Volume Title: Analysis of Wisconsin Income

Volume Author/Editor: Frank A. Hanna, Joseph A. Pechman, and Sidney M. Lerner

Volume Publisher: NBER

Volume ISBN: 0-870-14164-3

Volume URL: http://www.nber.org/books/hann48-1

Publication Date: 1948

Chapter Title: Patterns of Income: Summary

Chapter Author: Frank A. Hanna, Joseph A. Pechman, Sidney M. Lerner

Chapter URL: http://www.nber.org/chapters/c1004

Chapter pages in book: (p. 59 - 75)

PART II

Patterns of Income

JOSEPH A. PECHMAN

CHAPTER 1

Summary

ECONOMIC THEORISTS, since the time of Ricardo, have devoted much attention to the distribution of national income among the factors of production, often called the 'functional' distribution of income. An approximation may be obtained from the distribution of income by type of receipt: the wage earner receives wages in return for his labor; the 'investor' receives interest, dividends, or rents in return for the use of his property; and the business man receives entrepreneurial income which is, in part, payment for his labor and enterprise, and in part, payment for the use of his property.[1] More recently, the technical literature has emphasized the 'personal' distribution of income, i.e., the distribution of income by size. Data on the distribution by type of receipt, i.e., the composition of income, have been available longer, since they are a byproduct of most national income estimates. Data on the distribution by size are more difficult to compile and not until the last few years have acceptable estimates been made.[2] Moreover, there are no adequate *annual* estimates. In the absence of empirical evidence, it has generally been as-

[1] Since an economic function may be compensated in several ways, and some payments are for more than one function, a functional distribution cannot be estimated exactly from the distribution by type of receipt. For example, an executive of a corporation may receive either a salary or dividends or both. See Sec. B.

[2] Income Size Distributions, *Studies in Income and Wealth,* Vol. Five (National Bureau of Economic Research, 1943).

sumed that year-to-year changes in the distribution by type of receipt indicate roughly year-to-year changes in the distribution by size.[3]

Examples of the assumption of this relation are abundant. Simon Kuznets writes:[4]

> "Wages and the bulk of salaries constitute the main income of a large group in the population whose per capita income is relatively low; and changes in the relative share of wages and salaries indicate, though only approximately, changes in the relative share of the lower income groups. Dividends and interest disbursements are received largely by those whose average income is relatively high; and a change in the proportion of income going out as interest and dividends, is, with certain qualifying conditions, an index of the change in the share of income received by the high income groups. Entrepreneurial income payments occupy an intermediate position and tend to vary greatly in magnitude from one industrial branch to another. Dominated by agriculture and retail trade they represent the main income of that large class of small entrepreneurs whose average income is fairly low and is subject to the vicissitudes of the competitive struggle."

According to the Department of Commerce:[5]

> "The presentation of income payments by types of payments is intended to be indicative in a very rough way of the distribution of current income by size of income. . . ."

To what extent do changes in the functional distribution of income reflect changes in the personal distribution? Given distributions by size and by type of receipt for one year, and also the distribution by type of receipt for the next year, can the distribution by size for the second year be inferred within tolerable limits of accuracy? For example, assuming that the National Resources Committee and the Department of Commerce data are comparable, can a 'good estimate' of the distribution by size in

[3] Functional distribution, distribution by type of receipt, and composition of income are used synonomously throughout this Part. Personal distribution and distribution by size are also used interchangeably.

[4] *National Income and Capital Formation, 1919-1935* (National Bureau of Economic Research, 1937), p. 27.

[5] *Monthly Income Payments in the United States, 1929-40* (Washington, D. C., 1940), p. 11.

1937 be made from the 1935-36 distribution (prepared by the former) on the basis of changes in the distribution by type of receipt (as prepared by the latter) between 1935-36 and 1937? If this method were bound to yield a close approximation to the actual distribution, there would be less need for long and expensive field surveys. Elaborate studies would be required only infrequently, perhaps once every five or ten years, to check the results of the above method and to provide benchmarks for future extrapolations.

Although the detailed tabulations of Wisconsin individual income tax returns leave much to be desired, they provide extensive information on the sources from which persons at different income levels derive their incomes and changes in the distribution of income among individuals over time. In Wisconsin about one-third of income recipients filed returns in 1936; and a considerable number of those filing had low incomes. In 1936 an estimated 26 percent of all persons with incomes under $2,000 filed returns; [6] all persons with incomes over $2,000 (except employees of the federal government) were required to file. Consequently, the sources of both low and high incomes can be analyzed. The Wisconsin data on changes over time in the distribution of income by size are by no means complete. However, several detailed tabulations, designed especially for the purposes of this study, provide material for an examination of the assumptions usually made concerning the relation between the functional and personal distributions of income.

This chapter summarizes briefly the findings based upon the detailed analysis in the next four chapters.

A Composition and Size of Individual Incomes

In 1936 wages and salaries accounted for more than three-quarters of the incomes reported on Wisconsin tax returns under $2,000. They constituted a smaller share of large incomes: above the $100,000 level, for example, wages and salaries were only about 10 percent of reported income. On the other hand, property

[6] See Part I, Table 1.

receipts, except rents, constituted a larger share the larger the individual income. Dividends, less than 2 percent of incomes under the $2,000 level, rose to about 47 percent above $100,000. Capital gains, less than .5 percent below the $2,000 level, rose to about 27 percent above $100,000. Taxable interest, 2-4 percent in the lower income groups, was 8 percent in the higher. Business and partnership profits played their largest role in the middle income groups, $4,000-10,000, where they constituted 20-22 percent of reported income; under $2,000, they were 10 percent, and above $100,000, only 1 percent. Rent varied between 1.75 and 2.5 percent, except for the under $1,000 group, where they were 3.7 percent, and the groups above $20,000 where they were 1.3 percent or less.

B Patterns of Income

The above description does not present an adequate picture of the composition of individual incomes; for a percentage based on aggregate income reported in any income group conceals sizable differences in the income characteristics of the individuals in it. All individuals in one income group do not report the same types of receipt; nor do those with the same types of receipt report them in the same proportions.

The details are brought out in tabulations of the 'patterns' of individual incomes. A pattern describes, essentially, the types of receipt of various sizes that make up an individual's total income. For example, individuals who receive only wages, both wages and dividends, and wages, dividends, and interest do not have the same pattern of income.

On the basis of these patterns, all individuals were classified into three functional groups: (1) wage earners—whose sole or largest source of income was a wage or salary payment; (2) entrepreneurs—whose sole or largest source of income was business; (3) 'investors'—whose sole or largest source of income was from property. In 1936 the average income of investors was highest ($2,892); that of entrepreneurs, next ($2,073); and that of wage earners lowest ($1,686). This is not to say that all wage earners

were at the bottom of the income scale, all business men in the middle, and all investors at the top. Division of the three groups by income brackets reveals representatives of each at every level. In fact, the frequency distributions of income for the three groups are alike in one respect: the lower the income group, the more numerous the individuals in it tend to be. Investors have the highest average income, not because a majority of them are concentrated at the higher levels, but because a larger percentage of investors than of wage earners and entrepreneurs are at the higher levels.

The significance of a classification depends upon the homogeneity of the groups selected. Is a classification of individuals by the three functional groups significant? If all wage earners received only wages, all business men, only business incomes, and all investors, only property incomes, the answer would obviously be affirmative. However, some individuals receive their incomes from two, three, or more sources, and might legitimately be put in more than one functional group.

The 1936 Wisconsin data indicate that a functional grouping of individuals with small incomes yields three fairly homogeneous groups: about three-quarters of individuals with less than $2,000 income reported income from only one source and most of the others reported so small a share from secondary and tertiary sources that it could be ignored. For example, secondary and tertiary sources constituted less than 4 percent of the aggregate income of wage earners; less than 10 percent of the aggregate income of entrepreneurs; and less than 15 percent of the aggregate income of investors.

As individual incomes increase, the percentage of individuals reporting only one source of income diminishes rapidly, and, more important, the secondary and tertiary sources of income account for a progressively larger share of aggregate income. For example, of the seventy-four individuals with incomes exceeding $100,000 in 1936, only one reported a single source, three reported two sources, and the remaining seventy, three or more sources.

The diversity of receipts reported on returns at the higher income levels is due partly to the lack of correspondence between

type of receipt and economic function. An entrepreneur may report his income as a salary, as a business or partnership profit or as both. Similarly, the owner of a closely held corporation may choose to receive his income as salary, as dividends, or as both.[7] Of the 441,000 returns filed in Wisconsin in 1936, both salaries and business or partnership profits were reported on 10,000; both salaries and dividends on 30,000.[8] There are, unfortunately, no data showing the percentage of the individuals in the two groups who received income from only one establishment but reported two different receipts.

C Stability of Income Composition

On the basis of a sample of 13,184 Wisconsin taxpayers, a very large proportion of the income recipients apparently receives income from the same source or sources year after year. From 1929 to 1936, 97-99 percent of the wage earners in the sample reported wages in successive years, and more than 75 percent of the recipients of the other receipts (except capital gains) reported the same type of receipts in successive years. In other words, there seems to be little shifting among the three functional groups: wage earners tend to remain wage earners; entrepreneurs, entrepreneurs, and investors, investors.

Composition of income at given absolute income levels appears to be fairly stable year after year, despite changes in the amount and size distribution of national income. In 1929 wages constituted about 80 percent of the income of individuals in the $1,500-2,000 income group, and, in 1936, 82 percent. In 1934, when national income was much lower than in 1929 or 1936, wages were still about 80 percent of reported income in this group. At the $10,000-15,000 level, dividends were 15, 16, 14, and 18 percent of reported income, and business income was 20, 20, 17, and 19 percent, in 1929, 1934, 1935, and 1936, respectively.

[7] Conceivably, he might even choose to receive it as rent or interest.

[8] For tax reasons, there is an incentive to receive income as salary, rent, or interest rather than dividends. Nevertheless, wages and dividends are reported more frequently than wages and rent, or wages and interest, at all levels above $2,000.

Chart 2 gives a more complete picture of the consistency of the percentages for the various components of income at absolute income levels.[9]

D Relation between Income Composition and its Size Distribution

How does the size distribution of income change when wages increase or decrease relatively more than other receipts? Do the shares of property receipts increase and those of service income decrease when incomes are less equally distributed? What changes in the size distribution of income are associated with changes in the composition of income?

First, 'size distribution of income' must be defined more precisely. The definition chosen will depend, of course, upon the problem at hand. Since we are most interested in the 'relative' aspects of the size distribution, we chose one of the simpler definitions, a definition in terms of the Lorenz curve. This curve shows the percentage of the aggregate income received by any given percentage of recipients arrayed by the size of their incomes. If every person received the same income, the Lorenz curve would indicate that any given percentage of recipients received the same percentage of aggregate income. When other than perfect equality obtains, a given percentage of individuals at the lower end of the income scale receives less than this percentage of the aggregate, implying that the recipients of higher

[9] In *National Income: A Summary of Findings,* Simon Kuznets computed the shares of total income received by the highest 5 percent of income recipients, 1919-38 (pp. 97-106). 'Inter-type' of payments shifts (i.e., changes in composition of all incomes) account for a larger proportion of the changes in the shares of the upper income groups than do 'intra-type' of payments shifts (i.e., changes in the distribution of the types of payments by total income classes). This constitutes evidence that income composition at the highest *relative* income levels (i.e., the top 5 percent of income recipients) behaves approximately like the composition of all incomes. It does not, however, contradict the evidence from Wisconsin income tax data that income composition at *absolute* income levels (e.g., the $2,000-3,000 or the $10,000-15,000 level) is fairly stable. Since the lower limit on the absolute income scale of the top 5 percent of income recipients increases as incomes rise and decreases as incomes fall, income composition for this group must change, if income composition at absolute income levels remains the same.

incomes receive a share of the aggregate more than proportional to their number.[10]

Another concept often used refers to the 'absolute' aspect of the size distribution. An absolute size distribution, usually represented by an histogram or by a smoothed frequency curve, shows the number or percentage of recipients between specified absolute levels of income and the amount or percentage of aggregate income they receive. It is used when it is said, e.g., that 80 percent of the nation's families and individuals received less than $2,000 in 1935-36, or that 10 percent received $2,000-3,000.

The distinction between these two aspects of an income distribution is important, because changes in the one do not necessarily reflect changes in the other. It is erroneous to assume that when the percentage of recipients with incomes above a certain high level, e.g., $25,000, increases, the distribution of income necessarily becomes less equal. An increase in the percentage of recipients above the $25,000 level may indicate merely that the histogram (or frequency curve) has shifted toward the higher income levels; it does not necessarily indicate that individuals with high incomes are receiving a larger share of aggregate income. Indeed, the results of this study suggest that fluctuations in aggregate income may be accompanied by considerable changes in the absolute distributions of income without appreciable change in the relative distributions.

If size distributions for all recipients were available for a fairly long period, the relation between changes in income composition and in its personal distribution could be analyzed directly. However, the only available data on size distributions are tabulations of incomes reported on tax returns, which cover a varying and unknown percentage of recipients each year. Changes in the distributions by type of receipt as shown by income tax statistics might be attributable in large part to a mere change in the percentage of recipients filing.

To avoid this basic difficulty, inherent in all income tax data, a series of hypothetical calculations were made. The analysis relied heavily on the stability of the composition of income at

10 For a detailed description of the Lorenz curve, see M. O. Lorenz, Methods of Measuring the Concentration of Wealth, *Publications of the American Statistical Association,* New Series, No. 70 (June 1905).

the several income levels. It is essentially an analysis of the changes that would occur in the functional distribution of income as computed from Wisconsin income tax returns for 1936 if both the absolute and relative size distributions were altered assuming that (a) the number of persons filing, and (b) the composition of income at each income level remained the same.

Changes in Income Composition Associated with Changes in its Absolute Distribution

In 1936 the aggregate income reported by the 441,000 filers in Wisconsin was about $808 million.[11] Of this sum, about 70 percent was reported in the form of wages, about 13 percent as entrepreneurial income, about 6 percent as dividends, and about 11 percent as interest, rents, capital gains, and from miscellaneous sources. To analyze the effect of changes in the absolute distribution of income reported by these individuals, the income of each individual was increased first 25, then 50 percent, the resulting functional distribution of aggregate income being computed on the assumption that the upward shift in all incomes did not affect the composition of income at the various income levels. Since each income was increased by the same percentage, the relative distribution did not change.

After aggregate income had been increased from $808 million to $1,015 million, wages accounted for only 67 percent, while the percentages for dividends, interest, and capital gains rose. When aggregate income was increased an additional 25 percent (to $1,218 million) wages decreased to 65 percent, while the percentages for dividends, interest, and capital gains rose.

These changes in the composition of aggregate income may be explained quite easily by the above mentioned differences in the composition of income at the several income levels; i.e., as the income scale is ascended (above the $2,000 level), wages decrease as a percentage of aggregate income, while the shares of the property receipts—dividends, interest, and capital gains—in-

[11] Of the 441,000 filers, 335,000 are shown separately in Part I, Table 1, in the $1-2,000 income group. Included in the groups above $2,000 are the remaining 106,000 filers and an estimated 5,000 federal employees who received more than $2,000 and did not file returns.

crease. As the income of each individual is increased, he is shifted to a higher income level. Since income composition is held constant at each level (an assumption that seems reasonable on the basis of our data), the greater the shift to higher levels the greater the number of individuals with incomes in which property receipts play a preponderant role.

Changes in Income Composition Associated with Changes in its Relative Distribution

The changes in the composition of income associated with changes in its relative distribution were determined similarly. The aggregate income and the number of filers in Wisconsin in 1936 were kept constant, while the relative distribution (i.e., the Lorenz curve) was shifted 25 percent, then 50 percent toward the line of equal distribution. This is equivalent to shifting each individual income 25 and 50 percent toward the mean income, and, consequently, to changing the relative as well as the absolute distribution of income. Again it was assumed that the shift of individuals to new income levels did not affect the composition of income at each level.

As the relative distribution is shifted 25 percent, wages increase from 70 to 74 percent of aggregate income, and all the property receipts decrease relatively. A further 25 percent shift of the relative distribution raises wages to 77 percent, while property receipts decline correspondingly. These changes in the shares of the various receipts are due to the greater concentration of incomes about the mean income as the Lorenz curve is shifted toward the line of equal distribution. Since the mean income in 1936 was $1,840, these shifts cause a greater concentration of individuals at income levels where wages are more, and property receipts less, important.

Together the two hypothetical calculations show that changes in the absolute and relative distributions may induce changes in the composition of aggregate income independently. As aggregate income increases, i.e., as the absolute distribution is shifted toward higher income levels, wages account for a smaller proportion of aggregate income if the composition of income at each

level remains the same. The result will be the same as the relative distribution moves away from the line of equal distribution. Consequently, a decrease in the ratio of wages to aggregate income could be caused by either an increase in aggregate income with the relative distribution remaining the same or by a shift in the Lorenz curve away from the line of equal distribution with the aggregate income remaining the same. Hence, in an actual situation, if the aggregate income increases and the ratio of wages declines, from these facts alone we cannot infer what has happened to the relative distribution. It may have remained the same, become more equal (but not enough to offset the effect of the increase in aggregate income), or become less equal.

However, under some circumstances the change in the distribution by size can be appraised with more certainty. If the share of wages rises as aggregate income increases (and the composition at each level remains the same), it is clear that the size distribution of income has become relatively more equal; for, had the relative distribution remain unchanged, the consequences of an increase in aggregate income would have been a decline in the percentage of wages. Likewise, and for similar reasons, a decline in the share of wages as aggregate income falls signifies that the size distribution has become relatively less equal. However, even when we know that the distribution of income has changed, we do not know how much, for there is no way of calculating the degree to which one factor offsets the other.

E Changes in the Relative Distribution of Income

To what extent are changes in aggregate income related to changes in its distribution among individuals? For example, what happens to the share of the lowest third of recipients as national income rises or falls?

Size Distributions of Types of Receipt

On the basis of 1929, 1935, and 1936 income tax data, income receipts may be ranked in the following order of equality: wages,

entrepreneurial incomes, rents, interest, capital gains, and dividends; i.e., wages were more equally distributed among wage recipients than entrepreneurial incomes among entrepreneurial income recipients, which, in turn, were more equally distributed than rents, and so on. One example illustrates the large differences among these distributions: in 1936 the wage recipients in the lower half of the wage distribution received about 28 percent of all wage receipts reported, while the dividend recipients in the lower half of the dividend distribution received only about 2 percent. (In a completely equal distribution, the individuals in the lower half would account for 50 percent of aggregate receipts). The data indicate that the order of rank among the several receipts does not change, and that changes in the distributions of the more equally distributed receipts are smaller than in the less. Wages are always the most equally distributed receipt and dividends the least.

As aggregate income changes, the total of each receipt and its relative distribution change simultaneously. Since the effect of such changes on the size distribution of total income cannot be ascertained directly from the income tax data for a period of years, hypothetical calculations must again be resorted to. These calculations show the effect on the size distribution of total income of changing either the magnitude or the size distribution of any one receipt, on the assumption that the magnitudes and size distributions of all other receipts remain unchanged.

Effect of Changes in the Relative Distribution of Receipts on that of Total Income

If it is assumed that the aggregate and size distribution of every receipt except wages remains unchanged, while the size distribution (but not the aggregate) of wages is made 25 percent more equal, the size distribution of total income becomes 15 percent more equal.[12] On the other hand, when the distributions of dividends and of interest are made 25 percent more equal, the size

[12] In technical terms, the Lorenz curve of wages was shifted 25 percent closer to the line of equal distribution at all points. The resulting Lorenz curve of total income reduced the 'area of concentration' (i.e., the area between the Lorenz curve and the line of equal distribution) 15 percent.

distribution of total income becomes only 4 and 1 percent, respectively, more equal.

Effect of Changes in Aggregate Receipts on the Size Distribution of Total Income

If it is assumed that the aggregate (but not the relative distribution) of wages is reduced 50 percent, while the aggregate and size distributions of the other receipts remain unchanged, the size distribution of total income becomes 19 percent less equal; when all dividend receipts are reduced 50 percent, the size distribution of total income becomes only 5 percent more equal.

The changes in both the aggregates and the size distributions of the receipts assumed by these hypothetical computations are larger than the actual year-to-year changes. Nevertheless, except for wages, the influence of changes in the several receipts on the relative distribution of total income is small. It will be recalled that the aggregate of one receipt was reduced 50 percent while the other receipts were held constant. This assumption is, of course, unrealistic since the magnitudes of all other receipts usually change simultaneously. Consequently, a 50 percent decrease in every wage receipt would induce a change in the relative distribution of total income that should be smaller than the 19 percent indicated above, in view of the offsetting influences of changes in the other receipts. Furthermore, since the size distribution of wages does not change more than 1 or 2 percent from one year to the next, the effect of the shifts in it on the distribution of total income will be much less than the effect of a 25 percent shift, which is 15 per cent. These demonstrations, although hypothetical, go a long way to explain why the year-to-year changes in the relative distribution of total income are small.

Changes in the Relative Distribution of Total Income Over Time

The Wisconsin income tax data indicate that, when aggregate income increases, the lower part of the array of incomes tends to become more equally distributed and the upper part less. When aggregate income decreases, these tendencies are reversed. The Lorenz curves of two such distributions (i.e., for a high- and for a

low-income year) cross.[13] Thus, the upper part of the distribution of income may be misleading as a guide to changes in the entire distribution, since the lower part may behave in the opposite manner. If such a measure as Pareto's is used to describe the tail, or the higher levels, of the distribution—where it is most nearly valid—the part of the distribution excluded from the measure is likely to behave in the opposite manner.

F Conclusion

During the twenty years for which we have relatively reliable series on the composition of national income, year-to-year changes in the shares of the various receipts have been small. On the basis of the above analysis, it is clear that the changes in the relative distribution that have accompanied these small changes in composition must also have been small. Rapid and even extreme fluctuations in economic conditions apparently have little influence on the relative distribution of income.

Furthermore, there is no inherent relation between changes in composition and in the relative distribution of income. In only special cases, when (1) both national income and the share of earnings increase concurrently or (2) both decrease, is there a more or less direct relation. In case (1), the relative distribution becomes more equal; in case (2) less equal. This relation may be summarized in tabular form.

WHEN THE SHARE OF EARNINGS	WHEN INCOME INCREASES	WHEN INCOME DECREASES
Rises	The relative distribution becomes more equal	How the relative distribution changes is not known
Falls	How the relative distribution changes is not known	The relative distribution becomes less equal

Even this conclusion is not entirely certain, because it assumes that shifts in the Lorenz curve, utilized to describe the relative income distribution, are uniform at all points. The simplicity of the relation disappears if the Lorenz curves for two years cross or

[13] Other data examined by Horst Mendershausen corroborate the evidence of the Wisconsin data that Lorenz curves of total income tend to cross. See *Changes in Income Distribution during the Great Depression*, Studies in Income and Wealth, Vol. Seven (1946), Ch. 2.

if the curves do not shift at all points in the same direction from the line of equal distribution and by the same relative amount.[14]

Finally, the margin of error in the national income totals is probably large enough to cast doubt on any inferences about year-to-year shifts in the relative distribution that may be drawn from the movements of the various receipts relative to the aggregate. Certainly, to suppose that the year-to-year changes in the relative distribution that do occur can be validly inferred from changes in the composition of national income would attribute more accuracy to the data than is claimed by national income estimators.

[14] This analysis was completed before Simon Kuznets published his analysis of the changes in the share of total income payments received by the highest five percent of income recipients, 1919-38 (*National Income: A Summary of Findings,* pp. 97-106). His data also show that the relative distribution of income "seems to display a marked degree of stability" (p. 100). As noted in note 9, he found, in addition, that 'inter-type' of payments shifts, on the whole, account for a larger proportion of the changes in the shares of the upper income groups than do 'intra-type' of payments shifts. It was impossible to measure separately the effects of the inter- and intra-type of payments shifts on the basis of Wisconsin data because we had a complete distribution and an estimate of total income only for 1936. Hence, our findings, though not contradictory to those of Mr. Kuznets, are necessarily stated in more general terms.