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*Part Two*

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## *Discussion*

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# INCOME CAPITALIZATION AS A METHOD OF ESTIMATING THE DISTRIBUTION OF WEALTH BY SIZE GROUPS

CHARLES STEWART

NATIONAL income and its distribution have thus far proved both more susceptible of measurement and more useful in economic analysis than national wealth and its distribution. It has, indeed, been questioned whether, if the former is available, the latter is necessary or of much use.[1] Not infrequently, it has been suggested that the one distribution is tantamount to the other. To this writer it seems that estimates of wealth, and its distribution by size classes, would prove of substantial independent value for economic analysis, provided they were considerably more accurate than the estimates heretofore made.

The distribution of wealth has been sought chiefly for the purpose of indicating the prevailing degree of inequality in a country, or of comparing the degree of inequality in countries of different social structures. Even aside from their statistical crudeness the results have not proved adequate indicators of economic welfare. The grouping, for example, of individuals of the same wealth but in far different positions of economic security and power is a definite shortcoming, but this is probably even more serious in the case of the income distributions. Even so the results may demonstrate, satisfactorily if roughly, the measure of inequality prevailing at any given time.

[1] See Simon Kuznets, *Studies, Volume Two*, Part One, especially pp. 37–61, discussion by R. T. Bye, Gerhard Colm, M. A. Copeland, and E. M. Martin, and reply by Dr. Kuznets.

That unwarranted generalizations have been derived from these rough estimates for purposes of political argument is not to be denied. But if it is true, as responsible political commentators would have us believe, that one of the major aims of the present administration is to bring about some redistribution of wealth, then it seems obligatory for economists to produce estimates of greater merit than the pioneer estimates which have been so abused. The question of the measurement of inequality may seem to some an idle question, simply a matter of popular curiosity, without much utility for economic analysis. Yet it will remain a matter of paramount public interest so long as economic inequality remains a political problem.[2]

In many respects income may be a better index of economic welfare, if not of power, than wealth, but to the extent that many types of unrealized incomes are excluded it is certainly defective. Persons in either high or low income brackets who derive their income from earned sources are not in economic positions similar to those who derive their income from property. This is another important argument in favor of the view that wealth is a better index of economic power. Unless the theoretical and practical difficulties in the way of capitalizing earned incomes are surmounted—or those involved in estimating unrealized items of income—the two distributions will not be identical. Not only can both be used as checks against the other; each will prove of use in the treatment of special economic problems.

Neither the question of tax justice nor the economic effects of taxation, for example, can be fully studied without more adequate information on the distribution of wealth. Facts about income do not completely suffice for these purposes. The campaign to 'broaden the base' of the income tax is defended on the grounds that our tax structure is highly progressive. No refined judgment, however, as to the weight of the entire tax burden upon the various strata of income and wealth can be made without adequate data on the distribution of wealth. To some degree the capitalization of property incomes may suffice but for any complete analysis involving property, estate, and gift taxes, this would not be satisfactory. If tax justice is to be given intelligent consideration in

[2] Cf. Harry Campion, *Public and Private Property in Great Britain* (Oxford University Press, 1939), Introduction by J. Jewkes.

the forthcoming simplification of the federal tax structure, this matter becomes of great importance. And for any judgment as to the influence of taxation upon savings and investments, it is useful if not imperative to have wealth distributions of considerable refinement.

In Europe and in this country several methods have been developed for estimating the distribution of wealth by size groups. Before the imposition of the income tax in the United States, county probate court records afforded virtually the only data for such purposes. Since *Statistics of Income* became available the income tax data have been used in various ways that will be described in the following sections. Few attempts have been made to construct wealth tables simply by capitalizing items of income reported for taxation; nor is such a purpose the aim of this article.

It seems to the present writer that two techniques may be employed to obtain wealth distributions that are not mere reflections of income statistics. The first is the estate-multiplier method, discussed in the next section, which is widely used abroad, particularly in England. The second is the method suggested by Fritz Lehmann which utilizes, in combination, American income and estate tax data.

Since the material necessary for the estate-multiplier method is not available for the United States, the main purpose of this paper is to test Lehmann's method and to compare the results and problems with those of other methods which are also based, at least to some extent, upon the income-capitalization approach.

## *I The Alternative Methods*

### 1 THE ESTATE-MULTIPLIER METHOD

Of the various ways of estimating the distribution of wealth by income or wealth brackets, the estate-multiplier method is probably the most desirable, but it is at present inapplicable to the American statistical material. This method rests "on the assumption that the dying in each age group are a fair sample of the living in the same age group". Making this assumption, "it is possible from the [estate duty statistics] to construct a table of distribution among the living. The numbers and values of decedents'

estates in each age-group are multiplied by the reciprocal of the death rate for that age group." [3] Curiously enough, the federal estate tax statistics for 1922–24 were cast in the right form to provide the data required by this method. The number and value of the estates filed at time of death were presented by age groups and sex. By multiplying the number of estate returns by a factor representing the ratio of the 'quick and the dead', for each age group and sex, the distribution of wealth could be estimated. To the writer's knowledge these statistics have not been utilized.[4] It may be that the material is too rough. The age groups in the official estate statistics were rather broad (ten years, in most cases). More serious is the fact that a total of 1,918 estates were untabulated in the annual statistics of 1922, 1923, and 1924; and when later summarized the data were not broken down by age groups.[5] There is no reason except expense why the old practice should not be resumed and improved. It would be sufficient for this purpose if such compilations were made at five-year intervals. For any year since 1916 the necessary material might still be obtainable from the Treasury records; and the results should be more valuable than the estimate of the Federal Trade Commission for 1912–23, at least as far as the upper brackets are concerned.[6]

One important difficulty, however, is involved: What is the mortality rate, by age groups and sex, of the wealthy stratum of the population? It is no doubt different from that of the general population. This information seemingly is lacking for the United States but the difficulty is not at all insuperable. In England, for example, the death rates for various 'social' or occupational classes have been published by the Registrar-General for selected years.[7]

The chief limitation of this method, if applied to the federal

[3] Josiah Wedgwood, *The Economics of Inheritance* (London: Routledge, 1929), p. 45. See also G. W. Daniels and Harry Campion, *The Distribution of National Capital* (Manchester University Press, 1936), p. 4.

[4] Cf. W. L. Crum, *The Distribution of Wealth* (Harvard Business Research Studies, No. 13, 1935), pp. 10–14. Estate tax returns by age and sex groups are plotted in Pareto-type curves, and these are taken as presumptive distributions of wealth, but the estate-multiplier method is not applied.

[5] U. S. Bureau of Internal Revenue, *Statistics of Income, 1924*, p. 95.

[6] Federal Trade Commission, *National Wealth and Income*, Senate Doc. 126, 69th Cong., 1st Sess. (Washington, 1926), pp. 56–69.

[7] Cf. Wedgwood, *op. cit.*, p. 45; Daniels and Campion, *op. cit.*, pp. 14–18.

estate statistics, is the fact that the results would refer only to the very wealthiest classes. Because of differences in estate taxes, this limitation is not present in the English estimates. The residuum of national wealth in the hands of individuals could be allocated, however, to the broad wealth class below the federal tax limit, though this involves some dangers and assumes that the total wealth is known; or the result could be supplemented by other methods.

## 2 DISTRIBUTION OF PROBATED ESTATES

At the end of the last century C. D. Wright, M. O. Lorenz, and C. B. Spahr made use of available state probate records in Massachusetts, Wisconsin, and New York to estimate the *distribution of estates*.[8] The results must be differentiated from a distribution of wealth. The dispersion of decedents' estates gives at best but a hint as to the latter. In 1915 W. I. King elaborated the Massachusetts and Wisconsin results and presented some international comparisons in his *Wealth and Income of the People of the United States*. Since the estate and income taxes became effective only in 1916, there was no possibility at that time of employing the estate-multiplier method or the income-capitalization approach. But later, despite the shortcomings of the old method, the Federal Trade Commission resorted to it in the study covering 1912–23, and concluded that its sample was "sufficiently good . . . to give an approximately correct picture of the facts". No cognizance, apparently, was taken of the possibility of applying the estate-multiplier method to the estate tax statistics. Capitalizing income, on the basis of income tax statistics, was deemed impracticable. Now, however, further study of probated estates, especially the smaller ones, would prove invaluable in supplementing the income-capitalization results.

## 3 DIRECT CENSUS OF WEALTH

Another general method is the direct census of wealth. Australia made such a census as a war measure in 1915.[9] The cost of a census

[8] See C. L. Merwin, Jr., Part One, Sec. I.

[9] G. H. Knibbs, *The Private Wealth of Australia and its Growth* (Melbourne: Commonwealth of Australia, Commonwealth Bureau of Census and Statistics, 1918), pp. 24–5, 30–1, 48–9.

is obviated if the property tax can be taken as a presumptive measure of wealth distribution, and this method was utilized in Massachusetts and Michigan late in the 19th century and by Helfferich in his estimate for Prussia in 1908.[10] But in no western country today could this presumptive method be employed, for the reasons that have led to the breakdown of the property tax itself. Nor would the expense warrant a direct census save in some emergency. The United States has made inventories of national wealth that have been of use in roundabout ways in constructing wealth distribution tables, as will be indicated below.

## *II Refinement of the Income-Capitalization Method*

### 1 CONTRIBUTIONS OF INGALLS AND KING

The capitalization of income approach is inherently less desirable than the estate-multiplier or direct census methods, largely for the reasons that it excludes non-income yielding property and that it is difficult, if not impossible, to apply to the lowest income brackets. Yet it has proved the most useful method in working with the existing American materials.

W. R. Ingalls was the first to employ the technique. Critical of the conclusions concerning the distribution of wealth in the United States implied by the studies of probated estates, widely quoted in political discussion, Ingalls first challenged the results by means of what we might call the inventory method and only later brought into play income-capitalization. He made a rough division of the total national wealth, as reported by the Census and other sources, in the hands of farmers, corporations, business interests, and the public generally. "The data are fragmentary, but they are sufficient to indicate clearly the extensive distribution of wealth among the people of the United States."[11]

This was the roughest sort of beginning. Except when combined with the income-capitalization method, based upon income tax statistics, the results are unsatisfactory and at best suggestive. This next step was likewise taken by Ingalls in an article first published in *The Iron Age*, October 4, 1923, and re-

[10] Federal Trade Commission, *op. cit.*, p. 56n; Wedgwood, *op. cit.*, pp. 101–2.

[11] *Wealth and Income of the American People* (York, Pa.: Merlin, 1922), p. 199.

printed in his *Current Economic Affairs*. The most refined use of income-capitalization, supplemented by other techniques, is King's estimate for the United States as of December 31, 1921.[12]

## 2 TYPICAL PROBLEMS OF THE CAPITALIZATION APPROACH

Some of the typical problems involved in the capitalization approach are revealed by the estimates of Lewis Corey and R. R. Doane for 1928 and 1929.[13] Both employed substantially the same procedures as King, though in much cruder fashion. Essentially, the method is a combination of the inventory and income-capitalization approaches: national wealth as indicated by available data is distributed according to size groups by means of indices obtained from income tax statistics. For only by "skillfully combining several methods", as Lehmann described King's work of 1921, can it be hoped to obtain at all trustworthy estimates for the whole range of income classes. Only to a limited extent are property incomes directly capitalized and aggregated by income classes.

The distributions for 1928 and 1929 are, in fact, incomplete approximations. Corey's results refer only to income-yielding wealth but embrace the entire range of wealth from the wealthiest to the poorest. Doane's distribution, on the contrary, includes non-income wealth but excludes all persons below the federal income tax limits.

One limitation of the pure income-capitalization approach, namely the problem of including non-income wealth, was partly minimized by Doane (also by King) by using income tax statistics chiefly for the purpose of obtaining keys for the distribution of wealth totals known from other sources. Bank deposits, insurance, individually owned houses, and all varieties of personal property, present problems to be dealt with in one way or another. Two questions are suggested: whether all personal property is counted in national wealth totals, and whether suitable

[12] The procedures used by Ingalls and King are more fully described by Merwin, Part One, Sec. I.

[13] Lewis Corey, *The Decline of American Capitalism* (Covici Friede, 1934), p. 350. The traditional tabulation according to income or wealth classes is abandoned by Corey in favor of broad social classes, though probably with too few subdivisions. R. R. Doane, *The Measurement of American Wealth* (Harper, 1933), pp. 25, 33.

keys have been employed to allocate such property to wealth classes.

The treatment of wealth in the hands of persons below the income tax levels presents another difficulty. For this task much information is essential concerning the magnitude of different items of wealth such as farm property, bank deposits, insurance, automobiles, and other types of durable property. Some data of this type are available in agricultural, financial, and other statistics. How to make the necessary allocation, even roughly, is the problem. Unfortunately the methods used by King and Corey are not fully described, but the problem is beset with many difficulties and dangers. Some measure of extrapolation, for example, must be employed, as King indicates. If aggregate wealth is properly defined and accurately determined, with institutional and public wealth eliminated from total private wealth, some degree of extrapolation based upon available indices of distribution may be permissible; or if it is not deemed necessary to specify the distribution of wealth within the sub-classes of the non-tax brackets, the residuum may be assigned to that broad wealth stratum. As an alternative, a somewhat arbitrary figure or a special census for a single year may be taken as a norm over a period of years if it is assumed that the wealth in the lower brackets is not subject to great fluctuation. Another possibility, referred to by King, is that net income may approximate net wealth (or stand in some definite relationship to it) for the lowest strata of income recipients.

But there are other difficulties. Total national wealth estimates, as Ingalls pointed out, usually refer to physical wealth, and it is questionable whether non-physical assets of going concerns are properly reflected in such inventories. Since the capitalized earnings of corporations may exceed their physical assets, the resulting distribution of wealth appears more unequal than it is. On the other hand, capitalized earnings may be less than the physical assets counted in the national inventory, with the contrary distortion of results.

### 3 DISTRIBUTION OF INCOME-YIELDING PROPERTY

The theoretical and statistical problems involved in capitalizing wage incomes have deterred economists from attempting any distribution of wealth embracing human capital; and the short-

comings of a simple application of the income-capitalization technique, which excludes non-income property, are apparent. Nevertheless the distribution of income-yielding property is of importance *per se;* it is more valuable as a presumptive distribution of wealth than the familiar dispersion of the estates of the dying. Maxine Yaple has estimated the ownership of such property by income-tax brackets as a means of measuring the progression of federal taxation upon income and wealth.[14] The values of the different types of payments reported for 1928–32 were capitalized by yield rates representing, in most cases, an average for a complete business cycle. The present writer has recast her results in the belief that they are of interest in this connection; her study is the only thorough application of a strict capitalization approach.

The critical problem in this approach, other than the inclusion only of income-yielding property of the higher income brackets, is clearly the rate of capitalization to be applied to various types of property income. Adequate statistical data are lacking on the rate of yield of the different types of income-earning property and on changes in these rates over time. Data on the yield of corporate stocks are perhaps more abundant. Yet the indices that exist refer only to selected issues. Whether the indicated year-to-year changes in yield are representative of fluctuations in the yield of all stocks is questionable. In any case the rate of yield is but an approximation. Since the general range is known, the precise rate may not be so important, except for the fact that corporate stock is held in different proportions by individuals in the different income brackets.

Another question relates to the assumption always made that the rate of yield of common stocks or other investments is equal for all income classes. It is highly questionable that common and preferred stocks, seasoned and unseasoned issues, are held in the same proportions by the various brackets. Nevertheless there are far more difficulties connected with the rate of yield of business properties, real estate and miscellaneous properties, and rights.[15]

One factor of particular importance, especially in the higher

[14] 'The Burden of Direct Taxes as Paid by Income Classes', *American Economic Review*, XXVI (December 1936), 691–710.

[15] *Ibid.*, pp. 704–7.

brackets, is the retention of profits in closely held corporations. The resulting distribution appears less unequal than is actually the case.

The results of Miss Yaple's study are summarized in Table 1. In addition to persons below the federal tax limits, this distribution excludes approximately three million of the smaller income tax returns. It does not purport to include personal property of a non-income variety, makes no allowance for debts and administrative expenses, and does not fully account for insurance. According to this table the half million income recipients with the highest incomes owned approximately $140 billion of income yielding property. This is approximately two-fifths of the aggregate private wealth, according to various estimates of that total.

TABLE 1

DISTRIBUTION OF INCOME-YIELDING PROPERTY IN THE UNITED STATES AS AN AVERAGE FOR 1928–1932
*(derived from the study by Maxine Yaple)* [1]

| OFFICIAL INCOME CLASS *(thousands of dollars)* A | AVERAGE CAPITALIZED INCOME PER RETURN B | AVERAGE NUMBER OF RETURNS C | AGGREGATE CAPITALIZED INCOME (B X C) *(millions of dollars)* D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) *(millions of dollars)* F |
|---|---|---|---|---|---|
| 7– 10 | 107.5 | 188,305 | 20.26 | 446,391 | 139.359 |
| 10– 25 | 207. | 190,856 | 39.51 | 258,086 | 119.099 |
| 25– 50 | 540. | 43,049 | 23.24 | 67,230 | 79.589 |
| 50– 100 | 1,140. | 15,753 | 17.89 | 24,181 | 56.349 |
| 100– 150 | 2,020. | 3,851 | 7.79 | 8,428 | 38.459 |
| 150– 300 | 3,325. | 2,960 | 9.86 | 4,577 | 30.669 |
| 300– 500 | 6,750. | 852 | 5.42 | 1,617 | 20.809 |
| 500–1000 | 12,200. | 502 | 6.15 | 765 | 15.389 |
| 1000–2000 | 23,100. | 184 | 4.252 | 263 | 9.239 |
| 2000–3000 | 37,000. | 40 | 1.48 | 79 | 4.987 |
| 3000–4000 | 55,500. | 14 | .777 | 39 | 3.507 |
| 4000–5000 | 92,222. | 9 | .83 | 25 | 2.73 |
| Over 5000 | 118,750. | 16 | 1.9 | 16 | 1.9 |

[1] *Op. cit.*, p. 705. The net estate data in Miss Yaple's study were adjusted by the addition of the average personal exemption for the years involved.

## 4 LEHMANN'S CORRELATION OF DIVIDEND INCOME AND NET ESTATES

As is evident from the fact that no year-to-year estimates of the distribution of wealth exist, the whole technique of the income-capitalization method as developed by Ingalls, King, Corey, Doane and Yaple is extremely involved. The next major contribution to the method was introduced by Fritz Lehmann [16] and simplified the procedure substantially. For general purposes Lehmann's method may prove adequate for the higher brackets if the results are checked from time to time by other methods. To date its usefulness is limited by the absence of any satisfactory, or widely accepted, estimates of total national wealth, and by defects in the original data—difficulties that are shared by the other methods as well.

Lehmann described his method, which he devised to make a rough estimate for the United States as of 1930, as a "short-cut . . . combining the results of the federal income tax statistics with the results of the federal estate tax returns". The essential steps are as follows: the value of corporate stock owned by persons in each income class is estimated by capitalizing the dividend income shown on the income tax returns; the relation between the value of corporate stock owned and the net estate is estimated from the estate tax returns; this relation is then used to convert the values of corporate stock owned into estimates of the total net estate of persons in each income class.

Some of the advantages of the method are:

1. The method is simple enough to employ for year-to-year estimates of changes in the wealth of the higher brackets.

2. The result includes the value of both income and non-income yielding property which may otherwise be neglected either because of the deficiencies of the other income-capitalization approaches or because such property may be overlooked in the national wealth inventories.

3. Only one capitalization rate is required, that for dividend income, eliminating many of the difficulties arising from the de-

[16] 'The Distribution of Wealth' in *Political and Economic Democracy*, ed. by Max Ascoli and Fritz Lehmann (Norton, 1937), p. 161.

termination of rates of yield for other types of property even less susceptible of estimation.

4. The method makes no assumption that the distributions of wealth among the living and dying are comparable, as is implied by the probated estate method. The critical assumption is merely that in the estates of the living and dying, corporate stock represents about the same proportion of the net estate for each income-wealth class.

## *III Annual Estimates of the Distribution of Wealth in the United States, for the Higher Brackets, 1922–1936*

The facility of Lehmann's technique, compared with the complexities of the method developed by King, makes possible estimates over a period of years as a means of testing its usefulness. Annual estimates for the years beginning with 1922, when the necessary income and estate-tax data were available for the first time, are therefore presented in this section and compared with the earlier results in the concluding section.

### 1 DESCRIPTION OF THE METHOD

The derivation of these estimates involved the following steps:[17]

1. The average rates of yield indicated by Standard Statistics indices[18] were employed to capitalize the dividend income reported by individuals filing federal income tax returns.[19] This

[17] Cf. Gerhard Colm and Fritz Lehmann, *Economic Consequences of Recent American Tax Policy*, Supplement 1 to *Social Research* (1938). Ap. A: 'Method of Estimating the Influence of the Personal Income, Gift and Estate Taxes upon Savings and the Distribution of Wealth', prepared by the present writer, pp. 91–8.

[18] Standard Statistics Co., Inc., New York. *Standard Statistics Bulletin, Base Book Issue*, 1932–34, p. 125. For 1922–25 the average rate of yield was derived from the index of 33 industrial common stocks, 20 industrial preferreds, and 20 unseasoned stocks became available; in 1928 the index of 20 unseasoned stocks (*ibid.*, 1928–29, p. 16) was discontinued, as was the index of 33 industrials in 1929. Since 1931 there is a paucity of data. For 1931 cf. *Statistical Bulletin* (April 1934), p. 27; for 1934, *Standard Earnings* (January 1936), p. 24.

The estimated yields in percentages are as follows for the years covered: 1922, 6.4; 1923, 6.6; 1924, 6.2; 1925, 5.2; 1926, 5; 1927, 4.75; 1928, 4; 1929, 4.6; 1930, 5.6; 1931, 7; 1932, 7.4; 1933, 4.4; 1934, 4.1; 1935, 4.5; 1936, 4.5. Cf., Yaple, *op. cit.*, pp. 704–7.

[19] *Statistics of Income*, 1922–36.

was done separately for each year and for each of fourteen income brackets. The brackets used include all the returns filed.

2. The average holdings of corporate stock by persons in the various income classes were obtained by dividing the aggregate corporate stock thus estimated by the number of income recipients in each class.

3. From the estate tax statistics [20] the average net size of estates for each official estate class was obtained by dividing the aggregate value of estates filed (allowing for no deductions except 90 per cent of the reported indebtedness) by the number of decedents in each class. Because the small number of returns in the higher brackets in any single year would make for unreliable results, the average size of estates for each year represents a three-year moving average.

4. The average holdings of corporate stock in each year in each estate class was similarly obtained as a three-year average.

5. The average corporate stock in each estate class was plotted, separately for each year, against the corresponding average net estate on a double logarithmic scale.

6. A curve drawn through the plotted points was then employed to determine the average size of estates corresponding to the average corporate stock held by persons in each income class. Two assumptions are made: that corporate stock comprises the same fraction of the estates of the dying as of the total estates of the living, and that stock holdings are closely correlated with wealth classes.

7. The average wealth of persons in each income bracket thus obtained was then multiplied by the number of persons in each class for the given year, to give the aggregate wealth for each income bracket.

8. For purposes of analysis and comparison the resulting distributions of wealth were plotted (both persons and wealth cumulatively) on double logarithmic paper. The curve may then be extended a short distance for a limited measure of extrapolation if it is desired to compare the same number of income recipients over several years, as was done in Table 2.

[20] *Ibid.*

## 2 SOME DIFFICULTIES OF THE METHOD

The chief difficulties are encountered at the extreme ends of the curve that correlates average corporate stock and average net estates. It has already been noted that it was necessary to take a three-year average of the estate data because of the few returns in the very highest estate classes. Even then the curve did not extend sufficiently far. For invariably each year's income tax returns revealed individuals whose dividends, when capitalized, exceeded substantially the corporate stock possessed by decedents included in the estate tax returns.[21] The estimates for the income classes above $2 million required in most instances some extrapolation of the curve discussed above in (5), and an examination of the results for the ten wealthiest income recipients will reveal great fluctuations from year to year. Nevertheless this may not be too serious for the final results. At most it may account for an error of less than 1 per cent in the total distribution. As will be indicated later, Miss Yaple's results suggest that a simple application of the capitalization approach might be used for the very highest brackets, at least as a check.

The shortcomings of the estate data contribute to the problem. One reason, perhaps, why the curves derived from these statistics do not indicate estates with corporate stock as large as those parcels of corporate holdings revealed in the income returns is the fact that gifts *inter vivos* reduce the size of estates by time of

[21] This fact suggests either the possibility of a flaw in the method or an error in the earnings factor; and to the degree that undistributed profits minimize the dividends reported for taxation, the difficulty would be enhanced. The disparity is not likely to be explained by the possibility of under-valuation of corporate stock in the estates of the deceased, provided the law is properly administered. While an error in the earnings rate is a possibility, the explanations below seem more probable: (1) While corporate stock constitutes a large fraction of the total wealth of the largest estates filed, it is possible that corporate stock comprises a larger percentage of the large estates of the living (of younger men) than of the dying. This was stated above as the critical assumption of the method. (2) The fact that total estates of the magnitude indicated for the living do not appear in the estate statistics may be explained best by gifts *inter vivos* on the part of the older generation of wealthy men, in anticipation of death (not in a legal sense). This process was facilitated by the lack of a gift tax from 1916 to 1924 and from 1926 to 1932, and by the present gift tax rate equal to three-fourths of the estate tax rate. If this is the chief explanation, the difficulty will not lead to any serious error in the results.

death. This transition, however, is reflected in the income tax data; dividends are accordingly reduced.

Because of the large exemption allowed by the federal estate tax, data are lacking for estates of less than approximately $50,000.[22] In order, therefore, to determine the size of estates corresponding to the income classes below $5,000 the curve again had to be extended a short distance. In large measure, then, the estimates of the wealth of income tax recipients in the taxable brackets below $5,000 depend upon a degree of extrapolation. This usually involves a large fraction of taxable persons and a considerable fraction of national wealth. It is in this connection that the method requires supplementation by other methods and, equally important, independent and accurate estimates of aggregate national wealth.

In the income tax statistics persons of widely different wealth are grouped according to their net taxable income. In the higher brackets, particularly, this means that persons with large earned incomes or capital gains are classified with persons with far larger property holdings, thus reducing the average dividends for the class. A counterbalancing factor results from the fact that undistributed profits and the exclusion of income from tax exempt securities place people of greater wealth in lower income brackets, increasing the average dividends for the class. This again is a difficulty affecting the other methods equally.

As already indicated, the important assumption is made that corporate stock represents approximately the same fraction of the net estate of the living and the dying. This does not seem unreasonable since other factors than those directly related to age groups are largely responsible for the nature of the investments of the wealthy. It is the rate of taxation rather than old age, for example, that explains the drift toward tax exempt government bonds.

The rate of yield of corporate stock from year to year is dif-

[22] The estate statistics do provide, however, a small sample from year to year of estates with gross value over $50,000 but with very small net value because of debts, etc. For this reason it is questionable how representative their composition may be assumed to be. The estimates for the income classes below $5,000 are derived largely by extrapolation and are grouped separately for that reason. Samples of small estates (Colm and Lehmann, *op. cit.*, p. 48) indicate that bank deposits as a percentage of total estates increase rapidly in the smaller brackets.

ficult to estimate with any nice precision, but the difficulty is not peculiar to this method. No serious error will result in any given year from this factor in the allocation of wealth to the taxable classes of income and wealth; the same rate will apply to all classes. But for the complete distribution of wealth, assuming that total national wealth is known from other sources, an error in the capitalization rate will mean that too large or too small a proportion of the total will be assigned to the higher brackets relative to the others. If the dividend income of these persons amounts to $5 billion in a certain year, a difference of 1 per cent in the rate of yield might make for a difference of $25 billion or more in the wealth assigned to them. It seems to the present writer that this constitutes one of the chief hazards of the method, as well as of other methods that depend on capitalization of income.

Two other related questions remain. The rate of yield combines common and preferred stocks, but the various wealth brackets may hold the two types of securities in different proportions. More serious is the difficult matter of the proportionate holdings of seasoned and unseasoned stocks. As a consequence, the rate of yield obtained by the different classes may vary substantially. It might be presumed that better investment advice is available to the wealthy, but there is evidence that a random selection of investments may prove more profitable than a selection made with the best of knowledge. Likewise there is the counterbalancing consideration that taxation induces the wealthy to forego more speculative and profitable securities.

### 3 ESTIMATES OF WEALTH, 1922–1936

Annual estimates for the fifteen years for which data are available are presented in Table 2. The year-to-year changes in the distribution can best be observed by examination of the charts in the final section. In these charts the logarithm of the cumulative amount of wealth is plotted against the logarithm of the cumulative number of persons and the resulting points joined to yield fairly smooth curves. The 1922 curve is extremely similar to King's for 1921, intersecting it at three points (Chart 3). Similarly, for the later years of the decade the results obtained by the

method described above afford rather striking comparisons with the other available distributions of wealth in the United States.

TABLE 2

DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1922* | | |
| | 6. | 2,500,000 | 15. | 7,500,000 | 178. |
| Below 5 [1] | 8. | 2,500,000 | 20. | 5,000,000 | 163. |
| | 20. | 1,500,000 | 30. | 2,500,000 | 143. |
| | 32.7 | 405,789 | 13.278 | 1,000,000 | 113. |
| 5– 10 | 65. | 391,373 | 25.5 | 594,211 | 99.722 |
| 10– 25 | 190. | 151,329 | 28.8 | 202,838 | 74.222 |
| 25– 50 | 500. | 35,478 | 17.74 | 51,509 | 45.422 |
| 50– 100 | 1,050. | 12,000 | 12.61 | 16,031 | 27.682 |
| 100– 150 | 2,000. | 2,171 | 4.35 | 4,031 | 15.072 |
| 150– 300 | 3,400. | 1,323 | 4.5 | 1,860 | 10.722 |
| 300– 500 | 7,000. | 309 | 2.163 | 537 | 6.222 |
| 500–1,000 | 11,800. | 161 | 1.9 | 228 | 4.059 |
| 1,000–2,000 | 17,800. | 48 | .854 | 67 | 2.159 |
| 2,000–3,000 | 28,000. | 10 | .280 | 19 | 1.305 |
| Over 3,000 [2] | 114,000. | 9 | 1.025 | 9 | 1.025 |
| | | | *1923* | | |
| | 6.8 | 2,500,000 | 17. | 7,500,000 | 197. |
| Below 5 [1] | 10.8 | 2,500,000 | 27. | 5,000,000 | 180. |
| | 22. | 1,500,000 | 33. | 2,500,000 | 153. |
| | 24.5 | 602,370 | 14.799 | 1,000,000 | 120. |
| 5– 10 | 65. | 397,630 | 25.8 | 625,897 | 105.201 |
| 10– 25 | 182. | 171,801 | 31.2 | 228,267 | 79.401 |
| 25– 50 | 480. | 39,832 | 19.1 | 56,466 | 48.201 |
| 50– 100 | 1,070. | 12,452 | 13.3 | 16,634 | 29.101 |
| 100– 150 | 2,150. | 2,339 | 5.04 | 4,182 | 15.801 |
| 150– 300 | 3,550. | 1,301 | 4.61 | 1,843 | 10.761 |
| 300– 500 | 6,800. | 327 | 2.25 | 542 | 6.151 |
| 500–1,000 | 12,400. | 141 | 1.74 | 215 | 3.901 |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1923* | | |
| 1,000–2,000 | 14,700. | 51 | .75 | 74 | 2.161 |
| 2,000–3,000 | 37,100. | 12 | .446 | 23 | 1.411 |
| Over 3,000 [2] | 87,700. | 11 | .965 | 11 | .965 |
| | | | *1924* | | |
| Below 5 [1] | 11.2 | 2,500,000 | 28. | 7,500,000 | 253. |
| | 17.6 | 2,500,000 | 44. | 5,000,000 | 225. |
| | 29.3 | 1,500,000 | 44. | 2,500,000 | 181. |
| | 51. | 302,862 | 15.567 | 1,000,000 | 137. |
| 5– 10 | 66. | 437,330 | 28.9 | 697,138 | 121.433 |
| 10– 25 | 181. | 191,216 | 34.6 | 259,808 | 92.533 |
| 25– 50 | 465. | 47,061 | 22. | 68,592 | 57.933 |
| 50– 100 | 1,050. | 15,816 | 16.65 | 21,531 | 35.933 |
| 100– 150 | 1,920. | 3,065 | 5.9 | 5,715 | 19.283 |
| 150– 300 | 3,020. | 1,876 | 5.66 | 2,650 | 13.383 |
| 300– 500 | 5,860. | 457 | 2.68 | 774 | 7.723 |
| 500–1,000 | 10,000. | 242 | 2.42 | 317 | 5.043 |
| 1,000–2,000 | 15,000. | 50 | .75 | 75 | 2.623 |
| 2,000–3,000 | 44,000. | 15 | .66 | 25 | 1.873 |
| Over 3,000 [2] | 121,000. | 10 | 1.213 | 10 | 1.213 |
| | | | *1925* | | |
| Below 5 [1] | 12. | 2,500,000 | 30. | 7,500,000 | 258. |
| | 17.2 | 2,500,000 | 43. | 5,000,000 | 228. |
| | 31.3 | 1,500,000 | 47. | 2,500,000 | 185. |
| | 45.6 | 169,230 | 7.743 | 1,000,000 | 138. |
| 5– 10 | 52. | 503,652 | 26.25 | 830,770 | 130.257 |
| 10– 25 | 163. | 236,779 | 38.6 | 327,118 | 104.007 |
| 25– 50 | 260. | 59,721 | 15.8 | 90,339 | 64.407 |
| 50– 100 | 950. | 20,958 | 19.9 | 30,618 | 48.607 |
| 100– 150 | 1,700. | 4,759 | 8.1 | 9,660 | 28.707 |
| 150– 300 | 2,550. | 3,223 | 8.54 | 4,901 | 20.607 |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1925* | | |
| 300– 500 | 4,000. | 892 | 3.57 | 1,678 | 12.067 |
| 500–1,000 | 8,400. | 479 | 4.025 | 786 | 8.497 |
| 1,000–2,000 | 14,900. | 147 | 2.179 | 307 | 4.472 |
| 2,000–3,000 | 10,400. | 29 | .301 | 60 | 2.293 |
| 3,000–4,000 | 43,000. | 15 | .645 | 31 | 1.992 |
| Over 4,000 [2] | 84,000. | 16 | 1.347 | 16 | 1.347 |
| | | | *1926* | | |
| | 12. | 2,500,000 | 30. | 7,500,000 | 300. |
| Below 5 [1] | 16.4 | 2,500,000 | 41. | 5,000,000 | 270. |
| | 32.7 | 1,500,000 | 49. | 2,500,000 | 229. |
| | 43.5 | 105,132 | 4.566 | 1,000,000 | 180. |
| 5– 10 | 71. | 560,549 | 39.9 | 894,868 | 175.434 |
| 10– 25 | 180. | 246,730 | 44.4 | 334,319 | 135.534 |
| 25– 50 | 500. | 57,487 | 28.74 | 87,589 | 91.134 |
| 50– 100 | 1,300. | 20,520 | 27.46 | 30,102 | 63.394 |
| 100– 150 | 2,100. | 4,724 | 9.94 | 9,582 | 35.934 |
| 150– 300 | 3,100. | 3,267 | 10.1 | 4,858 | 25.994 |
| 300– 500 | 5,400. | 892 | 4.83 | 1,591 | 15,894 |
| 500–1,000 | 10,000. | 468 | 4.68 | 699 | 11.064 |
| 1,000–2,000 | 14,900. | 160 | 2.365 | 231 | 6.384 |
| 2,000–3,000 | 40,000. | 34 | 1.36 | 71 | 4.019 |
| 3,000–4,000 | 41,000. | 14 | .574 | 37 | 2.659 |
| Over 4,000 [2] | 91,000. | 23 | 2.085 | 23 | 2.085 |
| | | | *1927* | | |
| | 13.6 | 2,500,000 | 34. | 7,500,000 | 331. |
| Below 5 [1] | 17.2 | 2,500,000 | 43. | 5,000,000 | 297. |
| | 27.3 | 1,500,000 | 41. | 2,500,000 | 254. |
| | 65.1 | 80,403 | 5.247 | 1,000,000 | 213. |
| 5– 10 | 67. | 567,700 | 38.1 | 919,597 | 207.753 |
| 10– 25 | 210. | 252,079 | 52.9 | 351,897 | 169.653 |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS *(thousands of dollars)* A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) *(millions of dollars)* D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) *(millions of dollars)* F |
|---|---|---|---|---|---|
| | | *1927* | | | |
| 25– 50 | 640. | 66.123 | 42.5 | 99,818 | 116.753 |
| 50– 100 | 1,300. | 22.573 | 29.5 | 33.695 | 74.253 |
| 100– 150 | 2,210. | 5.261 | 11.7 | 11,122 | 44.753 |
| 150– 300 | 3,500. | 3.873 | 13.6 | 5.861 | 33.053 |
| 300– 500 | 5,600. | 1.141 | 6.50 | 1.988 | 19.453 |
| 500–1,000 | 10,000. | 557 | 5.57 | 847 | 12.953 |
| 1,000–2,000 | 16,500. | 194 | 3.2 | 290 | 7.383 |
| 2,000–3,000 | 24,500. | 55 | 1.342 | 96 | 4.183 |
| 3,000–4,000 | 43,000. | 22 | .916 | 41 | 2.841 |
| Over 4,000 [2] | 100,000. | 19 | 1.895 | 19 | 1.895 |
| | | *1928* | | | |
| | 8.8 | 2,500,000 | 22. | 7,500,000 | 310. |
| Below 5 [1] | 12. | 2,500,000 | 30. | 5,000,000 | 288. |
| | 28.6 | 1,489,113 | 42.617 | 2,500,000 | 258. |
| 5– 10 | 62.5 | 628,766 | 39.2 | 1,010,887 | 215.383 |
| 10– 25 | 200. | 270,889 | 54.2 | 382,121 | 176.183 |
| 25– 50 | 520. | 68,048 | 36. | 111,232 | 121.983 |
| 50– 100 | 1,110. | 27,207 | 30.25 | 43,184 | 85.983 |
| 100– 150 | 1,900. | 7,049 | 13.4 | 15,977 | 55.733 |
| 150– 300 | 2,900. | 5,678 | 16.42 | 8,928 | 42.333 |
| 300– 500 | 4,700. | 1,756 | 8.25 | 3,250 | 25.913 |
| 500–1,000 | 6,400. | 983 | 6.3 | 1,494 | 17.663 |
| 1,000–2,000 | 14,300. | 356 | 5.1 | 511 | 11.363 |
| 2,000–3,000 | 27,500. | 91 | 2.5 | 155 | 6.263 |
| 3,000–4,000 | 26,000. | 20 | .52 | 64 | 3.763 |
| 4,000–5,000 | 43,000. | 18 | .773 | 44 | 3.243 |
| Over 5,000 | 95,000. | 26 | 2.470 | 26 | 2.470 |
| | | *1929* | | | |
| | 9.3 | 2,500,000 | 23. | 7,500,000 | 300. |
| Below 5 [1] | 14.4 | 2,500,000 | 36. | 5,000,000 | 277. |
| | 25.7 | 1,467,929 | 37.77 | 2,500,000 | 241. |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1929* | | |
| 5– 10 | 65. | 658,039 | 42.8 | 1,032,071 | 203.23 |
| 10– 25 | 192. | 271,454 | 52.1 | 374,032 | 160.43 |
| 25– 50 | 530. | 63,689 | 33.7 | 102,578 | 108.33 |
| 50– 100 | 1,050. | 24,073 | 25.4 | 38,889 | 74.63 |
| 100– 150 | 1,770. | 6,376 | 11.25 | 14,816 | 49.23 |
| 150– 300 | 2,530. | 5,310 | 13.48 | 8,440 | 37.98 |
| 300– 500 | 4,300. | 1,641 | 7.05 | 3,130 | 24.50 |
| 500–1,000 | 7,300. | 976 | 7.12 | 1,489 | 17.450 |
| 1,000–2,000 | 13,100. | 357 | 4.68 | 513 | 10.330 |
| 2,000–3,000 | 19,300. | 67 | 1.29 | 156 | 5.650 |
| 3,000–4,000 | 24,500. | 32 | .782 | 89 | 4.360 |
| 4,000–5,000 | 38,000. | 19 | .723 | 57 | 3.578 |
| Over 5,000 | 75,000. | 38 | 2.855 | 38 | 2.855 |
| | | | *1930* | | |
| | 3.2 | 2,500,000 | 8. | 7,500,000 | 190. |
| Below 5 [1] | 4.8 | 2,500,000 | 12. | 5,000,000 | 182. |
| | 13.9 | 1,500,000 | 21. | 2,500,000 | 170. |
| | 26.1 | 189,588 | 4.938 | 1,000,000 | 149. |
| 5– 10 | 56. | 550,977 | 31. | 810,412 | 144,062 |
| 10– 25 | 210. | 198,762 | 41.8 | 259,435 | 113,062 |
| 25– 50 | 590. | 40,845 | 24.1 | 60,673 | 71,262 |
| 50– 100 | 1,300. | 13,645 | 17.75 | 19,828 | 47,162 |
| 100– 150 | 2,350. | 3,111 | 7.3 | 6,203 | 29,412 |
| 150– 300 | 3,900. | 2,071 | 8.09 | 3,092 | 22,112 |
| 300– 500 | 6,900. | 552 | 3.81 | 1,021 | 14,022 |
| 500–1,000 | 12,700. | 318 | 4.05 | 469 | 10,212 |
| 1,000–2,000 | 25,000. | 110 | 2.75 | 151 | 6,162 |
| 2,000–3,000 | 42,000. | 21 | .882 | 40 | 3,412 |
| Over 3,000 [2] | 133,000. | 19 | 2.530 | 19 | 2,530 |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS *(thousands of dollars)* A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) *(millions of dollars)* D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) *(millions of dollars)* F |
|---|---|---|---|---|---|
| | | | *1931* | | |
| | 2.8 | 2,500,000 | 7. | 7,500,000 | 130. |
| Below 5 [1] | 3.6 | 2,500,000 | 9. | 5,000,000 | 123. |
| | 10. | 1,500,000 | 15. | 2,500,000 | 114. |
| | 21.1 | 409.269 | 8.6 | 1,000,000 | 99. |
| 5– 10 | 51. | 417,655 | 21.35 | 590,731 | 90.40 |
| 10– 25 | 200. | 137,754 | 27.6 | 173,076 | 69.05 |
| 25– 50 | 585. | 24,308 | 14.28 | 35,322 | 41.45 |
| 50– 100 | 1,320. | 7,830 | 10.35 | 11,014 | 27.17 |
| 100– 150 | 2,600. | 1,634 | 4.25 | 3,184 | 16.82 |
| 150– 300 | 4,400. | 1,056 | 4.65 | 1,550 | 12.57 |
| 300– 500 | 7,500. | 268 | 2.02 | 494 | 7.92 |
| 500–1,000 | 18,500. | 149 | 2.762 | 226 | 5.900 |
| 1,000–2,000 | 24,000. | 54 | 1.3 | 77 | 3.138 |
| 2,000–3,000 | 41,000. | 12 | .492 | 23 | 1.838 |
| Over 3,000 [2] | 122,000. | 11 | 1.346 | 11 | 1.346 |
| | | | *1932* | | |
| | 2. | 2,500,000 | 5. | 7,500,000 | 84. |
| Below 5 [1] | 3.2 | 2,500,000 | 8. | 5,000,000 | 79. |
| | 6. | 1,500,000 | 9. | 2,500,000 | 71. |
| | 14. | 643,558 | 9.062 | 1,000,000 | 62. |
| 5– 10 | 52. | 251,014 | 13.1 | 356,442 | 52.938 |
| 10– 25 | 180. | 79,210 | 14.3 | 105,428 | 39.838 |
| 25– 50 | 480. | 18,480 | 8.9 | 26,218 | 25.538 |
| 50– 100 | 1,250. | 5,902 | 7.4 | 7,738 | 16.638 |
| 100– 150 | 2,750. | 995 | 2.74 | 1,836 | 9.238 |
| 150– 300 | 4,800. | 595 | 2.86 | 841 | 6.498 |
| 300– 500 | 9,000. | 140 | 1.26 | 246 | 3.638 |
| 500–1,000 | 16,500. | 86 | 1.42 | 106 | 2.378 |
| 1,000–2,000 | 35,000. | 15 | .525 | 20 | .958 |
| Over 2,000 [2] | 86,500. | 5 | .433 | 5 | .298 |

TABLE 2—*Cont.*

DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B X C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1933* | | |
| | 2.8 | 2,500,000 | 7. | 7,500,000 | 110. |
| Below 5 [1] | 4.4 | 2,500,000 | 11. | 5,000,000 | 103. |
| | 7.7 | 1,500,000 | 11.5 | 2,500,000 | 92. |
| | 19. | 668,108 | 12.67 | 1,000,000 | 80.50 |
| 5– 10 | 69. | 229,754 | 15.88 | 331,892 | 67.83 |
| 10– 25 | 231. | 75,643 | 17.4 | 102,138 | 51.95 |
| 25– 50 | 630. | 18,423 | 11.63 | 26,495 | 34.55 |
| 50– 100 | 1,640. | 6,021 | 9.89 | 8,072 | 22.92 |
| 100– 150 | 3,150. | 1,084 | 3.42 | 2,051 | 13.03 |
| 150– 300 | 5,900. | 695 | 4.11 | 967 | 9.61 |
| 300– 500 | 11,000. | 141 | 1.553 | 272 | 5.5 |
| 500–1,000 | 21,500. | 81 | 1.755 | 131 | 3.947 |
| 1,000–2,000 | 30,000. | 39 | 1.17 | 50 | 2.192 |
| Over 2,000 [2] | 93,000. | 11 | 1.022 | 11 | 1.022 |
| | | | *1934* | | |
| | 3.6 | 2,500,000 | 9. | 7,500,000 | 138. |
| Below 5 [1] | 5.6 | 2,500,000 | 14. | 5,000,000 | 129. |
| | 10.6 | 1,500,000 | 16. | 2,500,000 | 115. |
| | 24.5 | 577,353 | 14.09 | 1,000,000 | 99. |
| 5– 10 | 74. | 290,824 | 21.6 | 422,647 | 84.91 |
| 10– 25 | 240. | 102,892 | 24.775 | 131,823 | 63.31 |
| 25– 50 | 700. | 20,931 | 14.638 | 28,931 | 38.535 |
| 50– 100 | 1,720. | 6,093 | 10.480 | 8,000 | 23.897 |
| 100– 150 | 3,750. | 982 | 3.690 | 1,907 | 13.417 |
| 150– 300 | 6,800. | 690 | 4.7 | 925 | 9.727 |
| 300– 500 | 12,800. | 116 | 1.489 | 235 | 5.027 |
| 500–1,000 | 24,500. | 86 | 2.11 | 119 | 3.538 |
| 1,000–2,000 | 23,500. | 25 | .588 | 33 | 1.428 |
| Over 2,000 [2] | 106,000. | 8 | .848 | 8 | .848 |

TABLE 2—*Cont.*

## DISTRIBUTION OF WEALTH IN THE UNITED STATES

| INCOME CLASS (*thousands of dollars*) A | AVERAGE WEALTH PER PERSON B | NUMBER OF INCOME RECIPIENTS C | AGGREGATE WEALTH (B × C) (*millions of dollars*) D | PERSONS WITH INCOMES ABOVE SPECIFIED LIMITS (COL. C CUMULATED FROM BOTTOM UP) E | TOTAL WEALTH HELD BY PERSONS WITH INCOMES ABOVE SPECIFIED LIMIT (COL. D CUMULATED FROM BOTTOM UP) (*millions of dollars*) F |
|---|---|---|---|---|---|
| | | | *1935* | | |
| Below 5 [1] | $3.6 | 2,500,000 | 9. | 7,500,000 | 137. |
| | 5.6 | 2,500,000 | 14. | 5,000,000 | 128. |
| | 10. | 1,500,000 | 15. | 2,500,000 | 114. |
| | 28.5 | 499,885 | 14.269 | 1,000,000 | 99. |
| 5– 10 | 62. | 339,842 | 21. | 500,115 | 84.731 |
| 10– 25 | 193. | 123,564 | 23.8 | 160,273 | 63.731 |
| 25– 50 | 580. | 26,029 | 15.1 | 36,709 | 39.931 |
| 50– 100 | 1,300. | 8,033 | 10.4 | 10,680 | 24.831 |
| 100– 150 | 2,700. | 1,395 | 3.9 | 2,647 | 14.431 |
| 150– 300 | 5,000. | 896 | 4.5 | 1,252 | 10.531 |
| 300– 500 | 10,000. | 206 | 2.06 | 356 | 6.031 |
| 500–1,000 | 17,300. | 109 | 1.89 | 150 | 3.971 |
| 1,000–2,000 | 33,500. | 31 | 1.04 | 41 | 2.081 |
| Over 2,000 [2] | 101,000. | 10 | 1.041 | 10 | 1.041 |
| | | | *1936* | | |
| Below 5 [1] | 7.4 | 2,500,000 | 18. | 7,500,000 | 189. |
| | 8. | 2,500,000 | 20. | 5,000,000 | 171. |
| | 15.3 | 1,500,000 | 23. | 2,500,000 | 151. |
| | 34. | 323,009 | 11.028 | 1,000,000 | 128. |
| 5– 10 | 64. | 440,866 | 28.4 | 676,991 | 116.972 |
| 10– 25 | 180. | 176,649 | 32. | 236,125 | 88.572 |
| 25– 50 | 550. | 41,137 | 22.6 | 59,476 | 56.572 |
| 50– 100 | 1,130. | 13,620 | 15.45 | 18,339 | 33.972 |
| 100– 150 | 2,100. | 2,606 | 5.49 | 4,719 | 18.522 |
| 150– 300 | 3,600. | 1,544 | 5.59 | 2,113 | 13.032 |
| 300– 500 | 7,700. | 330 | 2.55 | 569 | 7.442 |
| 500–1,000 | 14,300. | 178 | 1.55 | 239 | 4.892 |
| 1,000–2,000 | 23,000. | 42 | .965 | 61 | 2.342 |
| Over 2,000 [2] | 72,500. | 19 | 1.377 | 19 | 1.377 |

[1] The estimates for the classes below $5,000 involve considerable extrapolation.
[2] Grouped.

## 4 COMPARISON OF THE ESTIMATES

The results of this and other studies, plotted on Charts 1, 2, and 3, suggest the following conclusions:

1. Except for approximately the fifty wealthiest individuals, the curves for all years are noticeably symmetrical, and, as is necessarily the case with unequal distributions plotted in this manner, are somewhat concave in all phases of the business cycle.

2. During the years of the upswing, ending in 1929, aggregate national wealth increased steadily, but no marked changes occurred in the character of the distribution. Virtually no changes in inequality occurred. During the depression years, 1930–32, there was a considerable flattening of the curve, indicating increasing inequality. With the beginning of recovery in 1933 the curves became more sharply diagonal, i.e., the left end fell somewhat and the right end moved upward. Thus it may be concluded that the capitalization of income approaches are sensitive to year-to-year changes in the business cycle and, contrary to changes in the distribution of income, inequality in the distribution of wealth is accentuated during depression years.

3. The wealth of the 7,500,000 persons with the largest incomes is shown to have increased approximately $130 billion during 1922–28, or as much as or more than the entire national wealth increased according to any existing estimates. It is not likely that their wealth was enhanced at the expense of lower wealth classes. The sharp increases in national wealth in Doane's national wealth estimates, in excess of Kuznets' figures on capital formation,[23] seem to be confirmed. But we are here in the treacherous field of valuation. For it may likewise be argued that negative savings in depression years cannot be so great as indicated by the present curves or by the estimates of national wealth by Doane and the National Industrial Conference Board for 1930–32. This aspect of the problem requires further investigation beyond the scope of this paper. For this reason the present writer hesitates to present the results in the usual manner, namely, that certain percentages of the population possess certain percentages of the total wealth in given years.

[23] Simon Kuznets, *National Income and Capital Formation* (National Bureau of Economic Research, 1937), p. 48.

Chart 1

DISTRIBUTION OF WEALTH IN THE UNITED STATES AS ESTIMATED BY THE LEHMANN METHOD
1922 – 1929

Chart 2

DISTRIBUTION OF WEALTH IN THE UNITED STATES AS ESTIMATED BY THE LEHMANN METHOD
1929 – 1936

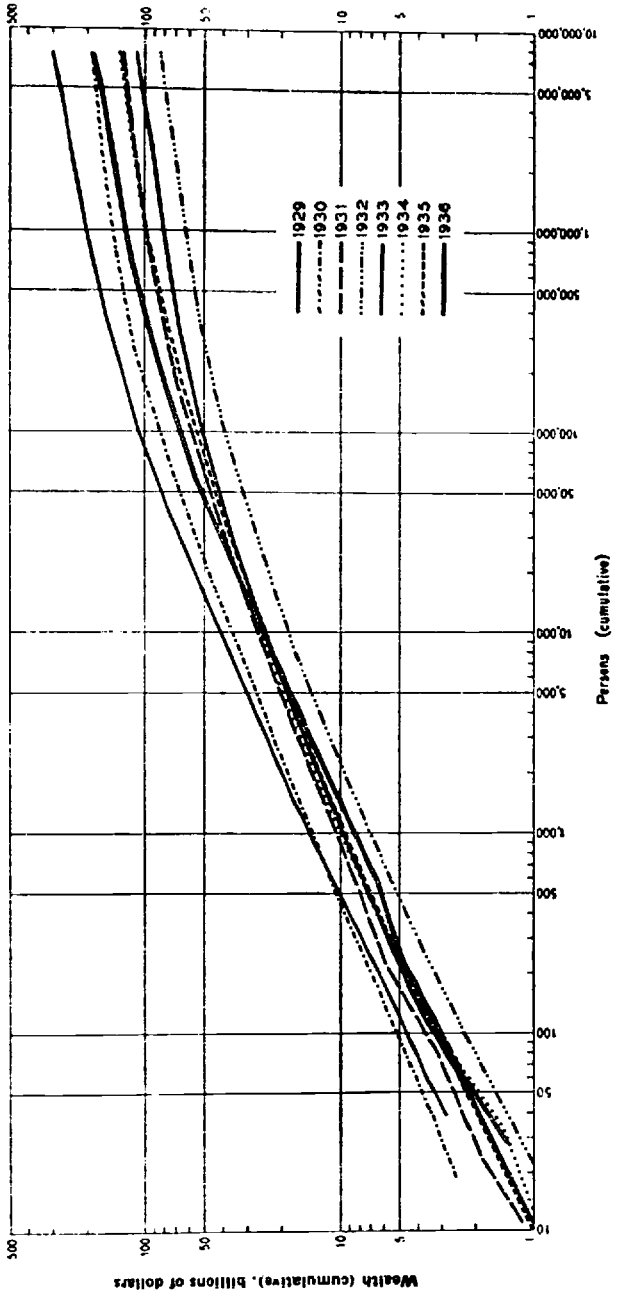
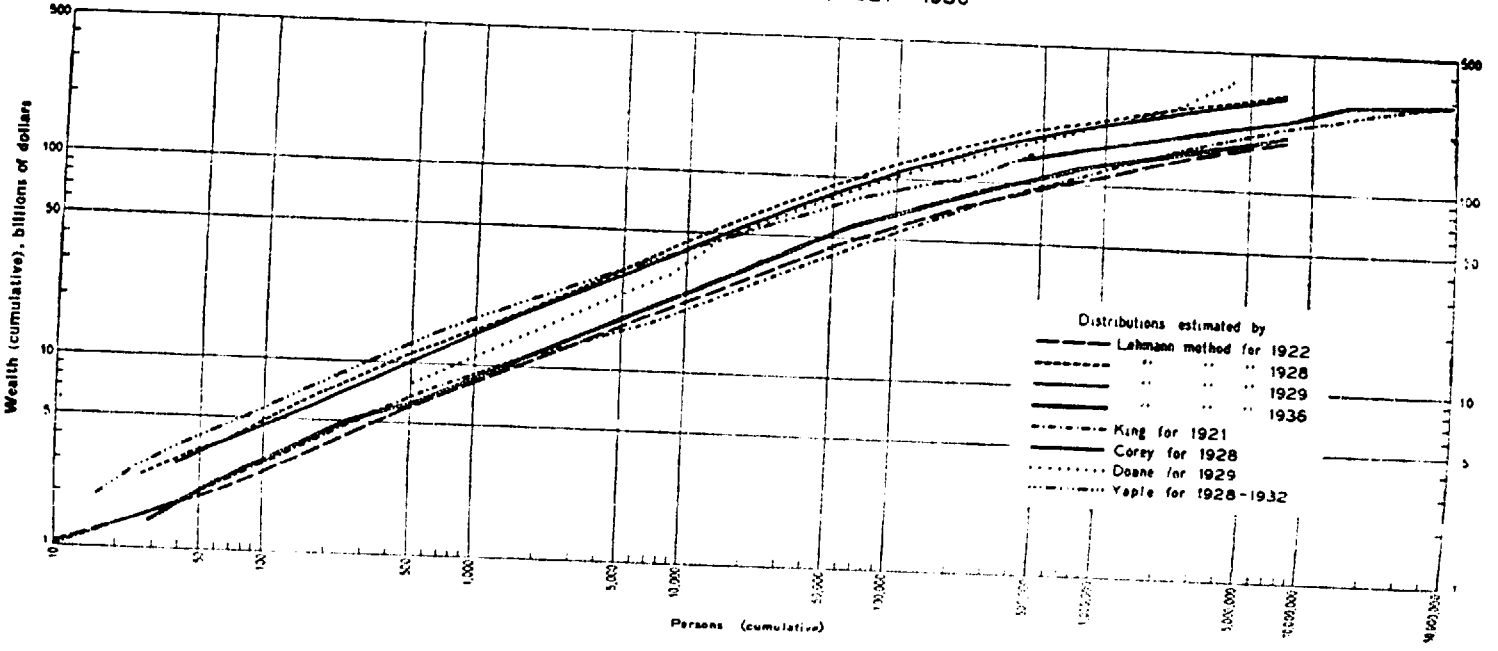


Chart 3

## COMPARISON OF DIFFERENT ESTIMATES OF THE DISTRIBUTION OF WEALTH IN THE UNITED STATES FOR SELECTED YEARS, 1921 - 1936



4. The lower two curves on Chart 3 depict King's distribution for 1921 and the present study's estimate for 1922. It has already been noted that the curves intersect at three points. If a total wealth figure of $309 billion,[24] or any amount in excess of King's estimate of $281,159 million for 1921, is assumed for 1922, the curves would again cross. The results at the points of crossing are summarized in the accompanying table. Two substan-

THE DISTRIBUTION OF WEALTH, 1921–1922

| PERSONS [25] | WEALTH | PERCENTAGE OF TOTAL WEALTH |
|---|---|---|
| 40 | $ 1,780,000,000 | ½ of 1 |
| 4,000 | 14,500,000,000 | 5 |
| 400,000 | 90,000,000,000 | 30 |
| 17,000,000 | 230,000,000,000 | 74.5 to 81.5 |

tially different income-capitalization methods thus give closely comparable results and confirm the rough calculations of Ingalls.

5. Corey's distribution of non-income yielding wealth for 1928 is the short solid line at the right side of Chart 3. Inasmuch as Corey did not show the stratifications within the broad social groups he employed, the first datum plotted is for the wealthiest 382,341 persons of the Upper Bourgeoisie. The curve intersects the tail of another distribution, that of Miss Yaple's for 1928–32. While neither the strict capitalization method of Miss Yaple nor the special method of the present study are applicable to the lowest classes of wealth, Corey's conclusions may be tested by the results. In the first place Miss Yaple's curve, embracing depression as well as prosperity years, is on much the same level as Corey's; for 1928 her technique would have yielded higher wealth figures than his. It is to be expected that a distribution of income-yielding wealth would be more unequal than a distribution of total wealth. But assuming that the distribution becomes more unequal in depression years, the shapes either of Corey's or Miss Yaple's curves may be questioned. One curve begins where the other ends, but the slopes are somewhat different. One would expect Corey's slope to be less flat than Miss Yaple's, or *vice versa*. Caution must be used in drawing conclusions, for they

[24] Derived from the estimate of the Federal Trade Commission for 1922.

[25] King distributes the total among 40,900,000 persons for 1921. For 1922 the number of 'gainfully employed', 43,600,000 persons, is used.

can be only tentative. Again it must be said that the results are remarkably close in view of the substantially different methods.

6. Miss Yaple's figures indicate that the wealthiest brackets possess more income-yielding wealth than the estimate of total wealth for these classes in the present study. There are possibilities of error in her method, discussed previously. But, as already pointed out, the present results are most unreliable for the first 10 or more persons. A strict capitalization approach, therefore, might well be used at least as a check upon the present method in the highest brackets.

7. Doane's curve for 1929 is roughly parallel to the present study's for the same year, and would be much more similar in shape were it not for two minor arithmetical errors which account for the sharp rises in the curve. Both estimates assign an identical amount of wealth to the first million and a quarter persons. The irregularity at the right extremity of Doane's curve should be ignored, not only because it results from a slight error, but because of the shortcomings of the income tax data for the classes below $5,000. As stated previously, Doane's estimate refers only to income tax classes and must, therefore, be supplemented by other methods.

8. Comparing the property pyramid in the United States in 1922 and 1936, one can observe no marked tendency toward increasing or decreasing equality. If the results are reliable, there is a remarkable similarity between the distributions of 1921–22 and 1936. Waiving the question of the changes in general price level, the results suggest the influence of the depression in terms of national wealth. The question of the impact of continued heavy taxation upon income and wealth in the future is another matter, but British experience indicates that the consequence is an arresting of the tendency toward increasing inequality rather than any positive movement toward increased equality. The same result is predicted for the United States in the study by Colm and Lehmann already referred to.

## *IV A Concluding Statement*

In conclusion it may be emphasized that the most general problem, common to all methods based upon the capitalization approach, is the determination of the wealth total, which requires agreement as to the practical limitation of the definition. It cannot continue to be urged, for example, that the wealth total is meaningless if it excludes human capital. Whether the aggregates for size groups can be added together to give a total wealth figure depends upon the reliability of the methods. The results thus obtained, however, may be checked against estimates obtained by other methods. But in any case the total inventory, its definition and comprehensiveness, remains the chief general problem.

The various methods discussed are subject to certain common problems, as indicated in the text. In the first place, none of the methods today is adapted particularly to the treatment of wealth and its distribution in the lower brackets, except by means of a considerable measure of extrapolation. Lehmann's method is applicable only to the income and estate tax brackets, and must necessarily be supplemented by other methods. These other methods have not yet been devised. No substantial improvement has been made in this connection since King's estimate of 1921. It is suggested that the existing probate court records offer an important field for investigation for small estates,[26] though apparently small estates are not consistently probated in all states. Until more refined methods are developed for handling the problem of the lower brackets, the results of any of the methods must be rather suspect in the lower ranges. And for this country the solution of the problem by the estate-multiplier method awaits the development of an estate tax comparable to the English.

Certain other difficulties are shared by the various methods: (1) the determination of accurate average earning ratios; (2) the use of a single rate of yield for the various strata of income and wealth; (3) the many inadequacies of the income tax data—par-

[26] Cf. Colm and Lehmann, *op. cit.*, p. 48.

ticularly the treatment of capital gains and losses, and the influence of undistributed profits by closely held corporations.

Special difficulties involved in the Lehmann method include: (1) the various inadequacies of the estate tax data—the smallness of the sample in the higher classes, the time lag in the dates of filing and valuation, and the sharp break in the data at the lower end of the distribution resulting from the large exemptions permitted; (2) the problem of gifts *inter vivos*; (3) the assumption that the younger and older generation of wealthy individuals (i.e., the living and the dying) hold similar proportions of their wealth in the form of corporate stock; (4) the use of the regression of stock on wealth, rather than wealth on stock, in the matching process.

The present estimates of the distribution of wealth are perhaps sufficiently accurate to indicate the relative measure of wealth inequality in the United States, the smallness of any changes in inequality over fifteen years, the influence of the business cycle; and to provide materials for analysis in the field of public finance and taxation. Whatever purposes wealth distributions may be used for, accurate distributions make simpler the derivations of breakdowns of the results according to geographical divisions or estate composition when these are needed for purposes of economic analysis. This is particularly true if the wealth distributions are closely associated, statistically, with the income data.

## *Discussion*

### I MILTON FRIEDMAN

Any judgment of the adequacy of the method utilized by Mr. Stewart to derive distributions of wealth must in large part hinge on the purposes for which the distributions are desired. If the major purpose is to obtain an approximate indication of the degree of inequality of wealth in any one year or period of years, then relatively large margins of error can be tolerated. On the other hand, if the purpose is to investigate changes in inequality from year to year or over fairly short periods, much stricter standards must be applied. Our knowledge of the direction, and much less the magnitude, of such changes even over long periods is exceedingly meager. But that very fact suggests that the changes cannot be very large: if they were, even the exceedingly inadequate data available could not have failed to reveal them. Mr. Stewart's purpose seems clearly to be the establishment of year-to-year changes in the distribution of wealth; else he would scarcely have computed the distribution of wealth in each of a period of years. If it is granted that such changes must be exceedingly small, then the method he employs must be judged by strict standards, with even relatively minor biases worthy of attention.

The method devised by Professor Lehmann and employed by Mr. Stewart rests on two sets of data: one derived from federal income tax data, the other from estate tax data. The income tax data show the number of individuals and the average amount of dividends received in each of a large number of income classes. The estate data show the average value of the corporate stock held by estates in each of a large number of estate or wealth classes. These two bodies of data are combined by capitalizing the average amount of dividends received by individuals in each income class, entering the estate table with the resultant esti-

mates of value of corporate stock, and determining the average wealth of the classes that own those amounts of stock. The individuals in each income class are then attributed the average wealth of the wealth class that owns the same average amount of stock. The class intervals of the final wealth distribution are thus stated in terms of amounts of income, and the number of individuals in each class is the same as the number of income recipients in the original income table.

The difficulties with this method are of two types. There are, first, the difficulties arising from the character and reliability of the data: the difficulty of accurately estimating the capitalization factor; the empirical necessity of using the same capitalization factor for all income classes: the fewness of the returns in the very high, and the absence of any returns in the very low, wealth classes and the consequent necessity of extrapolation; the decidedly different age distribution of the individuals covered by the estate data and those covered by the income tax data; the use of figures based on unaudited returns; the biased nature of the sample of individuals filing income tax returns; the absence of a wealth total that might be employed to correct at least partly for this bias; the conceptual difficulties with the income total used to classify individuals by income classes; and so on. Second, there are the difficulties inherent in the method that could not be removed by any conceivable improvement in the data employed.

The comments that follow are restricted almost exclusively to the difficulties of the second type, although some consideration will be given to one aspect of the character of the data—the treatment of capital gains in the income concept—that seems to be of crucial importance for the measurement of year-to-year changes by the Lehmann method. Practically all the difficulties of the first type are mentioned and adequately discussed by Mr. Stewart, while he does not deal with those of the second type. Further, the difficulties connected with the character and reliability of the data might conceivably be removed or rectified; those inherent in the method cannot.

### 1 DIFFICULTIES INHERENT IN THE METHOD

The difficulties inherent in the method center about the exact interpretation of the classes in the tables purporting to describe the distribution of wealth. Offhand, one is tempted to suppose that they are what they pretend to be, namely, classes of income recipients, and that the wealth assigned to a given class is an estimate of the wealth owned by individuals with incomes between the limits defining the class interval. But this interpretation which appears to be accepted by both Professor Lehmann and Mr. Stewart is, on further analysis, untenable. Before passing to this analysis, however, it may be well to point out the implications of such an interpretation, since the other methods of obtaining wealth distributions by capitalizing income, with which Mr. Stewart compares the Lehmann method, yield, in theory, essentially a distribution of wealth by income classes.

Let us suppose that we have a table showing the *wealth* owned by individuals in successive *income* classes. What relationship will such a distribution bear to one showing the *wealth* owned by individuals in successive *wealth* classes? It is clear that the former distribution will tend to show less inequality than the latter. The 10 per cent of individuals holding the smallest amounts of wealth must hold a smaller proportion of total wealth than 10 per cent of the individuals chosen on any other criterion, unless this other criterion is perfectly correlated with amount of wealth, in which case the two groups will hold the same proportion of total wealth. More generally, if individuals are classified by the amount of wealth owned, the resultant classes clearly differ with respect to amount of wealth by as much as or more than if any other basis of classification, say size of income, is used. The seriousness of this bias in the direction of showing less inequality than actually exists depends on the degree of correlation between wealth and income. The higher the correlation, the less the difference between the degree of inequality of a distribution of wealth by income classes and a distribution of wealth by wealth classes. The correlation between wealth and income is doubtless fairly high, although few data bear directly on the problem.

Chart 1 may, however, serve to illustrate the magnitude of

the difference between distributions of wealth by wealth classes and by income classes. It is based on the Australian Census of Wealth and Income taken in 1915.[1] The heavy solid line in the

Chart 1

LORENZ CURVES SHOWING DISTRIBUTION OF WEALTH BY WEALTH CLASSES AND BY INCOME CLASSES AUSTRALIA, 1915

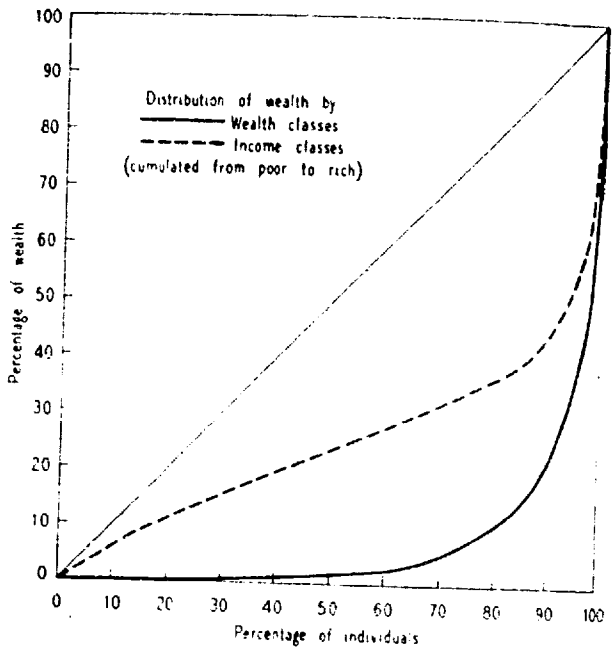



chart is a Lorenz curve based on the observed distribution of wealth by wealth classes.[2] The broken line is based on the distri-

[1] G. H. Knibbs, *The Private Wealth of Australia and Its Growth* (Commonwealth of Australia. Commonwealth Bureau of Census and Statistics, Melbourne, 1918), pp. 30, 31, 49. The table in this volume cross classifying individuals by size of income and of wealth suggests a fairly high but far from perfect correlation. This statement is based on visual inspection only but is supported by Chart 1.

[2] The Lorenz curve is a useful device for depicting graphically the degree of relative inequality. Along the horizontal axis is measured the percentage of individuals, arrayed in order of wealth (or income, etc.). Along the vertical axis is measured the percentage of the total wealth owned (income received) by the corresponding percentage of individuals. Thus the various points on a Lorenz curve indicate the proportion of total wealth owned by the poorest 1 per cent, 2 per cent, etc. of individuals. If each individual owned the same amount of wealth, it is evident that the percentage of wealth would be the same as the percentage of individuals,

bution of wealth by income classes. It gives the percentages of wealth held by successive percentages of individuals arrayed by size of income. The very marked discrepancy between the two curves suggests the extreme dubiousness of treating a distribution of wealth by income classes as an approximation to a distribution of wealth by wealth classes.[3]

From the viewpoint of year-to-year comparisons, the temporal stability of the correlation between wealth and income is perhaps of even greater importance than its size. For if it were stable, the bias would be approximately constant, and year-to-year changes in the distribution of wealth by income classes might reasonably be taken to reflect year-to-year changes in the distribution of wealth by wealth classes. Unfortunately, this convenient assumption cannot be made. The amount of wealth owned by an individual is probably typically far more stable over time than the amount of income received; and the 'probably' can be converted into 'almost certainly' if income is defined to include capital gains and/or losses, as it is in the income tax figures. The degree of correlation between income and wealth can thus reasonably be supposed to vary considerably from year to year; and, as a consequence, the bias inherent in using a distribution of wealth by income classes is also subject to considerable variation. Year-to-year changes in such distributions can thus not be assumed to reflect year-to-year changes in the distribution of wealth by wealth classes without a careful analysis of the magnitude of the bias relative to the magnitude of temporal changes in the latter distribution, an analysis that

and that the Lorenz curve would be a straight line. The straight diagonal lines in the charts are thus designated the lines of equal distribution. The greater the divergence between the Lorenz curve and the line of equal distribution the greater the inequality (M. O. Lorenz, 'Methods of Measuring the Concentration of Wealth', *American Statistical Association Publications*, New Series, No. 70 (June 1905), pp. 209–19).

[3] The early part of the broken curve in Chart 1 will appear strange to those accustomed to Lorenz curves: the first two segments of the curve have steeper slopes than the next. This is of course impossible if the vertical axis measures the percentage of the characteristic by which the individuals are arrayed—as with the solid line. It is entirely possible however when, as with the broken line, the individuals are arrayed by a different characteristic. It reflects the fact that the average wealth of the two lowest income classes—those with incomes below £50—is greater than that of the next income class, presumably because the intermediate income groups derive a considerably greater proportion of their income from earnings than the very low income groups.

may well be impossible without data that would make the whole procedure unnecessary.

As already indicated, these remarks are to some extent directed against a 'straw man'. The Lehmann procedure does not yield a distribution of wealth by income classes. To obtain an approximation to this distribution it would be necessary to combine the income and estate tax data in a different fashion than is done in the Lehmann method. Most nearly exact would be the utilization of a cross tabulation of the income tax data showing the number of individuals receiving dividends of various amounts by income classes. The average amount of stock owned would be determined by capitalization. The average wealth of individuals owning the average amount of stock held by each dividends-income class would then be ascertained, weighted by the number of individuals in each class, and added for each income class. This would involve employing the regression of wealth on stock rather than the regression of stock on wealth, the one employed in the Lehmann method.[4] A less exact procedure, but one that would presumably though not necessarily yield a closer approximation than the Lehmann method, would be to eliminate the step requiring a cross classification, but to use the regression of wealth on stock. Stated differently, this procedure would require the computation from the estate tax data of a table showing the average wealth of individuals owning various amounts of stock, and the use of this table in combining the income and estate tax data.

The Lehmann method matches each wealth class with the income class that holds the same average amount of stock. It is exceedingly difficult to give a simple and unambiguous interpretation to this matching process. In the light of the preceding remarks, it seems clear that it does not give the average wealth held by individuals with the specified income. Nor would it necessarily seem to give the wealth class that occupies the same position in a classification of individuals by amount of wealth that the income class occupies in a classification of individuals by size of income. Offhand, we might expect the result to be

[4] In practice, of course, the truncated nature of the distribution of the estate tax returns by amount of wealth would make exceedingly difficult and treacherous the computation of a regression of wealth on stock.

some mixture of these two and hence the Lehmann procedure to yield a distribution more unequal than the distribution of wealth by income classes, but less unequal than the distribution of wealth by wealth classes. However, the statistical tests described below contradict the last of these conclusions: though in the three tests made the distribution obtained by the Lehmann procedure is uniformly more unequal than that analogous to a distribution of wealth by income classes, in one of the tests it is also more unequal than that analogous to a distribution of wealth by wealth classes. Thus our present conclusion must be exceedingly tentative: the distribution obtained by the Lehmann procedure may be expected to show greater inequality than a distribution of wealth by income classes; we have no reason to expect it to approximate a distribution of wealth by wealth classes but cannot state whether or in what way it will consistently differ from such a distribution.

If this conclusion is valid it means that, for the purpose of obtaining an approximate indication of the degree of inequality in the distribution of wealth, the Lehmann procedure has at least one very important advantage over the other capitalization of income approaches. The latter attempt to approximate a distribution of wealth by income classes and as a result have a very definite bias in the direction of suggesting less inequality than actually exists. The Lehmann procedure, on the other hand, may yield results showing either less or more inequality than actually exists; if the result shows less inequality than actually exists the difference will be smaller than if one of the other methods had been used. This advantage may, of course, be counterbalanced if the possible magnitude of error in the Lehmann method when it shows greater inequality than actually exists is fairly large; but on this point we do not have enough evidence to speak with any confidence. It should be noted that these considerations are only indirectly relevant if the Lehmann procedure is used to study year-to-year changes. For this purpose the relevant question is the temporal constancy of the bias or error in the various methods.

The statistical tests referred to were made with two sets of data. One set consisted of figures on the incomes from independent professional practice of about 1,400 physicians in 1932,

1933, and 1934. The second set consisted of similar figures for about 1,000 dentists.[5] For each set of data tables were available cross classifying the professional practitioners by their income in different years, e.g., size of income in 1933 by size of income in 1932. In performing the experiments for which results are presented professional income in 1933 was treated as analogous to the income reported on income tax returns, professional income in 1932 as analogous to the value of stock held (i.e., as analogous both to the capitalized value of the dividends reported on income tax returns and to the value of the stock owned reported on estate tax returns) and professional income in 1934 as analogous to wealth (i.e., value of estates). Two tables were therefore constructed for each profession, one showing average income in 1932 by 1933 income classes, the other showing average income in 1932 by 1934 income classes. The Lehmann method was then utilized to derive from these tables the estimated distributions of income in 1934 to compare with the known distributions.[6] In addition, a third test was made utilizing the data for physicians but treating income in 1932 as analogous to the income reported on income tax returns and income in 1933 as analogous to the amount of stock owned. The results of this test were intermediate between those of the other two and therefore are not presented: the Lehmann procedure yielded a distribution very close to the correct one.

These experiments are designed to test solely the bias inherent in the method. None of the difficulties arising from the character or reliability of the data is present: capitalization is unnecessary; since the tables cover the whole range of incomes, extrapolation is not required; since the several bodies of data all relate essentially to the same individuals,[7] they are completely free from error arising from non-comparability. Further, even

[5] These data were obtained from returns to questionnaire studies made by the Department of Commerce and are described more fully in Simon Kuznets and Milton Friedman, 'Incomes from Independent Professional Practice, 1929–1936', *Bulletin 72–73* (National Bureau of Economic Research, February 5, 1939).

[6] In applying the Lehmann procedure the actual average incomes in 1932 for each 1933 income class were used. In converting these averages into estimates of 1934 income a linear regression of 1932 income on 1934 income was employed.

[7] There are slight differences because some individuals reported their incomes in 1932 and 1933 but not in 1934, others their incomes in 1933 and 1934 but not in 1932, and so on. But these differences are of very minor importance.

from the purely technical side, the data are exceedingly favorable to the Lehmann method. The correlations between incomes in the different years are extremely high; [8] and, I suspect, are higher than the correlations between income and dividends, wealth and amount of stock owned, or income and wealth. Finally, the fact that the data relate to the same individuals, while listed above as avoiding difficulties connected with the character of the data, also obviates a difficulty inherent in the method. If the wealth and income data related to the same groups of individuals there would be no need to utilize the Lehmann method: the observed wealth distribution would provide a more satisfactory answer.

Chart 2 presents the results of these experiments. The heavy solid lines are the Lorenz curves for the actual 1934 medical and dental distributions: the 'correct' distributions the Lehmann method is designed to approximate. The dotted lines are Lorenz curves based on distributions of 1934 income by 1933 income classes. They are analogous to distributions of wealth by income classes and are the distributions which, according to the interpretation accepted by Professor Lehmann and Mr. Stewart, are approximated by the Lehmann method. In accordance with the above discussion, the dotted lines in both cases indicate considerably less inequality than the solid. Finally, the broken lines are Lorenz curves based on the 1934 distributions obtained by the Lehmann method. For dentists, this line is intermediate between the other two. For physicians, on the other hand, the broken line shows greater inequality than either of the other two. The fact that the errors are in opposite directions in the two cases is peculiarly important in evaluating the usefulness of the Lehmann method in studying year-to-year changes since it suggests that the error may display little temporal stability.

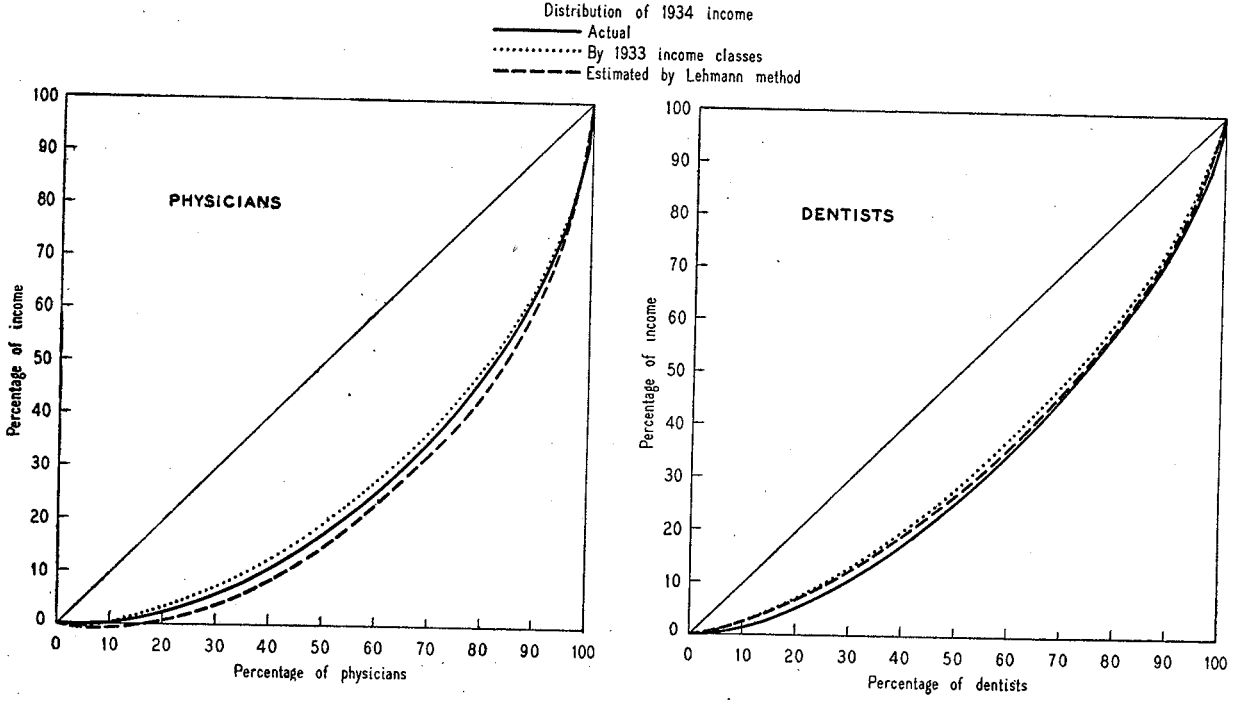
Offhand, the errors suggested by Chart 2 may not seem particularly great. As emphasized above, however, their importance can be judged only by comparison with the differences in equality that it is desired to study. In the present instances these differ-

[8] The correlation coefficients for physicians and dentists are as follows:

| YEARS COMPARED | CORRELATION COEFFICIENT | |
|---|---|---|
| | PHYSICIANS | DENTISTS |
| 1932 and 1933 | .92 | .94 |
| 1933 and 1934 | .95 | .94 |
| 1932 and 1934 | .89 | .91 |

Chart 2

COMPARISONS OF DISTRIBUTIONS OBTAINED BY THE LEHMANN METHOD WITH OTHER DISTRIBUTIONS
LORENZ CURVES BASED ON DATA ON INCOMES OF PHYSICIANS AND DENTISTS



ences are exceedingly small: for both dentists and physicians, the Lorenz curves for 1932 and 1933 practically coincide with the one for 1934 on Chart 2. If the three curves were drawn on a chart the size of Chart 2 it would be impossible to distinguish them. Thus the divergent Lorenz curves in Chart 2 are all obtained from distributions whose Lorenz curves are practically identical.

## 2 INCLUSION OF 'CAPITAL GAINS' IN INCOME REPORTED ON INCOME TAX RETURNS

The treatment of capital gains and losses on income tax returns is one of the deficiencies of the data utilized by Mr. Stewart that is perhaps most important for the purpose for which his distributions have been derived and at the same time has been least adequately discussed by him. The exact treatment of capital gains and losses has varied over the period covered by Mr. Stewart's estimates, but in general the net income figure used in classifying the returns includes capital gains in whole or in part, while for most of the period losses have not been deducted. The effect of this treatment of capital gains and losses on the changes in inequality of *income* shown by income tax data is clear: it tends to make for greater inequality in prosperous years when capital gains are important than in depressed years when capital gains are unimportant and losses are unrecorded.

The effect of this definition of income on the inequality of wealth shown by distributions derived from income tax data by the Lehmann method is more complicated and, strangely enough, in exactly the opposite direction. As noted by Mr. Stewart, the inclusion of capital gains means that during prosperous years the high income groups include many individuals with large receipts from this source and hence with relatively small receipts from dividends. During depressed years, there will be few such individuals and consequently the higher income groups will derive a relatively larger proportion of their income from dividends. The estate tax data will presumably be little affected by capital gains.[9] Consequently, the high income classes will

[9] Whether and how they will be affected will depend on how the increases in wealth from realized capital gains are distributed among various forms of assets.

be matched, during prosperous years, with relatively low wealth classes (those owning the same average amount of stock) and, during depressed years, with relatively higher wealth classes. This introduces a bias that tends to make distributions of wealth derived by the Lehmann method less unequal during prosperous than during depressed years. This bias may be somewhat offset by the direct bias in the original income distribution. The statements about the bias in the estimated wealth distributions do not depend on whether the concept of income that is accepted as the basis for income distributions includes or excludes capital gains or losses. Though personally I should, for most purposes, support an income concept that excludes capital gains or losses, the acceptance of an opposite view in no way affects the preceding argument. And parenthetically, it may be indicated that in view of the difference in the treatment of gains and losses, the bias noted in income distributions based on income tax data is also unaffected by the concept of income accepted.

These comments gain added point in the light of Mr. Stewart's conclusions about the cyclical behavior of the inequality of income and wealth. He states that "contrary to change in the distribution of income, inequality in the distribution of wealth is shown to be accentuated during depression years".[10] Thus, the changes he notes in the inequality of both income and wealth are in the direction that, in the absence of any 'real' changes, the treatment of capital gains and losses might be expected to produce.

## 3 CONCLUSIONS

The statistical experiments outlined above suggest the existence of a definite error inherent in the Lehmann method of estimating the distribution of wealth. This error can hardly be expected to be constant from year to year, and indeed the experiments suggested that it might vary considerably in direction. These experiments, moreover, were heavily weighted in favor of the Lehmann method. In practice, the errors might be expected to be considerably greater, even with entirely accurate data. If to this technical difficulty we add the many and serious deficiencies in the data employed, the conclusion inescapably

[10] Point 2 in Sec. III, 4.

emerges that the Lehmann method is useless for the purpose of studying short period changes in the distribution of wealth—the purpose for which Mr. Stewart utilized it.

Mr. Stewart reaches a conclusion exactly the reverse of the one just stated: "that the capitalization of income approaches are sensitive to year-to-year changes in the business cycle".[11] But this conclusion seems to be based entirely on the irrelevant fact that the distributions he derives vary from year to year. The relevant question is whether these variations reflect changes of the same magnitude and direction in the underlying distributions of wealth that his estimates are designed to approximate.

Our conclusion as to the uselessness of the Lehmann method in studying short period changes does not mean that the method may not be useful for other purposes. Indeed our incomplete analysis suggests that for the purpose of obtaining an approximate indication of the degree of inequality it is superior to the other capitalization of income methods since, while subject to error, it is seemingly not subject to a consistent bias. This conclusion is, however, based solely on the technical characteristics of the methods and does not take into account differences in the adequacy of the data needed for the different approaches. Moreover, even on the technical side, it rests on a seriously incomplete analysis and may be reversed by further evidence.

## II W. L. CRUM

I am much interested in Mr. Stewart's method, and hope to examine it later with care. I am still sanguine about its possibilities, despite certain serious obstacles, including the 'correlation' element mentioned by Mr. Friedman which greatly impresses me. I am tempted to raise some small points:

1. The estate tax data cover a small number of cases in any one year, and that number is strikingly small in high size classes. Hence, the danger of sampling errors in these high classes, as they are used to calculate ratio of stocks to total assets, is very great. This risk is only partly reduced by the curve-fitting operation and it becomes particularly important in the year-to-year comparisons stressed by Mr. Friedman.

[11] See point 2 in Sec. III, 4.

2. The securities in the estate tax figures are usually valued at market, until recent Acts, at date of death. This implies that the capitalization factor should aim to produce *market* values of stocks held by income recipients. This necessity greatly increases the task of determining the capitalization factor in each year.

3. In general, it may be necessary to use a varying capitalization factor from income class to income class. Different income classes may hold varying proportions of stocks, as between dividend payers and others and as between those paying high and those paying low dividends. The income tax law itself may produce a bias of this sort, and other causes of bias may exist about which we may know little. I regard the whole determination of capitalization factors as highly uncertain.

## III FRITZ LEHMANN

When I used the method of combining the results of the income tax statistics with the results of the estate tax statistics in order to estimate crudely the distribution of national wealth, I did not expect that this trick would be found worthy of scientific discussion. The use I made of this method has been questioned in Mr. Stewart's paper. He believes that the margin of error in computing total wealth figures is too great to admit of any conclusion as to how great a percentage of total wealth is owned by one group. I am somewhat more optimistic than he, but since it is a change in the distribution of wealth that is under debate, this is not a suitable opportunity for giving my reasons in greater detail.

If the other methods of obtaining wealth distributions by capitalizing income are compared with the combination method I used, the decision as to which deserves to be rated higher depends on the weighing of some advantages and disadvantages. The combination method has the disadvantage of applying the distribution of property in estates to the property of all living people. It is possible that the wealth of an average living person is invested in a manner quite different from the wealth of deceased persons.

Another disadvantage follows from the fact that *Statistics of Income* groups income receivers according to income, including capital gains. If people with high capital gains are supposed to be people with a preference for stocks, the effect may be that the holding of stocks is over-rated in the higher income groups and under-rated in the lower income groups. But this effect may be offset first by the fact that the members of the wealthier class into which capital gains lift an income receiver of smaller means tend to invest a higher percentage of total property in stocks, second, by the possibility that the realization of capital gains may frequently result in a shift from stocks to other forms of property.

There is a third difference between the two methods which Mr. Stewart believes favors the combination method, while I am inclined to hold the opposite view. The combination method uses only the yield on stocks; this yield is used to estimate the value of the stock owned and from this figure is derived the value of all property of a group of income receivers. The capitalization method has to apply several yields: for stocks, for interest-bearing property, for real estate, and for business. In addition to increasing the difficulties of computation, the use of several yields increases the number of possible errors. On the other hand, the combination method magnifies every mistake committed in estimating the yield of stocks. This is particularly important for the lower income and wealth groups for which stocks constitute only a minor part of all property.

A final disadvantage of the combination method results from the fact that there is a wide variance in the date of death of those for whom estate tax returns are filed in a particular year.

But against all these drawbacks the combination method possesses the very important advantage that it accounts for all property, not only for property that yields taxable income. The grouping of kinds of property in the federal estate tax statistics does not admit of a clear segregation of such items. It is not unlikely however that 30 to 40 per cent of the value of all estates for which returns were filed, say in 1934, consisted of property that yielded no income subject to federal income taxation. The greater the preference of the wealthier groups for liquid bank

deposits, insurance, and tax-exempt securities, the greater will be the advantage of the combination method.

This comparative evaluation of the other capitalization approaches and the combination method takes no account of those criticisms to which both methods are equally exposed, criticisms that center in the objection that reliable results as to the distribution of wealth among different wealth groups can never be obtained from income tax statistics.

## IV CHARLES STEWART

Mr. Friedman was not unjustified in his impression that I was interested in the utility of employing the Lehmann method for obtaining year-to-year changes in the distribution of wealth. Nevertheless I do not attach much importance to such short period changes and, as stated in the paper, the intention of the annual estimates was chiefly the testing of the method. For it does not seem to me that the production of highly refined estimates of changes in wealth distribution from year to year possesses great value for economic analysis. Knowledge of the relative degree of inequality and of shifts in distribution over a period, such as a decade, is, on the other hand, highly important. In the absence of fuller data and more adequate methods, the Lehmann method possesses value for these purposes.

Rather basic in Mr. Friedman's discussion is the question of 'size classes'. It is perhaps something of an historical accident that every distribution of American wealth in the last twenty years has been by income classes rather than by wealth classes. Dr. King, it is true, presented his final results by wealth classes, by converting the distribution by income classes into wealth classes, but in such a way that the conversion was purely one of nomenclature. Mr. Friedman is entirely correct in pointing out, with illustration from the Australian material, that the two distributions are widely divergent. Accidental though it may have been, the result, I think, is quite fortunate: for most purposes for which wealth distributions may be employed, it is highly desirable that they be linked to income distributions. There is no *a priori* reason why income distributions should be by income classes and

wealth distributions by wealth classes. It is important, however, that we be aware of the difference. Consequently I made no effort to convert the present estimates, as Dr. King had done, because I was impressed with the advantages of obtaining results tied closely to the income brackets of *Statistics of Income*.

The ingenious statistical experiments presented in Mr. Friedman's discussion, designed to test whether there is an inherent bias in the Lehmann method, show two results: (1) that the Lehmann method produces a distribution more unequal than a distribution by income classes; [1] (2) that the result may be either more or less unequal than a distribution by wealth classes. The first conclusion is relevant, the second is not. For it is no advantage of the Lehmann method, as Mr. Friedman suggests, that it may sometimes give a result closer to a distribution by wealth classes. But if Mr. Friedman's interpretation that the Lehmann distribution is not precisely identical with a distribution by income classes is correct,[2] it is then a highly important conclusion that there is a consistent bias inherent in the method in the direction of greater inequality, as indicated in (1) above.

One result to be hoped for from the present discussion is that the Treasury Department will undertake the tabulation of estate tax returns classified by size of corporate stock holdings. The ambiguity of the meaning of the matching process, referred to by Mr. Friedman, arises from the lack of data. This perhaps is an illustration of the fundamental difference between Mr. Friedman's and my approaches to the problem. I have attempted estimates on the basis of the available statistical materials and the techniques open to an individual investigator, in the belief that there is urgent need for even approximate results in this field. Many of the data are rough and defective, and there are many gaps. The combination of the income and estate tax data, by the matching process, would escape the difficulties described by Mr. Friedman if tabulations existed for (1) income by dividend classes and (2) wealth by stock classes. The former was published for the first time for the 1935 returns; the latter tabulation is not included,

[1] See Mr. Friedman's argument that the Lehmann distribution is neither 'by income classes' nor 'by wealth classes'.

[2] Because in the matching process the regression of stock on wealth, rather than wealth on stock, is necessarily employed in the absence in *Statistics of Income* of a tabulation of wealth by stock holdings.

to my knowledge, in the proposed program of the Works Progress Administration Income Tax Study.[3]

While admitting the possibility of a bias, I cannot agree with Mr. Friedman that the Lehmann method "does not give the average wealth held by individuals with the specified income". It aims to do that, but the result is only an approximation. What the margin of error may be depends in part upon the use of an average for capitalized dividends for each income class. The 1935 tabulation indicates that while there are substantial disparities in the amount of dividends received by individuals in the various income brackets, there is, nevertheless, a marked regularity in the data. How great a bias is introduced by the use of the regression of stock on wealth rather than wealth on stock is another consideration. Though the number of returns in the highest estate brackets is too few, there is a marked regularity in the curve correlating wealth classes and stock holdings (i.e., stock on wealth). What the Lehmann method does is to match capitalized dividends for the various income classes with corresponding amounts of corporate stock possessed by individuals possessing amounts of wealth indicated by the estate tax returns.

The results obtained by this 'short-cut' method are rather close to those obtained by King and others by more complex methods. While King's estimate as of December 31, 1921 was subjected to sharp criticism, it seems significant to the writer that the present estimate for 1922 is virtually identical with it. The real shortcoming of the method, likewise true of any capitalization approach, is that it applies only to income tax brackets.

At the same time many difficulties derive from the data. These have been mentioned by Professors Crum and Lehmann and by Mr. Friedman. Capital gains and losses represent a serious problem, and Mr. Friedman is quite correct in concluding that their influence may well account for the changes in inequality noted in different phases of the business cycle. Until recently, however, the relevant data in *Statistics of Income* have not been such as to allow any corrections for this factor. Examination of the new tabulations appearing for 1935 and 1936 indicates that the refinements that could be made would alter the shape of the curve appreciably only in exceptional years.

[3] Such a regression of wealth on stock might be of little value, as Mr. Friedman suggests, because of the high exemption allowed by the present estate tax law.