs seem to be "obvious" contributing factors to the outpouring of personal income distribution research. The information available for measuring size distribution in the U.S. improved markedly during the 1950s and 1960s, and was accompanied by massive improvements in data processing technologies.

There is indirect evidence for the stimulating effects of lower data processing costs. In "Progress and Microdata," Andrew Oswald (1991) reviews all full-length articles in the Economic Journal (EJ) from 1959 through 1990 in order to examine the following claim: "Compared with today, did a previous generation have journals full of practical articles based on data for real firms and real people?" Oswald finds that the percentage of EJ articles using empirical microdata grew from 5% during 1960–1969 to 17% during 1980–1989, using a 3-year moving average. However, the increase from 5 to 17% is not smooth. There is, in fact, a spike that occurs from 1973 to 1980, after which the percentage of empirical articles does not change much.[53] The spike in microdata-oriented research occurs across many fields in economics-not just within distribution – and is thus consistent with the notion

that "cheaper data and computing" helped promote more research in the personal distribution.

But why did the development of good income distribution data take so long? Given that data supply is at least partly endogenous, why didn't the effective demand for income distribution data produce better data before the 1950s and 1960s?

Merwin's answer in 1939 was that many American citizens, instinctively distrustful of the state, and perhaps concerned about tax liability, were disinclined to provide income and consumption data to government surveyors. Merwin speculated that his attitude was "probably fostered by democratic institutions that aim to exalt free enterprise, individualism and personal liberty-all with a minimum of government interference" (p. 75).

Kuznets (1939), who agreed with Merwin's assessment that personal distribution data were seriously inadequate, disagreed with Merwin's explanation for it. Kuznets argued that the data, bad as they were, were improving owing to the fact that citizens increasingly saw the government more as an ally than as an adversary. The Great Depression had raised serious doubts about effectiveness of "free and individualistic economic organization," less assurance of large production growth in the future, and less belief that one's economic fortune is largely due to individual ability. Thus were Americans, Kuznets argued, increasingly adopting "an attitude . . . that makes the provision of income information a natural and acceptable step designed to help public authorities in dealing with commonly recognized economic problems" (p. 92).

But Kuznets also emphasized that better data would be the natural byproduct of an expanded welfare state – the number of Federal income tax returns were not increased tenfold from 1929 to 1946 in order to improve personal income distribution data, but those better data were produced as a byproduct. Once a government institutes "a graduated income tax, social security legislation, laws concerning wages and hours, etc . . . it [enters] fields of administrative activity whose byproducts are large bodies of data on distribution of income by size," Kuznets argued. In effect, Kuznets proposed, once the welfare state acquires a legitimacy sufficient to expand its administrative functions, as it did so conspicuously in the New Deal Era, it generates SDI data almost in passing (p. 92).

11.2. Distribution Ethics May Not Specify an Acceptable Gini Coefficient[54]

A second impediment to the development of the personal income distribution concept may have come from modern economist's endemic discomfort with

normative questions. Some of this is simply part of the neoclassical *ethos*: since the failure of welfare economics in the 1920s and 1930s, many American economists have felt ambivalent concerning normative questions, of which "who should get what" is an example par excellence (Atkinson & Bourguignon, 2000).[55]

Even economists willing to engage with moral philosophy found ambiguities when trying to apply theories of distributive justice to real, live income distributions. Part of this ambiguity is a matter of precision. A distributive ethics ordinarily does not designate a morally acceptable point (or range) of income inequality.[56] A second aspect of the ambiguity arises from the fact that not all theories of distributive justice pertain to the entire income distribution. Take, for example, the view that a decent society is one that provides for its poor. In practice, this means there is a floor, or safety net below which no one shall fall, but there is no income ceiling, or other ethical constraint on income dispersion. A society with no poverty can be deemed just without knowledge of the entire distribution. More generally, "help the poor" is an injunction ethically distinct from "narrow the income distribution," even if, in practice, the former will tend to promote the latter.

Were there developments circa 1970 that might have reduced the difficulty of applying theories of justice to actual income distributions? Two such developments suggest themselves. First, Atkinson (1970) devised a means for ranking Lorenz curves that crossed, thereby providing a method for identifying and gauging the *normatively-relevant* inequality characteristics of a particular distribution. Atkinson helped inspire Amartya Sen (1997) and others who developed the literature that derives welfare measures from income distributions.[57]

Second, the "War on Poverty" focused attention on measures of poverty, which require determining a "poverty line." A literature developed in the 1960s in the U.S. about how to measure poverty, which included the empirical notion of poverty lines. Such measures are inevitably contested, but, as a practical matter, drawing a poverty line is more straightforward than determining which sets of income distributions are ethically acceptable.

12. FACTORS GENERATING CONTINUING INTEREST IN FUNCTIONAL DISTRIBUTION

Even in the face of the numerous factors promoting a move to the personal income distribution, the functional distribution enjoyed some countervailing support of its own: (1) its pragmatic role in neoclassical macroeconomics; and (2) its centrality to the Cambridge School and to other heterodox views of economic relations.

12.1. The Aggregate Production Function

The neo-classical production function of the national economy, a macroeconomic entity, has its origins in marginal productivity theory. It was originally devised as part of a microeconomic explanation of a firm's demand for productive factors. But when Paul Douglas, a student of John Bates Clark, set out to provide some evidence for marginal productivity theory, his data, employment (L), and capital (C), were aggregate at the national level. Douglas asked the mathematician Charles Cobb to devise a functional form that would provide a decent fit to the painstakingly assembled macroeconomic data (1899–1922) and that would also yield constant factor shares of output, a widely accepted stylized fact.[58]

Though beset with difficulties, the Cobb-Douglas functional form proved to be a useful formulation for American neoclassical economists willing to aggregate the firm's production function into a macroeconomic production function.[59] The national production function has had a somewhat checkered history. Robert Solow characterized it as follows: "I have never thought of the macroeconomic production function as a rigorously justifiable concept. In my mind it is either an illuminating parable, or else a mere device for handling data, to be used so long as it gives good empirical results, and to be abandoned as soon as . . . something better comes along" (1966, pp. 1259–1260).

But it never was completely abandoned, in part because its analytical properties proved so useful to modern macro theory. For example, modern macro theory aims to develop a "relatively simple, relatively aggregated" way of describing and analyzing the economy. In such approaches factor shares are convenient as a shorthand way of dealing with returns within the economy. Real business cycle models, for example, pay attention to factor shares. Moreover, macro modeling approaches often use the concept of the representative agent. In order to get into personal-distribution-type issues, one must get away from the representative agent, and build heterogeneity into the consumer side of the model. While heterogeneity is sometimes introduced to deal with particular macro-empirical puzzles, it is very difficult to build in heterogeneity in a simple but general way.

The national production function caused a conspicuous and prolonged dust-up with Cambridge School partisans. In the so-called "Cambridge Controversies," Joan Robinson and other Cambridge, England economists denied the very possibility of measuring aggregate capital. This issue commanded attention for decades, and was still of great interest in the late 1960s and after.[60]

12.2. Individuals vs. Social Classes

The issues underlying the Cambridge Controversy ran deeper than the technical matters of whether interest rates price capital or whether heterogeneous capital

goods could meaningfully be aggregated. The deeper disagreement concerned whether individuals or classes were the appropriate unit of analysis. American neoclassical economists adopted marginal productivity theory, with its general theory of factor pricing, and its microeconomic emphasis on the allocation of resources. The Cambridge School, in reviving Ricardo, adopted the classical conception of distribution, which has the different factors' shares determined not as the byproduct of a general factor pricing process, but by theoretically distinct processes, an approach that carries with it the classical vestige of distribution as a matter of division between socioeconomic classes. These very different approaches to the problem of "why do they get what they get" led to (or perhaps embedded) very different conceptions of the appropriate "who" (in "who gets what?") as the relevant unit of analysis.

The Cambridge School, like the Progressives, Fabians, Institutionalists and other predecessors on the Left, did *not* reason as follows: (1) We want to help the poor; (2) we don't have enough data to know who exactly is poor, but labor is poor, and therefore a decent proxy for poverty; ergo (3) let's help labor. Instead, their reasoning was: (1) We want a fairer distribution of income; (2) the market is unfair because capital gets more than it deserves, indeed, capital gets more *because* labor gets less; ergo; (3) redistribute from capitalists to workers.

The Cambridge School did not regard labor as deserving *because they were poor*. In principle, poverty could be eliminated and the functional distribution would still be unfair. The Cambridge School regarded labor as a class as deserving because they were being unfairly exploited. *Thus, it is not that workers' poverty is unfair, but that the unfairness of capitalism explains workers' poverty*. The Cambridge School view was that income distribution is the product of the intrinsic opposition of (class) interest in production, that workers are poor because capitalists are rich. It thus regards the functional distribution as the distribution concept of greatest importance. As Avi Cohen and Geoff Harcourt put it in their recent review of the Cambridge Controversies: for the "English" Cantabridgians, "social class (position within the division of labor) becomes the fundamental unit of analysis" (2003, p. 208).[61] The group of economists who were most committed to the idea that modern economies were unjust in their distribution, were also committed, by the same deep assumptions, to the functional distribution.

13. CONCLUSION

This essay documents American economics' 20th century move from a functional to a personal distribution of income, and has speculated on what caused the change and why it happened as late as it did. Among the interesting features

our narrative has considered are: the role of the Conference on Research on Income and Wealth in encouraging the development of better data, and in adducing new uses for income distribution data; the changing rationale for the study of personal income distribution among its proponents; Kuznets's and Friedman's call for more research decades before the outpouring of personal income research in the 1970s; the impetus of better data, lower-cost data processing, human capital theory, War-on-Poverty and other redistributive programs, the obsolescence of the functional distribution with respect to income inequality, and the intellectual vogue in distributive justice in pushing scholarship toward the personal conception of distribution; and, apparent handicaps notwithstanding, the functional distribution's ongoing role as a pragmatic tool in the representative-agent models of neoclassical macroeconomics, and as a concept central the Cambridge School and to other heterodox views of capitalist economic relations.

NOTES

1. This anecdote was recounted to Goldfarb by a Ph.D. economist who witnessed the conversation. The anecdote helped to suggest the topic of this paper.

2. "Political Economy," Ricardo wrote to Malthus, "you think is an enquiry into the nature and causes of wealth – I think it should rather be called an enquiry into the laws which determine the division of produce of industry among the classes who concur in its formation. No law can be laid down respecting quantity, but a tolerably correct one can be laid down respecting proportions. Every day I am more satisfied that the former enquiry is vain and delusive, and the latter only the true objects of the science" (Letter dated 9 October 1820, *Works* (Sraffa Edition Vol VIII, pp. 278–279, Cited in Kaldor, 1955, p. 54, Note 4).

3. Since well-being is famously difficult to measure, the distribution of income (or, less frequently, consumption or wealth) commonly stands in for the distribution of well-being in the large The "they" in question may be different persons or groups. Income distribution trends can measure a cohort over time, or can measure a section of the distribution comprised of persons or groups that vary over time – such as the "middle quintile" of the income distribution.

4. "Inequality" can refer neutrally to an income distribution that is not uniform, but it also has come to connote a undesirable departure from income equality (see Allyn Young, 1917). This terminological ambiguity illustrates how, in the study of distribution, ethical judgments tend to encroach upon factual descriptions, a point also made by Atkinson and Bourguignon (2000).

5. Because these ideas are well-documented in an extensive secondary literature, we present only the barest sketch, eschewing interpretive subtleties. For histories of the 19th-century production and distribution theories, see for example Cannan (1917 [1894]), which covers 1776–1848, and Stigler (1949), which pertains to 1870–1895. See also Hollander (1903).

6. Critics like Henry George, whose several editions of *Progress and Poverty* (1879) motivated Clark to develop his marginal productivity theory of distribution, likewise retained the Ricardian view that distribution is a matter of productive function.

7. Progressive-Era American economics was slow to adopt marginal analysis; it remained only partially integrated into the disciplinary fabric well into the 1920s. Marginal productivity theory is not even mentioned in leading American textbooks until E. R. A. Seligman (1905). See the discussion in Howey (1972).

8. Carver, for example, argued that "The right of the present social order to exist depends on the laws which govern not functional, but personal distribution. Our only interest in functional distribution is due to the light which it throws on the vastly more important question of personal distribution" (1901, p. 579).

9. See, for example, Josiah Stamp (1919) and Arthur Bowley (1920).

10. Pareto proposed that, at least for relatively high incomes, the distribution of income could be described by the formula $\ln N = C - \alpha \ln Y$, where Y is income and N is the number of persons with income above Y, and α, which $= 1.5$, is the coefficient of inequality. (For more on Pareto's Law, see Persky, 1992).

11. See King's (1915) *The Wealth and Income of the People of the United States*.

12. Wesley Clair Mitchell writes in the preface to the first volume of the NBER's *Studies in Income and Wealth*: Every candid investigator who has tried to make, or use properly, estimates of national income realizes how difficult it is to know just what the results mean. Those who have not struggled with the highly technical problems that crop up in the work can scarcely appreciate their intricacy, or how considerable are the differences in results . . . produced by . . . slightly different definitions (1937, pp. vii–viii).

13. The data Pareto used to construct Pareto's Law were derived from European incomes well above mean. The Federal income tax was established by the 16th Amendment to the Constitution, ratified in 1913. The annual *Statistics of Income*, which reports data from tax returns, commences in 1916.

14. See Stapleford (2003) for an exhaustive and illuminating account of the 1935–1936 survey of consumer purchases.

15. We are indebted to Malcolm Rutherford for drawing our attention to this literature, and for the insight that Margaret G. Reid, a student of Hazel Kyrk's, was a colleague of Theodore Schultz's, and that Jacob Mincer and Gary Becker were exposed to Reid's work on the household during her tenure at Chicago.

16. In the 1940s, the American Economic Association sponsored the "Blackiston Series of Republished Articles in Economics" which were "designed to make accessible in its successive volumes the most useful articles and essays in the various fields of economic analysis and policy." *Readings in the Theory of Income Distribution* was Volume Three in the series, and was reprinted as late as 1963. In selecting content, editors Bernard Haley and William Fellner, with the help of Fritz Machlup, "consulted approximately 30 professional economists . . . known to have an interest in the theory of distribution" (p. xi).

17. There are 7 articles under the heading "Production Function and Marginal Productivity," 8 under "Wages," 7 under "Interest," 4 under "Profit," and 2 under "Rent." The Bowman article appears under the heading "Concept of Income and Distribution," along with two articles on National Income/National Product and JM Clark's entry, "Distribution," which says, flatly: "economic theory has for a long time concerned itself with functional distribution only" (p. 58).

18. The volume also contains a bibliography assembled by Frank Norton, Jr. The section on "Personal Distribution of Income and Wealth" contains 80 citations. 5 of these are in Italian; 8 in *the Survey of Current Business* (6 of these by Edward Denison); 20 are from the NBER's *Studies in Income and Wealth*; 3 are Conference Board publications.

19. Appendix 1, available from the authors, gives an extended description of the data analysis concerns and contents in the 9 volumes from Vol. 3 (1939) to Vol. 23 (1958) dealing wholly or in part with income distribution issues. In the text we limit ourselves to brief observations about Vol. 5 (1943) and Vol. 23 (1958).

20. We discuss Merwin's and Kunzets's conjectures on why the data were then so poor in Section 8.

21. "In 1940 the Census of Population for the first time contained questions on income, but unfortunately not in detail. Each person 14 years of age or older, except inmates of specified institutions, on April 1 was asked how much he had received in 1939 in money wages and salaries up to $5,000, and whether he had received other income of $50 or more" (*Series*, 1943, p. 61). The chapter notes that, before the 1940 Census was administered, "certain political opposition to the income questions received front page notice." (p. 67) It goes on to wonder how this might have affected responses to the income questions.

22. The 1950 Census included three questions about income. One asked about the amount of income wages or salaries in 1949, the second about amount of income earned on the individual's "own business, professional practice, or farm," and the third asked about amount of income income from "interest, dividends, veteran's allowances, pensions, rents or other income (aside from earnings)" (Goldfield, 1958, pp. 55–56).

23. Hobson was on the faculty of the Robert Brookings Graduate School in its first year, 1924–1925 and influenced scholars there for some years (Rutherford, 2001, pp. 16–17).

24. Today's research focuses on credit market imperfections and political economy effects. Credit-market imperfections can make it difficult for the poor to borrow, which leads to sub-optimal investment, retarding growth (Aghion & Bolton, 1997). The political economy story argues that when inequality drives the median voter below average income, he votes for tax and regulatory redistribution that causes sub-optimal investment in human and physical capital, retarding growth (Persson & Tabellini, 1994).

25. Becker says in *Human Capital* (1964, p. 7, Note 2): "In addition to the earlier works of Smith, Mill, and Marshall, see the brilliant work (which has greatly influenced my own thinking about occupational choice) by M. Friedman and S. Kuznets. . . ."

26. One of Kanbur's gripes is that the Kuznets curve viewpoint is a "reduced form" approach that discourages detailed examination of what has actually happened in specific economies, tending to "overlook the rich texture of actual relationships . . . which can be revealed in detailed case studies of the development process" (Kanbur, p. 797).

27. This was not the case in less developed countries, which is consistent with development economics' ongoing interest in distribution.

28. David Lindauer noted that a 1935 QJE paper by J. R.Walsh entitled "Capital Concept Applied to Man" lays out a good deal of the basic human capital theory that appears in the 1960s. Dan Hamermesh independently suggested that a major precursor laying out human capital ideas is Dublin and Lotka *The Money Value of a Man* (1930). Becker cites both of them in *Human Capital* (see 1964, Notes 2, p. 7 and 20, p. 148). The issue, analogous to our size distribution question, is why, as Lindauer put it, "Becker was enormously influential; Walsh made no impact." Sahota notes that there was a previous and much older "treatment of human skill within the capital-theory framework," which he calls " '(t)he old vintage' theory of human capital," going back to Adam Smith (1776) through Alfred Marshall (1890), a literature that "has been extensively surveyed by Bernard F. Kiker (1968)." (1978, p. 11). Becker, in the same footnote that cites Walsh and expresses his intellectual debt to Kuznets and Friedman (1945), also acknowledges the influences of Smith, Mill and Marshall (1964,

p. 7, Note 2). Stuart Mill's viewed educational expenditures as investment, and believed that they would have economically observable effects. On this last point and for a useful discussion of the early literature in human capital, see Teixeira (2003).

29. T. W. Schultz's work is often cited as contributing importantly to the 1960s birth of human capital research at Chicago. Blaug (1980, p. 224) notes that "The birth of human capital theory was announced in 1960 by Theodore Schultz," and Sahota (1978, p. 11) refers to the 1960s development as being "under the inspiration of Theodore W. Shultz." Becker also cites Schultz as a key influence (1964, p. 7, Note 2).

30. Mincer reports that his dissertation on wage differentials was directly inspired by Friedman's dissertation and Kuznets and Friedman (1945) on professional incomes (Teixeira, 2003, p. 307).

31. Both Becker and Mincer remark on the long neglect of the personal distribution. Becker (1967, reprinted in 1993, p. 109) explains that economists "neglected the study of personal income distribution during the last generation" because they lacked a theory "that both articulates with general economic theory and is useful in explaining actual differences among regions, countries and time periods." By general economic theory, Becker means neoclassical economics' maximization-cum-equilibrium method. He then goes on to try to show that "emphasizing investment in human capital" allows development of "a theory of income distribution that can satisfy both desiderata" (p. 109).

Mincer (1970) indicates that the study of the functional distribution, rather than size distribution, "continues to flourish in the literature despite the blurring of . . . social class identifications and despite the recognition that under modern conditions the variance in labor incomes is the dominant component of total income inequality. Remote links exist between the functional and size distributions of income, but (the functional distribution of income) approach does not address itself to the distribution of labor incomes" (1970, p. 3).

32. The subtraction of the six is to account for the years before schooling begins. See Rosen (1992) for a useful discussion of Mincer's contributions. A later innovation possible only on data sets that included information on tenure at the firm was to enter this firm-specific tenure as a separate variable additional to the one measuring general labor market experience. This was to try to capture the separate effect of firm-specific training. The distinction between general on-the-job training and firm-specific on-the-job-training was one of Becker's (1964) important conceptual contributions. For a discussion of some difficulties with the interpretation of the firm tenure variable, see Hutchens (1989).

33. The term "general earnings function" is used by Mincer (1970, p. 8), attributing the function's development to Becker (1964). The general earnings function can be written in several related forms. One useful version (Becker & Chiswick, 1966, p. 359) showed an individual's earnings E_n in year n (gross of that year's cost of investment) as equaling the sum of the "raw" earnings X_n the individual would have obtained in the absence of any human capital investment, plus a series of terms, each term being the net investment cost C_{ij} of a particular human capital investment i (schooling, for example) in year j, multiplied times the rate of return r_{ij} on that type of investment in year j:

$$E_n = X_n + \sum r_{ij} C_{ij}$$

Empirical implementations usually express the dependent variable in logs. The transformation to logs is discussed in for example Becker and Chiswick (1966, p. 363) and Mincer (1970, p. 7).

34. A number of the specific empirical applications of the general earnings function make the assumption that the rate of return *r* is identical across categories of investment. One important example is the assumption in Mincer's simple schooling equation that r is identical for different schooling levels. This assumption is contradicted by numerous studies (see, for example, Blaug, 1976, pp. 838–839).

35. This equation has log of earnings as the dependent variable. Schooling is entered linearly as an explanatory variable. Labor market experience, measured as age minus schooling minus six, is entered as both linear and squared terms.

36. Nothing as influential as human capital theory could escape criticism, and its theory and empirical implementations have been widely criticized. Usefully critical discussions from the mid to late 1970s include Blaug (1976), Sahota (1978) and Rosen (1977). Appendix 2, available from the authors, sets forth a number of these criticisms, and evaluates how serious they look from today's perspective.

37. The first edition was entitled *The Theory of Competitive Price*.

38. Data on lawyers' income by age and size of community is used to illustrate that these two variables can generate considerable extraneous dispersion. In his example, "controlling" for these two sources of variation makes a Lorenz-curve measure of inequality look less unequal by more than 1/3. He goes on to discuss hours differences, differences in training, and so forth.

39. H. L. Moore (1911), for example, posited that ability was normally distributed, and sought empirical evidence for what he saw as the implication: that wages were also normally distributed.

40. Kaldor open his article with: "According to the Preface of Ricardo's Principles, the discovery of the laws which regulate distributive shares is the principal problem of political economy. The purpose of this paper is to present a bird's eye view of the various theoretical attempts, since Ricardo, at solving this 'principal problem.' "

41. While the rest of the volume is mostly about the functional distribution, there are scattered additional discussions directly relevant to size distribution. For example, Bronfenbrenner considers the relation of the functional to the personal distribution, noting the difficulties with making statements that relate changes in the importance of labor's share to changes in the size distribution.

42. The book also includes Johnson's reading list. "The Personal Distribution of Income" section contains 6 articles: Roy (1951), Friedman (1953), H. P. Miller (1963), Mincer (1958), Becker (1967), and Reder (1969). Only the Friedman article is required. The entire reading list consists of two texts (a Johnson volume on two sector general equilibrium models, and Bronfenbrenner, 1971). Of the 91 additional articles and books listed, 18 are required.

43. Johnson's model assumes a static population, "in which all babies born have exactly the same natural capacities, and all adults do exactly the same work. The minute a baby is born, it goes into an orphan for rearing. The orphanage . . . debits the child with the costs of its upbringing until it reaches the age of fifteen, at which point it becomes a member of the labor force." (p. 207) During its working life, it pays of its debts to the orphanage, and saves for retirement. The interest rate is zero, and individuals consume the same amount at every age.

In this world, the lifetime income and consumption pattern of every individual is identical. But a cross-section of the income distribution at any point in time "permits us to make such shocking observations as 'the top 26 2/3% of income earners receive 60% of the total

income,' and 'one third of the population received no income whatsoever' – gross inequality in the first case, widespread and shameful poverty in the second" (p. 208).

44. For example, "(T)he theory of the impact of income taxation applied only to measured cash income in the presence of nonpecuniary advantages . . . of various occupations suggests . . . that society will tend to be relatively overpopulated with people anxious to do good . . . as contrasted with people . . . concerned only to maximize their monetary returns from economic activity" (p. 216).

45. Appendix 3, available from the authors, reviews Blinder (1974), Thurow (1975) and Atkinson (1970), important examples of the substantial contributions to the personal distribution outpouring of the 1970s.

46. The first two categories contain important contributions that go back many decades, and the existence of the first four categories is recognized by earlier authors such as Bronfenbrenner. However, the treatment in Sahota documents contributions in the first two categories throughout the 1960s and 1970s. Of more significance, Sahota devotes considerable attention to the importance for SDI of the third and fourth categories – especially to human capital theory. Bronfenbrenner had devoted one paragraph each to human capital theory and individual choice theory.

47. Sahota's bibliography numbers each entry. The numbers run from 1 to 324. However, there is a 215a and a 254a, so the actual number of items is 326.

48. By way of comparison, Reder's 1969 article contains 40 citations (the bibliography is numbered 1 to 41, but number 7 is missing). Thirty-one of these are from 1955 or later. Only 18 of the 40 Reder cites are in Sahota, though the overlap in authors cited is larger.

49. We owe this point to David Colander.

50. The 1975 Conference on Research on Income and Wealth volume (Smith, 1975) exploiting microdata to analyze tax-related issues is an example of this emphasis and concern. The concern with the distribution of tax burden by income class is a long-standing tradition in public finance, displayed for example in Richard Musgrave's well-known graduate public finance text of 1959.

51. Though beyond the scope of this paper, it might be possible to empirically assay the relationship between the extent of income redistribution and the volume of theoretical research and data development dedicated the personal income distribution topics. One option would be to compare the US, this paper's focus, with the continental European states, which are earlier to develop a tax-incidence literature, for example, and which also seem to have a concomitantly earlier development of SDI data. And do, for example, data collection efforts lead or lag the redistribution programs? The history of European approaches to personal income distribution is, more generally, an interesting topic for future research.

52. We owe this idea to Tyler Cowan.

53. The 1970–1979 average is 15%,"close" to the 17% average for 80–89. Actually there is a small rise from around 1968 to 1971, a drop to 1973 then a much larger rise.

54. We owe this point to Royal Brandis, who expressed the matter roughly as follows: Even if you had personal distribution numbers, there is the "so what" question of how you turn these numbers into findings about economic justice?

55. But not all. See Ray Fair (1971) "The Optimal Distribution of Income" and the literature it responds to, cited therein.

56. And, even if it did, considerations of justice are not exhausted by an examination of a given distributional outcome. As Robert Nozick (1974) argued contra Rawls, an evaluation

of consequences don't exhaust our ethical concerns, there is also the justness of the process by which individuals come to their location in the income distribution.

57. The Atkins index proved quite influential because it better connected the welfare and income-distribution literatures. Note well that the Atkinson index requires the analyst to specify, as an input, a parameter known as the level of "inequality aversion."

58. Keynes called the constancy of labor's share "a bit of a miracle" (1939, p. 48). Kaldor argued that ". . . no hypothesis as regards the forces determining distributive shares could be intellectually satisfying unless it succeeds in accounting for the relative stability of these shares in the advanced capitalist economies over the last 100 years or so, despite the phenomenal changes in the techniques of production, in the accumulation of capital relative to labor and in real income per head" (1955, p. 24). Solow (1958, p. 618) was more skeptical: "like most miracles, this one may be an optical illusion."

59. The Cobb and Douglas (1928) formulation ($P = AL^kC^{1-k}$) imposed constant returns to scale, the index numbers used for labor and capital were somewhat fishy (C was capital capacity, not capital employed), and the data were collinear. Most problematically, Cobb and Douglas assumed that if their estimate of labor's share (k) was near to the actual k provided by a direct measure of labor's share, then the Cobb-Douglas assumptions were thereby validated. The problem is that other functional forms (such as $P = aL + bC$), with quite different assumptions, can also generate the same estimate of labor's share. So, a decent fit for labor's share does not, by itself, validate the Cobb-Douglas assumptions, as pointed out by Simon and Levy (1963).

60. A major breakthrough about how to overcome the conceptual measurement-of-capital difficulties was the methodology appearing around 1967 in the work of Hall and Jorgenson (1967), and Hall (1968) (see also Diewert, 1980, a paper given at a conference in the early 1970s). They showed how a theoretically-defensible measure of aggregate capital could in fact be derived and used. The fact that their papers appeared in 1967 and later shows that a focus on factors and their shares was still of great interest in the late 1960s and well into the 1970s. Ed Dean suggested this point to us. For a useful discussion of the development of measures of capital input, see Dean and Harper (2001, pp. 62–63).

61. The American neoclassical economists, in contrast, said that workers are poor because buyers don't attach a high value to the labor services the poor have to sell. Poor workers are not cheated in process of production and exchange, as critics had it, they are cheated in the birth lottery, which under-endowed them, and perhaps by market failure, which permitted socially sub-optimal investment in poor workers' human capital.

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