ECONOMIC DEVELOPMENT AND CULTURAL CHANGE
Volume XI, Number 2, Part II January 1963

QUANTITATIVE ASPECTS OF THE ECONOMIC GROWTH OF NATIONS:

VIII. DISTRIBUTION OF INCOME BY SIZE*

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I. Problems of Definition and Measurement

In this paper we deal with the relation between economic growth and the distribution of income by size among the individuals and households in a country. Two questions are of particular interest. First, do the changes in the scope and structure of the production process that accompany economic growth and constitute its essence also affect the distribution of the growing income among the population? Second, does the size distribution of income, thus affected by the process of modern economic growth, have, in turn, an effect on the latter—by influencing not only consumption and savings but also the contribution of the income recipients to national product? The first question involves an evaluation of the contribution of economic growth to the welfare of a country's inhabitants. It has loomed large in the economic literature, partly in connection with the generalizations of the classical and Marxian schools concerning long-term trends in the distribution of the national product and the thesis of "increasing misery," partly in connection with attempts to derive invariant "laws" of similarity in space and constancy in time; and it has always been the focus of extended discussions dealing with the problems of the low income groups who may not be sharing in the country's economic growth, or of the top income groups who may be attaining too much economic power. The second question, which treats the size distribution of income as one factor among many determining economic growth, has also loomed large in economic discussions that attempt to trace the flow of income from the productive system through the households as a basis for effective demand, as a source of savings to finance capital formation, and as a mechanism through which an adequate participation of man in the productive process can be assured.

We are interested in those changes in the size distribution of income that can be properly attributed to the shifts in production structure indispensable to the economic growth process—not in those that may have occurred for reasons not related to the basic characteristics of the growth process itself. In observing changes

* This paper draws heavily upon work in the field initiated under the auspices of the Committee on Economic Growth of the Social Science Research Council. As with the other papers in the series, Miss Lillian Epstein provided valuable assistance in preparing the tables and editing the text. I am also indebted to the late Mrs. Selma F. Goldsmith and to Professors P. Luzzatto Fegiz and Seymour S. Goodman for permission to use their unpublished estimates.

over time or differences in cross-section analysis we should be able to distinguish the relevant from the incidental, and we therefore need a firm set of links between the observable changes in the production structure that constitute economic growth and the observable associated changes in the income distribution. Likewise, in analyzing the changes in the income distribution as a factor determining economic growth, we need a firm theory of the effects of different aspects of the size distribution of income on economic growth. Much of the difficulty in the discussion of the topic is due to the lack of a firm theory of causes and consequences of economic growth, traceable further to the extreme paucity of data that would be useful in the formulation and testing of the proper links between economic growth and the distribution of income among the population.

Dispiriting as such an exercise may be, we shall attempt to specify the kind of data on the size distribution of income needed to approximate answers to the questions raised above—revealing how limited the available data are, and exposing the danger of overstatements that our intense interest in "who gets what" so easily generates. As an introduction to the summary of the statistical evidence that could be assembled, we discuss briefly the specifications of the data required for our purposes, with particular reference to the definitions of the income shares, the recipient units, the period of income cumulation, the rates of income mobility, and the measure of income inequality. In this discussion we will also consider some aspects of the size distribution that bear directly upon international comparisons in cross-section analysis and upon long-term trends observable in the data that are usually available.

1. The Income Shares

Since we wish to study the effects of economic growth, conceived as changes in the production process, on the size distribution of income, the income shares needed are presumably those that flow directly out of participation in the production process—wages, salaries, and other compensation of employees; entrepreneurial income; and returns on property invested by households in the production process. Any subsequent redistribution of these primary shares that has nothing to do with the production process—gambling gains, gifts, and the like—should be of no concern. Once we agree on what the production process is—and such a definition must underlie our study and measure of economic growth itself—the definition of income shares should directly follow.

But this comfortingly simple conclusion is immediately disturbed, since the compensation of the people or of their capital directly engaged in production may be affected by differential conditions of employment or redistributions that are unavoidable concomitants of participation in the production process. Consider the possible effect of a progressive income tax on the compensation of employees with differing degrees of training and skill. Once the tax has been in effect for some time and is accepted as a form of redistribution, the range of compensation of employees flowing directly from the productive process is likely to be at least partly adjusted to it—so that the after-tax income of the higher skill groups will still reflect the differential compensation for the greater ability. Similarly, after free benefits, e.g., state-paid medical and educational services, which accrue mostly to the lower income groups (or at least are of proportionately greater value to them), have been established, there may be more ready acceptance of low rates of compensation flowing out of the production process. Thus inequality in the distribution of employee compensation as it originates in the production process may be

greater merely because of the extension of progressive income taxation at one end and because of free benefits at the other end, i.e., because of the expected "redistribution," not because of any change within the production process itself. If so, the income shares that properly reflect the changes in the production process are compensation of employees and other payments, excluding income taxes and including free benefits.

That the point is of considerable weight for international comparisons, and implicitly for long-term trends, is suggested in Table 1. Service and property incomes constitute the income shares of households as they flow directly from the production process. Their redistribution through direct taxes, transfers, and direct services by government is a third of the original shares in the high income, developed countries and below a tenth in the underdeveloped countries (see line 8). If, as may be reasonable to assume, the shares originating in production have been partly adjusted to the expected redistribution, they would, all other conditions being equal, tend to show wider inequality in developed than in underdeveloped countries. And the more relevant comparison may be of service and property incomes after taxes and including transfers and benefits. By implication, the growth over time in the relative weight of direct taxes, transfers, and direct services by government in the developed countries would, all other conditions remaining the same, tend to widen inequality of service and property incomes originating in the production process; but such a trend would be properly attributable to expected redistributions, and might not be apparent in the more suitable base series, i.e., income after taxes and including benefits.

Consider next the effect of conditions of participation in the production process. If earning a high income requires living in urban communities, with higher prices than in the countryside for identical goods, the comparison of income shares should adjust for differences in the cost of living at comparable levels of satisfaction of want; and our discussion of this problem in Paper VII, in connection with the maintenance of the share of consumption with the rise in per capita income in the course of economic growth is relevant here (see pp. 41-48). The production process reflects the different conditions of life associated with different roles and status levels of participation in it; and any changes in the size distribution of income that reflect such differentials in associated and indispensable costs must be adjusted for the effects of the latter. Thus if in the process of economic growth the inequality in shares flowing from the productive process widens (or narrows) because differential costs widen (or narrow) these changes cannot be interpreted as meaningful trends in the distribution of income. Unfortunately, we have no evidence on this point, either in international cross-section comparisons or in the movements over time in the developed countries. Some light, however, may be shed by the scanty evidence on the distribution between the agricultural and nonagricultural sectors.

2. The Recipient Units

Since it is individuals who participate directly in the productive process, for our purposes the income recipient unit may seem to be the individual rather than the family, consuming unit, or any larger group. But the difficulties of securing a meaningful distribution of income among individual income recipients prove, in fact, to be discouragingly great.

To begin with, little meaning can be attached to a distribution among individuals of property income or of that income which originates within households

Table 1.
Shift from Service and Property Income to Disposable Income, Including and Excluding Direct Services by Government, Post-World War II Years (Based on current price totals)

	Groups of Countries by Per Capita Product			
	I (1)	II and III (2)	IV and V (3)	VI and VII (4)
1. Number of countries	7	6	8	11
2. Service and property income as % of GNP	75.7	76.9	78.7	78.6
3. Current transfers to households as % of line 2	9.1	11.4	3.8	1.9
4. Direct taxes on households as % of line 2	14.4	14.2	4.7	2.5
5. Transfers and taxes as % of line 2 (line 3 + line 4)	23.5	25.6	8.5	4.4
6. Direct services by government as % of GNP	6.0	6.0	4.0	3.5
7. Line 6 as % of line 2	7.9	7.8	5.1	4.5
8. Total shift as % of line 2 (line 5 + line 7)	31.4	33.4	13.6	8.9

Entries are from "Quantitative Aspects of the Economic Growth of Nations. VII. The Share and Structure of Consumption," Economic Development and Cultural Change, X, 2, Part II (January 1962). (This paper will be referred to hereafter as Paper VII, and references to any of the other papers in the series, of which seven have been published, will be similarly cited.) Lines 1-5 are from Table 2, p. 6 (line 9 of that table being used for line 2); and line 6 is from Table 6, p. 12, line 4.

Current transfers to households are largely from government; and it is assumed that they are received by groups distinct from those that contribute in the way of direct taxes. The entries in line 6 are rough estimates of direct services by governments (as distinct from transfers) to ultimate consumers, in the way of education, health, and recreation.

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from unpaid family labor. In the former case, most of the underlying ownership claims are held by family units, not by distinct individuals. In the latter case, a given individual's participation in the production process is not clearly distinguishable from that of other members of the family. The proportions of total income accruing to the population that cannot thus be distributed among individuals are far from negligible. The share of property income rises to over 20 percent of total personal income, and the contribution of agriculture, and of similarly traditional sectors in which unpaid family labor is prevalent, is a large share of the total product of underdeveloped economies. Consequently, the use of size distributions of income with individuals as the basic recipient unit may yield distorted comparisons.

But even if we exclude property income, and treat the product of unpaid family labor as part of the individual income of the family head (which makes the latter less comparable with individual incomes of heads of families with no unpaid family labor and of other family members who may be receiving income), other difficulties remain. In observing the distribution of participation or earned income

among individuals, do we include only those who received some income during the time period covered, or do we also include those who should have received some through gainful engagement but did not because of the limitations of the production system (rather than through some fault of their own)? Presumably the latter should also be included, with zero or negligible incomes (the same reasoning applies to both); yet it would be extremely difficult, if not impossible, to define this missing group properly under differing conditions of social organization and economic development, for it involves the normative concept of the groups within the population that are entitled to effective, income-earning opportunities within the country's productive system. The same problem emerges within the active, and presumably income-receiving, labor force which includes some marginal or at least secondary groups—a result of age, and in some occupations, of sex. The relative importance of these secondary groups varies among countries and presumably over time with differences or changes in family and social organization, since the latter lead to differences or changes in accepted views as to who is to be considered a member of the active labor force and thus claim income-earning opportunities. The numbers of individual income recipients given in the labor force data (which presumably comprise all potential earned-income recipients) include large groups of marginal cases in some countries that are not included in other countries; and size distributions of income among individual recipients are affected by these differences in the extent to which society permits labor force participation by marginal groups, a decision that may have little direct relation to the constraints of the productive system which adapts itself to different conditions and compositions of labor supply.

In this connection the evidence in Table 2 is of interest. While there are no significant differences between developed and underdeveloped countries in females as a proportion of the labor force (excluding unpaid family labor wherever possible), the male labor force in the underdeveloped countries includes larger proportions of the very young, and this excess is not offset by smaller proportions of the very old (lines 2-5). Consequently, the weight of male "secondary" labor force groups is significantly greater in the underdeveloped than in the developed countries. This finding would be strengthened if we included males under 15 years of age, of whom there are far greater proportions in the labor force in the underdeveloped countries. The reasons for the difference, which lie partly in the age structure of total male population and partly in the much higher age specific labor force participation ratios among the very young and the very old in the underdeveloped countries, do not concern us here. They are the result of demographic and family living patterns and of the generally low level of economic performance, not of the specific demands of the production system, which does not call, on technical grounds, for more young boys or old men. Hence, the implicit difference in the size distributions of earned income suggested by Table 2, which, other conditions being equal, indicates a wider inequality in the underdeveloped than in the developed countries, would be due exclusively to the fact that the labor force data for the developed countries do not include the same groups of very young and very old (presumably with no income).

The difficulty just raised with the distribution among individual income recipients would be reduced, if not eliminated, if we shifted the distribution to income cumulated over long periods, particularly to life cycle spans, in which the temporary lack of productive engagement or the low incomes at extreme age levels would be properly weighted within the total income-earning life span. But even with life span income, countries would differ significantly in the use of what might be called non-primary labor supply in general. These differences would not be due to constraints imposed by the technical necessities of the productive process proper, but

Table 2.
Some Relevant Characteristics of the Economically Active Population, and of the Size of Households, Post-World War II Census Year, Late 1940's and Early 1950's

		Groups of Countries by Per Capita Product			
		I (1)	II and III (2)	IV and V (3)	VI and VII (4)
	Economically Active Population				
1.	Lower age limit in census	14.3 (3)	13.4 (8)	10.1 (12)	12.0 (11)
2.	Proportion of females to males (%)	34.7 (8)	36.6 (13)	22.0 (16)	32.6 (12)
3.	Male workers, 15-19, as % of all male workers 15+	7.8 (8)	10.0 (9)	14.2 (10)	13.5 (9)
4.	Male workers, 65+, as % of all male workers 15+	4.8	4.7	4.5	4.8
5.	Young and old male workers as % of all male workers 15+ (line 3 + line 4)	12.6	14.7	18.7	18.3
	Size of Households				
6.	Number of persons per household	3.4 (7)	3.8 (9)	4.9 (10)	5.0 (5)
7.	Proportion of households with more than 5 persons to all households (%)	11.8	18.8	35.0	37.7

All entries are unweighted arithmetic means of figures for individual countries. Figures in parentheses indicate the number of countries covered, those in line 3 applying also to lines 4 and 5, and those in line 6, to line 7.

Lines 1-5: from United Nations, Demographic Yearbook, 1956 (New York, 1956). Line 2 is from the note to Table 10, p. 302; line 3 is from Table 11, pp. 303ff. and Table 14, pp. 420ff., and excludes unpaid family labor when possible; lines 4 and 5 are from Table 11.

Lines 6 and 7: from United Nations, Demographic Yearbook, 1955 (New York, 1955), Table 9, pp. 216ff. Entries are for private households when possible.

rather to the general conditions of social organization. One must conclude that the use of the individual as the basic income recipient not only bars the possibility of properly studying the size distribution of total personal income among the relevant total population, but also fails to reveal the effects of the production process proper. Indeed, it is becoming increasingly clear that the net effects of production changes on the size distribution of income, called for in our two questions, cannot be measured—short of intensive study of the production processes themselves, with their primary, secondary, and further effects. All it will be possible to do here is observe the differences in space or changes over time in the size distributions of income in their most complete coverage, and relate them to different or changing levels of economic development—in the hope that some suggestive association will emerge. For this purpose, the individual income recipient unit, while more useful than other units in reflecting differences in contribution to the production

process, is unsuitable because it bars a complete distribution of personal income among the total population, and because the distributions based on it are affected too much by differences among countries and over time in the selection of those who can claim individual engagement in the production process. This selection is, in essence, determined by the relation to need, i.e., by the degree of dependence of the consuming unit, largely the family, upon the contribution of the individual member through his participation in the labor force. The needs, however, are those of consuming or family units. Indeed, size distribution of income assumes full meaning only when it is related to population needs, not merely to the intrinsic productive properties of the individual members of the population. For this reason meaningful size distributions must use a basic consuming unit whose needs determine choices not only with respect to use of income but also with respect to receipt of income. Distributions among individual recipients are highly valuable as constituent components, but they cannot substitute for distributions among consuming units, i.e., units which respond to and are affected by changes in the production system that constitute economic growth.

Distributions among families or consuming units differ from those among individual income recipients in that they cover total income and population, and classify supplementary income earned by others than the head of the family with the income of the head rather than treat it separately. For participation or earned incomes, the two types of distribution can be compared, and this will be done whenever data permit. In general, and for obvious reasons, the distributions among individual income recipients show wider inequality than the corresponding distributions among family or consuming units. But most of the available data relate to family units, or to some approximation to them.

Two major questions in connection with distributions among family units should be noted. Disregarding technical details of definition (whether the family unit is limited to persons related by blood and residing together, the usual definition, or includes some non-related co-residents, or dependent relatives residing elsewhere), one may observe first that even separate families or households may be related—so that the economic fortunes of one are the concern of another. For example, the family unit of a parent couple and the family units of their married children, all living in separate households, presumably have a community of interest: the economic resources of all may be pooled for some special purposes, and the economic success or failure of one is of interest to all. The size distribution of income should reflect the changing shares of units that have such strong community of interest, and it would be of value to study the distribution not merely among separate families or households, but among clusters of households with that community of interest. The available data do not permit such an approach; but its relevance must be borne in mind in the interpretation of existing distributions. Thus, if the small nucleated families, characteristic of the more developed countries, are more subject to combination in such related clusters than the larger extended families of the underdeveloped countries, the distribution of income based on the common definition of the family or consuming unit might show wider inequality in the developed than in the underdeveloped countries. But this difference would be an exaggeration of that shown by distributions taking account of ties of interest among separate but related households.

The other question is due to the differing size of family or household units. The larger incomes of some may be due to a larger number of income earners, and may be associated with a larger number of persons for whose consumption and savings the total family income provides. Some adjustment for the size of the

family or household unit must therefore be made—by relating total income to total number of persons, or to some type of adult equivalent; and this will be done whenever the data permit. Households are, in general, larger in the underdeveloped than in the developed countries; and the dispersion of income among household units may, on this account alone, tend to be wider in the underdeveloped countries (see Table 2, lines 6 and 7). At any rate, a simple reduction to a per capita basis, and the regrouping of the distribution by per capita family or household income, is warranted whenever the necessary data are available.

3. The Period of Income Cumulation

Income may be affected by short-term factors, whether they are the type that affects large numbers of family units almost equally (e. g., a crop failure or an unusually large crop) or have a different impact on different units (e. g., sickness or a turn of personal fortune). These short-term effects may be nearly random, i. e., reflect a multiplicity of causes, none great enough to stand out; or they may be systematic, as in business cycles during which some income types respond more sensitively than others (e. g., entrepreneurial incomes in trade compared with salaries in government)—with consequent effects on the size distribution of income among families dependent upon different types of income.

Short-term variability of income can be viewed as a consequence, at least in part, of the factors involved in economic growth. Thus, in underdeveloped countries, dominance of traditional agriculture may mean that the incomes of a large proportion of families are subject to marked fluctuations in crops; while in the developed countries with the free organization of the market business cycles may dominate short-term movements. Nevertheless, we should distinguish between the short- and the long-term components of income, since they might have different sources in the productive system in the course of growth and would have different impacts on the disposition of income by recipients, on their responses to income as an incentive. Unfortunately it is not easy to adjust the income distribution for the effect of short-term income variability.

Ideally, one should have for this purpose long records of income receipts for each family or household unit, so that the secular paths rather than the fluctuating annual amounts could be traced. If such records were available for all units in the population, we could set up a size distribution of secular income ordinates rather than of given year values. And if lifetime cycles of income could be established, an alternative distribution of secular values, adjusted for the particular phase of the life cycle occupied by a given family unit in a given year, might be secured. If income recipients tend to evaluate their incomes within the perspective of the life earnings cycle based on current or recent experience, a distribution of what might be called secular-life-cycle-relatives of income might give us an insight not provided otherwise.

But no long-time records of income for separate family units are available on a scale that would permit international or interregional comparisons; and we must use more practical devices, while keeping the wider problem in mind. One practical approach has been suggested by the illuminating analysis by Milton Friedman in A Theory of the Consumption Function (National Bureau of Economic Research, 1957). For our purposes, the major conclusion of Professor Friedman's analysis is that, on some reasonable assumptions, the size distribution of household consumption (or the variance of household consumption for family units

grouped by size of family income) is a far better approximation to the size distribution of what he calls "permanent" (i.e., long-term) income than the size distribution of measured annual income (the income distributions usually provided). To be sure, the distinction is largely based on the implicit treatment by the income recipient of income as the basis for decisions concerning consumption and savings—not on the evaluation of income with reference to different criteria (e.g., phase of lifetime progression, or standing relative to incomes of other groups). Since the use of income for consumption and savings lends importance to size distributions of income, for the few countries for which we have comprehensive distributions of household consumption by size of income, we can use these at least as a check on the size distributions of income.

Another practical alternative is to study income differentials not among discrete households, but among groups of them—particularly among groups distinguished by attachment of the household head to different industrial sectors. Such a grouping will not eliminate short-term changes in income which are common to all or most units within a group, and may still leave some cyclical elements in the income differentials. But it should minimize the short-term effects on income that are different for different units within the group, e.g., those that are largely random, or those associated with different phases in the life cycle of earnings; and these may be the more important components in the short-term disturbances of income values. At any rate, the relevant data on intersectoral income differentials should be utilized to supplement the conventional size distributions among discrete family or household units.

4. The Rates of Income Mobility

Two size distributions of income, even if they relate to long-term income levels of family units, may differ greatly in meaning because of different degrees of internal mobility. If in one distribution the given family units remain at the same long-term income position, absolute or relative, while in another the long-term income level of some families involves marked shifts upward and downward, the responses of the household units to income level as well as their ties with the productive system are likely to be quite different. Yet the two size distributions of family income may be quite similar in their measurable characteristics—with respect to income, recipient unit, and period of income cumulation as defined above. While reduction of transient income elements naturally reduces income mobility, the use of long-term income levels (even related to position in the life cycle of earnings) does not bar extensive and significant mobility due to long-term, "permanent," differences in the endowments of different families relative to secularly changing opportunities afforded by the production system in the process of growth. Nor would such mobility be reduced to insignificance for clusters of family units related by ties of common interest: even for these there may be upward or downward mobility, not only in absolute long-term income but also in income relative to those of other family clusters in the country.

Since, as already indicated, we have no long-term income records for families, the extent of income mobility cannot be studied on a scale even remotely adequate for our purposes. Yet the point must be stressed because it directs our attention to the implications of some basic characteristics of economic growth for the interpretation of the conventional measures of the size distribution of income. Sustained and marked increases in per capita income are a constituent feature of economic growth. It follows that, unless there are factors to the contrary, the incomes

of a much greater proportion of families will rise more in a country sustaining economic growth than in a stagnant or slowly growing country. Thus at least absolute upward income mobility is a direct function of economic growth. Furthermore, if such growth takes place under relatively free market conditions, the rise must affect the personal income of families—since the accompanying changes in industrial structure cannot be made without the inducement of higher incomes in those sectors of the economy that are the carriers of growth. Given a greater degree of structural shifts accompanying vigorous economic growth, and hence significantly greater internal mobility, there is likely to be more income mobility—not only absolute, with a balance toward rises, but also relative, in which some groups, perhaps previously low in the scale, may be rising, and others, perhaps previously high in the scale, may be declining. One would tend to assume that internal income mobility is more limited in stagnant, slowly growing societies than in rapidly growing countries; and there are some implications also for the trends in income mobility over the long time span of growth within a country.

The importance of this aspect of the income distribution cannot be denied. Indeed, extreme mobility would rob the size distribution of income of much of its present meaning. If the groups of family clusters that were in the upper brackets have moved, with the passage of a generation, to the bottom of the array and have been replaced by groups of clusters whose immediate forebears began at the bottom; if the identity of the groups in the size distribution of income has changed markedly, the differences revealed by the latter have no cumulative impact; there is no persistent economic class consciousness; and there is little meaning to the question whether the poor are getting poorer and the rich richer. Of course, for purely technical analysis of the effect of economic growth on income size and change, and of effects of the latter on economic groups, it should still be of interest to distinguish higher and lower income groups, while separating within each those who are recent additions from above or below. But with complete mobility, a complete shift from top to bottom and from bottom to top within a generation or some such reasonably limited period, the impact of the size distribution of income and of the problems created by income differentials would be much reduced, if not completely cancelled. Actually, the extreme mobility suggested in the illustration has not operated; and wealth and poverty, or more precisely, high and low relative income position have tended to be transmitted in good part, within one group to its descendants. Yet to the extent that modern economic growth has been accompanied by wider structural shifts and by greater economic and income mobility than in the more slowly growing or stagnant societies, size distributions of current or even of secular long-term income levels have lost much of their meaning as pictures of the shares of relatively stable groups within the population. And when we evaluate the comparisons in cross-section analysis between size distributions of developed and underdeveloped countries and the trends over time in the course of growth, we shall be forced to speculate on the effects of internal income mobility on the meaning of these distributions of income levels.

5. The Measure of Income Inequality

It is clear from the preceding discussion that no single summary measure of inequality in the size distribution of income for a given country at a given time is adequate. The variety of definitions of income shares, before and after redistribution through taxes and transfers; of recipient units, ranging from individuals to families to clusters of family units tied by common interests; of the period of income cumulation, or of the devices designed to approximate long-term income

levels by reducing the transient and temporary components in them; and of the ways of taking account of income mobility—all mean that no single distribution and no single measure of income inequality would suffice. Granted that inadequate data and difficulties in measurement sharply limit the number of size distributions securable, differing in definition of income, shares, recipient units, and the like, there still are several distributions available, and hence several measures of income inequality, corresponding to different underlying variants.

But there is another complication in addition to the possible multiplicity of underlying variant size distributions for one country and year. Given a single size distribution, a number of measures of inequality can be derived, each yielding a somewhat different value. Formally speaking, each measure is a summary of income differences among distinguishable groups, with different weighting systems for income differences of various types (absolute and relative, large and small relative to the mean, and so on). [1] Depending upon the particular aspect of the size distribution to be stressed, one or the other of several measures is most appropriate; and in comparisons, the several measures of inequality may yield different results.

Furthermore, any measure of inequality has a double meaning. On the one hand, it is a purely formal index of differences among incomes of the several groups distinguished in the distribution. No normative or analytical implications need be attached, even though the base with which differences in income are compared is complete equality of incomes. On the other hand, one may argue, in line with some of the discussion above, that, given the wide differences in the productive capacity (because of age, sex, education, etc.) and in needs (because of differences in size of family units, if not reduced to a per capita basis; or of the life cycle phase of the unit), one should not expect complete equality of income, nor consider it the proper base for measurement of observed income differences. These observed differences should perhaps be measured against a base that embodies what might be called "warranted" inequality. [2] The result would then be a measure of what, for want of a better term, might be called "unwarranted" inequality. How in such an approach one would treat inequalities arising out of concentration of wealth and property income is not easy to see; and the whole notion, involving as it does difficult problems of imputation of income differentials to reproducible or natural differences in efficiency and in comparable needs, is not easy to apply. But it points up the limited meaning of the conventional measures of inequality which use absolute equality of all units as a reference base.

In the summary of statistical evidence that follows we shall be limited to measures of total inequality, and whatever findings emerge will necessarily be tentative until more intensive analysis can reveal the factors involved and permit us to trace the various forces that produce the observed income differentials. Under the circumstances, and given the tenuous character of much of the data in the field, we feel it is best to show as much of the size distributions themselves

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1. For a recent useful review see Irving B. Kravis, The Structure of Income (Philadelphia: University of Pennsylvania Press, 1962), particularly Ch. VI, pp. 161-81.

2. In this connection see the discussion in George Garvy, "Inequality of Income: Causes and Measurement," in Studies in Income and Wealth, Volume XV (New York: National Bureau of Economic Research, 1952), pp. 27-47.

as possible; concentrate on some of their obvious features, such as the shares of the top and bottom ordinal groups; and present only one or two of the formal, aggregative measures of inequality.

II. International Comparisons for Post-World War II Years: Size Distributions of Income before Taxes among Family or Consuming Units

In assembling the evidence on the size distribution of income for recent years, summarized in Table 3, we have limited it to the shares of ordinal groups (i.e., groups distinguished by the order position of their per unit income) in the country's total population. Even if the underlying data covered only part of the population, we included them if that part could be placed within the array of total population by size of income. We excluded data for a group when the standing of that group within the total for a country was unknown, because we could not evaluate the significance of the data for the leading question here: the differences among countries at different levels of development, or the changes over time in the course of development, in the distribution of income among the total population of the country. Obviously, evidence on some specific group, e.g., the income of tax-return filers, or budget studies of wage earners or of farm families, is not a reliable guide to the size distribution of income among the total population—unless, again, the position of the subgroup within the total can be approximated. Incidentally, almost all of the voluminous literature on the application of the Pareto law to income distributions (usually of tax returns), and on budget studies, relates to such subgroups, without reference to the total population and the income of which these subgroups are parts; and cannot, therefore, be used in the present discussion.

A second comment bears upon the character of the data underlying the measures in Table 3 and the subsequent tables. Unlike the information on industrial structure, distribution among factor shares, consumption and capital formation (all treated in the preceding papers in this series), much of which flows directly from the censuses on population (relating to labor force and occupations), agriculture, industry, construction, distribution, and the like, the evidence on the distribution of income by size is more in the nature of synthetic estimates, in which the ingenuity of the investigator overcomes gaps in and deficiencies of the available data. To be sure, the measurement of national product by industrial origin or factor shares, and the distinction between consumption and capital formation, also involve some such elements of estimation. But they are clearly of greater weight in the derivation of countrywide estimates of size distribution, since these must combine detailed information on the flow of income from the productive system (similar to that used in the other distributions of national product) with additional and scarce data on the individual and family units who receive this income. It may not be an exaggeration to say that we deal here not with data on the distribution of income by size but with estimates or judgments by courageous and ingenious scholars relating to size distribution of income in the country of their concern. Nevertheless, the comparison has some value, since the estimates and judgments are based on a variety of data and are transmuted reflections of them, rather than irresponsible notions stemming from preconceived and unchecked views on the subject. At any rate, in the desire to attain the broadest possible coverage, we accepted as many estimates as seemed reasonably founded; and excluded evidence for only two countries, the estimates for which could not be

Table 3.
Shares of Ordinal Groups of Income Units (Families or Tax Returns), Selected Countries, Late 1940's and Early 1950's

Country and year	Shares of Ordinal Groups							
	0-20% (1)	21-40% (2)	41-60% (3)	0-60% (4)	61-80% (5)	81-90% (6)	91-95% (7)	Top 5% (8)
1. India, 1950	7.8	9.2	11.4	28.5	16.0	12.4	9.6	33.4
2. India, 1955/56	n.a.	n.a.	14.8	33.5	19.7	13.6	9.6	23.6
3. Ceylon, 1952/53	5.1	9.3	13.3	27.7	18.4	13.3	9.6	31.0
4. Northern Rhodesia, 1946	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	45.3+ (1.4%)
5. Southern Rhodesia, 1946	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	65.3 (5%)
6. Kenya, 1949	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	50.9+ (2.9%)
7. Mexico, 1950	6.1	8.2	10.3	24.6	15.6	10.8	9.0	40.0
8. Mexico, 1957	4.4	6.9	9.9	21.2	17.4	14.7	9.7	37.0
9. Colombia, 1953	n.a.	n.a.	n.a.	31.4	12.2	8.0	6.8	41.6
10. El Salvador, 1946	n.a.	n.a.	n.a.	32.2	15.7	8.5	8.1	35.5
11. Guatemala, 1947/48	n.a.	n.a.	13.2	28.8	15.8	11.6	9.3	34.5
12. Barbados, 1951/52	3.6	9.3	14.2	27.1	21.3	17.4	11.9	22.3
13. Puerto Rico, 1953	5.6	9.8	14.9	30.3	19.9	16.9	9.5	23.4
14. Italy, 1948	6.1	10.5	14.6	31.2	20.4	14.4	10.0	24.1
15. Great Britain, 1951/52	5.4	11.3	16.6	33.3	22.2	14.3	9.3	20.9
16. West Germany, 1950	4.0	8.5	16.5	29.0	23.0	14.0	10.4	23.6
17. Netherlands, 1950	4.2	9.6	15.7	29.5	21.5	14.0	10.4	24.6
18. Denmark, 1952	3.4	10.3	15.8	29.5	23.5	16.3	10.6	20.1
19. Sweden, 1948	3.2	9.6	16.3	29.1	24.3	16.3	10.2	20.1
20. United States, 1950	4.8	11.0	16.2	32.0	22.3	15.4	9.9	20.4

(Continued on next page)

Table 3 (Cont.)

Line 1: Based on M. Mukherjee and A. K. Ghosh, "The Pattern of Income and Expenditure in the Indian Union; A Tentative Study," Bulletin of the International Statistical Institute, XXXIII, Part III, International Statistical Conferences, India, 1951, Lorenz curve equations given on p. 56.

Line 2: From H. F. Lydall, "The Inequality of Indian Incomes," The Economic Weekly, XII, 23, 24, and 25 (June 1960), 873-74. In this estimate the survey data, used for brackets not subject to income tax, were reduced to a per capita basis, while tax returns were assumed to represent 3 persons each (see p. 873).

Line 3: Based on Central Bank of Ceylon, Survey of Ceylon's Consumer Finances (Colombo, 1954), Table 21. The distribution of consumer or household ("spending") units is used.

Lines 4-6: From United Nations, National Income and Its Distribution in Under-Developed Countries, Statistical Papers, Series E, No. 3 (New York, 1951), Table 12, p. 19. The table shows the proportions in personal income and in total population of the African and non-African populations. The percentages of the non-African population who received the shares of personal income indicated in column 8 are given in parentheses. The entries for Northern Rhodesia and Kenya are entered with a + sign, since the shares of the top 5 percent are obviously larger than those shown.

Lines 7-8: From Ifigenia M. De Navarette, La Distribución del Ingreso y El Desarollo Económico de México (Mexico, D. F., 1960), Table 12, p. 85, and the table on p. 87.

Line 9: Based on United Nations, Analysis and Projections of Economic Development. III. The Economic Development of Colombia (Geneva, 1957), Table 13, p. 28 (showing number and income for major occupational-industry groups in the population, 13 in all).

Line 10: Based on Henry C. Wallich and John H. Adler, Public Finance in a Developing Country: El Salvador—A Case Study (Cambridge, 1951), Table 2, p. 26.

Line 11: Based on John H. Adler, Eugene R. Schlesinger, and Ernest C. Olson, Public Finance and Economic Development in Guatemala (Stanford, 1952), Tables 57 and 58, pp. 222 and 225.

Line 12: Based on K. H. Straw, "A Survey of Income and Consumption Patterns in Barbados," Social and Economic Studies, I, 4 (August 1953), 5-40. The shares of ordinal groups were interpolated for the distributions given separately for the crop season and hard times; and then weighted by 2.1 and 2.7, respectively (the income totals given for these two parts of the year).

Line 13: Based on Puerto Rico, Department of Labor, "Income and Expenditures of Families in Puerto Rico in 1953," Report A-1—Income of All Families (Processed), Tables 1 and 3, pp. 11 and 13.

Line 14: Based on P. Luzzatto Fegiz, "La Distribuzione del Reddito Nazionale," Giornale degli Economisti e Annali di Economia, IX (New Series) (July-August 1950), Table 6, 352.

Line 15: Based on H. F. Lydall, British Incomes and Savings (Oxford, 1955), Table 9, p. 24.

Lines 16-19: From United Nations, Economic Commission for Europe, Economic Survey of Europe, 1956 (Geneva, 1957), Ch. IX, Table 3, p. 6. The shares for Denmark in col. 1 and 2 and col. 6 and 7, combined in the source, were distributed by the shares for Sweden.

Line 20: From U.S. Department of Commerce, Income Distribution in the United States (Washington, 1953), Table 21, p. 85.

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reconciled with the available countrywide totals.[3] Undoubtedly, the estimates are subject to error, and the error is likely to be much wider in the less developed countries. But while it is impossible to set specific limits on such errors, the general cast of a total size distribution, given clear definitions of the recipient unit and of the income apportioned, is not sensitive to even large errors for some of the components. And we can at least rely on the broad consensus of evidence as an indication of significant aspects of real processes.

Many of the sources provided a distribution of income by detailed ordinal groups; and the shares could be directly entered in Table 3. In other cases, we had to interpolate in order to estimate the shares of the ordinal groups used as standard in the table. The interpolation, here and throughout the paper, was carried through by straight lines to the logarithms of the cumulative totals of units and of income arrayed in increasing per unit income. The implication is that the graph of cumulative numbers of units against their cumulated income, in an array of rising per unit income, is a straight line on a double-log scale (the implication of the Pareto law). This assumption, while not fully valid for all ranges on the income scale, particularly in the shift from the very low to the higher levels, is sufficiently realistic for the short segments within which the interpolations had to be made.

We may now consider the evidence in Table 3. Its coverage of countries is quite limited: among the underdeveloped countries, two are in Asia, three in East Africa, and six in Latin America; and there are none among the less developed countries of Europe, unless Italy is considered one. Of the developed countries, there are just six; and the younger countries overseas (Canada, Australia, New Zealand) are not represented. No Communist countries are covered. When we refer in the discussion below to underdeveloped and developed countries outside the Communist orbit we are dealing with the ends of a range, for much of which we have no information. With these warnings, the findings for the size distribution of total income before taxes among families or spending units may be summarized.

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3. These were for the Philippines, as given in United Nations Technical Assistance Programme, The National Income of the Philippines and Its Distribution (New York, 1952), and for Japan, for which income tax data are available for a number of years and family budget data for recent years are given in Chotaro Takahashi, Dynamic Changes of Income and Its Distribution in Japan (Tokyo, 1959). The allocation of income by income brackets for the former excluded about 31 percent of estimated personal income; the data for the latter could not be reconciled with the national product estimates for the country (when the numbers of persons covered in the size distribution data were taken into account).

First, the shares of the upper income groups are distinctly larger in the underdeveloped than in the developed countries. The top 5 percent of family or spending units in most underdeveloped countries receive 30 percent of total income or more; the shares of the corresponding group in the developed countries range from 20 to 25 percent. For the top decile, the share in most underdeveloped countries ranges between 40 and 45 percent of total income, in the developed countries between 30 and 35 percent. For the top quintile, the shares in underdeveloped countries are between 50 and 60 percent, in the developed countries between 40 and 50 percent. The rather low level of shares in the estimate for India in 1955/56 (line 2) may well be due to the adjustment of consumer or family units for the number of persons: as will be indicated in Table 9 below, such an adjustment, if made simply by using the average number of persons per family in each family income class (rather than distinguishing several groups by size of family within each class), tends to narrow the spread substantially. Hence the only true exception in Table 3 to the finding of higher shares of the top groups in the underdeveloped countries is Barbados (line 12); and in this case, the author warns:

> It is likely that due to several factors, among them some non-cooperation on the part of the highest income groups in both seasons, the share of total income received by the groups above $50 per week [i.e., the top 6 to 8 percent] is on the low side. Thus the degree of inequality is likely to be slightly greater than appears from the figures presented. [4]

It should be observed that, in general, any bias due to understatement of top incomes, is likely to be relatively greater in the data for underdeveloped countries, and would only strengthen the finding of higher shares of upper income groups in the underdeveloped countries.

Second, while the shares of the lowest income groups are in some underdeveloped countries lower than those in the developed countries, the differences are much narrower than for the shares of the upper income groups, and may not be significant. If we deal with the lowest 60 percent, for which the number of countries covered is the largest, and omit lines 2 and 12 as exceptions, the shares range from 21 to 32 percent for the less developed countries, and from 29 to 33 percent for the developed countries. But if we also omit Mexico from the former, the share of the remaining six underdeveloped countries (two in Asia and four in Latin America) ranges from 28 to 32 percent of total income; and if we omit Great Britain from the list of developed countries, the share in the remaining five ranges from 29 to 32 percent. Thus for most of the countries in Table 3, the shares of income received by the lowest three quintiles of the population do not differ significantly. This conclusion is confirmed when we examine the shares of the two lowest quintiles in the few cases for which they can be distinguished: the levels for the underdeveloped and developed countries are not very different.

Third, it follows from the preceding two findings that the shape of the income distribution curve is different in underdeveloped and developed countries. The low income groups in the former receive shares in total income as high as those of the low income groups in the developed countries; but the upper income brackets in the underdeveloped countries receive appreciably higher shares in total income than they do in developed countries. Consequently the distribution of incomes below the top bracket must be less unequal in the underdeveloped than in the

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4. See Straw, op. cit., pp. 29-30.

developed countries. If the share of incomes below the top quintile is say 45 percent in the underdeveloped and 53 percent in the developed countries, while the shares of the lowest and next quintiles are 5 and 10 percent respectively in both groups of countries, the two lowest quintiles in the underdeveloped countries account for 11 and 22 percent of all income below that of the top 20 percent, whereas the two lowest quintiles in developed countries account for only 9 and 19 percent of all income below that of the top 20 percent. Thus, distributions which, like those in the underdeveloped countries, are characterized by wider inequality in the sense that their upper income groups may receive a larger share of total income, may also display narrower inequality in the distribution of incomes below the top group.

This difference in the size distribution of income between underdeveloped and developed countries is reflected in the contrast between two measures of income inequality that can be easily calculated. The first is the concentration ratio—ratio of the area between the Lorenz curve and the diagonal representing full equality to the area under the diagonal—which measures the departure of the Lorenz curve from complete equality, expressed as a ratio to complete inequality (which would be represented by the full right-angle triangle under the diagonal). It ranges from 0 for complete equality to 1 for maximum inequality; and we computed it for nine underdeveloped countries in Table 3, excluding lines 2 and 4-6, counting Mexico twice, and basing the ratio on the standard ordinal groups in columns 4-8. The average (arithmetic mean) of the concentration ratios for the underdeveloped countries in lines 1, 3, and 7-13 is 0.44. A similar measure for the six developed countries in lines 15-20 is 0.37. We also computed the ratio on the basis of the complete range of ordinal bands for six underdeveloped countries (shares of the lower quintiles are not available for Colombia, El Salvador, and Guatemala) and for the six developed countries. The measures are 0.47 and 0.42, respectively. The concentration ratio, sensitive to the large shares of the upper income groups, shows that inequality is significantly wider for the underdeveloped than the developed countries.

The other measure of inequality, the standard deviation of logarithms of income, is less sensitive than the concentration ratio to large absolute income deviations and more responsive to relative income differentials over a wide frequency of units, but it can be calculated only for those countries in which the lowest quintiles can be distinguished. For the six underdeveloped countries (again counting Mexico twice) the mean measure is 0.337; for the six developed countries it is 0.352. Thus, for the same sample, the standard deviation of logs of income shows greater equality for the underdeveloped countries, while the concentration ratio shows greater inequality for the underdeveloped countries—a clear reflection of the patterns indicated above. [5]

In Table 3 the units are either families or consuming units (even in the case of tax returns), not individual recipients. Distributions among the latter are available for recent years for Ceylon and for two other countries not included in Table 3; and Table 4 thus extends the coverage somewhat.

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5. Margaret G. Reid made this same point in comparing measures of inequality in the income distributions for Ceylon and the United States in her review article of the Ceylon study. See "A Survey of Ceylon Consumer Finances," American Economic Review, XLVI, 5 (December 1956), particularly the table and comments on p. 960.

Table 4.
Shares of Ordinal Groups of Income Recipients, Three Countries, Recent Years

Shares of ordinal groups	Ceylon, 1952/53 (1)	Norway, 1950 (2)	Australia 1942/43 (3)	Australia 1954/55 (4)
1. 0-20%	4.3	5.5	4.9	5.6
2. 21-40%	8.4	10.4	10.1	12.5
3. 41-60%	12.2	15.4	16.3	17.8
4. 0-60%	24.9	31.3	31.3	35.9
5. 61-80%	18.5	23.7	22.6	22.4
6. 81-90%	14.1	16.0	14.5	13.8
7. 91-95%	10.1	10.8	9.3	9.0
8. Top 5%	32.4	18.2	22.3	18.9
9. Concentration ratio	0.50	0.39	0.40	0.35
10. Standard deviation of logs of income	0.36	0.31	0.33	0.29

Col. 1: Based on Survey of Ceylon's Consumer Finances, op. cit., Table 10.

Col. 2: From Norway, Central Bureau of Statistics, The Effects of the Norwegian Tax System on the Personal Income Distribution (Det norske Skattesystems virkninger på den personlige inntektsfordeling) (Oslo, 1954), p. 83. The table gives the shares of deciles and the top 1 and 2 percent; the share of the top 5 percent was interpolated.

Col. 3: Based on H. P. Brown, "Estimation of Income Distribution in Australia," in Milton Gilbert and Richard Stone, eds., Income and Wealth Series VI (London, 1957), Table IV, last column, p. 231. We converted the frequency distribution to a distribution of income by using the midvalues of the income intervals.

Col. 4: Based on Australia, Bureau of Statistics, Year Book of the Commonwealth of Australia, 1958 (Canberra, 1958), p. 850. The table gives the distributions of numbers and income of recipients by "actual" income classes (actual income being gross income minus expenses incurred in earning it), beginning with income of £105. We estimated the number of recipients for the lower end class (below £105) from the movement of the frequencies in the other classes and the proportion shown by Dr. Brown for 1942/43, taking into account the marked rise in per recipient incomes. The number was assigned the average income for the lower open-end class assumed for 1942/43 (£75), and the data were then complete for interpolation of the standard ordinal groups.

In general, distributions among individual recipients are likely to be more unequal than those among family or consuming units, even when the former exclude the large numbers of recipients whose income is limited to minor amounts of property incomes (or incidental earnings). If the income of the primary income earner within a family is large, it is likely to be accompanied by no or low income of subsidiary income recipients; and, conversely, if the income of the head of a family is inadequate, it is likely to be accompanied by greater reliance on incomes of other members of the family. But the important finding in Table 4 is that here again the shares of the top income brackets in the one underdeveloped country, Ceylon, are distinctly higher than those of the two developed countries, Norway and Australia, with consequent effects on the concentration ratios. The one

difference from Table 3 is that not only the concentration ratio but also the standard deviation of logs of income is somewhat higher for Ceylon than for the two developed countries. However, this difference in comparative inequality, as measured by the standard deviation of the logs, between the distributions of families and of individual recipients can hardly be considered significant in view of the small sample in Table 4. But it may well be that, with the larger family units and the greater possible number of income earners within the family in the underdeveloped countries, the shift to the individual recipient basis (excluding minor property income when that is the only source) widens inequality by reducing the shares at the lower ends of the distributions much more in the underdeveloped than in the developed countries; with the observed effects on the standard deviation of logs of income.

The evidence in Tables 3 and 4 can be supplemented by data on the industrial distribution of product (or participation income) and labor force. These data, used in two earlier papers in this series,[6] permit us to derive product (or participation income) per worker for several sectors in a country's productive system. This measure is only a crude approximation even to intersectoral differences in income received per worker, let alone the full size distribution of income among families, consuming units, or recipients. However, differences in productivity and product per worker among major industrial sectors within a country are an important factor in the size distribution of total income; the data are available for many more countries than could be covered in Tables 3 and 4; and the group averages are free of at least some of the transient income elements that affect the distributions underlying Tables 3 and 4. They should therefore be reviewed at this juncture, as suggesting the nature of at least one important component making for differences in the size distribution of income among countries at different levels of per capita income and economic development.

In Panel A of Table 5 we present the measures of inequality derived as they were in Papers II and III, i.e., as the sum of absolute differences between the percentage shares in labor force and in product of the various sectors in the economy, for eleven individual countries for which the underlying industrial distributions of labor force and product (or earnings) were given in a single United Nations source (column 2). The number of sectors distinguished for each country, given in the stub, is substantially larger in most cases than the three or five major sectors used in the distributions in Paper II and Paper III. To make the measures comparable with those derived from the full size distributions covered in Table 3, we converted them to concentration ratios (column 3). This was done by arraying the several sectors by increasing per worker product or income, cumulating, and then calculating the concentration ratios from the resulting cumulations of percentages of labor force and product (the latter representing a Lorenz curve with as many segments as there are sectors). Although the underlying groups are different from those distinguished in a size distribution of income of the type used in Table 3, the formal significance of the concentration ratio is the same. The arithmetic mean of the concentration ratios for the seven underdeveloped countries in Panel A is 0.42, while that for the three or four (excluding or including Italy) developed countries is only 0.15. This small sample thus reinforces the conclusion, derived from Table 3, that the wider inequality of the size distribution of income in the less developed countries largely reflects the higher shares of the upper income groups.

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6. See Paper II, particularly pp. 45-46, where the measure of intersectoral inequality in product per worker was introduced; and Paper III, Table 34, p. 80, where it was also used.

Table 5.
Measures of Inequality and Concentration Ratios Based on Employment-Status Groups or Industrial Sectors, Selected Countries, Late 1940's and Early 1950's

A. Based on Employment-Status Groups and Earnings

Country, year, and number of groups	Share of A sector in labor force (%) (1)	Measure of inequality (2)	Concentration ratio (3)
1. Northern Rhodesia, 1946 (11)	83.1	95.6	0.54
2. Southern Rhodesia, 1946 (8)	68.9	114.8	0.62
3. Kenya, 1949 (7)	n.a.	72.6	0.41
4. Chile, 1948 (9)	33.4	60.0	0.40
5. Peru, 1947 (7)	58.2	48.0	0.26
6. Venezuela, 1936 (11)	53.6	71.0	0.40
7. Puerto Rico, 1946/47 (11)	33.2	43.4	0.30
8. Japan, 1949 (8)	31.8	21.8	0.15
9. Italy, 1948 (8)	38.1	22.6	0.17
10. Denmark, 1948 (11)	26.1	27.9	0.19
11. United States, 1949 (12)	12.2	13.9	0.10

B. Based on Industrial Sectors in Labor Force and in Product

Groups of countries by per capita product	Number of countries (1)	Share of A sector in labor force (%) (2)	Measure of inequality (3)	Concentration ratio (4)
12. I	4	10.6	13.4	0.09
13. II	6 (5)	23.3 (19.6)	26.5 (21.3)	0.16 (0.13)
14. III	6	26.7	25.0	0.17
15. IV	8	48.0	24.0	0.16
16. V	4 (3)	44.5 (51.8)	35.1 (41.8)	0.22 (0.26)
17. VI	7	57.2	37.7	0.23
18. VII	6 (5)	75.9 (72.9)	65.0 (55.4)	0.35 (0.30)

Lines 1-11: Based on United Nations, Statistical Papers, Series E, No. 3, Tables 15-20, 22, 24, 25, 27, and 29. The data for Cuba were not used because the groupings did not seem adequate. For Denmark, the entries are based on the distribution of assessed income excluding persons without occupation or with unspecified occupation. Whenever possible, unpaid family labor and similar groups were eliminated from the distributions before cols. 2 and 3 were calculated.

The entries in col. 2 are the sum, regardless of sign, of the differences between the percentage shares in labor force and in earnings of the various sectors. The entries in col. 3 are derived from the same groups, but the groups were arrayed in order of increasing per capita earnings and cumulated; and the ratio of the area between the diagonal and the Lorenz curve to the total area under the diagonal computed.

(Continued on next page)

Lines 12-18: Entries are unweighted arithmetic means of estimates for individual countries, given in Appendix Table 1. The figures in parentheses in lines 13, 16, and 18 exclude Venezuela, Japan, and the Congo. Since their structures differed considerably from those of the other countries in the respective groups we thought it desirable to show both averages.

The evidence in Panel B of Table 5 is far more important, because it summarizes data for many more countries, forty-one altogether. Eight industrial sectors are usually distinguished; and it should be added that when in some countries one or two sectors were not shown separately, these were usually quantitatively small (e. g., electric light and power, or mining where it is not important). The distributions are more detailed than those given in Paper II; and an attempt was made to use labor force and product distributions for the same or adjacent dates, to minimize disparities that may be due to changes over time in one apportionment not observable in the other.

While there are some irregularities in the association, the less developed, less industrialized countries display, as we already observed in Paper II, wider intersectoral inequality in product or income per worker. The concentration ratios in column 4 range from an average of 0. 09 for Group I and 0. 13 for Group II (excluding Venezuela, which is not typical of countries at that stage of development), to 0. 30 or more in Group VII, even excluding the Belgian Congo. Since agriculture, treated as a single sector, accounts for such a large proportion of the labor force in the less developed countries, their concentration ratios are proportionately more reduced by the resulting flatness in the Lorenz curve than are those of the more developed countries; and consequently the averages in column 4 of Panel B of Table 5, and for that matter the ratios for individual countries in column 3 of Panel A, understate the contrast in inequality between the two groups of countries. In any case, the findings in Table 5 lend support to the conclusion that wider inequality of income distributions in the less developed countries is associated with the higher shares of their upper income groups.

The concentration ratios for the size distributions of income in Table 3 average 0. 47 for the underdeveloped, and 0. 42 for the developed countries (most of the former would be in Groups VI and VII, and most of the latter in Groups I and II). The ratios in Panel B of Table 5 are appreciably lower, ranging from 0. 09 to 0. 30. This is hardly surprising since the distributions in Table 5 do not and those in Table 3 do reflect income differentials within the sectors. Somewhat more unexpected is the much greater reduction from Table 3 to Table 5 in the concentration ratio for the developed than for the underdeveloped countries: the former drops from 0. 42 to about 0. 11 (an average of Groups I and II), a reduction of well above two-thirds; the latter drops from 0. 47 to about 0. 27 (an average of Groups VI and VII), a drop of less than half.

The reason lies in the technical relation between inequality among sectors and that in the total size distribution, when measured by a concentration ratio. This can be shown by a simple illustration. Assume two sectors, A and B (e. g., agriculture and nonagriculture), and assume for simplicity's sake that each accounts for half of the labor force. Assume further that relative inequality of the income distribution within each sector is the same, the shares of the successive quintiles being 4, 10, 18, 26, and 42 percent, respectively, of the total income for each sector. Then, if the per unit income in the two sectors is the same, the concentration ratio derived from intersectoral per unit incomes is 0; that for the

total size distribution of income is 0.37; and the ratio of the former to the latter is 0. If per unit incomes for sectors A and B are 90 and 110 percent respectively of the countrywide per unit income, the concentration ratio derived from intersectoral inequality will be 0.05, that for the full size distribution, 0.38, and the ratio of the former to the latter rises to 0.14. If the per unit incomes for sectors A and B are 50 and 150 percent respectively of the countrywide per unit income, the concentration ratio based on intersectoral inequality is 0.25, that for the full size distribution is 0.45, and the ratio of the former to the latter rises to 0.56. Finally, if the incomes per unit for sectors A and B are 5 and 195 percent of the countrywide income, the concentration ratio based on intersectoral inequality is 0.475, that for the full size distribution is 0.63, and the ratio of the former to the latter rises to 0.75. In short, under the conditions stated, viz., equal weight of the two sectors in terms of number attached and equal relative differentials of incomes within each, an increase in the intersectoral inequality in per unit income results in a larger rise in the concentration ratio based on the latter than in the concentration ratio based on the full size distribution of income. In other words, since inter- and intra-sectoral inequality combine, in some fashion, to produce inequality in the total size distribution, the widening of the former (inter-) while the latter remains unchanged within each sector, naturally increases its relative importance in the total.

This simple illustration demonstrates that the size distribution of total income is a combination of others—in particular, of distributions within sectors. The variables involved are the relative size distribution of income within each sector, the weight of each sector in terms of the population it represents, and the intersectoral differences in per unit income. We shall have occasion to return to this problem below when we deal with the size distribution of income within major sectors of the productive system. In the present connection, the relevant point is that unless intra-sectoral size distributions of income for the various sectors differ materially between underdeveloped and developed countries, and in directions opposite to those of intersectoral income differentials; and unless the different weights of sectors have a material effect on the size distribution, given the same inter- and intra-sectoral income inequalities, the intersectoral income differentials do reflect differences in the size distributions of total income. We venture to say in advance that shifts in sector weights, in and of themselves, are not likely to have a major effect on the relative size distribution of income; and intra-sectoral income distributions are not likely to offset intersectoral income inequalities.

Evidence of the type used in Table 5, available for the U.S.S.R., sheds some light on the income distribution in at least one Communist country. In general, the distribution of income among various population groups in the Communist countries requires data that take account of both money income and income in kind; and such data do not seem to be available. Furthermore, there is some serious question whether they are meaningful for countries in which until recently, and even today, there is no free market for major consumer goods; and in which therefore deficiencies of supply may rob high incomes of their value. Nevertheless, the intersectoral inequalities in product per worker in the U.S.S.R. are of some interest; and since they are based on earnings and exclude property income, they approximate more closely what we need than the sectoral distribution data for the non-Communist countries. Based on three sectors (A; M+, i.e., mining, manufacturing, construction, and transport and communication; and S-, remaining services) and average shares for 1950 and 1958, the concentration ratio works out to 0.22—about the same as the average for Groups V and VI in Panel B of

Table 5. Since by its per capita income and the share of agriculture in product (23 percent), the U.S.S.R. belongs in Group II or Group III, intersectoral inequality in product or earnings per worker seems rather high. On the other hand, the share of labor force in agriculture—between 40 and 50 percent in the 1950's—would put the U.S.S.R. in Group V; in which case, the concentration ratio is at about the group level. [7]

Additional information on intersectoral differences in product per worker are provided in the recent report by the United Nations on the world economic situation (Table 6). Among Communist countries also intersectoral disparities in product per worker tend to be wider for the countries with a higher share of agriculture in labor force, and hence less industrialized and developed: the concentration ratios are distinctly larger for Yugoslavia, Romania, and Bulgaria than for East Germany, Czechoslovakia, and Hungary. If we use the share of agriculture in the labor force as the basis of comparison, the concentration ratios in 1950 are only slightly higher than for the corresponding groups in Table 5; but almost all rise appreciably to 1959 and are in that year significantly higher than those in Table 5. If we use per capita income as the basis, some of the countries, particularly the first three, are likely to fall in Group II or Group III; and in this case, the concentration ratios at least for Czechoslovakia and the U.S.S.R. are too high. The industrial structure differentials between product and labor force in the Communist countries are quite different from those in the free market economies; the product per worker in the A sector is relatively much lower in the former than in the latter; and insofar as it means a greater agricultural-nonagricultural differential in incomes, it may also mean a wider income inequality—when countries with the same per capita income are compared. Whether this higher intersectoral income inequality is offset by a more limited range of income dispersion within each sector, or by the communal services, is a question that can be answered only by an intensive analysis that is not feasible here, and perhaps not feasible at all with the present limited supply of data.

III. International Comparisons for Post-World War II Years: Selected Adjustments of the Size Distributions for Scope of Income and Number of Persons per Family or Consuming Unit

Of the various possible adjustments for scope of income, period of cumulation, recipient unit, and the like, discussed in Section I, only a few can be made with the available data—particularly since we need measures for more than one country for purposes of comparison. And even when such comparisons are possible, so few countries are covered that the results must be judged illustrative rather than conclusive. But data for even a few countries, if the latter are at widely separated points on the range between underdeveloped and developed, may prove revealing. We shall discuss the effects: of adjustments for taxes and government benefits; of the shift from total income to consumer expenditures; and of the adjustment for the number of persons per family or consuming unit. These are the only aspects of the size distribution of income for which comparative data could be found. But we shall devote some space to speculations on other aspects, such as price differentials between upper and lower income groups, income mobility, and the like.

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7. The data are from Table VIII. 6 in my paper, "A Comparative Appraisal," in Abram Bergson and Simon Kuznets, eds., Economic Trends in the Soviet Union (Harvard University Press [in press]).

Table 6.
Concentration Ratios Based on Intersectoral Product per Worker, Communist Countries, 1950 and 1959

	1950		1959		Average 1950 and 1959 concentration ratio
	Share of agriculture in labor force (%)	Concentration ratio	Share of agriculture in labor force (%)	Concentration ratio	
	(1)	(2)	(3)	(4)	(5)
1. East Germany	26.6	0.14	18.1	0.19	0.16
2. Czechoslovakia	38.6	0.25	28.5	0.27	0.26
3. U.S.S.R.	50.3	0.30	42.2	0.35	0.33
4. Hungary	52.5	0.26	42.9	0.28	0.27
5. Poland	60.1	0.25	51.0	0.36	0.31
6. Yugoslavia	67.8[a]	0.38[a]	61.0	0.43	0.41[a]
7. Romania	73.8	0.29	69.2	0.41	0.35
8. Bulgaria	79.7	0.27	66.9	0.41	0.34

a. Based on data for 1953.

The underlying data are from United Nations, World Economic Survey, 1961 (New York, 1962), Ch. 3, particularly Tables 3-1, 3-6, and 3-7, pp. 88, 92, and 93. For each country, the shares in labor force are given for six sectors (industry, agriculture, construction, transport and communication, trade and other, and services). The entries in columns 1 and 3 are shares in the total including services. However, since material product is given for the first five sectors only, in calculating the concentration ratios we computed the shares in labor force omitting services.

1. Effects of Adjustments for Taxes and Government Benefits

We may begin with the flow of personal factor incomes, i.e., compensation of employees, incomes of entrepreneurs, and property incomes, received by individuals and households in return for their participation or the participation of their property in the production process; add transfers, largely from government, to obtain total personal income; subtract all taxes, both direct and indirect; and finally add all benefits in kind provided by the government (excluding transfers), whether in the form of final services (e.g., education, health, or recreation) or of more general services. It is clear that much detailed information, in addition to a variety of assumptions, is required to make these adjustments, particularly the apportionment of all taxes and of the various government benefits among the various income groups. To apportion indirect taxes we need data on consumption expenditures by various income groups on the different goods subject to tax, as well as assumptions concerning the shiftability of taxes (even of some direct). In the allocation of government benefits, a most difficult problem arises in connection with the government expenditures on general functions (administration, defense, legislation, and the like); and, in fact, the procedures used employ alternative rough bases of allocation (number of people, income, or tax burden for the various income groups). Each adjustment for taxes and benefits calls for special study

for each country, a study that must combine a variety of underlying data with a set of reasonable assumptions on points on which data are not or, in the nature of the case, cannot be available.

It is thus a matter of fortunate accident that we could draw upon studies for five countries, two underdeveloped and three developed, all relating to the late 1940's (Table 7). For Great Britain and the United States, the studies distinguish between personal factor income and total personal income including transfers (lines 7 and 8 and 14 and 15). For El Salvador, Guatemala, and Norway, the estimates begin with total personal income, the concept used in Table 3. In all five countries the effect of deducting taxes can be segregated from that of adding benefits from government expenditures, but for Norway the effect of the latter could not be measured. The effects of these adjustments on the shares of ordinal groups are quite clear. The exclusion of taxes, given some progressivity in their impact, reduces the shares of the upper brackets and raises somewhat the shares of the lower income groups. But except in Great Britain and perhaps Norway the reduction in inequality is minor. So is the effect of adding the benefits from government expenditures if they are allocated (as they are in lines 3a, 6, 10, and 17) largely in proportion to income. Only when benefits are distributed in proportion to numbers (as in line 3b) does the addition of benefits reduce income inequality perceptibly.

Minor as these effects are, the impacts are different in the underdeveloped from the developed countries, specifically in the relative reduction of the shares of the top group. Thus, for the top 5 percent, the adjustment for taxes and benefits reduces the share from 35.5 to 35.0 percent for El Salvador and from 34.5 to 33.2 percent for Guatemala, or from 1 to 4 percent of the original share. For Great Britain the reduction is from 22.7 to 18.3 percent, for Norway from 18.2 to 15.0 percent (adjusted for taxes only), and for the United States from 24.0 to 21.9 percent, or about a fifth, a fifth, and a tenth, respectively. Moreover, the allocation by proportion to income of government benefits, particularly for the general components, may overstate the value of these benefits to the upper income groups. At any rate, the adjustments of the type illustrated in Table 7 make for a somewhat wider contrast between the higher shares of upper income groups in the less developed countries and the lower shares of these groups in the developed countries; and thus only accentuate the wider inequality in this particular aspect of the size distribution of income in the underdeveloped countries.

2. Effects of the Shift from Total Income to Consumer Expenditures

In Section I we suggested, following Professor Friedman's hypothesis, that the distribution of consumer expenditures may provide a better approximation to the long-term income differentials than the customary distributions of annual income. Whether or not we accept this hypothesis fully, for both developed and underdeveloped countries, it should be of interest to compare, along with the size distributions of total annual income, the differentials in consumer expenditures.

The easily available data cover only four countries, two underdeveloped and two developed (Table 8). In all four the ordinal groups are those in the array of total personal income per unit, not of income excluding direct taxes (disposable income) or of consumer expenditures. But re-arraying by per unit disposable income or by per unit consumer expenditures would probably have only negligible effects on the shares. For the United States, no comprehensive study of all consumer units is available for a recent year; but we thought that a comparison for the largest

Table 7.
Effects of Redistribution through Taxes and Benefits on Shares of Ordinal Groups in Total Personal Income, Selected Countries, Late 1940's or 1950

	Shares of Ordinal Groups					Concentration ratio
	0-60% (1)	61-80% (2)	81-90% (3)	91-95% (4)	Top 5% (5)	(6)
El Salvador, Families, 1946						
1. Total personal income	32.2	15.7	8.5	8.1	35.5	0.40
2. Line 1, excl. taxes	32.7	15.7	8.4	8.0	35.2	0.39
3. Line 2, incl. benefits						
a. Assumption 1	32.8	15.7	8.4	8.1	35.0	0.39
b. Assumption 2	35.0	16.1	8.5	7.8	32.6	0.36
Guatemala, Families, 1947/48						
4. Total personal income	28.8	15.8	11.6	9.3	34.5	0.44
5. Line 4, excl. taxes	29.7	16.1	11.5	9.2	33.5	0.42
6. Line 5, incl. benefits	30.1	16.0	11.5	9.2	33.2	0.42
Great Britain, Consuming Units, 1948/49						
7. Personal factor income	33.3	20.0	12.9	9.4	24.4	0.35
8. Total personal income	36.6	19.6	12.2	8.9	22.7	0.31
9. Line 8, excl. taxes	39.3	21.0	12.9	9.0	17.8	0.26
10. Line 9, incl. benefits	40.1	20.8	12.5	8.3	18.3	0.25
Norway, Individual Recipients, 1950						
11. Total personal income	31.3	23.7	16.0	10.8	18.2	0.35
12. Line 11, excl. direct taxes	33.5	24.4	16.1	10.6	15.4	0.31
13. Line 12, excl. indirect taxes and subsidies	34.8	24.1	15.8	10.3	15.0	0.30
United States, Consuming Units, 1949/50						
14. Personal factor income	31.5	20.4	14.5	8.5	25.1	0.37
15. Total personal income	33.8	20.2	14.0	8.0	24.0	0.34
16. Line 15, excl. taxes	35.4	20.0	13.9	8.1	22.6	0.32
17. Line 16, incl. benefits	35.9	20.1	14.0	8.1	21.9	0.31

Lines 1-3: Based on Wallich and Adler, op. cit., Table 54, p. 188. In line 3a benefits of government expenditures are proportionate to income, except for cultural and social expenditures; which are distributed on the assumption that groups with annual incomes of less than 3,600 colones (i.e., the lower 95%) receive 20 percent more than their share on the basis of income alone, and that the upper income groups receive proportionately less than their share. In line 3b benefits are distributed on a per capita basis.

Lines 4-6: Based on Adler, Schlesinger, and Olson, op. cit., Table 57, p. 217, and Table 58, p. 222. Government benefits are apportioned on the basis of income, except social and cultural expenditures which are allocated on a per

(Continued on next page)

capita basis (see p. 219). The assumption is similar to, but not quite identical with, that underlying line 3a.

Lines 7-10: Based on Allan M. Cartter, The Redistribution of Income in Postwar Britain (New Haven: Yale University Press, 1955). Personal income (i.e., personal factor income adjusted for transfers) is taken from Table 3, p. 32, and the number of units from Table 1, col. 1, p. 27. Direct taxes on personal income (from Table 7, p. 39) and indirect taxes (from Table 11, p. 43), but not death duties or profits and income taxes on nonpersonal income, are subtracted in deriving the shares in line 9. Benefits are derived by averaging estimates based on three assumptions: that indivisible expenditures (i.e., general government operations, defense, and the like) are equal per capita, proportional to net private income, or proportional to taxes. The resulting average is close to proportionality to income (see ibid., Table 16, p. 52). Mr. Cartter's estimates take into account taxes and benefits of the central government alone.

Lines 11-13: Based on The Effects of the Norwegian Tax System..., op. cit., pp. 84 and 88.

Lines 14-18: Based on Alfred H. Conrad, "Redistribution through Government Budgets in the United States, 1950," in Alan T. Peacock, ed., Income Redistribution and Social Policy (London, 1954). Benefits not directly allocable are an average of estimates based on the assumptions of equal per capita distribution and of proportionality to the tax burden (see ibid., Redistribution Table IV, p. 201). Thus the assumption is fairly similar to those underlying lines 3a, 6, and 10. We exclude from benefits items considered as transfer incomes (interest on government debt, veterans' services and benefits, and social security and relief payments, as given in ibid., Table III, p. 214) and add them to income (as given in ibid., Redistribution Table I, p. 197), since the latter presumably excluded transfers. We also limit taxes to those bearing upon consumer income alone, excluding corporation income taxes and death and gift duties (for the latter see ibid., Redistribution Table II, p. 204).

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group, urban families, would yield a good approximation to the shift for the entire country from shares in disposable income to those in consumer expenditures.

Several conclusions may be suggested. First, the elimination of direct taxes reduces the spread in the ordinal shares, but appreciably more so in Great Britain and the United States than in Ceylon and El Salvador (even though we assumed for the former that all direct taxes, and for the latter that all progressive taxes, are chargeable to the top 5 percent of units). Thus, in the shift from total to disposable income the shares of the top 5 percent in Ceylon and El Salvador decline 6 and 2 percent, respectively, and the shares of the lower 60 percent rise 3 and 1 percent (all taken as percentages of the shares in disposable income); in Great Britain and the United States the declines in the shares of the top 5 percent are over a fifth and a tenth, and the rises in the shares of the lower 60 percent are about 7 and 5 percent, respectively, of the shares in disposable income. Correspondingly, the drop in the concentration ratios that results from deducting direct taxes is relatively greater for the two developed countries. This finding accords with our general expectations, since direct taxes are a much greater share in income and their effective progressivity is also likely to be greater in developed than in underdeveloped countries.

Second, in all four countries the spread in ordinal shares contracts sharply as we pass from shares in disposable income to those in consumer expenditures.

Table 8.
Effects on the Shares of Ordinal Groups of the Allowance for Direct Taxes and of the Shift to the Distribution of Consumption Expenditures, Family or Consumer Units, Selected Countries, Late 1940's and Early 1950's

	Shares of Ordinal Groups					Concentration ratio
	0-60% (1)	61-80% (2)	81-90% (3)	91-95% (4)	Top 5% (5)	(6)
Ceylon, 1952/53						
1. Total income	28.5	17.9	14.9	8.4	30.3	0.42
2. Line 1, excl. direct taxes	29.3	18.3	15.3	8.6	28.5	0.41
3. Consumption expend.	38.1	21.2	14.9	8.1	17.7	0.27
El Salvador, 1946						
4. Total income	32.2	15.7	8.5	8.1	35.5	0.40
5. Line 4, excl. direct taxes	32.6	15.9	8.5	8.1	34.9	0.39
6. Consumption expend.	36.1	18.9	10.3	9.5	25.2	0.32
Great Britain, 1951/52						
7. Total income	33.4	22.4	14.3	9.0	20.9	0.33
8. Line 7, excl. direct taxes	36.0	23.9	14.8	9.2	16.1	0.29
9. Consumption expend.	38.0	24.2	15.1	8.9	13.8	0.26
United States, 1950						
10. All consuming units, total income	32.0	22.3	15.4	9.9	20.4	0.35
11. Line 10, excl. federal income tax liability	33.6	22.9	15.7	9.8	18.0	0.32
12. Urban families, income after taxes	40.2	22.4	14.1	8.5	14.8	0.24
13. Urban families, consumption expend.	44.7	22.8	13.6	7.8	11.1	0.18

Lines 1-3: Based on the Survey of Ceylon's Consumer Finances, op. cit., Table 36, for total income and expenditures including direct taxes other than income tax. Direct taxes, except income tax, were derived from Table 26, which gives them as percentages of consumer expenditures, within each income bracket. Income taxes were derived from the estimate of income taxes paid by households during the year of coverage, given on p. 31, and we assumed they were all paid by the top 5% group of income units. Taxes were subtracted from consumer expenditures by income brackets and the shares in line 3 were calculated.

The entries in line 1 differ from those in Table 3 because they are based on a less detailed breakdown by income brackets. This procedure was followed for the sake of comparability within this table, since taxes and expenditures were given only by the broader income groups.

(Continued on next page)

Lines 4-6: Based on Wallich and Adler, op. cit. Direct taxes are from Table 34, p. 127: we assigned all the progressive taxes (largely income) to the top 5% of income units, and distributed the "proportional" taxes on the basis of income in each income class. Total income minus direct taxes underlies the entries in line 5. Consumer expenditures by income brackets (excluding direct taxes) are from Table 88, pp. 326-27.

Lines 7-9: Based on Lydall, British Incomes and Savings, op. cit., Table 9, p. 24, for income including taxes (designated "gross" in the source); Table 24, p. 51, for income excluding direct taxes (designated "net" in the source); and Table 68, p. 138, for consumption expenditures.

The entries in line 7 differ from those in Table 3 because they are based on a less detailed breakdown by income brackets—for comparability with lines 8 and 9.

Lines 10-11: Based on Income Distribution in the United States, op. cit., Tables 19-22, p. 85.

Lines 12-13: Based on U.S. Bureau of the Census, Historical Statistics of the United States (Washington, 1960), Series G-353 through G-372, p. 182. The underlying data refer to income after taxes and current consumption expenditures of all families of two or more persons in cities of 2,500 and over.

In Ceylon, the share of the top 5 percent in consumer expenditures is more than a third lower than the share in disposable income, while the share of the lowest 60 percent is almost a third higher; in El Salvador, the share of the top 5 percent in consumer expenditures is almost a third lower than the share in disposable income, while the share of the lowest 60 percent is a tenth higher. The effects of the shift in developed countries, while in the same direction, are not as great. In Great Britain, the share of the top 5 percent in consumer expenditures is less than a fifth lower than the share in disposable income; the share of the bottom 60 percent about 6 percent higher. In the United States, the share of the top 5 percent drops about a fourth in the shift from the distribution of disposable income to that of consumer expenditures; the share of the bottom 60 percent rises about a tenth.

This finding implies that savings, the difference between disposable income and consumer expenditures, are far greater in proportion to income, in the upper income groups in the underdeveloped than in the developed countries; and that the differentials in savings-income ratios are appreciably wider in the former than in the latter. Reference to the original sources underlying Table 8 illustrates this implication. For Ceylon, the savings of the top 4.5 percent of spending units amounted to 30 percent of disposable income; whereas for the lowest 42 percent of spending units, dissavings amounted to about 30 percent of disposable income. For El Salvador, the savings-disposable income proportion for the top 5 percent of family units was roughly 36 percent; that for the lowest 60 percent was, surprisingly, positive and 2 percent, but this figure may not be significant as indicated in the discussion in the source (see Wallich and Adler, op. cit., p. 328, footnote 2). For Great Britain, the savings-income ratio for the top 4 percent of units (by gross income) was 16 percent—far lower than that for either Ceylon or El Salvador; the dissavings proportion for the lower 58.8 percent was 4 percent of disposable income. Finally, for the United States, the savings-income proportion for the top 6.6 percent of urban families was 25 percent; the dissavings ratio for the lower 56 percent of urban families was about 9 percent (all of income after taxes). In general, the savings ratio for the top income groups is much higher in the underdeveloped countries, and the spread in the ratios along the income range is wider.

Granted the crudity of the estimates, and the small sample in Table 8, the suggestion remains that the difference between the distributions of disposable income and of consumer expenditures, as well as the range in the savings-income ratios, is much wider in the underdeveloped than in the developed countries. What is the significance of such a finding? Are the transient elements in income relatively so much more prominent in the underdeveloped countries? They may well be, because of the greater dominance of agriculture, subject to annual variations in yield, and of entrepreneurs whose incomes are generally more variable than those of employees. But would the upper income groups in the underdeveloped countries be as much affected as the lower groups, who are so much more exposed to the vagaries of weather and fortune than the rather entrenched upper groups? The disparity between the shares in income and in consumer expenditures of the lower income groups in the underdeveloped countries may be fully an effect of the transient component in income; but this can be only partly true of the difference between shares in income and in consumer expenditures of the upper income groups. The larger savings-income ratio of the latter may be more of a long-term characteristic than the high dissavings-income ratio for the lower income groups. And this may also be true of the developed countries. Unfortunately we have no evidence for testing this hypothesis.[9]

Whatever the interpretation, a third conclusion is suggested by Table 8. Even the shares of the top groups in consumer expenditures are somewhat higher in the underdeveloped countries. For the top 5 percent group, the shares in consumer expenditures in Ceylon and El Salvador are 18 and 25 percent; for the top 10 percent group, 26 and 35 percent (lines 3 and 6). For Great Britain, the corresponding shares are 14 and 23 percent (line 9); for the United States (applying to line 11 the ratios of line 13 to line 12), about 14 and 23 percent, respectively. The concentration ratios for shares in consumer expenditures, reflecting largely the higher shares of upper groups, are 0.27 and 0.32 for the two underdeveloped countries and 0.26 for Great Britain and, by extrapolation, 0.24 for the United States. The shares of the lower 60 percent group are very similar: slightly above 36

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9. The implication of the hypothesis can be illustrated by using some of the shares in Table 8. If we assume that all the transient elements affect the distribution below the top 5 percent, the shift will fall only within these brackets. Then for Ceylon, if we assume that for the 0-60% group, the share in long-term income levels is 38.1 percent (see line 3, column 1), and that for the top 5% (completely unaffected by transient elements, by extreme assumption) is 28.5 percent (see line 2, column 5), the share in long-term income of the 61 to 95% group is the residual 33.4 percent. A similar set of assumptions applied to Great Britain would yield shares for the three successive ordinal groups (0-60%, 61-95%, top 5%) of 38.0, 45.9, and 16.1 percent, respectively. The interpretation implicit in these assumptions (or any that minimize the transient element in the shares of the top income groups) results in a comparison in which the share of the top group in the underdeveloped countries is still higher relative to that in developed countries than in Table 3 (e.g., 29 percent for Ceylon and 16 percent for Great Britain); the shares of the lowest income groups are about the same; but the intermediate income groups have appreciably lower shares in the underdeveloped than in the developed countries (33 percent for Ceylon and 46 percent for Great Britain). The implications for the economic and class structure of underdeveloped as against the developed countries are clear and intriguing.

percent in El Salvador, about 38 percent in Ceylon and Great Britain, and about 37 percent in the United States. In short, the differences in the pattern of the size distribution of income between underdeveloped and developed countries, observed in connection with Table 3, persist in the distribution of consumer expenditures, although they are attenuated.

3. Effects of Adjustment for Number of Persons per Family

Since family, consuming, or spending units differ in the number of earners or persons included, differences in size distribution of income among such units, no matter what the scope of income or consumer expenditures, may be due to differences in size of units; and the contribution of the latter is important, since inequalities in either earning or consumption capacity must be related to the number of potential workers or consumers involved. Yet even the simple reduction of family or consuming units to a per capita basis can be made for just five countries, two of them underdeveloped; and the results differ with the amount of detail used in the adjustment (Table 9).

In the rough adjustment we use the average number of persons per family or consuming unit for each income class, income classes being by per unit income (lines 2, 4, 7, 10, and 13). This adjustment reduces inequality in the size distribution of income by raising the shares of the lower brackets in all five countries and reducing those of the upper brackets in four. By and large, there is a positive correlation between the size of family (or unit) income class and the average number of persons per unit in the class. Thus, in Ceylon, the average number of persons per spending unit is less than 2 in the lowest income bracket, rises to less than 3 in the next, to above 3 in the third, averages about 4 per unit for the lowest 59 percent of the units, and rises to 6.7 per unit for the top 6.1 percent of the spending units. In Puerto Rico, the average number of persons per family rises from about 3.5 in the lowest income class to over 5 in the class fourth from the lowest (these four classes constituting about 77 percent of the families) and then drops off slightly to less than 5 persons per unit for the top 4.5 percent of families. In Great Britain, the average number of persons per spending unit rises from 1.26 in the lowest gross income bracket (accounting for somewhat less than a quarter of all units) to 3.13 per unit in the next to the highest bracket (about 13 percent of all units) and 2.77 per unit at the top (top 7.5 percent of units). In the data for the Netherlands, which are limited to families of two or more, the average number of persons per family rises from 2.0 in the lowest family income group, 2.8 in the next, and 3.4 in the third from bottom (the three together accounting for about 40 percent of all families), to 4.0 or 4.1 for upper income classes. In the United States, in the distribution by money income alone, for families and unattached individuals (treated as families of one), the average number of persons per unit rises from close to 2 in the lower income brackets to over 4 in the upper. This adjustment reduces income inequality, with the concentration ratios declining within a range from about 5 percent (in Puerto Rico) to more than a half (in Great Britain). It should be noted that the concentration ratios for Ceylon and Puerto Rico (lines 2 and 4, col. 6) are still much higher than those for the three developed countries (lines 7, 10, and 13).

The picture changes when we can distinguish subgroups by number of persons within each income class of family or spending units. The additional detail permits the calculation of per capita income in each cell, re-ranking of the cells for a distribution that is more sensitive to per capita income differentials among

Table 9.
Effects on the Shares of Ordinal Groups of Adjustment for Number of Persons per Family or Consuming Unit, Selected Countries, Early 1950's

	Shares of Ordinal Groups					Concentration ratio
	0-60% (1)	61-80% (2)	81-90% (3)	91-95% (4)	Top 5% (5)	(6)
Ceylon, 1952/53						
1. Consuming units	27.7	18.4	13.3	9.6	31.0	0.43
2. Adjusted, single average per income class	33.6	19.3	11.8	8.0	27.3	0.35
Puerto Rico, 1953						
3. Families	30.3	19.9	16.9	9.5	23.4	0.38
4. Adjusted, single average per income class	32.1	18.6	16.5	9.2	23.6	0.36
5. Adjusted, seven cells per income class	26.8	19.6	15.3	11.5	26.8	0.43
Great Britain, 1951/52						
6. Consuming units	33.4	22.4	14.7	8.9	20.6	0.33
7. Adjusted, single average per income class	49.1	20.0	10.9	9.3	10.7	0.14
8. Adjusted, six cells per income class	30.8	20.3	15.7	11.8	21.4	0.37
Netherlands, 1954						
9. Families, two or more	40.1	21.3	13.6	8.5	16.5	0.25
10. Adjusted, single average per income class	44.2	20.0	12.4	8.0	15.4	0.20
11. Adjusted, four cells per income class	36.5	21.4	14.9	10.1	17.1	0.29
United States, 1952 (Money income only)						
12. Families and unattached individuals	31.0	23.8	15.8	10.4	19.0	0.35
13. Adjusted, single average per income class	38.7	21.8	14.5	8.7	16.3	0.26
14. Adjusted, seven cells per income class	29.7	22.6	16.2	10.8	20.7	0.37

Lines 1-2: Based on Survey of Ceylon's Consumer Finances, op. cit., Tables 21 and 22. Table 22 shows the total number of persons in the spending units, for each income class of spending units. Average income per person was computed for each income class (income per spending unit), the groups re-arrayed in increasing order of income per person, number of persons and income cumulated, and new partition lines interpolated to derive the shares in line 2.

(Continued on next page)

Lines 3-5: Based on "Income and Expenditures of Families...," op. cit., Tables 3, 9, and 10, pp. 13, 22, and 23. For the derivation of line 4 see the notes to lines 1-2. For line 5, cells within each income group were distinguished (by number of persons per unit, ranging from less than 3 to 10 and more); the number of persons, per capita income, and total income for each cell were calculated (there were 63 cells in all); the cells were arrayed in increasing order of per capita income; number of persons and total income were cumulated; and the partition lines interpolated.

Lines 6-8: Based on Lydall, British Incomes and Savings, op. cit., Table 9, p. 24, and Appendix Table 5, p. 250. The distribution is of gross income. For the derivation of line 7 see the notes to lines 1-2; of line 8, see the notes to lines 3-5. There were 30 cells (five income classes and six size of unit cells within each).

Lines 9-11: Based on J. W. W. A. Wit, "De Verdeling van de Gezinsinkomens in Nederland in de jaren 1949 en 1954," in Netherlands, Central Bureau of Statistics, Statistiche en econometrische onderzoekungen (1956, fourth quarter), pp. 157-77. Table 4, p. 172, shows the distribution of families (ranging from two to five or more persons), for each family income bracket, and the average number of persons per family for each income bracket. The average income for each bracket was approximated from Table 7, p. 175, and ranged from 1.3 thousand gilder (for the bracket of less than 2 thousand), to 19.0 thousand (for the top bracket of 10 thousand and over). For the derivation of lines 10 and 11 see the notes to lines 1-2 and 3-5. The number of cells was 36 (nine income classes and four number of persons cells within each).

Lines 12-14: Based on U.S. Bureau of the Census, Current Population Reports: Consumer Income, Series P-60, No. 15 (April 27, 1954), Table 3, p. 10. The median size of family shown for each income bracket was raised a tenth to approximate the arithmetic mean. Only money income is included. Lines 13 and 14 were derived by the procedures described in the notes to lines 1-2 and 3-5. The total number of cells was 112 (16 income classes and seven size of unit cells within each).

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families or spending units; and re-estimating the ordinal shares within the total population (number of persons represented). In all four countries (this adjustment was not possible for Ceylon) the differentials in ordinal shares are appreciably wider not only than those in shares resulting from the crude adjustment just discussed (i.e., in lines 4, 7, 10, and 13) but even than those in the shares based on the original unadjusted size distributions among families or spending units (compare lines 5, 8, 11, and 14 with lines 3, 6, 9, and 12). Apparently there are enough large families at low family income levels and small families at high family income levels to extend the tails of the size distribution at both ends. In particular, the full adjustment for number per family or spending unit lowers significantly the share of the low ordinal groups: thus the share of the lowest 60 percent drops from 30.3 percent to 26.8 percent in Puerto Rico, from 33.4 to 30.8 percent in Great Britain, from 40.1 to 36.5 percent in the Netherlands, and from 31.0 to 29.7 percent in the United States. And all the concentration ratios are higher with this detailed adjustment than without it. Whether the effect would be the same if instead of persons we used some adult equivalent base, cannot be told without further analysis not feasible here. But as the results stand, the proper adjustment for number per family or consuming unit widens the inequality in the size distribution of income in the specific countries: one underdeveloped and three developed.

Is it legitimate to argue that the same would be true for Ceylon in Table 9 and by implication, for most underdeveloped countries? Offhand, no grounds exist for assuming that the more detailed adjustment should yield results different in direction, if not necessarily in magnitude, from those for the developed countries. And we can therefore only conclude, if any conclusion is warranted, that the detailed adjustment for number of persons per family or spending unit, is likely to support the findings in Table 3, amplified and discussed in Tables 6-8, as to the higher share of upper income groups in the underdeveloped countries.

4. Effects of Other Factors

In addition to re-distribution through taxes and benefits, the effect of transient components that may be eliminated by a shift from shares in income to shares in consumption, and the adjustment of family or spending units for number of persons, a variety of other factors bear upon the evaluation of our main findings—the higher share of upper income brackets in the underdeveloped countries, and the approximate equality of the shares of the lowest 60 percent group. Here we can only speculate; but even such speculations may be useful.

The first of these relates to differential price levels for lower and upper income groups. It is quite likely that in both underdeveloped and developed countries, the higher income brackets, more concentrated in the urban communities, pay higher prices for the same type of goods and for the same satisfaction of wants than the lower income brackets. Indeed, such price differentials are one way by which the various groups in the population adjust to long-term inequalities in income. But are these intergroup price and cost differentials relatively wider in the underdeveloped than in the developed countries? On the one hand, urban-rural differences in prices of agricultural products may be relatively wider in the underdeveloped countries, because of high cost of transportation. On the other hand, the much greater extent of fabrication and the higher cost of distribution in the urban communities of the developed countries (discussed in Paper VII) may add an element of cost relatively greater than that added by greater use of domestic service among the higher income brackets of the underdeveloped countries. And when we deal with nonagricultural products, which are likely to be cheaper in the cities than in the countryside, would the price differentials necessarily be less favorable to the higher income groups in the underdeveloped countries than to the urban population of the developed countries? The difficulty in dealing with these questions is that we need to know the different product-mixes of consumption expenditures at different income levels in both groups of countries, as well as the corresponding price differentials. The adjustment of the income spread for the relevant price differences might possibly reduce inequality more in the underdeveloped than in the developed countries; but there is no preponderance of evidence in this direction and it is far from a distinctly probable result.

By contrast, the remaining considerations tend either to support the finding of wider income inequality in the underdeveloped countries or to accentuate its significance. First, the rough similarity of the shares of lower income groups, observed so far, may be misleading. In the developed countries, the increasing fractionalization of spending units—the separation of units with very old (retired) or very young (learner) family heads, or of broken units (with female heads)—means that a high proportion of the units in the lower income brackets are of this type. Thus, of the lowest fifth of family units (by money income) in the United States in 1959, as much as a third had family heads aged 65 or over, as much as a

quarter had female family heads, and over a half had heads who were not in the labor force (including a small fraction in the armed forces or unemployed).[10] In the underdeveloped countries the separation of units with aged heads or heads in the learning phases of their life span or of broken units is much more unusual, the older generations, the widows, and the young learners tending to live within the larger family. To put it differently, the combination of separate family or spending units into clusters tied by common interest, of the type discussed in Section I, would have a much greater effect on the size distributions in the developed than in the underdeveloped countries, raising the share of the lower brackets much more appreciably in the former than in the latter. Consideration of the generally higher average income levels, the social security provisions, and the greater weight of occupations like the professions (with large learner groups, whose early years of practice are still in the learning stage), typical of the developed countries, supports the conclusion that the allowance for this factor would produce a significantly greater upward shift in the share of lower income groups in the developed than in the underdeveloped countries.

Second, since the developed countries have a record of past growth and may even now be growing at substantial rates while underdeveloped countries are still to enter the modern growth process, economic and income mobility is bound to be greater in the former than in the latter. Such mobility, i.e., the shift in relative income position among individuals, taking their long-term income levels (adjusted for transient and cyclical changes) into account, is a direct consequence of the structural (industrial, status, etc.) changes that necessarily accompany growth in income per capita and an indirect consequence of the institutional adjustments to such structural shifts that must have been made in the developed countries in the process of their past growth. Hence, even if we deal with the distribution of long-term levels of income, in developed countries the upper and lower income brackets are groups among which and within which mobility is great and the identity of the units changeable; whereas in the underdeveloped countries the composition of these groups tends to be unchanging, with members and their forebears in the same bracket for long periods of time. The significance of the income differentials as a basis for the crystallization of permanent groups, in which both high and low relative income standings tend to be cumulative in their consequences, may be quite high for the underdeveloped countries; and much lower for the developed.

Finally, the obvious difference in average income per unit must be stressed. All measures used above distinguished groups by their income position relative to the countrywide average. But a per unit income equal to 50 percent of the countrywide average is one thing when the latter is $4,000 and another when it is $200. In general, the welfare inequality implicit in the same relative spread of per unit income (say, from 50 to 500 percent of the average for the country) is the greater, the lower the average real income in a country. And from this standpoint, the income distributions in underdeveloped countries signify a far greater range of welfare inequality (and would, even with a narrower range in shares of ordinal groups than those shown in the preceding tables) than do the income distributions for developed countries, all fine-spun discussions of the impossibility of interpersonal

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10. These percentages are overlapping, and have been derived from different classifications. The underlying data are from my paper, "Income Distribution and Changes in Consumption," in Hoke S. Simpson, ed., The Changing American Population, A Report of the Arden House Conference (New York, 1962), Table 5, pp. 34-35.

comparisons notwithstanding. For it is of the essence of economic growth that it is associated with common patterns of economic values and demonstration effect, among and within countries; and it is in the light of these, rather than of introspection, that welfare implications are to be judged.

We may conclude that, even if we disregard the difficult question of intergroup cost of living and price differentials, the size distribution of income among family units, adjusted for number of persons per unit and for other effects, is distinctly more unequal in underdeveloped than in developed countries. The share of upper income groups in the former is higher; and, with the proper allowance for fractionalization and separation of spending units in the developed countries, the share of the lower groups in the underdeveloped countries is likely to be lower. Furthermore, the lower economic and income mobility in the underdeveloped countries tends to maintain an unchanging identity of groups at both ends of the income distribution range, and is therefore conducive to continuing income differentials.

Questions as to the possible causes of these differences in the size distribution of income between underdeveloped and developed countries, and of their significance for economic growth, naturally arise. But the answers to these questions, inadequate at best, will be dealt with more effectively after we have considered other cross-section differentials in the size distribution of income.

IV. Regional Differences within Countries

If countries with different per capita income, industrial structure, and level of development, reveal different patterns of size distribution of income, can the same be said of regions within one country? Whether or not the association between the economic characteristics of the regions and their size distributions of income is the same as that found in international comparisons, the findings should be of interest for themselves, and should facilitate the analysis of factors that contribute to international differences in patterns of size distribution of income.

For Italy we have the most complete data on income distribution within regions for a recent year: the basic sample study for 1948 distinguished thirteen regions, whose population ranged from one and a quarter million (for Sardinia) to over six and a half million (for Lombardy). A frequency distribution of families by family income classes is given for each region, and we approximated the income shares by using the class means from the countrywide detailed distribution. The shares of the standard ordinal groups were then estimated for each region; and on the basis of data for 1952 both per capita net income and the distribution of the labor force and gross product between agriculture and nonagriculture were also estimated for each region. We then arrayed the regions in descending order of per capita income, and combined them in four overlapping groups of four regions each (one region overlapping), calculating unweighted arithmetic means for each group (Table 10).

For the groups of regions distinguished in Table 10, per capita net income ranges from 140 to 50, or 2.8 to 1 (line 1). In general, the share of the labor force attached to the A sector (agriculture, hunting, fishing) increases with the decline in per capita income, although not through the full range (line 2). Intersectoral inequality in gross product per worker, calculated for only two sectors (A and non-A), rises with the decline in per capita income only from Group A to Group B; then,

Table 10.
Shares of Ordinal Groups in 1948, Regions within Italy Grouped by Per Capita Income in 1952

	Groups of Regions by Per Capita Income				
	A (1)	B (2)	C (3)	D (4)	Italy (5)
Relevant Measures, 1952					
1. Index of average income per capita	139.8	98.7	65.9	50.0	100.0
2. Share of A sector in labor force (%)	33.8	44.7	54.8	53.1	42.4
3. Measure of intersectoral inequality, A and non-A sectors	23.5	33.8	32.4	24.9	33.0
Shares of Ordinal Groups, Families, 1948 (%)					
4. 0-20%	6.6	6.6	6.6	5.7	6.1
5. 21-40%	11.2	11.4	11.0	9.6	10.5
6. 41-60%	15.2	15.8	14.8	13.0	14.6
7. 0-60%	33.0	33.8	32.4	28.3	31.2
8. 61-80%	20.7	21.6	20.5	18.3	20.3
9. 81-90%	14.9	15.0	14.7	13.1	14.4
10. 91-95%	10.2	10.0	10.3	9.6	10.0
11. Top 5%	21.2	19.6	22.1	30.7	24.1
12. Concentration ratio	0.38	0.36	0.39	0.45	0.40
13. Standard deviation of logs of income	0.28	0.28	0.28	0.32	0.30

Entries are unweighted arithmetic means of estimates for individual regions, given in Appendix Table 2. Group A is an average of col. 1-4; Group B of col. 4-7; Group C of col. 7-10; Group D of col. 10-13.

unexpectedly, it drops in Group C, and is even lower—and only slightly higher than in Group A—in Group D (line 3).

The most interesting findings are in lines 4-13. In general, the relative income differentials are wider in Groups C and D, particularly the latter, than in Groups A and B. The shares of the lower income brackets are distinctly lower in the low income regions; those of the top 20, 10, and 5 percent brackets are distinctly higher. The association between these relative income differentials and the level of per capita income is not continuous. But if we compare the results for Group D, which includes the South (Campania, Puglie, Lucania, and Calabria) and Sicily, with Groups A and B, which include the North and most of the central part of the country, the contrast warrants the conclusion that relative income inequality is wider in the low income, less industrialized regions; and this wider inequality is a reflection of the higher shares of upper income groups (shown also by the concentration ratios in line 12) and of the lower shares of the low income groups (shown also by the standard deviations of logarithms of income in line 13). In this respect, the regional data for Italy agree with the international comparisons, and suggest further a more perceptibly lower level of the low income groups.

The data by states, for the United States in 1953 and 1957, are derived by an entirely different procedure (Table 11). Based on the work of Professor Seymour S. Goodman, they involve a comparison of population and income represented on the federal income tax returns with total population and total personal income by states. The latter had to be adjusted to assure greater comparability of the numerators and denominators; but the adjustments are minor (compare lines 1 and 2, and 20 and 21). From our standpoint, the inclusion by Professor Goodman of realized net capital gains is undesirable; but in both years the proportion to total personal income is only about 1 percent and its effects are negligible. Also, the conversion of tax returns to population represented on them was necessarily crude: the number of persons per return in each income class in the country as a whole was applied to the same income class on the tax returns for each state. The estimates may understate somewhat the shares of the upper income groups; but as we shall see, they check fairly well with the countrywide estimates, and the possible errors are not the kind that would obscure the major findings.

Table 11.
Shares in Personal Income of Ordinal Groups in Total Population, United States, States in Six Groups of Eight, 1953 and 1957

	Groups of States by Per Capita Income					
	I	II	III	IV	V	VI
	(1)	(2)	(3)	(4)	(5)	(6)
		A. 1953				
Relevant Measures						
1. Personal income per capita ($)	2,266(2,236)	1,940	1,715	1,538	1,362	1,114
2. Line 1, adjusted ($)	2,277(2,248)	1,945	1,728	1,555	1,369	1,120
3. Tax liability as % of personal income	14.9(14.0)	12.7	12.2	11.2	9.9	8.9
4. Share of property income in personal income (%)	13.2(12.3)	11.6	11.2	11.7	10.5	8.7
5. Share of net transfers in personal income (%)	2.7(2.8)	3.7	4.0	3.7	4.8	4.8
6. Measure of intersectoral inequality in participation income per worker	8.9(7.8)	7.3	12.7	9.75	12.3	17.95
Shares in Adjusted Income before Tax						
7. Top 1%	7.1(6.3)	5.8	6.0	6.0	6.2	6.6
8. 2nd to 5th%	8.0(8.0)	8.0	8.5	8.7	8.9	9.8
9. Top 5% (line 7 + line 8)	15.1(14.3)	13.8	14.5	14.7	15.1	16.4
10. 6th to 10th%	6.8(6.8)	6.9	7.3	7.3	7.4	8.0
11. Top 10% (line 9 + line 10)	21.9(21.1)	20.7	21.8	22.0	22.5	24.4
12. 11th to 25th%	14.4(14.6)	14.8	15.5	15.9	16.6	18.6
13. Top 25% (line 11 + line 12)	36.3(35.7)	35.5	37.3	37.9	39.1	43.0
14. Concentration ratio	0.14(0.13)	0.13	0.14	0.15	0.16	0.20

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Table 11 (Cont.)

		(1)	(2)	(3)	(4)	(5)	(6)
	Shares in Adjusted Income after Federal Income Tax Liability						
15.	Top 1%	4.8(4.5)	4.3	4.5	4.5	4.7	5.2
16.	Top 5%	12.1(11.8)	11.6	12.2	12.4	12.8	14.1
17.	Top 10%	18.5(18.2)	18.1	19.0	19.3	19.8	21.8
18.	Top 25%	32.6(32.4)	32.6	34.2	34.9	36.2	40.2
19.	Concentration ratio	0.09(0.09)	0.09	0.11	0.12	0.13	0.17
	B. 1957						
	Relevant Measures						
20.	Personal income per capita ($)	2,573(2,535)	2,143	1,924	1,790	1,601	1,276
21.	Line 20, adjusted ($)	2,556(2,531)	2,127	1,920	1,788	1,605	1,275
22.	Tax liability as % of personal income	13.6(13.1)	12.2	11.5	11.0	10.7	9.6
23.	Share of property income in personal income (%)	14.4(13.0)	12.5	12.7	12.55	11.0	9.9
24.	Share of net transfers in personal income (%)	3.4(3.5)	4.6	4.7	4.5	5.2	5.7
25.	Measure of intersectoral inequality in participation income per worker	8.8(7.6)	7.4	12.0	10.6	10.7	19.4
	Shares in Adjusted Income before Tax						
26.	Top 1%	7.2(6.3)	6.0	6.1	5.8	6.2	6.9
27.	2nd to 5th%	8.4(8.3)	8.2	8.5	8.6	8.7	9.9
28.	Top 5% (line 26 + line 27)	15.6(14.6)	14.2	14.6	14.4	14.9	16.8
29.	6th to 10th%	6.5(6.5)	6.8	7.0	7.2	7.6	8.6
30.	Top 10% (line 28 + line 29)	22.1(21.1)	21.0	21.6	21.6	22.5	25.4
31.	11th to 25th%	14.9(15.1)	16.1	16.0	16.3	16.9	19.1
32.	Top 25% (line 30 + line 31)	37.0(36.2)	37.1	37.6	37.9	39.4	44.5
33.	Concentration ratio	0.15(0.12)	0.14	0.15	0.15	0.17	0.22
	Shares in Adjusted Income after Federal Income Tax Liability						
34.	Top 1%	5.1(4.7)	4.5	4.7	4.5	4.9	5.5
35.	Top 5%	12.7(12.3)	12.1	12.5	12.4	13.0	14.7
36.	Top 10%	19.0(18.6)	18.6	19.2	19.3	20.3	23.0
37.	Top 25%	33.7(33.4)	34.4	34.8	35.3	36.9	41.8
38.	Concentration ratio	0.11(0.10)	0.11	0.12	0.12	0.14	0.19

Entries are unweighted arithmetic means of estimates for individual states. The grouping of the latter and the estimates underlying lines 2, 6-19, 21, and 25-38 are given in Appendix Table 3. The figures in parentheses in col. 1 are averages excluding Delaware.

Lines 1, 3-5, 20, and 22-24: Underlying data are taken or calculated from the U.S. Department of Commerce, Personal Income by States since 1929 (Washington, 1956), and Robert E. Graham, Jr., "General Rise in State Income in 1959," Survey of Current Business (August 1960), Tables III, 2, and 6-61, passim. Lines 5 and 24 refer to transfer payments minus personal contributions for social insurance.

In the tabulation below we compare the averages derived from Table 11 with the shares of corresponding ordinal groups in the distribution of countrywide personal income among families and unattached individuals, for the same years, derived from Department of Commerce distributions. The two sets of estimates are quite independent in method, and comparatively independent in the bodies of data that they emphasize.

Ordinal Groups	1953		1957	
	Average share from Table 11	Country, Dept. of Commerce distribution	Average share from Table 11	Country, Dept. of Commerce distribution
	(1)	(2)	(3)	(4)
Top 5%	14.9	19.9	15.1	20.2
Top 10%	22.2	28.7	22.4	29.1
Top 25%	38.2	50.8	38.9	51.4

Entries in cols. 1 and 3 are unweighted arithmetic means of shares in Table 11 (lines 9, 11, 13, 28, 30, and 32). Entries in cols. 2 and 4 are taken or calculated from Historical Statistics of the United States, Series G-99 through G-117, p. 166.

The average share (unweighted arithmetic mean) of the upper groups within the states is distinctly lower, about a quarter of the countrywide share. But such differences should be expected since the countrywide distribution reflects both inter- and intrastate differences in income, whereas the measures in Table 11 reflect only intrastate income differentials. The interstate income differences are quite sizeable: in both 1953 and 1957, the average per capita income of Group I was 1.37 times the unweighted arithmetic mean for all states (lines 1 and 20). The allowance for this difference would obviously bring the state differentials to close conformity with the countrywide. And one should note that the state measures reflect the slight rise in the shares of upper income groups from 1953 to 1957, recorded by the countrywide estimates. One may, therefore, place some confidence in the broad findings based on the state estimates.

These findings, taking into consideration both years, using the averages for Group I exclusive of Delaware (which has a highly peculiar income structure and unduly affects the group averages), and referring to the relevant data on per capita income, shares of property income and net transfers in total income, and the intersectoral inequalities in product per worker, may be briefly summarized.

First, the share of the top 1 percent, at the very peak of the distribution, shows no clear association with per capita income, despite the higher proportion of property incomes in the total in the high income states than in the low, which would make for a positive association between the share of the top 1 percent and per capita income. But there are factors that make for a negative association between the share of the top income group and per capita income—as becomes evident when we study the shares of the upper groups below the top 1 percent; and these factors affect even the share of the top 1 percent and serve to offset the effects of the higher proportions of property incomes.

Second, beginning with the 2nd to 5th percent group and through the 11th to the 25th percent group, the shares are distinctly higher in the low income than in the high income states, reflecting similar movements in intersectoral inequality in participation income per worker (based on five major sectors, lines 6 and 25); and this excess persists despite the lower property income shares and higher net transfer shares in these low income states.

Third, the shares of the top 25 percent bracket as a whole are higher in the low income than in the high income states, ranging from 36 percent in Group I to 43 percent in Group VI in 1953 (line 13); from 36 to 45 percent in 1957 (line 32). Accordingly, the shares of the lower 75 percent of the population are lower in the low income than in the high income states. There is a corresponding negative association between the level of per capita income and the concentration ratio—the latter rising from 0.13 in Group I to 0.20 in Group VI in 1953 (line 14) and from 0.12 to 0.22 in 1957 (line 33).

Fourth, the allowance for federal income tax liability, the preponderant direct tax on individuals in this country, has a greater effect on the upper than on the lower income brackets; but more important, it has a greater effect on income differentials in the high income states than in the low. In 1953, the high income states in Groups I and II bore a tax that was from 13 to 14 percent, whereas in the lower income states the tax was only from 9 to 10 percent of total income (line 3); in 1957 the corresponding proportions were 12 to 13 percent at one end, 9.6 to 10.7 percent at the other (line 22). Because the level of exemptions and the bases for different tax rates are identical throughout the country, the progressivity features of the federal income tax had a greater effect in high income states in which the top brackets, even with their relatively lower ratio to the state average, were absolutely much higher than in the low income states, and hence subject to much higher tax rates. Thus, for the top 1 percent, the reduction due to the tax liability in 1953 was about a third in Group I (a decline from 6.3 to 4.5 percent) and less than a quarter in Group VI (a decline from 6.6 to 5.2 percent); with similar differences observable in 1957 (lines 7 and 15, and 26 and 34). As a result the excess of the high share of upper brackets in the low income states is only accentuated for income after deduction of federal income tax liability: in 1953, the relative range of the concentration ratios from Group I to Group VI widens from a ratio of 1.5 to 1 for income before tax to a ratio of 1.9 to 1 for income after tax (lines 14 and 19). A highly progressive income tax must have this general effect whenever it is applied, with identical exemption limits and rates, to regions with different average income levels: the narrowing in income inequality produced by such a tax, all other conditions being equal, will be more pronounced in the high than in the low income regions.

In Paper III, which dealt with the industrial structure of income and labor force by states, we commented upon the importance of the association between income levels, industrial structure, and the proportions of Negroes. A related question arises in the present connection. Are the higher proportions of nonwhite population, subject to economic discrimination, the factor responsible for the higher shares of upper income brackets in the low income states in Table 11?

To answer this question, we followed the procedure adopted in Paper III: we excluded the 12 states with the highest proportions of nonwhites (the states with the highest proportions of Negroes, also); and regrouped the remaining 36 states by per capita income, thus deriving a new set of group averages (Table 12). This new set of averages for six groups of six states each has quite low proportions of nonwhite population and the differences among groups in this respect are rather minor (except for a slightly higher proportion in Group I, see lines 3 and 17). We classified the twelve states with high proportions of nonwhite population into two groups by that characteristic (Groups A and B in columns 7 and 8).

The first conclusion suggested by Table 12 is that the proportion of nonwhite population is an important variable, operating either through its contribution to the

Table 12.
Shares in Personal Income of Ordinal Groups in Total Population, United States, States in Six Groups of Six Each, Excluding Those with Large Proportions of Nonwhite Population, United States, 1953 and 1957 (All income before taxes)

	Groups of States, Excluding Those with Large Proportions of Nonwhites, by Per Capita Income						Excluded States by Proportion of Nonwhites	
	I	II	III	IV	V	VI	A	B
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A. 1953								
Relevant Measures								
1. Personal income per capita ($)	2,255	1,983	1,809	1,629	1,504	1,316	1,619(1,446)	1,132
2. Line 1, adjusted ($)	2,271	1,985	1,821	1,641	1,518	1,322	1,631(1,461)	1,139
3. Nonwhites, % of total population	6.0	4.0	2.7	4.6	4.3	4.3	18.8(19.8)	34.5
4. Share of property income in personal income (%)	12.7	11.4	11.3	11.9	11.0	10.2	12.3(10.9)	8.4
5. Share of net transfers in personal income (%)	2.8	3.9	3.8	3.9	4.3	4.5	3.9(4.2)	4.6
6. Measure of intersectoral inequality in participation income per worker	6.9	8.4	11.3	11.7	10.4	11.3	12.3(11.4)	19.7
Shares in Adjusted Income								
7. Top 1%	6.2	6.1	5.6	6.2	6.0	5.7	7.6(6.6)	6.9
8. 2nd to 5th%	7.9	8.0	8.1	8.7	8.7	8.9	9.1(9.2)	9.8
9. Top 5% (line 7 + line 8)	14.1	14.1	13.7	14.9	14.7	14.6	16.7(15.8)	16.7
10. 6th to 10th%	6.7	6.9	7.1	7.3	7.1	7.5	7.5(7.6)	8.1
11. Top 10% (line 9 + line 10)	20.8	21.0	20.8	22.2	21.8	22.1	24.2(23.4)	24.8
12. 11th to 25th%	14.4	14.7	15.2	15.6	15.9	17.1	16.3(17.0)	18.4
13. Top 25% (line 11 + line 12)	35.2	35.7	36.0	37.8	37.7	39.2	40.5(40.4)	43.2
14. Concentration ratio	0.125	0.13	0.13	0.15	0.15	0.16	0.18(0.18)	0.21

B. 1957

	Relevant Measures							
15.	Personal income per capita ($)	2,571	2,207	1,973	1,880	1,727	1,561	1,860(1,664)	1,299
16.	Line 15, adjusted ($)	2,577	2,168	1,995	1,864	1,734	1,546	1,830(1,662)	1,307
17.	Nonwhites, % of total population	8.1	6.2	3.6	3.2	4.9	4.6	18.0(18.8)	32.2
18.	Share of property income in personal income (%)	13.2	12.1	13.0	12.3	11.8	11.2	14.0(12.1)	9.8
19.	Share of net transfers in personal income (%)	3.5	4.7	4.8	4.6	4.4	5.6	4.6(5.0)	5.3
20.	Measure of intersectoral inequality in participation income per worker	6.9	8.9	10.6	12.5	7.8	13.3	12.3(11.4)	19.7
	Shares in Adjusted Income								
21.	Top 1%	6.4	6.1	6.0	5.6	6.3	6.1	7.6(6.6)	6.9
22.	2nd to 5th%	8.3	8.2	8.2	8.3	8.8	8.7	9.3(9.4)	9.9
23.	Top 5% (line 21 + line 22)	14.7	14.3	14.2	13.9	15.1	14.8	16.9(16.0)	16.8
24.	6th to 10th%	6.5	6.8	6.8	7.0	7.5	7.6	7.6(7.9)	8.6
25.	Top 10% (line 23 + line 24)	21.2	21.1	21.0	20.9	22.6	22.4	24.5(23.9)	25.4
26.	11th to 25th%	14.9	16.0	15.9	15.7	16.8	16.9	17.1(17.7)	19.1
27.	Top 25% (line 25 + line 26)	36.1	37.1	36.9	36.6	39.4	39.3	41.6(41.6)	44.5
28.	Concentration ratio	0.135	0.14	0.14	0.14	0.17	0.165	0.19(0.19)	0.22

For sources except for lines 3 and 17 see notes to Table 11.

Lines 3 and 17: Based on United States Census of Population, 1950 (for line 3) and 1960 (for line 17), United States Summary volumes.

level of per capita income and related characteristics of industrial structure, or independently. Thus, in general, the states with high proportions of nonwhite population are preponderantly from the low income Groups V and VI in Table 11; and this is clear in Table 12, since the averages in lines 1, 2, 15, and 16, in columns 7 and 8 (excluding the exceptional case of Delaware) are lower than the averages in columns 5 and 6. But it is also significant that in Group A, with higher per capita income than Group VI, the shares of the top brackets are nevertheless higher; as are the concentration ratios (compare columns 6 and 7, lines 7-14 and 21-28). In other words, higher proportions of nonwhite population make for wider income inequality even when they do not make for lower per capita income.

More relevant to the present subject is the comparison among the several Roman numeral groups in Table 12. Here we find that, even when the states with large proportions of nonwhite population are excluded, the lower income states still show higher shares for upper brackets, below the top 1 percent, and for the top 25 percent bracket as a whole. While the exclusion of these states reduces significantly the range of per capita income and the other related characteristics among states, we still observe the negative association between per capita income and the shares of upper income groups. The shares of brackets below the top 1 percent are still higher for the low income states; and so are the concentration ratios (lines 7-14 and 21-28, columns 1-6).

The third and last country for which we have an indication of differences in size distribution of income among regions for a recent year is Brazil (Table 13). The measures are indirect since they are based upon a comparison of the industrial structure, for each of some twenty states, of national product (for 1949-51) and labor force (for 1950): there are no direct estimates of the regional distributions of income by size. But we decided to include the evidence, because this is the only underdeveloped country for which we have any such data, and because the regional differentials are quite sizeable. In Table 13 we give both the measures of intersectoral inequality of the type given in Paper III, and the concentration ratios calculated from the sectoral shares.

Table 13.
Concentration Ratios and Measures of Intersectoral Inequality in Product per Worker, States Grouped by Product per Worker, Brazil, 1949-51

	Groups of States by Product per Worker				
	A	B	C	D	E
	(1)	(2)	(3)	(4)	(5)
1. Average product per worker, 1949-51 (000 cruzeiros)	19.2	14.2	10.2	8.4	6.6
2. Share of A sector in labor force, 1950 (%)	44.0	52.6	61.8	64.3	71.0
3. Measure of intersectoral inequality	23.7	24.8	35.8	48.1	61.3
4. Concentration ratio (based on sectors)	0.16	0.15	0.21	0.29	0.355

Entries are unweighted arithmetic means of estimates for individual states, given in Appendix Table 4.

Comparisons made above suggested a close association between intersectoral inequalities in product per worker and the inequality characteristics of the more detailed size distributions of income, particularly when the former are substantial (see in particular Table 5, Panel B). If then we accept the measures in lines 3 and 4 as approximations to differences in inequality in detailed distributions of income by size, the evidence for Brazil provides a striking confirmation of the findings for Italy and the United States. Here also, there is a clear negative association between per worker product (and presumably per capita income) and the share of labor force in the A sector, on the one hand, and the range of income differentials in the size distribution of income, on the other. The low income states, with the high shares of labor force in the A sector, are characterized by wider inequality in the size distribution of income, at least as it is reflected in concentration ratios.[11]

V. Factors Contributing to Wider Income Inequality in Less Developed Countries and Regions

We can now consider factors that may contribute to the observed differences in the size distribution of income patterns among countries or regions within a country: the higher shares of upper income groups in the less developed countries or regions, combined with rough equality of the shares of the lower groups in international (if not in interregional) comparisons. For the present purpose, the distributions can best be viewed as combinations of distinct components: (a) property income received by households, and (b) participation income of entrepreneurs and employees, distinguished further by industry or occupation. We distinguish these components in our discussion for two reasons. First, we have data on their relative shares for various groups of countries and regions (discussed in Papers II, III, and IV in this series). Second, we know, from studies already made, that the distributions of property income differ from those of participation income; and that various components within the latter may be characterized by different size-distribution-of-income patterns.

(a) For property income of households, including dividends, interest, and rent, but excluding returns on the equity of unincorporated entrepreneurs, the

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11. Several additional bodies of data were examined, but their reliability for the analysis at hand seemed questionable. The data for Barbados distinguish family income distributions, for the two seasons of the year, for four parishes on the island—two almost purely agricultural, and two more urban in character, with some differences in per family income. The difficulty was that the areas are quite small and insufficient data were provided on their distinctive economic characteristics. They were more suitable for comparisons of the A and non-A sectors than for regional analysis, and are used in Table 14 below. For the United States, the consumer expenditures and income study for 1935-36 distinguished several regions, but they were too few and broad for our purposes; while a restricted study at the Social Security Board (Bureau of Research and Statistics, Bureau Memorandum No. 44, Washington, December 1940), which contained estimates for 1935-36 by states, qualified the results so much that we question their usefulness. And too the depressed state of the economy in the survey year may not warrant the use of the data for secular analysis.

following findings are relevant here. First, the share of property income in total income of households in underdeveloped countries is about the same as, or slightly higher than, the share in the developed countries. If we add compensation of employees, income of entrepreneurs, and property income of households, the share of the last in the total, for post-World War II years, is about 12 percent in Group I, over 6 percent in Groups II and III, and about 11 percent in Groups IV-VII (excluding colonies and small units; see Paper IV, Table 1, pp. 10-11). If we allow for transfer receipts, which are proportionately (to household income) greater in developed than in the underdeveloped countries, the share of property in total income in the latter would be slightly higher than the share in the developed countries (say, in Groups I and II). Second, at least for the United States, and probably for other developed countries, the share of property in total income varies among regions and is lower in the low income, less developed regions (see Paper IV, Table 2, p. 14). Third, according to the evidence for the developed countries (and presumably for underdeveloped countries and for regions), property incomes are unequally distributed: a large proportion is received by the upper income groups; and they constitute a much larger proportion of the incomes of these upper groups than of the incomes of the lower groups or of total population. Thus, in the United States in 1948, the upper 5 percent of the population received about 70 percent of all dividends flowing to households, 26.5 percent of all interest, and 22.6 percent of all rent; and the share of property in total income for the top 5 percent group was 21.5 percent, whereas for the lower 95 percent it was 5.9 percent. [12] In Lydall's study for Britain for 1951/52, for the units with income of £1,500 and over, the share of property income in the total was 13 percent, compared with only 4 percent for the sample population. [13] Given this unequal distribution of property incomes, the greater their share in total personal income, the wider the inequality in the size distribution of the latter.

Since the share of property in total income is no lower in the less developed than in the more developed countries, it follows that, if the distribution of property incomes is characterized by the same degree of inequality in both groups of countries, the contribution of these incomes to inequality in the over-all size distribution would be the same in both groups of countries. [14] But one may well ask whether

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12. See Simon Kuznets, Shares of Upper Income Groups in Income and Savings (New York: National Bureau of Economic Research, 1953), Table 123, pp. 646-56, and Table 125, pp. 668-83.

13. See British Incomes and Savings, op. cit., Table 18, p. 43.

14. This conclusion denies the validity of the suggestions made by Harry T. Oshima in "A Note on Income Distribution in Developed and Underdeveloped Countries," Economic Journal (March 1956), 156-60. In this note, commenting on Theodore Morgan, "Distribution of Income in Ceylon, Puerto Rico, the United States and United Kingdom," Economic Journal (December 1953), 821-34, Dr. Oshima, in addition to criticizing the then available data on the size distribution of income in the underdeveloped countries as incomplete, advances some general arguments for his conclusion that "...assuming a broad definition of income (at least as broad as the definition adopted in the UN, A System of National Accounts with Supporting Tables, New York, 1953) and the recipient unit to be the household, our guess is that income (before tax) is distributed more equally in most countries of Latin America, Africa, Asia, and the Middle East than in the United (continued on next page)

the degree of concentration of property incomes in the underdeveloped countries is the same as in the developed. We have no direct evidence, but there are grounds for supposing that, if anything, ownership of income-yielding assets, other than the equity of individual entrepreneurs, may be more concentrated in the less developed than in the developed countries. To begin with, the lower per capita income and lower rate of savings in the former means that a smaller proportion of the population amasses savings consistently, particularly for investment outside the equity of individual entrepreneurs. If, for example, only 10 percent of population in the less developed countries attains such savings, and as much as 25 percent of population does so in the developed countries, income-yielding assets would be concentrated in the hands of a smaller proportion of population in the underdeveloped countries. Furthermore, the dynamic elements of growth, which shift the source of wealth from one sector to another and induce extensive economic mobility even within the upper brackets, are more prominent in the developed than in more stagnant underdeveloped countries; as are the attempts at legislative control over wealth accumulation by progressive taxation of income and inheritance.[15] Hence the equalizing effects of economic mobility and legislation have been far weaker in the underdeveloped than in the developed countries. Finally, the very low income level in the underdeveloped countries means a weaker economic position of the lower income groups and a greater possibility of persisting monopoly power of the wealthy few than in the developed countries. For all these reasons the hypothesis, if any is warranted, is that the persistence in the identity of the upper income groups, and hence the cumulative effect on concentration of wealth, have been greater in the underdeveloped than in the developed countries.[16] It follows that property incomes

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States or the United Kingdom." (P. 160.) All of his three arguments have bearing here. The first is that given the very low per capita income in the underdeveloped countries, close to the level of subsistence, there is little room for a surplus that would form the basis for an unequal distribution. The argument cannot be accepted in view of the historical fact that there have always been upper income groups—even in the earlier historical ages, when per capita income was lower than it is today. The two other arguments, more closely related to the effect of property incomes, are that the value of man-made assets per capita is much smaller in the underdeveloped countries, and "even if the concentration of their ownership were the same, this factor would contribute to equality" (p. 159); and that the proportion of entrepreneurs in the labor force of underdeveloped countries is much larger than in the developed countries, and "This means that, if the per capita value of all income-yielding assets (relative to earned income) is the same in both types of economies, this total of assets is probably distributed more equally in the underdeveloped countries" (p. 159). Both arguments fail if it is recognized that the share of property income, excluding the return on entrepreneurial equity in total income, is just as high in the underdeveloped as in the developed countries—the lower level of per capita wealth and the greater proportion of entrepreneurs in the former notwithstanding.

15. For a further discussion of this and related points see Simon Kuznets, "Economic Growth and Income Inequality," American Economic Review, XLV, 1 (March 1955), particularly pp. 8-12.

16. Greater political instability in the underdeveloped countries might be an offset since political changes might mean the shift of power from some established economic elites to others. But we cannot say that such political shifts do mean such economic shifts and mobility; nor can we calculate their effect on economic power.

would tend to be more concentrated in the underdeveloped than in the developed countries; and hence would contribute to the wider inequality in the size distribution of income in the former than in the latter.

All these arguments have to be modified in application to intracountry, interregional comparisons. First, if the shares of property in total income are lower in the less developed regions, as they are likely to be at least in the developed countries, they would tend to widen inequality less in the low income, underdeveloped regions than in the developed regions; and we saw, in Tables 11 and 12, that for the United States this effect on the share of the top 1 percent was sufficient to offset other factors making for higher shares in the less developed regions. Second, in a developed country, all regions are affected by the high rate of economic mobility and by the progressive economic legislation that characterize the country. Hence the arguments referring to the persistence of the same people in the upper brackets and the cumulative effect of such persistence on the greater concentration of wealth and property income in the less developed countries are not fully applicable to the less developed regions of a developed country. But this is a qualification, not a complete denial, of the effects: even within a developed country, the poorer regions are poorer because they have had less growth; and the very obstacles to growth may have also made for a greater cleavage between the lower and upper income groups. In the less developed countries, where regions are more isolated from each other than in the developed countries, the situation may be more truly comparable with that in international comparisons—in that property income shares may be no lower in the backward regions than in the developed, and in which persistence in accumulation of wealth may mean a greater concentration of income-yielding wealth than in the more developed regions. But this inference is highly conjectural, and its substantiation requires much additional interregional data for the less developed countries.

(b) In considering the distribution of participation incomes, it is helpful to distinguish between differentials among industrial sectors and within them. The data, available primarily for the developed countries, reveal marked differences not only in income distributed by employment status within a given industrial sector, with the difference between the generally higher income and wider dispersion among individual (unincorporated) entrepreneurs and the lower income and narrower dispersion among the employees; but also in the distributions by age, sex, education, place of residence (community-size), and where relevant, by race and color, all of these affecting income levels even for the same industry and employment status. But data for all these differentials for underdeveloped countries are lacking; and any attempt at a thorough comparative analysis that would take account of them (beyond the few casual observations already made in the earlier sections), would transcend by far the resources available for the present study. We must limit ourselves to intersectoral differences, with some attention to income differentials within the two broad sectors—agriculture and all other industries.

The major finding relevant here has already been stressed: the wider intersectoral differences in product or participation income per worker (or per capita) in the less developed countries and regions. These differences are due largely to the greater disparities, in the less developed countries or regions, between the product or participation income per worker in agriculture (and related activities) and the non-A sector as a whole. The factors that explain this wider range of differences can help to explain the higher shares of upper income groups in these same countries and regions. These factors were discussed elsewhere (see in particular Paper II, pp. 37-38) and are partly technological, partly institutional in character.

Given the relatively low level of productivity in the A sector in the less developed countries and regions—which, combined with the large share of the A sector, is what makes these countries and regions less developed—and given the existence of some modern sectors even in the less developed countries and regions, there is an element of technological necessity in the incomes in these modern sectors being large multiples of incomes in the A sector. Otherwise the people engaged in the modern sectors could not operate efficiently. For example, an adequately qualified engineer, physician, university professor, government or business executive, could not function effectively except at a given absolute standard of living and hence income—which may be a high multiple of the countrywide per worker income in an underdeveloped country. In this sense, underdeveloped countries and regions cannot afford income equality, or even as little income inequality as the higher income, more developed areas. Too little inequality in an underdeveloped area would mean that the small advanced economic components could not operate properly—whatever it might mean in the way of better relative standing of backward agriculture or handicrafts. There is also, of course, an element of institutional power relations: the trading, landlord, and financial groups can exercise far greater power vis-a-vis the masses of peasants and rural workers than in a developed country; and such dominance also means dominance in relative income per capita. One may argue that not only the welfare equivalents but also the power equivalents of the same relative income spread show a much wider range when the underlying average income is low than when it is high; and this means that, as time goes on, the spread in economic power may perpetuate and widen still further the underlying income differentials.

But granted that the differences in intersectoral product or participation income per worker, and, in particular, the differences between income per worker (or per capita) in the A and the non-A sectors, are wider in the less developed countries or regions, what are the income differentials within each sector, particularly within the A and non-A sectors? Despite the wider intersectoral differences in the less developed areas, and the different weights of the two sectors in the developed and the underdeveloped areas, it is possible that the intra-sectoral relative income differences, for the A and the non-A sectors, are the same in the less and more developed countries, in the less and more developed regions.

In this connection we clearly need more empirical data, specifically on the size distribution of income within the A and non-A sectors—for different countries and regions. And two types of distribution are possible: one by size of income originating within the sector, no matter by whom received; the other by size of total income received by economic units, depending primarily upon engagement in the sector. The two overlap to a great extent, since by far the preponderant part of income originating in the A (or the non-A) sector is received by units largely dependent upon engagement in that sector; but it is also true that units largely dependent upon agriculture often secure supplementary income from other sources and some units engaged in the non-A sector may receive some property income originating in agriculture. Whatever the case, the scanty data we have are based on the distributions of total income of units largely dependent upon engagement in the A and non-A sectors, respectively.

The relevant data are summarized in Table 14. It is limited to ten countries, and for some, e.g., India, the estimates are "notional" and subject to wide margins of error. Except for India, where the distinction is between rural and urban families (with some rural families engaged in pursuits other than agriculture), and for Germany, where the classification is of income tax returns by major sources of income on each, the distinction is between families (or recipients) whose heads are engaged in agriculture, as proprietors or farm workers, and all other families.

Table 14.
Shares of Ordinal Groups for the A and Non-A Sectors, Selected Countries, Late 1920's through Early 1950's

		% in total number (1)	Relative per unit income (2)	Shares of Ordinal Groups 0-20% (3)	21-40% (4)	41-60% (5)	61-80% (6)	81-90% (7)	91-95% (8)	Top 5% (9)	Concentration ratio (10)
	India, Families, 1950										
1.	Rural	84	n.a.	8.8	10.3	12.5	17.1	12.8	9.6	28.9	0.40
2.	Urban	16	n.a.	3.6	4.4	5.8	9.2	8.2	7.3	61.5	0.69
	Ceylon, Recipients, 1952/53										
3.	Agriculture, hunting, and fishing	52	100	5.5	9.8	13.5	18.4	13.5	9.4	29.9	0.45
4.	Other	48	158	3.4	7.7	12.1	19.0	14.6	10.4	32.8	0.52
	Puerto Rico, Families, 1953										
5.	Agriculture, forestry, and fishing	31	100	8.0	12.3	16.4	22.4	12.8	9.5	18.6	0.32
6.	Other	69	163	4.8	10.0	14.3	21.6	16.0	10.0	23.3	0.43
	Barbados, Families, 1951										
	Agricultural Parishes										
7.	Poor	n.a.	100	5.0	11.6	17.0	22.6	15.8	10.5	17.5	0.35
8.	Rich	n.a.	133	4.0	10.5	15.5	23.5	17.6	11.6	17.3	0.41
	Urban Parishes										
9.	Poor	n.a.	122	3.2	8.3	14.1	23.6	18.4	11.7	20.7	0.46
10.	Rich	n.a.	142	3.2	8.2	12.8	19.3	17.0	12.9	26.6	0.50
	Poland, Families, 1929										
11.	Agriculture	56	100	5.4	12.5	17.6	23.2	13.8	9.7	17.8	0.35
12.	Other	44	189	4.6	7.9	12.0	18.8	15.2	10.3	31.2	0.50

	Italy, Families, 1948									
13.	Agriculture	38	100	6.1	10.4	14.2	20.3	14.9	10.7	23.4	0.41
14.	Other	62	107	6.2	10.7	14.8	20.2	14.0	9.6	24.5	0.40
	Germany, Tax Returns (unadjusted), 1928									
15.	Agricultural income	11	100		44.0		22.5	14.0	8.3	11.2	0.19
16.	Other income	89	119		32.1		21.3	13.7	10.5	22.4	0.35
	Netherlands, Families, 1954									
17.	Agriculture	11	100	11.0	15.1	17.9	21.5	13.6	8.5	12.4	0.22
18.	Other	89	113	8.5	14.0	17.3	21.2	13.5	8.6	16.9	0.29
	Sweden, Recipients									
	1943									
19.	Agriculture	26	100	7.1	11.0	15.8	22.0	15.1	10.0	19.0	0.36
20.	Other	74	161	5.6	10.3	15.6	21.8	14.7	9.9	22.1	0.40
	1959									
21.	Agriculture	14	100	5.7	10.7	16.4	24.3	18.1	10.3	14.5	0.36
22.	Other	86	144	4.2	10.0	17.6	25.4	15.6	10.2	17.0	0.39
	United States, Families									
	1929									
23.	Farm	21	100	4.1	9.3	14.7	23.4	17.5	11.9	19.1	0.43
24.	Other, incl. capital gains	79	260	3.9	9.1	11.9	16.9	12.7	9.2	36.3	0.51
25.	Other, excl. capital gains	79	237	5.9	9.5	12.8	18.4	13.8	9.9	29.7	0.45
	1935-36, Nonrelief									
26.	Farm	25	100	5.6	10.7	15.5	21.8	15.0	10.1	21.3	0.39
27.	Nonfarm	75	155	5.2	10.3	14.3	19.8	13.7	9.1	27.6	0.43
	1950-53									
28.	Farm	14	100	4.7	10.0	15.3	22.5	16.1	10.7	20.7	0.41
29.	Nonfarm	86	161	7.2	12.7	16.5	21.2	13.8	9.1	19.5	0.34

(Continued on next page)

Table 14 (Cont.)

Lines 1-2: Based on Mukherjee and Ghosh, op. cit., equations for the Lorenz curves given on p. 56. The numbers of households underlying col. 1 are from the table on p. 55.

Lines 3-4: Based on Survey of Ceylon's Consumer Finances, op. cit., Tables 10 and 20.

Lines 5-6: Based on "Income and Expenditures of Families...," op. cit., Tables 5 and 6, pp. 14 and 15.

Lines 7-10: Based on Straw, op. cit., Table 18, p. 28. The entries in line 7 are for the parish of St. Lucy described in the source as "one of the poorest agricultural areas of Barbados;" in line 8 for the parishes of St. George and St. John, "reputedly the richest agricultural part of the island;" in line 9 for Bridgetown, "the capital and centre of the main urban area;" and in line 10 for the parish of St. Michael, "the parish surrounding Bridgetown, a large part of which is urban in character" (all quotations from p. 15). The shares of ordinal groups for each area were calculated separately for the "hard times" and the "crop season" parts of the year; and then combined, with the shares of total income reported for each part of the year (given in Table 17, p. 26) as weights.

Lines 11-12: Based on Jan Wisniewski, Rozkład Dochodow Według Wysokosci w. r. 1929 (Warsaw: Institut Badanie Konjunktur Gospodarczych, 1934). The basic unit appears to be families, and the total accounted for is about 8.5 million for a population of somewhat over 30 million and a labor force of about 15 million (in 1931, according to the United Nations, Demographic Yearbook, 1948). The agricultural group includes independent farmers and farm workers. The shares were interpolated by the standard procedure from distributions given for numbers and income (or estimated from midvalues).

Lines 13-14: Based on Luzzatto Fegiz, op. cit., Table 2, p. 348. Agricultural families include both entrepreneurs and farm workers.

Lines 15-16: Based on "Das Deutsche Volkseinkommen vor und nach dem Kriege," Einzelschriften zur Statistik des Deutschen Reichs, No. 24 (Berlin, 1932), Table 35, p. 111. The returns grouped under agriculture include, in addition to those reporting income from agriculture and forestry, those classified under rent (Vermietung und Verpachtung), as suggested in the text, p. 110. The income tax returns have not been corrected for underreporting.

Lines 17-18: Based on Wit, op. cit., Table 3, p. 172. We used the data for families (excluding unattached individuals), the agricultural group comprising both entrepreneurs and farm workers. The estimates of income are based on averages for income class intervals, derived from Table 7, p. 175.

Lines 19-20: Based on Sweden, Central Bureau of Statistics, Statistical Yearbook for Sweden 1945 [in Swedish] (Stockholm, 1945), Table 253, pp. 300-01. This is a distribution among recipients based on tax returns and appears to account for about 80 percent of total income of households. The distinction between the agricultural and other sectors is carried through for participation income alone, the group with other incomes not being divided by industrial source of income. The ordinal shares were calculated by the usual procedure applied to distributions of both number and income.

(Continued on next page)

Table 14 (Cont.)

Lines 21-22: Based on Sweden, Central Bureau of Statistics, Statistisk Tidskrift, No. 12 (December 1960), Table 1, p. 759, and the table on p. 763. Here again the distribution accounts for 80 percent or more of all personal income; but the distinction between agriculture and other sectors is carried through for all reported incomes.

Lines 23-25: Based on Maurice Leven, Harold G. Moulton, and Clark Warburton, America's Capacity to Consume (Washington: The Brookings Institution, 1934), Table 27, p. 206, and Table 29, p. 208, for capital gains by income classes; and Table 41, p. 213, for the income distributions among farm and nonfarm families. We assume that capital gains of farm families and unattached individuals are insignificant, and all are charged to nonfarm families.

Lines 26-27: Based on National Resources Committee, Consumer Incomes in the United States (Washington, 1938), Table 9B, p. 97. The average income for each class interval was derived from the countrywide distributions given in Table 3, p. 18. The distributions here exclude all unattached individuals as well as any families that received relief during the year. The exclusion of relief families has a greater effect on the distribution for nonfarm than for farm families, since only 8.9 percent of farm families received relief, compared with over 17 percent of nonfarm families (see Table 9A, p. 74).

Lines 28-29: Based on Selma F. Goldsmith, "Income Distribution in the United States, 1950-53," Survey of Current Business (March 1955), Tables 12 and 13, 17 and 18, and 22 and 23, pp. 25-27. We averaged the percentage shares in numbers and income for the three years 1950, 1951, and 1953 for the farm and nonfarm families; and then interpolated for the ordinal shares.

The evidence suggests that the size distribution of income within the A sector is less unequal than that within the non-A sector in the same country. This is true for all countries in Table 14, except Italy in 1948 and the United States in recent years. And the concentration ratios and shares of top brackets for two other countries point in the same direction. For Denmark, the average concentration ratio for agriculture for 1939, 1948, and 1953 was 0.32, compared with an average of 0.35 for manufacturing, 0.45 for trade, 0.57 for liberal professions, 0.48 for others, and 0.43 for all recipients.[16] For Norway, the share in 1948 of the top 5 percent of the rural population was 14 percent, of the urban population 19 percent (the shares are those of income recipients); and similar differences characterized the earlier years (1907 and 1938).[17]

The somewhat wider inequality of the income distribution of farm operator than of other families in the United States in 1950-53 (true also of other recent years, e.g., 1946 and 1954-60), is something of a puzzle, especially since the much cruder estimates for the earlier years (lines 23-27) yield results that conform to the rule. It may be due to a rise in the shares in total agriculture of the South and the West, both of which show wide inequality in the distribution of farm

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16. See Economic Survey of Europe, 1956, Ch. IX, Table 8, p. 13 (of Ch. IX).

17. See Norway, Central Bureau of Statistics, Economic Survey 1900-1950 [in Norwegian] (Oslo, 1955), Table 93, p. 186.

income, the former because of the cleavage between Negroes and whites, and the latter because of the cleavage between large-scale, capital intensive farms and smaller units. Whatever the reason, the exceptional finding for the United States in recent years suggests that in other countries not covered in Table 14, like Australia and New Zealand, where agriculture is large-scale and capital intensive, the size distribution of income within the A sector may be more unequal than that within the non-A sector. [18]

But the evidence in Table 14 warrants the conclusion that in both underdeveloped and most developed countries, income within the A sector is distributed less unequally than income within the non-A sector. And it is a plausible conclusion if we consider the wider range of occupations and industries in the non-A sector, with many of the occupations having a wide range of income by age, degree of education, and success in capital accumulation (e.g., the professional pursuits, trade, finance). In underdeveloped countries the distribution of income within the non-A sector may be relatively more unequal, since the urban population comprises, at the lower end of the income distribution, migrants from the countryside and at the upper end, members of the modern sectors and of the economic and financial elites.

Nor is there any contradiction between this finding of wider inequality in distribution of income in the nonagricultural sectors, and the findings of the earlier tables which show narrower inequality in the size distribution in those countries and regions that are the more developed and in which, therefore, the non-A sector has greater weight. It means only that the inequality in the size distribution of income is narrower in the more developed, more industrialized countries despite the greater weight within the latter of the non-A sector. Or, to put it differently, the narrower inequality in the income distribution in the more industrialized countries, combined with a greater weight of the non-A sector in the latter, means that the size distribution of income is much less unequal within the non-A sector of the more developed countries; and possibly the same is true of the size distributions of income within the A sector in the two groups of countries.

This question can be explored further with the help of an illustrative calculation (Table 15). We assume for underdeveloped countries typical size distributions of income for the A and non-A sectors separately, deriving the entries in lines 1 and 2 as simple arithmetic means of the shares shown for the three underdeveloped countries, India, Ceylon, and Puerto Rico (Table 14, lines 1, 3, and 5; and 2, 4, and 6, respectively). If then we assume as typical for underdeveloped countries a share of population attached to agriculture of 0.8 and a ratio of per capita income in the non-A sector to that in the A sector of 2 to 1, we can derive the shares of ordinal groups, in the combined distribution (line 3). The concentration ratio, 0.46, is about the same as the average ratio for the nine underdeveloped countries in Table 3 (0.44), and the standard deviation of logs of income in line 3, 0.31, is slightly lower than, but close to, that for underdeveloped countries in Table 3 (0.34).

If we assume that the size distributions of income within the A and non-A sectors are the same in the typical developed country as in the typical underdeveloped country (i.e., lines 1 and 2), then, given the share of population attached to

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18. In this connection, Brown (op. cit., p. 203) stated: "Even before the war, incomes derived from wool made up a relatively high proportion of the upper incomes and now most other types of farm incomes also tend to be in the upper groups."

agriculture in the developed countries of 0.2, and assuming, to sharpen the argument, the same per capita income in the A and non-A sectors, we can again derive the shares of the ordinal groups in the combined distribution (line 4). In this case, the concentration ratio is 0.52, showing wider inequality than the combined distribution for a typical underdeveloped country—for the simple reason that in the developed country a greater weight is attached to the size distribution within the non-A sector, and the latter is much more unequal than the distribution within the A sector. It is significant that even though intersectoral inequality in income per capita (between the two sectors) is narrower in line 4 than in line 3, the greater weight of the non-A sector more than compensates and results in a wider inequality for the combined distribution.

Clearly, in order to derive a combined distribution for a typical developed country that would, as it should, show narrower inequality than that for the typical underdeveloped country in line 3, particularly a significantly lower concentration ratio, we must modify the size distribution for the A sector (line 1), for the non-A sector (line 2), or for both. In line 5 we show the shares of ordinal groups in a typical size distribution of income for developed countries, as suggested by Table 3. In fact, these are averages of the shares for the six developed countries in lines 15-20 of Table 3. The concentration ratio for line 5, 0.42, is distinctly smaller than that for line 3, 0.46, while the standard deviation of logs of income for line 5, 0.36, is distinctly larger than that for line 3, 0.31—and the relation of the two measures is similar to that established on the basis of the data in Table 3.

Now, if, in shifting from the distribution for an underdeveloped country to one for a developed, we retain the size distribution within the non-A sector (line 2), then by using the typical share of the population attached to the A sector (0.2) and the ratio of per capita income in the A to that in the non-A sector (1 to 1), we can derive the shares of ordinal groups in the size distribution of the A sector as a residual. By direct subtraction, we get a rather irregular distribution among the ordinal groups within the A sector, with a negative entry for the top 5 percent group (line 6a), and the results are unacceptable; by re-arraying in ascending order of per capita income we convert to a systematic distribution, but we get a substantial group with negative income and an extremely high concentration ratio, 0.83, much higher than for the non-A sector, and re-arraying does not make the results more acceptable (line 6b). It follows that the size distribution of income for the non-A sector, assumed for underdeveloped countries in line 2, cannot be retained in the shift to the distribution for developed countries but must be modified, and presumably toward narrower inequality, or lower shares of the upper ordinal groups.

If we retain the distribution of the A sector (line 1), and the assumptions underlying lines 4 and 6, we derive the distribution for the non-A sector as a residual (line 7). Here the inequality of the residual non-A distribution, with its concentration ratio of 0.42, is slightly wider than that for the A distribution (0.40)—as it should be. It is quite consistent with the evidence for the United States and Sweden but the spread in the data for Germany and the Netherlands is much wider (see Table 14). One may conclude, in general, that unless differences in the inequality of the size distribution between the A and non-A sectors in the developed countries are wide, we can retain the size distribution within the A sector assumed for the underdeveloped countries in the derivation of the desired size distribution of total income for the developed countries.

The details of the illustrative analysis in Table 15 are subject to modification, although the values used are based on empirical data. But some inferences—relating to income inequality as measured by concentration ratios and thus reflecting

Table 15.
Illustrative Combinations of Shares of Ordinal Groups for the A and Non-A Sectors

	Shares of Ordinal Groups							Concentration ratio	Standard deviation of logs of income
Assumed, Underdeveloped Countries (based on Table 14)	0-20% (1)	21-40% (2)	41-60% (3)	61-80% (4)	81-90% (5)	91-95% (6)	Top 5% (7)	(8)	(9)
1. A sector	7	11	14	19	13	9	27	0.40	0.28
2. Non-A sector	4	7	11	17	13	9	39	0.55	0.38
Combined, Underdeveloped Countries (share of A sector in total population is 0.8; ratio of per capita income in A sector to that in non-A is 1 to 2)									
3. A and non-A combined	6.0	9.5	12.5	17.6	13.0	10.4	31.0	0.46	0.31
Same Components as in Line 3, but share of A sector in total population is 0.2; per capita income in A sector equals that of non-A									
4. A and non-A combined	4.6	7.8	11.6	17.4	13.0	9.0	36.6	0.52	0.36

	Desired Distribution for Developed Countries (based on Table 3)								
5.	Both sectors combined	4	10	16	23	15	10	22	0.42	0.36
	Derived Shares for A Sector, if non-A remains as in line 2, and assumptions are those in line 4									
6a.	Shares by direct subtraction	4	22	36	47	23	14	-46		
b.	Re-arrayed	-43	20	35	36	24	14	14	0.83	
	Derived Shares for Non-A Sector, if A remains as in line 1 and assumptions are those in line 4									
7.	Shares by direct subtraction (identical with re-arrayed)	3.25	9.75	16.5	24.0	15.5	10.25	20.75	0.42	0.39

largely the shares of the upper ordinal groups—are suggested. First, the size distribution of income within the non-A sector must be much less unequal in the developed countries than in the underdeveloped countries. Second, the size distribution of income within the A sector may be less unequal in the developed countries than in the underdeveloped countries; but the differences cannot be as great as for the non-A sector, and in some developed countries (United States, possibly Australia, and New Zealand) the size distribution of income within the A sector may be as unequal as, or slightly more unequal than, in many underdeveloped countries. Third, it follows that the narrower inequality in the size distribution of total income in the developed countries is due largely to the narrower inequality in the income distribution within the non-A sector, combined with the narrower intersectoral differences in per worker or per capita income, although in some developed countries there may be narrower inequality of income even within the A sector. Finally, as already indicated, the size distribution of total income in the developed countries is less unequal despite the greater weight in these countries of the non-A sector; which implies that in the course of economic growth, the rise in the share of the non-A sector would have increased the inequality of the size distribution of total income unless, parallel with such expansion of the non-A sector, there had been a reduction either in intersectoral inequalities in per capita or per worker income, or in the inequality in the distribution of income within the non-A sector. Given the orders of magnitude in Table 15, the inequality in the size distribution of total income in the developed countries could not have narrowed without a substantial narrowing of inequality in the income distribution within the non-A sector: reduction of intersectoral differences alone would not have sufficed.

It would have been desirable to attempt a parallel analysis of the distributions within the A and non-A sectors for regions of a country. Unfortunately, the data readily at hand are too limited, and a further search is not practicable. The data, which must cover incomes relatively completely, particularly income in kind, are available for the United States for 1935-36 (for five large regions; the more recent sample data by regions cover money income alone) and for Italy for 1948 (for 13 regions). The United States data refer to 1935-36, when the income structure may have been markedly distorted by the still continuing effects of the depression, and are confined to nonrelief families. The data for Italy may also be of limited value, since the average income per family in the A sector (for the country as a whole) is not much below that of per family income in the non-A sector (see Table 14, lines 13 and 14). In short, analysis on the basis of these two bodies of data did not seem warranted.

VI. Long-Term Trends in the Shares of Ordinal Groups

For only a few countries, all of them developed, do data permit some approximations to shares of ordinal groups over a long period. And in view of the difficulties of proper measurement of the size distribution of income, it is hardly surprising that many of the estimates are crude approximations—derived from comparisons of data reported on tax returns with total income received by households, and subject to all the possible errors due to the biases of the tax data and the difficulty of reducing them to units comparable with those in total population and income—even when an effort at adjustment is made. However, the estimates used here do possess the great advantage of relating to shares in total population and income—not the widely used and rather misleading measures relating to the distribution of tax return groups with an unknown relation to the rest of the country's income-receiving population. The broad trends which these data suggest merit emphasis, particularly if they are observed for a number of countries.

The detailed notes to Table 16 provide information on the sources used and the units for which the shares of ordinal groups are estimated. The data relate to nine countries (counting Prussia, Saxony, and Germany-West Germany as three), and in only four do the records reach back into the 19th century. Nevertheless, some trends are indicated.

First, for the period through the post-World War II years, there is a perceptible narrowing in inequality in the size distribution of income if judged by the declines in the shares of upper ordinal groups, less marked if judged by the rise in the shares of the lower ordinal groups. In most countries, the share of the top 5 percent group in income before taxes was 20 percent or less in the post-World War II years. In the 1920's or the 1930's the share of the top 5 percent group in income before taxes was about 30 percent, in some countries above and in others a bit below. Likewise, the share of the top 20 percent group in income before taxes in post-World War II years was between 40 and 45 percent; whereas in the 1920's and the 1930's it was well above 50 percent. The evidence on the share of the lowest 60 percent group is much more scanty, but there is some indication that it was below 30 percent in the 1920's and the 1930's and rose to well above 30 percent in the post-World War II years. But according to the evidence, the rise in the share of the lower brackets was less conspicuous than the decline in the shares of the upper groups.

Second, for the three countries for which shares in income before and after tax can be compared (United Kingdom, Sweden, United States), the decline in the shares of upper groups and the rise in the shares of the lower groups are somewhat greater for the shares in income after tax. This finding is not surprising: given the generally growing impact of progressive taxes in most developed countries in recent years, the trends toward equality should be more conspicuous in the shares in income after taxes. Another point to be noted is that the measures in Table 16 do not reflect services in kind (education, health, etc.) provided directly by government to ultimate consumers. Their inclusion, with the primary contribution to the lower income brackets and their increased weight in total income in recent years, would also accentuate the decline in the shares of upper income groups and the rise in the shares of the lower brackets.

Third, if we were to ask when this trend toward narrower inequality in the size distribution of income in the developed countries began, the evidence in Table 16 provides no clear answer. Even the few records that reach back before the 1920's show different patterns for different countries. In the United Kingdom, there is little decline in the shares of the upper brackets between 1880 and 1913; but by the 1920's the drop is significant compared with pre-World War I levels, and then the decline is resumed with World War II and subsequent years (lines 2 and 3). In Prussia the share of the top 5 percent seems to rise from 1854 to 1875 to 1913, markedly according to Procopovitch (line 7), but less so from 1873-80 on, according to Mueller (line 11). In any case, the decline in the upper shares—after a long period of constancy or rise—comes only after World War I; as it does for Saxony, and possibly for Germany as a whole. In the United States, the shares of the top groups seem to be constant from the few years before World War I through the 1920's; and the decline begins in earnest only with World War II. Only in Denmark is there a clear reduction in inequality, shown by the shares of the top 5 and 10 percent groups, from 1870 to the beginning of the present century; but we cannot say when this narrowing in inequality began (lines 25 and 26). In short, the narrowing of inequality in the size distribution of income in many developed countries may have started after World War I or with World War II; but the records are far too scanty

Table 16.
Long-Term Estimates of Shares of Ordinal Groups, Tax Units or Consuming Units, Selected Countries

		Successive Dates and Entries							
	United Kingdom	Bowley		Clark	Seers		Lydall		
1.	Dates	1880	1913	1929	1938	1947	1938	1949	1957
	Income before tax								
2.	Top 5%	48	43	33	31	24	29	23.5	18
3.	Top 20%	58	59	51	52	46	50	47.5	41.5
	Income after tax								
4.	Top 5%				26	17	24	17	14
5.	Top 20%				48	39	46	42	38

	Prussia	Procopovitch				Reich Statistical Office	
6.	Dates	1854	1875	1896	1913	1913	1928
7.	Top 5%	21	26	27	30	31	26
8.	Top 20%		48	45	50	50	49
9.	Lowest 60%		34		33	32	31

		Mueller				
		1873-80	1881-90	1891-1900	1901-10	1911-13
10.	Dates					
11.	Top 5%	28	30	32	32	31

	Saxony	Procopovitch			Reich Statistical Office	
12.	Dates	1880	1896	1912	1913	1928
13.	Top 5%	34	36	33	33	28
14.	Top 20%	56	57	55	54	50
15.	Lowest 60%	27	26.5	27	28	31

	Germany-West Germany	Reich Statistical Office			Mueller		United Nations		Wochenbericht	
16.	Dates	1913	1928	1928 (adj.)	1928	1936	1936	1950	1955	1959
17.	Top 5%	31	27	21	20	23	28	24	18	18
18.	Top 20%	50	49	45			53	48	43	43
19.	Lowest 60%	32	31	34			26.5	29	34	34

	Netherlands			
20.	Dates	1938	1949	1954
21.	Top 5%	19	17	13
22.	Top 20%	49	45.5	38.5
23.	Lowest 60%	31	34	40

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Table 16 (Cont.)

Denmark

		Zeuthen I			Zeuthen II		Bjerke		
24.	Dates	1870	1903	1925	1908	1925	1939	1949	1955
25.	Top 5%	36.5	28	26	30	26	24.5	19	17.5
26.	Top 10%	50	38	36	39	37	35	29.5	27.4
27.	Top 20%				55	53	51	45	44
28.	Lowest 60%				31	25	27	32	32

Norway

29.	Dates	1907	1938	1948
30.	Top 5%, country districts	27	20	14
31.	Top 5%, cities	28-32	22	19

Sweden

		Bentzel		
32.	Dates	1930	1935	1945
	Earned income before tax			
33.	Top 5%	30	28	24
34.	Top 20%	59	58	52
35.	Lowest 60%	19	19	23

		United Nations				
36.	Dates	1935	1945	1948	1948	1954
	Total income before tax					
37.	Top 5%	28	23.5	20	20	17
38.	Top 20%	56	51	47	45	43
39.	Lowest 60%	23	26	29	32	34
	Total income after tax					
40.	Top 5%	25.5	21	17		
41.	Top 20%	54	48	43		
42.	Lowest 60%	23	28	32		

United States

		Kuznets				
43.	Dates	1913-19	1919-28	1929-38	1939-43	1944-48
	Income before tax					
44.	Top 1%	14	14	13	11	9
45.	Top 5%	24[a]	25	25	21	17
	Income after federal tax					
46.	Top 1%	13	13	12	9	6
47.	Top 5%	22[a]	24	24	18	14

(Continued on next page)

Table 16 (Cont.)

		Successive Dates and Entries					
		Department of Commerce					
48.	Dates	1929	1935-36	1941	1944-47	1950-54	1955-59
	Income before tax						
49.	Top 5%	30	26.5	24	21	21	20
50.	Top 20%	54	52	49	46	45	45
51.	Lowest 60%	26	27	29	32	33	32
	Income after federal tax						
52.	Top 5%	29.5		21.5		18	18
53.	Top 20%	54		47		43	44
54.	Lowest 60%	26.5		30		34	34

a. 1917-19.

Lines 1-3; 1880 and 1913: Based on A. L. Bowley, The Change in the Distribution of the National Income, 1880-1913 (Oxford, 1920), the tables on pp. 16 and 22, which give the number of incomes and incomes received; to which the standard interpolating procedures were applied. The 1880 estimate in line 3 is for the top 17%.

Lines 1-3; 1929: Based on Colin Clark, National Income and Outlay (London, 1937), Table 47, p. 109, which gives the number of incomes and the amounts received, by income classes.

Lines 1-5; 1938 and 1947: Based on Dudley Seers, The Levelling of Incomes since 1938 (Oxford, n.d.), Table VIII, p. 39, which gives the shares from the top 1 percent of number of incomes down to the top 50 percent.

Lines 1-5; 1938, 1949, and 1957: Based on H. F. Lydall, "The Long-Term Trend in the Size Distribution of Income," Journal of the Royal Statistical Society, Series A, CXXII, Part I (1959), Tables 6 and 7, p. 14, which give the shares of the top ordinal groups.

Lines 6-9; 1854-1913: Based on S. N. Procopovitch, "The Distribution of National Income," Economic Journal, XXXVI (March 1926), 69-82. The underlying data are the income tax statistics, from which number of income recipients (tax returns, excluding those by legal entities) and their incomes at various upper levels are taken. These are compared with all income recipients, shown as a proportion of total population, and per capita income of total population. Our calculations assume that the number of dependents per income recipient or per tax return is identical with the countrywide ratio of total population to total income recipients.

Lines 6-9; 1913 and 1928: Based on distributions of tax returns, unadjusted for underreporting, for Prussia, interwar boundaries, given in "Das Deutsche Volkseinkommen...," op. cit., Table 30, p. 104, and Supplement 36, pp. 182-83.

Lines 10 and 11: From J. Heinz Mueller, "Trends in the Distribution of Income by Size in Germany, 1873-1913," a paper submitted to the 1959 meeting of the International Association for Research in Income and Wealth at Portoroz,

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Table 16 (Cont.)

Yugoslavia. Professor Mueller used the same data as Procopovitch except that income tax data were roughly corrected for understatement; and new estimates of total income were available. The entries are arithmetic means of shares for individual years.

Lines 12-15; 1880-1912: Based on Procopovitch, op. cit., and, for further detail, on his book, National Income of Western European Countries [in Russian] (Moscow, in the 1920's).

Lines 12-15; 1913 and 1928: Based on "Das Deutsche Volkseinkommen...," op. cit., Table 30, p. 104, and Supplement 36, pp. 182-83.

Lines 16-19; 1913 and 1928: Based on ibid., Table 33, p. 108, and Table 36, p. 111. The adjusted entries for 1928 are based on a distribution of tax returns corrected for underreporting. The figures refer to the interwar territory.

Lines 16-19; 1928 and 1936: Based on Mueller, op. cit. The figures refer to the interwar territory.

Lines 16-19; 1936 and 1950: From United Nations, Economic Survey of Europe, 1956, Ch. IX, Table 3, p. 6 (of Ch. IX).

Lines 16-19; 1955 and 1959: Based on "Die Schichtung der Privaten Haushaltseinkommen in der Bundesrepublik," Wochenbericht (Berlin, May 11, 1962), table on p. 80, which gives the distributions of number and income of households by income classes.

Lines 20-23: From Wit, op. cit., Table 6, p. 174. The distributions relate to families, excluding unattached individuals.

Lines 24-26; 1870-1925: Based on F. Zeuthen, Den Økonomiske Fordeling (Copenhagen, 1928), p. 465, the estimates for 1870 and 1903 in turn being from Jens Warming, "Indkomst-og Formeufordelingen i. Danmark," Nationaløkonomisk Tidskrift, XLV, 5 (1907), 401-26. The shares are in total adult population, 18 years of age and over, excluding married women; and the estimates in the source are of the percentages accounting for the top quarter of total income, 2nd quarter, etc. We interpolated for the shares of top ordinal bands by the standard procedure.

Lines 24-28; 1908 and 1925: Also based on Zeuthen, op. cit., Table IV, pp. 517 ff. The comparison here too is of tax returns to adult population, 18 years of age and over, excluding married women.

Lines 24-28; 1939, 1949, and 1955: Based on Kjeld Bjerke, "Redistribution of Income in Denmark before and after the War," a paper presented at the 1961 meeting of the International Association for Research in Income and Wealth at Tutzing, Germany. The shares are, at least for recent years, for income after taxes.

Lines 29-31: From Økonomisk Utsyn (Economic Survey), 1900-1950, Table 93, p. 186.

Lines 32-35: Based on Ragnar Bentzel, Inkomstfordelningen I Sverige (Stockholm, 1952), Table VI:1B, p. 88. Earned income is quite close to total income: it amounted to 6.1, 6.3, and 12.7 billion krone for the three years, compared with total income approximating 6.9, 7.1, and 14.5 billion respectively (mid-values of the range given in ibid., Table IV:1A, p. 44).

(Continued on next page)

Table 16 (Cont.)

Lines 36-42: From Economic Survey of Europe, 1956, Ch. IX, Table 3, p. 6, and Table 6, p. 22. For 1935-48, the income concept used is wide, comprising total income from employment and other sources, including all transfer incomes. Income after tax for the same years is net of all direct taxes paid by persons to central and local government on income and property. The entries for 1948 and 1954 are from annual tabulations of tax returns, and are not adjusted for coverage (unlike the entries for the preceding years). Thus the coverage in 1948 and 1954 is only 84 and 82 percent of total personal income, and 91 and 85 percent respectively of the population age 15 and over, excluding married women (see ibid., Ch. IX, Table 1, p. 3). For further detail on the income concept and recipient unit see the notes in ibid., Appendix B, pp. 34-35. In general, the recipient unit is the family in the narrow sense, i.e., husband, wife, and dependent children.

Lines 43-47: The underlying data are from Kuznets, Shares of Upper Income Groups..., op. cit. In general, the estimates, for slightly different population and income bases, were converted to continuous series by splicing (on the basis of an overlap in 1919, and one in 1929-33), the estimates for the most recent period being used as they stand and those for the earlier periods adjusted for comparability. The entries are arithmetic means of annual estimates.

Lines 44 and 45 are from Table 116, pp. 582 and 585. Lines 46 and 47 were derived by applying to lines 44 and 45 the adjustment for the effect of federal income taxes, calculated from columns 1 and 4 of Table 118, pp. 596-99.

The top percentiles represent the percentages of persons (men, women, and children) covered in the individual income tax returns reporting the largest per capita income in each year. In the basic variant (used here) the income total includes employee compensation, entrepreneurial income, rent, interest, and dividends; but income is taken largely as reported.

Lines 48-51; 1929, 1935-36, and 1941 are from Historical Statistics of the United States, Series G-100 through G-105, p. 166; 1944-47 from Income Distribution in the United States, Table 3, p. 81; 1950-54 from the Survey of Current Business (April 1958), Table 10, p. 17; 1955-59 from ibid. (April 1962), Table 10, p. 17. The consuming units include both families and unattached individuals. Family personal income includes all earned and property incomes, and transfers. The entries for 1944-47 are arithmetic means of shares for 1944, 1946, and 1947; and those for later years are means for the years indicated.

Lines 52-54; 1929 and 1941 are from Selma F. Goldsmith, "Impact of the Income Tax on Socio-Economic Groups of Families in the United States," a paper presented at the International Association for Research in Income and Wealth 1961 meeting at Tutzing, Germany; 1944-47, 1950-54, and 1955-59 are from the sources cited for lines 48-51.

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for the earlier periods and no empirical generalization is feasible. We shall return to some conjectures on this point when we discuss below the factors that may have caused the trend toward narrower inequality in income distribution in developed countries.

Fourth, in comparing the shares for the developed countries for the earlier dates, before the marked movement toward lesser inequality in the size distribution began, with those for underdeveloped countries in recent years, we find that income inequality in the developed countries in these earlier years was no narrower than it

is in the underdeveloped countries today. The shares of the top 5 percent group in the developed countries in the 1920's, of 30 percent or more of income before taxes, are not much below the shares of the top 5 percent group in the underdeveloped countries in Table 3—if we exclude the extreme cases of the Rhodesias and Kenya; and the same is true of the shares of the top 20 percent group which in the developed countries were well above 50 percent in the 1920's and 1930's (and possibly somewhat higher in earlier decades), not much if at all lower than the shares in many underdeveloped countries today. To be sure, the presently developed countries had a much higher per capita income in the 1920's and the 1930's than do most underdeveloped countries of today; the shares under discussion here are in terms of income before taxes; and the welfare implications of the income inequality in the developed countries, in the 1920's and even in the 19th century, must have been less striking than they are in the underdeveloped countries today. Nevertheless it is interesting that the pattern of distribution of income by size in underdeveloped countries is not unusual; that it was found in the presently developed countries not so long ago; and that the change in the latter may have begun quite recently, and occurred within a rather short time span.

In considering the factors that may have affected the long-term trends in the size distribution of income in developed countries, we face a difficulty not uncommon in attempts to explain economic trends, particularly in distributive or allocational rather than aggregative aspects of the economy. A variety of factors can be discerned, some inducing movements in one direction, others pushing the process in the opposite direction. The resulting trends are a net balance of these conflicting effects of different factors, and can properly be explained only if each factor can be observed and its possibly changing effects gauged over the period covered by the long-term trends under investigation.

Thus, in the present connection, it is easy to recognize changes in the process of growth of developed economies that should reduce the inequality in the size distribution of income. One of these is the narrowing intersectoral inequality in product per worker, already discussed in Paper II. We found that, in general, such intersectoral differences contracted in the process of growth (see Paper II, pp. 45-50). And if differentials between the A and the non-A sectors in product per worker loom large, we should expect the range of the resulting differentials to become narrower as the result and accompaniment of the mere decline in the share of the labor force in the A sector—the usual "industrialization" concomitant of modern economic growth. For if the share of the labor force in the A sector declines, and if the usually initially low ratio of product per worker in the A sector to that in the non-A sector does not drop further, intersectoral inequality must contract. For example, if the share of the labor force attached to the A sector declines from 0.8 to 0.2 and the ratio of per worker product in the A sector to that in the non-A sector remains at 0.5, the simple measure of intersectoral inequality declines from 26.6 to 17.8. Furthermore, product per worker in the A sector usually rises in the process of growth relatively to product per worker in the non-A sector—if the initial ratio of the former to the latter is low.

The movements of the per worker product in the M and S sectors similarly tend to reduce income inequality. As Paper II shows, the initially low ratio of product per worker in the M sector to that in the S sector tends to rise. And while in many countries the proportion of the labor force in the S sector tends to rise more than that in the M sector, any widening of inequality produced thereby is more than offset by the convergence in the per worker products of the two sectors.

Second, trends in the distribution of the labor force by status may also be viewed as reducing income inequality in the size distribution. The reduction in the proportion in the labor force of independent entrepreneurs (see Paper IV, pp. 49-50) means a reduction in the weight of a group whose income, even when adjusted for transient elements, shows wider inequality than that of employees—for the inequality in the former produced by differences in ability, in monopoly positions, or in accumulation of capital, tends to be much wider than in that of employees whose compensation is subject to narrower institutionally imposed limits. It may well be that a parallel trend, toward a rise in the share of salaried workers among all employees (see Paper IV, pp. 51-52) has also contributed to the narrowing inequality in the total size distribution, since the decline in the share of wage earners means a reduction in weight of the low income, unskilled labor components in the total; and the addition to the lower income clerical groups is of less consequence in that it tends to be recruited, more than unskilled labor, from the secondary labor supply, the auxiliary earners in any size distribution among families or consuming units.

Third, the share of property income in total household income declined (see Paper IV, particularly p. 49). Unlike the trends in intersectoral inequality in product per worker and in the status structure of the labor force, which began early in the process of modern industrialization, the decline in the share of property income is apparently a recent development that began in some European countries after World War I, and spread more generally among developed countries only between the pre- and post-World War II years. In view of the concentration of property income in the hands of upper ordinal groups, the decline in its share in the total income of households should have made for narrower inequality in the size distribution of income.

Finally, in addition to the statistical determinants, i.e., the quantified structural changes listed above, a variety of other factors, some measurable and others only describable, may have contributed to the narrowing inequality in the size distribution of income in the developed countries. For obvious reasons the distribution of income among various groups in society is a matter of perennial interest and passionate concern; and the egalitarian philosophy that is a concomitant of modern economic growth exercises continuous pressure that limits income inequality as much as considerations of productivity and the resistance of tradition permit. It is scarcely an accident that legal equality, political equality, and finally economic equality were the successive goals of modern society. And, more specifically, the legislative decisions—with respect to education and health services, inheritance and income taxation, social security, full employment, and economic relief either to whole groups (e.g., in farming) or to individuals—can be viewed as manifestations of the general decision to minimize economic inequalities by equalizing as much as possible economic opportunity and compensating for failures that could be debited to defects in the economic and social structures, not to the voluntary action of individuals. In this connection, it seems to me that the two world wars were notable stages in the process, in that the trends toward income equality received a strong push during and immediately after them. For the wars destroyed some long-established positions that may have been sources of high income, and demonstrated the capacity of governments to exercise greater control over economic life than had previously been practiced in the free, market-oriented economies. And the continuation of international tensions even after the armed conflicts were over made it difficult, if not impossible, for income inequalities to remain as wide as they had been. For the groups in the lower income brackets the earlier promise of possible gain in the long-run was qualified too much by the danger that faced societies in that long run; and the conviction that such inequalities were necessary

for, and justified by, the long-term economic growth of the societies concerned, had lost some of its strength.

In short, we could easily list a number of factors that should have made for narrower inequality in the size distribution of income in developed countries—some inducing such a trend in the earlier phases of the modern growth process, others emerging only more recently. On the other hand, we could also list changes that should have made for wider inequality in the size distribution of income. If the size distribution of income within the non-A sector was, in the earlier periods, much more unequal than that within the A sector—as the present patterns for underdeveloped (and many developed) countries suggest—the very rise in the share of the non-A sector, all other conditions being equal, should have widened total inequality in the size distribution of income; and as we saw in Table 15, the effects would more than offset the opposite influence of narrower intersectoral inequality in product per worker between the A and the non-A sectors. Furthermore, within the A and non-A sectors separately, there may be forces making for wider rather than narrower inequality in the distribution of income. The rise in productivity within the A sector, indispensable for modern economic growth, may have been associated with technological changes that raised the scale of production on farms and introduced a cleavage between the large commercial farms in the progressive part of agriculture and the small units lagging behind—which would make for wider inequality of income within the A sector, at least until the process of modernization had been introduced throughout the sector. Within the non-A sector, the continuous migration to the cities, from the countryside or from abroad, may have added to the lower income brackets, and this combined with the growth in relative importance of occupations with a long training period and wider inequality through the life cycle (such as the professions), may have contributed to widening the inequality—possibly within the M and the S sectors taken separately; and offsetting or more than offsetting the opposite effects of the convergence of the per worker products of the two sectors.

Thus, to repeat the comment made at the beginning of this discussion, the size distribution of income in the developed countries is subject to a variety of factors, some making for narrower inequality and others making for wider inequality. The actual trends are a net balance of these forces, and to account for them one should be able to measure the changing effects of pushes upward and of pulls downward. This we cannot do, here or elsewhere, without data that are not now available. It seems plausible to assume that in the process of growth, the earlier periods are characterized by a balance of counteracting forces that may have widened the inequality in the size distribution of total income for a while, because of the rapid growth of the non-A sector and wider inequality within it. It is even more plausible to argue that the recent narrowing in income inequality observed in the developed countries was due to a combination of the narrowing intersectoral inequalities in product per worker, the decline in the share of property incomes in total incomes of households, and the institutional changes that reflect decisions concerning social security and full employment. But these plausible conjectures are valuable only as indications of the directions which more intensive study should follow if a thoroughly tested explanation is to be secured.

VII. Concluding Remarks

With due allowance for incompleteness of coverage, concentration on the free economies, and exclusion of the Communist countries, the empirical findings can be summarized briefly.

(a) The size distribution of income among families or consuming units today is more unequal in the less developed countries than in the developed countries: the shares of upper income groups in the former are higher and the shares of the lower income groups, when adjusted for size of the family units, would be lower. This difference in relative income inequality is greater for income after taxes than for income before taxes.

(b) In general, the distribution of income in the underdeveloped countries and in many developed countries is less unequal within the agricultural sector than within the nonagricultural sector as a whole: the share of the upper groups is larger and that of lower groups is smaller in the non-A than in the A sector.

(c) It follows from (a) and (b) that the distribution of income within the non-A sector is much more unequal in the underdeveloped countries than in the developed countries.

(d) The limited sample of long-term records shows that the inequality in the size distribution of income in the developed countries has narrowed over time: the shares of the upper income groups have declined perceptibly and those of the lower income groups have risen somewhat. This trend toward narrower inequality, somewhat more pronounced in the distribution of income after taxes than in the distribution of income before taxes, can be observed in some countries after World War I, in others only beginning with and after World War II. Of the few countries with longer records (United Kingdom, Prussia, Saxony, and Denmark), only Denmark shows a narrowing inequality before the twentieth century.

(e) The pattern of the size distribution of income characterizing underdeveloped countries today is not too different from that observed in the presently developed countries in the 1920's and 1930's, or at the beginning of the century—before the recent trend toward narrower inequality. But per capita incomes in the underdeveloped countries today are much lower than they were in the presently developed countries in the early twentieth and even in the nineteenth centuries; and the welfare implications of the same relative inequality are likely to be much sharper in the underdeveloped countries.

These findings may shed some light on the differential impact of economic growth on various groups in the income distribution. But we must confess that they advance us only a short way toward answering the two questions posed at the outset of this paper.

The first question dealt with the effects of the changes in the nature and structure of production accompanying modern economic growth on the size distribution of income. The discussion of the implications of the changing weights and of changing intersectoral inequality in product per worker of the A and non-A sectors, of the changes in structure of labor force by employment status, and of the changes in the share of property income connected with those in the comparative supply of capital and labor, did touch upon some of the possible effects of economic growth on the size distribution of income. But with the data at hand, we could not distinguish the effects of changes in the production system from those of modifications or distortions in the social structure that are not necessarily related to the former.

The second question dealt with the influence, in turn, of the size distribution of income on the process of economic growth. Was the more unequal distribution of income in the earlier decades in the developed countries a factor favorable

to economic growth—in generating more savings for more capital accumulation, in providing properly differentiated incentives for the more productive and hence better paid groups? And should we view the unequal distribution of income in the underdeveloped countries today in an equally favorable light? Or was the unequal distribution of income in the early decades in the developed countries a hindrance to economic growth—in restricting effective demand, reducing the capacity of the underpaid to contribute fully to the country's output, limiting economic opportunity even for the abler members of the less privileged groups, and distorting the structure of production and investment? And should we view the wide inequality in the income distribution in the underdeveloped countries in the same, or perhaps even more, unfavorable light? All we can say is that the unequal distribution of income in the earlier decades in the presently developed countries did not prevent rapid economic growth. But our data do not reveal the specific social and economic circumstances, and we cannot say that a somewhat less (or more) unequal size distribution might not have contributed to even faster growth. We know far too little of the interplay between relative income position, the average income and its rate of growth, and the responses of man as producer, consumer, saver, and investor to answer such questions seriously. It would seem that, beyond a point where average income is at some rock-bottom minimum, the particular social and political structure and the prevailing social philosophy within which a specific size distribution of income pattern is generated, have much to do with the responses it produces in stimulating or impeding economic growth. An unequal size distribution of income may be favorable to economic growth if the larger incomes are compensation for activities deemed useful by society in terms of the economic growth that is desired; if the upper income brackets save and invest in accordance with criteria of social return; if concomitantly provisions for equality of economic opportunity are made; and if there is a social consensus regarding the future economy to be attained by the use of present income. A similarly unequal income distribution would be a serious obstacle to economic growth if higher incomes are secured by what the society generally considers to be illegitimate and unwarranted means; if these incomes are used to strengthen monopolistic positions or wasted on frivolous consumer luxuries; if rigid barriers are set up to the advancement of the abler people among the lower brackets; and if there is no real consensus concerning the better economic society to be attained by the use of present income.

Clearly, in evaluating the effects of the size distribution of income on economic growth, the knowledge of the quantitative characteristics of the distribution itself is just a beginning: we need far more knowledge of the economic and social conditions under which the distribution is generated than we now possess. In particular, we need to be aware of the stresses and strains to which income inequalities give rise so that, in concentrating on the purely economic aspects like generation of savings or effective demand, we do not overlook the effects of the cleavages created in the social and political structures that are indispensable for sustained economic growth.

Appendix Table 1.
Measures of Inequality and Concentration Ratios Based on Industrial Sectors, Early 1950's

	Date (1)	Share of A sector in labor force (%) (2)	Measure of inequality (3)	Concentration ratio (4)
Group I				
1. Belgium	1947; 1950	9.21	6.43	0.05
2. Canada	1951; 1950-52	17.03	19.13	0.12
3. United Kingdom	1951; 1950-52	5.00	7.90	0.06
4. United States	1950; 1950-51	11.19	19.93	0.12
Group II				
5. Denmark	1955; 1954-56	20.37	18.05	0.13
6. Finland	1950; 1950-51	32.24	16.72	0.09
7. West Germany	1959; 1957-58	7.87	17.05	0.11
8. Netherlands	1947; 1950	14.69	25.36	0.15
9. Norway	1950; 1950-51	22.82	29.55	0.19
10. Venezuela	1950; 1952-53	41.96	52.50	0.30
Group III				
11. Argentina	1947; 1950-51	25.39	22.59	0.20
12. Austria	1951; 1950-52	19.91	21.66	0.14
13. Chile	1952; 1951-53	31.19	33.66	0.23
14. Ireland	1951; 1950-52	30.92	10.56	0.06
15. Israel	1956; 1955-57	15.76	10.03	0.06
16. Puerto Rico	1950; 1950-51	36.77	51.31	0.31
Group IV				
17. Brazil	1950; 1950-51	53.72	33.21	0.29
18. Colombia	1951; 1950-52	52.69	28.82	0.18
19. Costa Rica	1950; 1951-52	52.49	8.22	0.05
20. Greece	1951; 1950-52	42.77	15.81	0.10
21. Italy	1951; 1950-52	32.52	20.77	0.15
22. Panama	1950; 1952-53	46.76	32.84	0.21
23. Spain	1950; 1951-53	43.25	17.15	0.12
24. Turkey	1955; 1954-56	60.14	35.39	0.21
Group V				
25. El Salvador	1950; 1953-55	61.02	46.86	0.29
26. Jamaica	1953; 1952-54	48.28	44.82	0.30
27. Japan	1957; 1956-58	22.90	14.89	0.09
28. Portugal	1950; 1951-52	45.98	33.77	0.19
Group VI				
29. Ceylon	1953; 1952-54	55.93	16.61	0.14
30. Ecuador	1956; 1955-57	52.95	35.83	0.20
31. Egypt	1947; 1950-51	57.28	32.08	0.18
32. Honduras	1956; 1955-57	75.80	47.50	0.27

(Continued on next page)

Appendix Table 1 (Cont.)

	(1)	(2)	(3)	(4)
33. Peru	1951-57	62.48	75.23	0.45
34. Philippines	1957; 1956-58	51.15	27.89	0.16
35. Taiwan	1956; 1955-57	44.62	29.06	0.18
Group VII				
36. Algeria	1954; 1953-55	64.39	72.46	0.39
37. Belgian Congo	1955; 1954-56	90.98	113.04	0.58
38. India	1951; 1950-52	70.56	36.41	0.21
39. Morocco	1952; 1951-53	71.84	72.17	0.41
40. Pakistan	1951; 1950-52	79.76	32.30	0.17
41. Thailand	1954; 1953-55	77.86	63.72	0.34

Underlying estimates, except for Peru, of gross domestic product (net, for a few countries) are from the United Nations, Yearbook of National Accounts Statistics for various years, or from the United Nations, Statistical Papers, Series H, No. 10. Estimates of labor force are from the International Labour Office, Yearbook of Labour Statistics, or from the United Nations, Demographic Yearbook for various years. The estimates for Peru are from Banco Central de Reserva del Peru, Renta Nacional del Peru, 1942-1957, pp. 35 and 45.

The industrial sectors distinguished are agriculture; mining; manufacturing; construction; electric light and power, gas, and water; transportation and communication; commerce; and services. Miscellaneous labor force and domestic product originating in dwellings have been omitted from the distributions: For Venezuela and the Belgian Congo, the mining sector was also omitted since the disparity between the shares in labor force and product, due to large property incomes, was particularly marked. In some countries minor sectors, e.g., electric light and power, were combined in the original data with a major sector, e.g., manufacturing.

Col. 1: The first date given is for labor force; the second for gross (or net) domestic product. In the case of Peru, the dates for both are the same.

Col. 3 and 4: For the derivation of the measures see the notes to Table 5, lines 1-11, col. 2 and 3.

Appendix Table 2.
Shares of Ordinal Groups, 1948, and Relevant Measures, 1952, Italy by Regions

	Lombardy (1)	Piedmont and Liguria (2)	Emilia (3)	Lazio (4)	Tuscany (5)	Veneto and Venezia Trident (6)
1952						
1. Income per capita, relative of countrywide	167.7	162.8	114.7	114.2	103.4	95.8
2. Share of A sector in labor force (%)	21.0	31.4	52.0	30.7	42.8	44.8
3. Measure of intersectoral inequality, A and non-A sectors	6.0	14.4	14.1	12.6	19.4	14.6
Shares of Ordinal Groups, Families, 1948 (%)						
4. 0-20%	6.92	7.37	5.57	6.60	6.57	6.18
5. 21-40%	11.58	12.50	9.64	11.17	11.65	10.32
6. 41-60%	15.28	16.93	13.14	15.44	16.46	14.42
7. 61-80%	20.96	22.35	18.24	21.39	22.57	19.74
8. 81-90%	15.22	15.05	13.08	16.14	15.05	13.51
9. 91-95%	9.94	9.75	9.73	11.18	9.73	9.53
10. Top 5%	20.10	16.05	30.60	18.08	17.97	26.30
11. Concentration ratio	0.364	0.321	0.455	0.368	0.350	0.414
12. Standard deviation of logs of income	0.279	0.249	0.318	0.280	0.272	0.297

Lines 1-3: The underlying estimates are from Svimez, Statistiche sul Mezzogiorno d'Italia, 1861-1953 (Rome, 1954), Tables 497 and 498, pp. 601-02 (for labor force), and Table 559, p. 685 (for gross national product and per capita income). Labor force and gross national product are given by industrial divisions for 18 regions. The latter were converted into the 13 regions shown by combining Piedmont and Liguria (col. 2); Trentino, Veneto, and Friuli V. Giulia (col. 6); Umbria and Marche (col. 7); and Basilicata and Calabria (col. 13); and entering the other regions shown separately in the other columns.

Lines 4-10: Based on Luzzatto Fegiz, op. cit., Table 4, p. 350, which gives the frequency distributions of families within the 13 regions. Total income by income classes was derived by means of the average income calculated from the countrywide distributions of number and income by income classes, given in Table 6, p. 352. The shares of the ordinal groups were estimated by the standard procedure for interpolation.

Lines 11 and 12: Calculated by the standard procedure used throughout this paper.

Marche and Umbria (7)	Sardinia (8)	Abruzzi and Molise (9)	Campania (10)	Puglie (11)	Sicily (12)	Lucania and Calabria (13)	Italy (14)
81.4	68.4	57.2	56.5	52.0	49.6	41.9	100.0
60.3	50.0	63.1	45.9	59.8	47.3	59.4	42.4
21.0	16.6	12.5	14.8	18.0	5.2	11.8	16.5
7.22	6.21	7.32	5.60	6.53	5.23	5.33	6.10
12.65	9.77	11.60	9.89	10.94	8.86	8.62	10.55
17.07	12.80	15.49	13.92	14.67	12.25	11.37	14.56
22.53	18.19	22.08	19.16	20.52	17.32	16.27	20.35
15.31	14.14	16.05	13.22	15.37	12.61	11.38	14.37
9.35	12.30	10.58	9.14	11.23	9.56	8.30	10.00
15.87	26.59	16.88	29.07	20.74	34.17	38.73	24.07
0.319	0.440	0.346	0.439	0.386	0.486	0.506	0.405
0.251	0.309	0.260	0.314	0.285	0.335	0.332	0.297

Appendix Table 3.
Shares in Personal Income of Ordinal Groups in Population, United States by States,

1953	Personal income, adjusted, per capita ($)	Share in Adjusted Income before Tax (%)				
		Top 1%	2nd-3rd%	4th-5th%	6th-10th%	11th-25th%
	(1)	(2)	(3)	(4)	(5)	(6)
Group I						
1. Delaware (A)	2,479	12.48	4.89	3.33	6.63	13.08
2. Connecticut (I)	2,418	6.60	4.77	3.22	6.53	13.90
3. Nevada (I)	2,403	4.89	4.05	2.98	6.21	13.65
4. New Jersey (I)	2,223	5.42	4.44	3.27	6.73	14.73
5. California (I)	2,222	6.01	4.52	3.20	6.74	14.49
6. Illinois (I)	2,189	6.58	4.84	3.37	6.94	14.87
7. New York (I)	2,168	8.00	5.36	3.62	7.06	14.53
8. Michigan (II)	2,113	6.49	4.75	3.36	7.24	15.96
Group II						
9. Ohio (II)	2,027	6.26	4.74	3.34	7.22	15.41
10. Maryland (A)	2,002	5.88	5.02	3.60	7.31	15.89
11. Washington (II)	1,987	5.40	4.58	3.35	6.82	14.66
12. Massachusetts (II)	1,967	6.51	4.72	3.43	6.85	14.20
13. Indiana (II)	1,911	5.22	4.25	3.36	6.81	14.84
14. Rhode Island (II)	1,907	6.54	4.59	3.34	6.36	13.01
15. Pennsylvania (III)	1,888	6.41	4.65	3.48	6.93	14.46
16. Wyoming (III)	1,874	4.52	4.27	3.38	6.94	15.56
Group III						
17. Oregon (III)	1,831	6.23	4.77	3.53	7.04	14.80
18. Montana (III)	1,799	4.35	4.41	3.37	6.81	15.21
19. Wisconsin (III)	1,771	5.85	4.60	3.62	7.24	15.57
20. Colorado (III)	1,760	6.25	5.03	3.72	7.42	15.74
21. Missouri (IV)	1,729	7.17	5.29	3.79	7.48	15.40
22. Minnesota (IV)	1,656	6.39	4.86	3.74	7.19	15.03
23. Kansas (IV)	1,649	5.72	4.93	3.78	7.50	16.21
24. Arizona (IV)	1,628	6.16	4.82	3.80	7.37	15.66
Group IV						
25. Nebraska (IV)	1,595	5.77	4.91	3.77	7.32	15.75
26. New Hampshire (IV)	1,587	5.79	4.86	3.69	7.12	15.31
27. Florida (A)	1,586	7.45	5.29	3.85	7.29	15.24
28. Texas (V)	1,561	7.58	5.37	3.98	7.07	15.92
29. Iowa (V)	1,561	5.46	4.78	3.65	7.12	15.60
30. Utah (V)	1,545	5.32	4.73	3.78	7.49	16.48
31. Idaho (V)	1,507	4.72	4.73	3.59	7.14	16.07
32. Virginia (A)	1,498	5.82	4.96	3.86	7.54	16.44
Group V						
33. Oklahoma (V)	1,473	7.25	5.26	3.98	7.51	16.04
34. Maine (V)	1,463	5.88	4.64	3.44	6.52	15.15
35. Vermont (VI)	1,449	5.81	4.58	3.37	6.39	14.46
36. New Mexico (VI)	1,402	6.03	5.16	4.16	8.24	18.10
37. South Dakota (VI)	1,355	4.91	4.64	3.50	6.87	16.08
38. Louisiana (B)	1,299	7.37	5.74	4.27	8.10	17.70
39. West Virginia (VI)	1,259	5.34	5.19	4.00	7.96	18.36
40. Georgia (B)	1,256	6.86	4.59	4.05	7.69	17.18

(Continued on next page)

1953 and 1957

Concentration ratio	Share in Adjusted Income after Federal Income Tax Liability (%)					Concentration ratio	Measure of intersectoral inequality
	Top 1%	2nd-3rd%	4th-5th%	6th-10th%	11th-25th%		
(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0.19	6.78	4.41	3.16	6.30	13.28	0.11	16.7
0.12	4.60	4.25	3.01	6.14	13.59	0.08	7.2
0.09	3.55	3.54	2.73	5.74	13.16	0.05	7.2
0.12	3.98	4.01	3.07	6.33	14.34	0.08	5.8
0.12	4.34	4.00	2.98	6.26	14.04	0.08	5.9
0.14	4.63	4.32	3.17	6.53	14.54	0.10	7.7
0.16	5.75	4.82	3.40	6.72	14.36	0.12	7.8
0.15	4.57	4.29	3.19	6.82	15.65	0.11	13.0
0.14	4.52	4.26	3.15	6.75	15.10	0.10	11.8
0.15	4.40	4.56	3.39	6.95	15.67	0.12	4.6
0.12	3.98	4.07	3.10	6.37	14.32	0.08	5.2
0.13	4.82	4.28	3.20	6.47	14.07	0.10	3.6
0.11	3.91	3.83	3.07	6.36	14.46	0.08	12.2
0.11	4.61	4.13	3.07	6.01	12.96	0.08	4.3
0.13	4.58	4.21	3.21	6.51	14.31	0.10	7.3
0.11	3.47	3.84	3.09	6.42	14.96	0.08	9.1
0.14	4.63	4.27	3.24	6.61	14.52	0.10	10.0
0.11	3.44	3.92	3.08	6.36	14.71	0.08	14.6
0.14	4.50	4.17	3.33	6.82	15.27	0.11	17.4
0.16	4.71	4.54	3.45	6.99	15.47	0.12	9.2
0.17	5.18	4.76	3.52	7.03	15.24	0.13	13.8
0.15	4.86	4.42	3.42	6.78	14.81	0.11	16.6
0.15	4.32	4.42	3.47	7.06	15.96	0.12	8.3
0.15	4.56	4.33	3.45	6.94	15.47	0.12	11.5
0.15	4.33	4.42	3.43	6.89	15.48	0.11	12.0
0.14	4.49	4.42	3.39	6.75	15.08	0.11	7.7
0.17	5.34	4.72	3.52	6.88	15.07	0.13	7.6
0.18	5.31	4.79	3.63	7.21	15.79	0.14	8.9
0.14	4.21	4.32	3.34	6.73	15.29	0.10	12.5
0.15	4.20	4.38	3.51	7.15	16.34	0.12	8.5
0.13	3.74	4.24	3.30	6.78	15.79	0.10	7.5
0.16	4.45	4.49	3.52	7.10	16.04	0.12	13.3
0.18	5.27	4.76	3.64	7.15	15.93	0.14	16.5
0.13	4.43	4.18	3.18	6.25	14.99	0.10	8.7
0.12	4.33	4.12	3.10	6.11	14.31	0.09	15.1
0.19	4.55	4.65	3.79	7.74	17.76	0.15	4.6
0.13	3.92	4.14	3.20	6.48	15.80	0.10	5.2
0.21	5.45	5.16	3.92	7.72	17.58	0.17	14.6
0.18	4.27	4.68	3.71	7.59	18.14	0.15	15.3
0.19	5.22	4.95	3.73	7.33	16.94	0.15	18.4

Appendix Table 3 (Cont.)

	(1)	(2)	(3)	(4)	(5)	(6)
Group VI						
41. N. Dakota (VI)	1,239	5.50	5.25	3.90	7.64	17.67
42. Kentucky (VI)	1,227	6.68	5.54	4.18	8.03	18.12
43. Tennessee (A)	1,224	6.91	5.59	4.25	8.17	18.30
44. N. Carolina (B)	1,172	6.96	5.63	4.09	7.75	17.91
45. S. Carolina (B)	1,137	5.90	5.46	4.11	8.06	18.45
46. Alabama (B)	1,086	7.12	5.81	4.30	8.21	19.34
47. Arkansas (A)	997	6.91	5.71	4.12	7.93	19.13
48. Mississippi (B)	881	6.97	5.89	4.25	8.51	19.91
1957						
Group I						
49. Delaware (A)	2,728	13.12	5.30	3.53	6.43	13.85
50. Connecticut (I)	2,838	6.45	4.90	3.40	6.25	13.71
51. New York (I)	2,608	7.58	5.21	3.53	6.53	14.47
52. Illinois (I)	2,466	6.35	4.91	3.47	6.58	15.48
53. New Jersey (I)	2,510	5.52	4.72	3.43	6.62	15.17
54. Nevada (I)	2,468	6.76	4.90	3.47	6.57	15.63
55. California (I)	2,571	5.74	4.62	3.40	6.59	15.13
56. Ohio (II)	2,257	5.98	4.79	3.39	6.68	16.02
Group II						
57. Massachusetts (II)	2,349	6.07	4.75	3.27	6.23	14.33
58. Michigan (II)	2,128	6.65	5.00	3.70	7.19	17.36
59. Maryland (A)	2,181	5.64	4.99	3.69	7.21	17.10
60. Pennsylvania (II)	2,113	6.93	4.85	3.39	6.68	15.63
61. Washington (II)	2,152	5.25	4.74	3.43	6.87	16.20
62. Indiana (II)	2,007	5.64	4.58	3.38	7.00	16.63
63. Rhode Island (III)	2,010	6.59	4.90	3.31	6.28	14.23
64. Wyoming (III)	2,073	4.84	4.45	3.34	7.04	17.01
Group III						
65. Wisconsin (III)	1,940	6.27	4.84	3.44	6.97	16.67
66. Colorado (III)	2,039	6.07	4.95	3.51	6.94	15.52
67. Oregon (III)	1,951	5.41	4.68	3.42	6.96	16.45
68. Missouri (III)	1,955	6.67	4.99	3.46	6.80	15.70
69. Montana (IV)	1,949	4.83	4.96	3.48	6.89	15.76
70. Arizona (IV)	1,790	6.86	5.31	3.78	7.67	17.45
71. Nebraska (IV)	1,848	5.12	4.44	3.25	6.69	14.28
72. Florida (A)	1,890	7.64	5.72	3.85	7.41	16.24
Group IV						
73. Minnesota (IV)	1,879	6.07	4.89	3.47	7.11	16.47
74. Iowa (IV)	1,840	5.01	4.38	3.23	6.72	14.88
75. New Hampshire (IV)	1,876	5.42	4.90	3.55	6.82	15.41
76. Kansas (V)	1,814	5.83	4.95	3.52	6.99	16.07
77. Texas (V)	1,812	7.11	5.42	3.81	7.56	16.92
78. Utah (V)	1,720	5,81	5.26	3.85	7.53	17.62
79. Virginia (A)	1,687	5.88	5.12	3.80	7.79	17.63
80. Maine (V)	1,679	5.50	4.82	3.45	7.10	15.58

(Continued on next page)

(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0.17	4.46	4.74	3.61	7.27	17.18	0.14	6.5
0.20	5.18	5.02	3.87	7.68	17.83	0.16	20.9
0.21	5.27	5.05	3.92	7.81	18.11	0.17	18.6
0.20	5.47	5.12	3.80	7.43	17.73	0.17	12.8
0.19	4.73	4.93	3.83	7.74	18.19	0.16	23.7
0.22	5.49	5.24	3.99	7.88	19.16	0.19	23.4
0.21	5.34	5.12	3.84	7.65	19.01	0.18	12.7
0.23	5.55	5.34	3.99	8.25	19.81	0.20	25.0
0.21	7.84	4.85	3.35	6.32	14.03	0.14	
0.12	4.67	4.36	3.18	5.99	13.44	0.08	
0.15	5.67	4.70	3.31	6.29	14.22	0.11	
0.14	4.65	4.42	3.25	6.37	15.20	0.11	
0.12	4.20	4.26	3.20	6.35	14.81	0.09	
0.15	4.83	4.28	3.20	6.36	15.51	0.11	
0.13	4.31	4.14	3.15	6.30	14.77	0.09	
0.14	4.48	4.33	3.18	6.43	15.72	0.11	
0.12	4.62	4.29	3.06	5.97	14.07	0.09	
0.18	4.90	4.57	3.48	6.98	17.12	0.14	
0.16	4.41	4.56	3.46	6.97	16.83	0.13	
0.15	5.09	4.41	3.21	6.45	15.42	0.11	
0.13	4.00	4.25	3.20	6.57	15.85	0.10	
0.14	4.31	4.17	3.18	6.66	16.19	0.11	
0.13	4.80	4.43	3.12	6.03	13.98	0.09	
0.13	3.69	4.02	3.13	6.68	16.58	0.10	
0.15	4.99	4.44	3.27	6.71	16.31	0.12	
0.14	4.59	4.46	3.28	6.61	15.22	0.11	
0.14	4.27	4.26	3.21	6.62	16.01	0.11	
0.15	4.99	4.50	3.25	6.48	15.32	0.11	
0.13	3.86	4.42	3.24	6.51	15.23	0.10	
0.18	5.24	4.84	3.58	7.37	17.22	0.15	
0.11	3.95	3.99	3.01	6.33	13.79	0.08	
0.19	5.71	5.15	3.61	7.11	16.00	0.15	
0.15	4.76	4.47	3.30	6.80	16.13	0.12	
0.11	3.94	3.97	3.02	6.37	14.41	0.08	
0.13	4.29	4.48	3.34	6.60	15.15	0.10	
0.14	4.48	4.47	3.31	6.69	15.75	0.11	
0.18	5.17	4.84	3.58	7.23	16.58	0.14	
0.17	4.62	4.78	3.64	7.27	17.43	0.14	
0.17	4.68	4.68	3.59	7.42	17.16	0.14	
0.14	4.40	4.36	3.25	6.79	15.20	0.11	

Appendix Table 3 (Cont.)	(1)	(2)	(3)	(4)	(5)	(6)
Group V						
81. New Mexico (V)	1,711	6.77	5.29	3.82	7.98	18.03
82. Idaho (V)	1,666	6.75	5.04	3.68	7.60	16.85
83. Vermont (VI)	1,681	5.66	4.73	3.35	7.13	15.38
84. West Virginia (VI)	1,531	5.94	5.07	3.84	8.01	18.60
85. Oklahoma (VI)	1,644	7.73	5.44	3.78	7.55	16.79
86. S. Dakota (VI)	1,574	4.60	4.21	3.24	6.67	14.94
87. Louisiana (B)	1,573	7.19	5.75	4.09	8.16	18.24
88. N. Dakota (VI)	1,463	5.11	5.03	3.67	7.73	16.76
Group VI						
89. Kentucky (VI)	1,385	7.85	5.50	4.12	8.65	18.83
90. Georgia (B)	1,445	6.96	5.64	4.06	8.31	17.62
91. Tennessee (A)	1,392	7.12	5.64	4.09	8.58	18.23
92. N. Carolina (B)	1,328	7.06	5.56	3.99	8.30	18.16
93. Alabama (B)	1,335	6.58	5.52	4.20	8.96	19.26
94. S. Carolina (B)	1,188	6.18	5.43	4.16	8.76	19.72
95. Arkansas (A)	1,159	6.49	5.64	4.23	8.31	19.54
96. Mississippi (B)	970	7.15	6.11	4.91	9.32	21.41

States are classified by personal income per capita into 6 groups of 8 states each as shown (for Table 11). The Roman numerals and capital letters in parentheses in the stubs indicate the groups into which the states fall for the 8 groups of 6 states each (for Table 12).

Col. 1-6 and 8-12: From Seymour S. Goodman, Patterns of Income Inequality by States, unpublished Ph.D. dissertation submitted at The Johns Hopkins University, Baltimore, 1959; and further calculations for 1953 and 1957 kindly provided by Prof. Goodman, now at Tulane University.

The income figures (col. 1 and the related totals) used by Prof. Goodman differ slightly from personal income. He adjusted the latter to include: (a) personal contributions to social insurance funds and (b) net realized capital gains reported on income tax returns, and to exclude (c) employer contributions to private pension, health, and group insurance funds. However, the adjustment is too small to affect comparability.

Col. 7: Based on col. 2-6 and calculated by the standard procedure.

Col. 13: Based on col. 8-12 and calculated by the standard procedure.

Col. 14: The measures are for 1950, the latest year for which the industrial distribution of the labor force by states is available, and are taken from the worksheets underlying Paper III, Table 34, p. 80.

(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
0.19	4.94	4.76	3.62	7.65	17.80	0.16	
0.17	5.77	4.56	3.43	7.28	16.37	0.14	
0.13	4.70	4.32	3.16	6.80	15.10	0.11	
0.18	4.65	4.65	3.61	7.70	18.28	0.16	
0.19	5.73	4.93	3.57	7.27	16.49	0.15	
0.10	3.67	3.83	3.00	6.22	14.45	0.08	
0.21	5.43	5.19	3.86	7.83	17.94	0.17	
0.15	4.21	4.57	3.38	7.31	16.34	0.12	
0.23	6.09	5.10	3.92	8.41	18.65	0.19	
0.20	5.52	5.15	3.80	7.93	17.27	0.17	
0.21	5.53	5.16	3.87	8.25	17.98	0.18	
0.21	5.62	5.11	3.75	7.97	17.95	0.18	
0.22	5.31	5.07	3.94	8.58	18.95	0.19	
0.22	5.12	5.01	3.94	8.39	19.39	0.19	
0.22	5.28	5.17	3.98	7.96	19.10	0.18	
0.26	5.91	5.66	4.61	8.92	21.28	0.24	

Appendix Table 4.
Measures of Intersectoral Inequality in Product per Worker, Brazil, by States, 1949-51

	Product per worker 1949-51 (000 cruzeiros) (1)	Share of A sector in labor force, 1950 (%) (2)	Measure of intersectoral inequality (3)	Concentration ratio (based on sectors) (4)
Group A				
1. Sao Paulo	23.1	34.9	20.48	0.15
2. Parana	18.1	60.2	18.14	0.11
3. Rio Grande do Sul	17.8	48.6	24.41	0.15
4. Amazonas	17.7	32.2	31.96	0.21
Group B				
5. Espirito Santo	15.2	64.3	19.13	0.12
6. Santa Catarina	14.9	53.0	23.06	0.14
7. Rio de Janeiro	14.0	36.2	20.70	0.13
8. Mato Grosso	12.5	57.1	36.43	0.22
Group C				
9. Minas Gerais	11.4	63.5	25.54	0.16
10. Para	10.2	39.2	52.91	0.33
11. Goias	9.9	77.5	26.33	0.14
12. Rio Grande do Norte	9.3	66.9	38.29	0.22
Group D				
13. Pernambuco	9.3	59.4	53.97	0.33
14. Paraiba	8.3	72.4	37.77	0.22
15. Bahai	7.9	64.8	52.96	0.32
16. Sergipe	7.9	60.8	47.60	0.30
Group E				
17. Ceara	7.6	69.0	55.25	0.32
18. Alagoas	7.0	68.8	47.58	0.28
19. Maranhao	5.9	70.4	64.79	0.38
20. Piaui	5.7	75.9	77.53	0.44

Underlying estimates of labor force are from Brazil, Servico Nacional de Recenseamento, VI Recenseamento geral de Brasil, 1950, Vol. 1 (Rio de Janeiro, 1956), Table 52, pp. 102 ff.; of national product, from Revista Brasileira de Economia (December 1957), pp. 108-10.

We excluded the Federal District (data are given in the original sources) and several small states for which only labor force figures are available. The population of the states included accounted, in 1950, for about 95 percent of the countrywide total, and that of Serra dos Aimores, the largestof the states omitted (except for the Federal District) was less than 0.5 percent.

For both labor force and product seven sectors were distinguished: agriculture, industry (including mining), trade, transport and communication, finance, services, and government. The miscellaneous category was omitted.

Col. 3 and 4: Derived by the standard procedure except that for col. 4 the shares in labor force were ranked by increasing order of sectoral product per worker.