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WHO BENEFITS FROM ECONOMIC DEVELOPMENT ?

by

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The distribution of income among individuals and households in a nation is central to its economic welfare and has become a major public concern in both developed and underdeveloped countries. Egalitarian philosophies stimulated by the industrial revolutions of Western Europe have produced widespread expectations that economic growth should equalize wealth and earnings opportunities as well as raise the average level of economic welfare.[1] These expectations have not been borne out; even in economically advanced countries, the persistence of significant hardcore poverty for large minorities in the midst of growing affluence for the majority has contributed to serious social tensions and political conflict.[2] In both developed and underdeveloped countries, growing public concern with income inequality has been heightened by Marxian and contemporary radical stress on forces in capitalist societies tending to increase the concentration of wealth and income[3] as well as by more orthodox studies of conflicts between distributional justice and economic efficiency.[4]

Theories of income distribution usually emphasize explanations of functional income shares and seldom make explicit implications for the distribution of income among persons and households.[5] They also vary greatly in the distributional patterns which they imply. Classical economists, by combining a subsistence wage theory, a competitive profit model, and the Ricardian rent theory, developed a dynamic analysis of growth and distribution on which they based their prediction that, as a rule, landlords would benefit at the expense of both capitalists and workers in the course of economic development.[6] Marx, in his model of capitalist accumulation, assumed that continuous labor-saving technical advances would increase the industrial reserve army of unemployed, depress wage levels, and result in a falling share of wages in total

output.[7/] In neoclassical theory, relative factor shares are governed by relative marginal productivities which, given technology, are determined by the relative amounts of factors employed; in this model, relative shares change with both technical changes altering marginal productivities and changes in the relative amounts of factors employed.[8/] More recently, Keynesian-type behavioral assumptions have produced distributional theories in which differences in the propensity to save between wage earners and capitalists and variations in the rate of investment interact to determine the distribution of income between wages and profits.[9/] The implicit assumption of all these theories with respect to the size distribution of income is that individuals possess various quantities of primary factors of production (capital, labor, land, or entrepreneurship) which determine their income shares and that these functional shares then ipso facto determine the distribution of personal incomes.

Little explicit theorizing has been done on determinants of the size distribution of income among individuals other than a few elegant models in which income distribution is determined by stochastic processes marginally related to basic economic forces.[10/] In contrast, empirical work on variations in the size distribution of income has yielded a variety of hypotheses and some sketchy evidence on the impact on the personal income distribution of such influences as industrialization,[11/] differences in level of education,[12/] variations in the distribution of wealth[13/] and in the incidence of taxation,[14/] as well as such characteristics of income recipients as age, sex, race, family size, and occupation, to mention a few.[15/] The results, while interesting, have been scanty and generally based upon relatively short time periods in a few advanced countries. Comparisons between countries are few because of overwhelming data deficiencies as well as conceptual difficulties.[16/]

In recent years, interest in the process of economic development has stimulated empirical work on the interrelationship between economic growth and the distribution of income. Kuznets' work on currently advanced nations indicates that "the relative distribution of income, as measured by annual incidence in rather broad classes, has been moving toward equality - with these trends particularly noticeable since the 1920's but beginning perhaps in the period before the first world war."[17] In contrast, however, sketchy evidence on the early stages of economic growth in advanced nations and on development patterns in contemporary underdeveloped countries suggests that at low levels of development growth tends to induce greater inequality in the distribution of income. Studies of several European countries in the nineteenth century indicates a relative worsening of the position of lower income groups with, at best, stability in their absolute position during the early years of industrialization.[18] Little work has been done on growth and distribution in today's underdeveloped countries, but such evidence as there is suggests the likelihood that in many low income countries economic growth has led to increased inequality in the distribution of income.[19]

The study of income distribution in currently underdeveloped countries is handicapped both by inadequacies of theory and data which beset all investigations of income distribution and by the importance in these countries of nonmarket influences rarely allowed for in theories of distribution. The application of neoclassical functional theories to very low income countries, for example, is greatly complicated by the impact upon earnings differentials of such nonmarket forces as norms set by powerful traditional or expatriate elites, semi-arbitrary scales for government employees, minimum wage laws out of line with labor availabilities and the degree of often premature unionization. Keynesian theories

are also of limited relevance because nonmarket forces restrict the operation of presumed links between savings, investment, and income. While Marxian theories which stress the impact of property ownership upon income distribution have greater relevance, they are (like non-Marxian theories) simplistic in their two-class view of society and in their assumption that materialistic motives dominate economic activity. In the study of underdeveloped countries, it is to be expected that a variety of historical and political influences which are difficult to measure will interact with classical economic considerations in determining the distribution of personal incomes.

The present study is an empirical investigation into the sources of intercountry variations in the distribution of income in contemporary low-income developing countries. Income distribution data on 44 underdeveloped countries (spanning the range from subsistence economies to those rapidly approaching a developed state) are used to construct crude measures of various facets of the income distribution. The independent variables are indices of economic, political, and social forces which could be expected on a priori grounds to influence the distribution of income.[20] These data are analyzed by a stepwise analysis-of-variance technique (described in the next section) permitting highly nonlinear interactions in order to obtain a "best-fitting" statistical representation of the empirical regularities underlying the data.

The methodological approach used in this study is thus overtly empirical rather than theoretical. This approach seems currently appropriate since theorizing on the determinants of the distribution of personal income in underdeveloped countries has produced a variety of equally plausible but poorly validated alternative hypotheses which do not provide an adequate basis for the construction of a priori specified models.[21] This is not to say, of course,

that in our approach we eschew the use of theory. Theory as well as historical and comparative evidence has guided our choice of variables and has been a major input in the construction of the socioeconomic and political typologies employed as independent variables. Theory also plays an important role in our interpretations of the statistical results. Since the use of cross-section data to gain insights into dynamic processes poses well-known problems,[22/] the interpretation of cross-section results as representing changes over time requires major use of theoretical reasoning together with historical evidence regarding both the progressions over time suggested by the data and the direction of relationships between closely associated variables.

It should be stressed that the present study is exploratory and designed to obtain preliminary and tentative insights into the varied interactions affecting the distribution of income in underdeveloped countries.[23/] Both the income distribution variables and the independent variables are crude indices appropriate only for the early stages of exploration of the relevant relationships. We feel, nevertheless, that this type of exploratory effort is essential both to further research into the conceptualization and measurement of the influences involved and to the design of research in depth on their interrelationships. Indeed, without the kind of preliminary insights into broad interconnections among social, economic, and political forces provided by exploratory studies such as the present one, major investment of resources in research on the determinants of variations in the distribution of income in underdeveloped countries is likely to be a waste.

The paper is organized as follows: the next section describes the technique of analysis. Section 3 discusses problems in the conceptualization and measurement of income inequality and describes the dependent and independent variables employed in the analyses. Section 4 presents the results of three

statistical analyses employing measures of three different aspects of income distributions. Section 5 discusses the implications of the results with regard to interactions between economic growth and the distribution of income; while the final section presents our summary and conclusions.

II. THE ANALYSIS OF HEIRARCHICAL INTERACTIONS

Our choice of technique was guided by the need for a statistical technique which does not assume linear relationships and which places as few restrictions as possible on the forms of interactions among variables. A flexible technique is desirable both because the complex processes influencing income distribution affect different strata of the population in different manners and because the forces inducing changes in income distributions may interact quite differently in countries having different sets of characteristics. For example, in countries which are heavily agricultural, industrialization may decrease the share in total income of the lower 60 per cent of the population and increase the share of the upper 20 per cent; while in countries with sizeable industrial sectors, further industrialization may shift the income distribution in favor of the middle 40-60 per cent of the population.

The statistical method used here is based on an analysis of variance. As with other analysis-of-variance techniques, the focus is upon "explanation" of variations in the dependent variable.[24/] The analysis selects from a set of independent variables the one which splits the parent sample into two subgroups having the smallest possible combined dependent-variable variance within the subgroups, or alternatively, for which the sum of the squared deviations of the subgroup means from the parent-sample mean is at a maximum. Each of the two subgroups thus obtained is then treated as a new parent sample for which the

analysis again selects the independent variable providing the "best" split, i.e., that which gives the largest total variance of subgroups means from the parent sample mean. Each of these subgroups is again treated as a parent sample and the process continued through a series of binary splits. The result is an assymetrical branching process which subdivides the original parent sample into subgroups constructed so as to facilitate prediction of the value of the dependent variable with the least error.

More specifically, at each step in the analysis, and for each candidate independent variable, all possible mutually exclusive partitions of the parent group into subgroups, each of which includes particular (usually successive) values of the independent variable, are examined. For each possible partition of the relevant independent variable, the variance of the group means from the grand mean is calculated for the dependent variable. The "best" partition is that which maximizes the fraction of the total variance of the dependent variable accounted for by the means of the subgroups (i.e. which maximizes the sum of the squared deviations of the subgroup means from the grand mean weighted by sample size). The proportion of parent sample variance thus "explained" by the best partition for the relevant independent variable is compared with the best partition for all other candidate independent variables. At each step in the analysis, that independent variable is selected for which the best partition accounts for the largest proportion of the overall variance of the dependent variable. The corresponding partition is then carried out, and each subgroup then treated as a new parent sample.[25]

To ensure statistical significance, groups are candidates for splits only if (1) they contain a number of observations greater than $\bar{N}$ (set equal to 10 for our study); and (2) they include at least a specified proportion of the overall variance (this proportion was set equal to 10% for our analysis). In

addition, splits which are not statistically significant (by an F test), and splits which produce splinter groups (i.e., which, in our case, contain less than 10% of the observations in the parent group) are not carried out in the present analysis.

If the independent variables are ordinal in nature (i.e., are ranked in either ascending or descending order, so that X_{r+1} is either greater or less than X_r), only those splits are permissible which place all values of X_r which are less than or equal to a certain value, say X_m, in a given group. If an independent variable is only nominal (i.e., is assumed to have no natural order), then the analysis forms the partitions which correspond to all possible combinations of values of X_r taken 2, 3, 4, ..., r-1 at a time, and selects that partition which performs best. The analysis can accomodate, therefore, dummy variables, or variables for which the investigator does not wish to specify a ranking a priori.

It is evident that this particular form of analysis of variance is extremely flexible. In spirit, it is akin to a highly non-linear type of stepwise multiple regression analysis. Like stepwise regression, the present technique finds, at each step, those combinations of values of the independent variables which permit prediction of the value of the dependent variable with least error. However, unlike regression analysis, this branching process admits highly non-linear interactions. The variables, interactions, and coefficients which best "explain" a difference of ΔY in the value of the dependent variable can be quite different for high values of the dependent variable from those which are required to account for the same difference at low or intermediate values. Furthermore, unlike in regression analysis, the independent variables need not be assumed to be uncorrelated with one another. That is, the present statistical

technique can accommodate interactions among independent variables. (These interactions, of course, constitute a particular type of non-linearity.)

The present technique of analysis is ideally suited, therefore, to study of systematic interactions between a dependent variable on the one hand, and a set of independent variables on the other, when there is reason to believe that the phenomenon to be analyzed affects different parts of the data differently, and when the best principles for stratifying the original sample into subsamples are not known a priori. Indeed, this technique of analysis is very well adapted to indicating the best principles for meaningful stratification.

III. THE VARIABLES

Measurement of the Distribution of Income

Since the concept of an income distribution is multidimentional, it is susceptible to measurement by a variety of methods, no one of which is valid for all purposes.[26/] Summary indices such as the Gini coefficient can be suitable for broad comparisons of distributions with very different degrees of inequality but suffer from their inadequacy for comparing distributions having quite different forms of inequality. For investigating differential impacts of distributional changes on various segments of the population, measures of the relative income shares received by particular quantiles of income recipients can be more appropriate. Yet, indices of relative income shares also have pitfalls: the choice of appropriate quantile is arbitrary; and variations in the incidence of characteristics of income receivers, both within given quantiles in different distributions and between different quantiles in a given distribution, complicate comparisons over time and across countries.[27/] Finally, it should be stressed that all measures of income distribution provide at best only an ordinal ranking

of observations with respect to the underlying aspect of income distribution measured.[28/]

Since the present study is designed to explore a wide variety of potential influences on several facets of the distribution of income, measures of seven different aspects of income distributions were formed from crude data for 44 underdeveloped countries. Each dependent variable was subjected to a separate statistical analysis in order to throw light upon the full range of interactions affecting income distribution in developing countries.[29/]

Overwhelming data deficiencies complicate greatly efforts to measure variations in the distribution of income. It would be desirable to have income data for family expenditure units adjusted for number of persons and stage of participation in the labor force; in addition, income distribution data should ideally refer to secular income levels and take account of movements of individuals between different income groups over time.[30/] In actuality, however, income distribution data almost invariably relate to income in a single year, are seldom available by appropriate expenditure units, are frequently unadjusted for number of persons, and rarely take account of mobility between income groups. Furthermore, except for recent years in a few countries, data are usually available for only a small number of broad income groups. Finally, the raw data on incomes received, even in developed countries, are notoriously unreliable.[31/]

The raw data on incomes in the 44 underdeveloped countries studied here have all the deficiencies just described and in addition pose several special problems with respect to their comparability, for only a few of which adjustments could be made. Three types of sources were used: budget (income-expenditure) studies which sample different strata of the population; income information compiled from national censuses; and tax returns. For some countries budget data referring to particular segments of the population (e.g. only urban

or only wage earners) were used in conjunction with National Accounts and other income data in order to construct an overall picture of income distribution. For some countries, for which basic information was exceedingly coarse, a finer breakdown by class intervals was achieved by fitting the available to an appropriate empirical or theoretical distribution. In cases in which the lowest end of the lowest income class was not available, the minimum income was estimated by fitting a Pareto curve to the data. In cases where the average income in the highest class interval was not available, it was estimated by selecting a value which would equate the average per capita (or per household) income estimated from the income distribution to the corresponding value estimated from the national accounts (i.e., to per capita national income).

There were other sources of incompatibility in the basic data. Some of the information referred to households, some to individuals, and some to active population. Where more than one type of information was available, information on households was preferred because households most closely approximate expenditure units. However, no adjustments of distributions relating not to households but rather to individuals or active population were made because of difficulties in estimating the appropriate adjustments.

Some of the data were, strictly speaking incomparable in that they refer to different years in the late nineteen fifties and nineteen sixties; however, this source of variation is not of great import since the broad lines of income distributions do not, as a rule, change very rapidly over time. More serious as a cause of incompatibility are differences in the extent of breakdown in the raw data by class intervals; these vary from 28 class intervals for Zambia to only 5 class intervals for some African and Latin American nations. Other things being equal, a greater amount of detail provides a larger estimate of income concentration.

The basic income distribution data for the study are summarized in Table 1 of Appendix A together with a full bibliography of country sources from which the data are derived. The seven dependent variables constructed from these data were:

(1) The concentration (GINI) coefficient. This index is a measure of the extent of departure of the actual income distribution from a uniform income distribution. Specifically, it is the ratio of the area between the cumulative income distribution curve and the uniform distribution line to the area of the triangle in which this distribution is inscribed. This coefficient usually is considered to be the best single index of income concentration.[32/]

(2) the income share of the poorest 20 per cent of the population.

(3) the income share of the lowest 60 per cent of the population.

(4) the income share of the middle quintile of the population (i.e., the 10% above and the 10% below the median income).

(5) the income share of the wealthiest 5 per cent of the population.

(6) the income share of the upper 20 per cent of the population.

(7) an index of the point at which the income distribution shifts its slope, from less than unity to greater than unity.[33/] The households before this point are receiving less than they would under a uniform distribution; those after this point are receiving more than their uniform distribution share. The more concentrated the distribution, the further to the right this point will be.

In the present paper, the results of three of the seven analyses performed with the above dependent variables are presented; those for the income share of the lowest 60 per cent, the income share of the middle quintile and the income share of the upper 5 per cent. This selection was made for reasons of space and because this set selected is quite representative of the full range of our results.[34/]

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The Independent Variables

The independent variables for the present study consist of thirty-one
indicators of economic, social, and political influences which could be expected
on theoretical grounds to affect the income distribution. For the most part,
they describe country characteristics for the period 1957-62; only the measures
of rates of change refer to the longer period 1950/51 to 1962/63. Except where
otherwise noted, descriptions for the indicators together with individual country
classifications may be found in Chapter II of Society, Politics, and Economic
Development.[35]

With respect to economic influences, four variables represent, either
directly or indirectly, the extent of factor endowments: these are the indica-
tors of, respectively, natural resource abundance, adequacy of physical overhead
capital, effectiveness of financial institutions, and the rate of improvement in
human resources. Variables indicative of sectoral productivity in agriculture
are those summarizing the level of modernization of techniques in agriculture
and the degree of improvement in agricultural productivity and an index of the
institutional structure of agriculture which combines information on land tenure
patterns and size and viability of farming units. The influences upon sectoral
productivity in industry are represented by indicators of level of modernization
of industry and change in degree of industrialization. Several variables summa-
rize various aspects of the allocation of resources between sectors likely to
influence economy-wide productivity: a measure of the importance of subsistence
farming (the size of the traditional agricultural sector); an index of the inter-
sectoral pattern of development (the extent of socio-economic dualism); and a
variable describing the compositon of exports (the structure of foreign trade).
A population variable in included to suggest the influence upon resource

productivity of external economies associated with the size of the market.[36/]
Finally, two direct measures of overall economy-wide resource productivity
were introduced into the analysis (indicators of per capita GNP and of level of
socio-economic development[37/]) as well as a measure of broad rates of change in
total productivity (indicative of potential for economic development.[38/] These
economic measures were supplemented by a variable suggestive of the extent of
income redistribution through taxation (level of effectiveness of the tax
system) and a measure of country size and orientation of development strategy.[39/]

Socio-cultural influences likely to affect income distributions are
represented by indicators of the extent of urbanization and the extent of lite-
racy as well as the relative importance of the indigenous middle class and the
extent of social mobility (measured by a composite of extent of educational
opportunity, access to membership in the middle class, and the extent of racial
and cultural barriers to mobility). Also included is a measure of cultural and
ethnic homogeneity based on the proportion of the population speaking the predo-
minant language together with distinctions based on ethnic and religious
homogeneity.

The political indicators include measures descriptive of both political
institutions and characteristics of political leadership likely to influence the
distribution of income. Indicators of the extent of political participation[40/]
and the strength of the labor movement represent the importance of participant
political institutions. Two variables represent selected aspects of colonial
experience of possible relevance to current type of govenment: a nominal indica-
tor of type of colonial experience (British, French or other)[41/] and a variable
scoring countries by the number of years since they have been self-govening.[42/]
Finally are four measures which summarize key characteristics of political
leadership: the political strength of traditional elites, the political strength

of the military, the extent of leadership commitment to promoting economic development, and the extent of direct government economic activity.[43]

The coverage of these independent variables is quite broad and includes most of the political, social and economic institutional influences stressed in social science literature as important to the shape of the income distribution. It will be noticed, however, that the coverage of conventional purely economic variables is incomplete: there are, for example, no measures of relative abundance or relative prices of capital and labor or of relative propensities to save by different classes. While these omissions were necessary because of absence of adequate data, we do not regard them as seriously hampering our investigation since our main interest is in underlying economic and noneconomic institutional influencew which are usually taken as given in economists' analyses of income distributions. More serious is the absence of measures of the distribution of property. Another set of variables omitted from our analyses are variables measuring variations in the incidence of such household characteristics as age, sex, occupation, stage of participation in the labor force and so forth. It should be noted, however, that the broader the classes of income considered, the more likely such variations in the incidence of household characteristics are to cancel out and the less likely they are to affect the results systematically.[44]

Validity of the present data

In view of the substantial margin of error and several sources of incompatibility in our income distribution data as well as the crudeness of our independent variables, their validity for the purpose of the present investigation needs to be briefly considered.

A basic characterization of a valid measure is that it "measures what it purports to measure."[45] Whether it does so or not can be established in two fundamentally different ways, one a matter of definition[46] and the other (more relevant for the social sciences) a matter of empirical connections. "Here the validity of a measurement is a matter of the success with which the measures obtained in particular cases allow us to predict the measures that would be arrived at by other procedures and in other contexts."[47] Valid measurement also requires, of course, that a measure be relatively free of error in its several senses.

Several considerations suggest that our crude data tend to be reasonably valid for the purpose of exploring broad interrelationships between income distributions and the varied influences affecting them. With respect to our dependent variables, the consistency of the empirical connections obtained with alternative specifications of income distributions together with the interpretability of the variations among subsets of results[48] suggest their validity for the present exploratory analyses. As for our independent variables, earlier statistical studies indicate their relatively insensitivity to reasonable alternative specifications of the concepts measured; in addition, the statistical interconnections obtained are both interpretable and broadly consistent with other knowledge and evidence.[49] In our present results, specific empirical associations between measures which are conceptually close yet obtained by independent measurement procedures also suggest reasonable appropriateness of our data procedures for the present purpose. For example, variations in the income share of the middle quintile as estimated from budget and income studies prove closely associated with differences in the strength of the indigenous middle class estimated from a combination of employment data and qualitative evidence on the weight of expatriate elements in the middle class. To give another example, our indicator of

socioeconomic dualism (close conceptually to extent of socioeconomic inequalities and based on qualitative evidence) shows a close empirical connection to indepen- dent estimates of degree of income inequality.[50/] Nevertheless, it is self- evident that the empirical connections obtained and our limited experimentation with alternative specifications of indicators are only partial indicants that our data measure what they purport to measure. Extensive testing with alternative specifications using alternative measurement procedures and other bodies of data would be necessary to evaluate them fully.

Validity of measurement requires not only measurement which is subs- tantively valid, but also measurement which is reasonably free of error.[51/] That is, a measure should be sufficiently reliable (i.e., invariant under repeated measurement), sufficiently sensitive (discriminate sufficiently between diffe- rent amounts of the property measured), and sufficiently accurate (i.e., free of systematic error due to omitted influences presumed included) for the purpose at hand. With respect to reliability, our resources have not permitted the kind of field work necessary to establish invariance under repeated measurement. Never- theless, our procedures in the construction of our independent variables would appear to assure a reasonable degree of reliability for our purpose.[52/] Our effort has been to obtain sufficiently little variability under repeated measure- ment so that variations in country rankings due to unreliability will be small relative to the broad systematic variations which provide the substance of our statistical results. With respect to sensitivity, it is clear that the degree of discrimination provided by our income distribution data and by our independent variables is not great absolutely: it would not be sufficient, for example, for the use of much of our data as inputs to policy planning models. Nevertheless, judging from the nature of our results, the degree of discriminations would

appear to be adequate for exploring broad interactions of the sort in which we are interested.[53/] Furthermore, it should be stressed that the present technique of analysis requires only ranking of observations with respect to the independent variables so that data need be considerably less sensitive than is desirable for other statistical techniques. With respect to accuracy, our independent variables do not seem to pose major problems of systematic error due to omitted influences presumed included. With our income distribution data, the major possibility for systematic error would seem to be a possible tendency to overstate the share of the lowest income groups and understate that of the highest ones because of lack of adjustments for variations size of households (which tends to be greater at the lower end of the income distribution.)[54/]

As discussed elsewhere,[55/] the major problems with our data are the interrelated ones of conceptualization and primary data availability. That is, while the operational definitions do indicate reasonably well what is included and what is omitted from the measures, they suffer from the inadequacy of links between the measures themselves and the often vague and ill-defined social science concepts they are intended to represent. It is for this reason, for example, that in the present study we have chosen a battery of income distribution variables to measure income inequality; any single one taken alone cannot be presumed to represent adequately the rather imprecise multidimensional concept of income inequality.

Thus, in summary, the variables included in our study provide rough measures of an unusually wide range of potential influences on the distribution of income which, while very crude, appear to privide reasonably valid country rankings for exploratory investigations such as ours into the broad interrelationships involved in transformations of the distribution of income in underdeveloped nations.

IV. THE STATISTICAL RESULTS

Three sets of results which span the range of our findings from seven analyses performed with our income distribution data are discussed in the present paper.[56] Each set of results is discussed as follows: First, a diagram of the successive splits obtained by the analysis shows, for each split, (a) the independent variable which "best" splits the sample at that step, (b) the size of the subgroups obtained, (c) the dependent-variable means for each of the resultant subgroups, and (d) the per cent of the dependent-variable variance "explained" by the differences between subgroup means and parent-sample mean. Footnotes to the diagrams list the "next-best" candidate independent variables with their "next-highest" per cents of dependent-variable variance accounted for. The diagrams are followed by summaries of the characteristics (as of about 1960) of the countries in the different subgroups obtained in each analysis.[57] Finally, we present our interpretation of the results.

In interpreting our results, we apply a priori reasoning together with historical and comparative evidence to gain semi-quantitative insights into dynamic interactions between the shape of the income distribution and a wide range of socio-economic and political characteristics summarized by our data. The pitfalls of using statistical relationships to throw light upon causal forces are well known: empirical associations may represent causality in either direction or be the result of common forces; an included variable may represent closely related influences not explicitly measured by it, and so forth. In addition, cross-country data typically violate the assumption necessary to the application of statistical models that, given correctly specified relationships, the behavior patterns of cross-sectional units are homogeneous except for random diversity and the systematic differences in objective opportunities expressed in the

included variables.[58] Nor would time series data give a better view of under-
lying dynamic relationships, for time series data (again, given correctly
specified relationships) violate the assumption required by statistical models
that behavior patterns over time are unchanging except for variations induced
by changes in the included variables and except for random variations. Given
the respective biases of both cross-section and time-series approaches, it is
clearly desirable to make complementary use of both approaches. Hence, our
interpretations here should be viewed as a partial attempt to gain some preli-
minary insights into the processes of relative income determination in
underdeveloped countries. It is obvious that any firm validation of our find-
ings will require testing our conclusions against other bodies of cross-section
data as well as against time-series studies of individual countries having
different sets of characteristics.

ANALYSIS OF SHARE OF INCOME ACCRUING TO LOWEST 60% OF POPULATION

On the average, over the entire set of 44 countries, the lowest 60% of the population receives 25% of total income. This is roughly 40% of the share they would receive, were income evenly distributed throughout the economy. The standard deviation of their income share is 7.7%; the range is from 2% (Libya) to 39% (Israel).

The results summarized in Figure 1 show that the allocation of income to the poorest 60% of the population is "explained," broadly speaking, by the extent of socio-economic dualism, the level of social and economic modernization, and the expansion of secondary and higher level education. The poorest 60% receive a relatively large share of total income - on the average, between 30 and 40% - under two quite different sets of circumstances: quite pervasive underdevelopment marked by the predominance of small-scale or communal subsistence agriculture (group 7); and substantial development associated with major efforts to improve human resources (group 9). Their income share is smallest where a sharply dualistic development process has been initiated by well entrenched expatriate or military elites ideologically oriented to receive most of the benefits of economic development. The remaining subgroups of countries, in which the income share of the poorest 60% ranges from 23 to 26%, include both fairly well developed moderately dualistic countries (group 8) and sharply dualistic countries which have less dynamic modern sectors and are not under the political control of tradition-oriented expatriate elites (group 5).[59/]

In general, the results do not support the hypothesis that economic growth raises the share of income of the poorer segments of the population. On the contrary, the contrast between the sharply dualistic economies in groups 4 and 5 suggests that economic dynamism at low levels of development works to the

relative disadvantage of lower income groups. In the countries in group 4,
money incomes per capita significantly higher than those in group 5 are asso-
ciated with an income share to the poorest 60% of only 17%; thus, rising money
incomes per capita originating in the rapid growth of narrow modern sectors
have benefitted small, usually expatriate, elites. Inequality in both groups
of sharply dualistic economies is in turn much greater than in the low income
less dualistic countries in group 7 in which economic growth, even narrowly
based, had not yet been effectively initiated during the period studied here.
As for countries at higher levels of development (group 6), the significant
overlap in levels of socio-economic development between subgroups 8 and 9 suggest
that even for countries at this level, economic growth does not necessarily result
in benefits to the poorest income-receivers. Our results suggest rather that
economic growth at this higher level benefits poorer groups only when accompanied
by broad based efforts to improve the human resource base of the economy.

Figure 1: Analysis of Share of Income of the Poorest 60% of the Population

Variance accounted for jointly: .74

Group 7

$\bar{y}$ = 36%

low development
potential

N = 6

Group 9

$\bar{y}$ = 30%

high school
enrollment

N = 11

Group 3

$\bar{y}$ = 28%

low and moderate
dualism

N = 31

Development Potential (.34)[b]

Group 6

$\bar{y}$ = 26%

moderate and high
development
potential

N = 25

Human Resources (.40)[d]

$\bar{y}$ = 26%

N = 44

Dualism (.26)[a]

Group 8

$\bar{y}$ = 23%

low school
enrollment

N = 14

Group 5

$\bar{y}$ = 24%

low GNP per
capita

N = 7

Group 2

$\bar{y}$ = 20%

sharp dualism

N = 13

GNP (.59)[c]

Group 5: Malagasy, Morocco, Sierra Leone, Sudan,
          Tanzania, Tunisia, Zambia
Group 4: Gabon, Iraq, Libya, Peru, Senegal, South Africa
Group 7: Burma, Chad, Dahomey, Ecuador, Niger, Surinam
Group 8: Bolivia, Brazil, Ceylon, Colombia, El Salvador,
          Ivory Coast, Jamaica, Kenya, Lebanon, Mexico,
          Nigeria, Pakistan, Rhodesia, Trinidad
Group 9: Argentina, Chile, Costa Rica, Greece, India,
          Israel, Japan, Panama, Philippines, Venezuela, Taiwan

Group 4

$\bar{y}$ = 17%

medium GNP per
capita

N = 6

Footnotes to Figure 1

(a) The only alternative candidate variable which distinguishes well among all 44 countries is the extent of government direct economic activity (24%).

(b) There are no significant alternative candidates for this split.

(c) The next best alternative candidate variables indicate that, on the average, the higher the level of socio-economic development (49% of variance) and the higher the rate of improvement of human resources (40% of variance), the larger the portion accruing to the lowest 60%.

(d) Two other variables "explain" 30% of the remaining variance: the degree of development potential and extent of social mobility. In the less dualistic countries, the higher the levels of economic and social development, the larger is the share of the lower income households.

SUMMARY OF CHARACTERISTICS (ABOUT 1961) OF SUBGROUPS IN
ANALYSIS OF SHARE OF INCOME OF POOREST 60% OF THE POPULATION[60/]

Group 2 ($\bar{y}$ = 20%): 13 sharply dualistic countries
    -rich in natural resources (except Senegal and Sudan)
    -characterized by sharp sectoral and/or geographic cleavage between an
     important exchange sector and a predominant, traditional, nonmonetized
     agricultural sector
    -handicraft production more important than modern techniques in the manu-
     facture of consumer goods (except South Africa)
    -school enrollment ratios less than 40%
    -literacy rates less than 35% (except Peru and South Africa)

Group 4 ($\bar{y}$ = 17%): 6 sharply dualistic countries with per capita GNP in 1961
                    ranging from $175 to $204 (except South Africa $427)
    -income share of upper 20% of population ranges from 64 to 89% (except
     South Africa 57%)
    -tradition-oriented elites politically strong (except Gabon and Iraq)
    -at best, moderate development potential (except South Africa)
    -at best, moderate factor scores on socio-economic development

Group 5 ($\bar{y}$ = 24%): 7 sharply dualistic countries with per capita GNP in 1961
                    below $171
    -income share of upper 20% of population ranges from 48 to 65%
    -tradition-oriented elites not politically strong (except Morocco)
    -low development potential and low factor scores on socio-economic
     development (except Tunisia)

Group 3 ($\bar{y}$ = 28%): 31 countries which at most moderately dualistic (except
                    Bolivia and Burma)
    -includes two types of countries: those which are not dualistic because
     almost no modern sector and (2) those which, despite some cleavage bet-
     ween traditional and modern sectors, characterized by significant
     interaction between the two

Group 6 ($\bar{y}$ = 26%): 25 moderately dualistic countries[*] with moderate or high
                    development potential

Group 8 ($\bar{y}$ = 23%): 14 countries with low or moderate rates of improvement in
                    human resources
    -factor scores in the middle two quartiles for the full sample (except
     Lebanon and Trinidad in upper quartile and Nigeria and Ivory Coast in
     lower quartile)
    -literacy rates less than 55% (except Trinidad, Jamaica, Colombia, and
     Ceylon)
    -per capita GNP under $340 in 1961 (except Trinidad, Lebanon, and Jamaica)

----
[*]
    except Bolivia

Group 9 ($\bar{y}$ = 30%):　11 countries with <u>exceptionally</u> high rates of improvement in human resources
   - factor scores on socio-economic development in the upper third for the full sample (except India and the Philippines)
   - literacy rates over 55% (except India and Taiwan)
   - per capita GNP over $340 in 1961 (except India, the Philippines and Taiwan)

Group 7 ($\bar{y}$ = 36%):　6 little or moderately dualistic countries* with low development potential
   - characterized by predominance of either small subsistence farms in which marketing of output of marginal importance or communally owned and operated lands
   - limited industrial sectors in which a narrow range of goods produced in small-scale factories and rare large-scale production foreign financed and managed
   - manufactured commodities less than 10% of exports; marked concentration of exports with more than 75% of exports from 4 leading commodities

---

* except Burma

ANALYSIS OF SHARE OF INCOME ACCRUING TO WEALTHIEST 5% OF THE POPULATION

In our sample the average share of income received by the top 5% of the population is 30% - six times as large as their share would be with an even distribution pattern. The standard deviation of this share is quite large, 10%. The lowest share is 11%, in Israel; the highest is 60%, in Rhodesia.

The results presented in Figure 2 indicate that the extent of natural resource abundance and the extent of direct government economic activity account, statistically, for a substantial part of variations among countries in the share of income received by the wealthiest 5 per cent of the population, but that extreme concentration of income is accounted for by the political and economic dominance of expatriate and other ethnically and culturally distinct subgroups in the population.

The average share of the top 5% in resource rich countries (group 3) is almost 50% greater than in less well endowed countries (group 2). Within both resource-rich and resource-poor countries, the best differentiator for degrees of income concentration is the extent of the direct economic role of the government: the average share of the upper 5% is significantly smaller in countries with large public sectors and important government net investments (groups 8 and 10) than in predominantly private enterprise economies (groups 9 and 11). The wealthiest 5% receive the smallest share for the entire sample in countries with relatively poor resource endowments in which the government economic role is very important (group 8).

Extreme income concentration at the top is found only in underdeveloped countries with an abundance of natural resources. The two small groups of countries which split off from the mainstream of the analysis by reason of average income shares to the wealthiest 5% of over 40% have rather special characteristics.

One group of 7 countries with extremely low scores on efforts to improve human resources consists of African nations at low levels of development in which traditional elites were politically influential and expatriate groups dominated the middle class during the period summarized by our data (1957-62). A second group of 3 countries is distinguished from the mainstream of resource-rich countries by their extreme cultural-ethnic heterogeneity. These countries have prohibitive ethnic-cultural barriers affecting significant segments of the population and/or sharp socio-cultural dualism effectively barring large population groups from the growth sectors of the economy. None of the three had a politically strong indigenous middle class during the period studied here; Peru, the only one with an indigenous middle class of any significance was dominated politically by a tradition-oriented culturally-distinct indigenous oligarchy.

The special traits of countries in groups 5 and 7 suggest that, historically, colonial powers have sought firmest entrenchment in those poor countries best endowed with natural resources and further, that the more firmly entrenched the expatriate financial, commercial, and technical elites, the greater the concentration of income in the hands of the top 5%. Our results are consistent, thus, with the view of economic backwardness under colonialism held by such political economists as Paul A. Baran, according to which very uneven income distribution and eventual economic stagnation are typical outcomes of a narrowly based growth process where natural resources are exploited for the primary benefit of a coalition of feudal-type land owners and a small class of wealthy, usually expatriate, businessmen.[61]

The relationship between economic growth and the income share of the top income receivers suggested by our results is nonlinear. For low-income countries where extreme concentration of income is typically the outcome of

sharply dualistic growth, there appears to be a critical level of development beyond which economic growth cannot be sustained without significant redistribution of income away from the top: no country in groups 5 and 7 has achieved a level of socio-economic development sufficient to place it in the upper third of our sample.[62/] For countries with less extreme income concentration at the top, quite wide variations in development levels are associated with given degrees of income concentration, suggesting that in underdeveloped countries generally, once some minimal degree of redistribution at the top has taken place, economic growth per se is not a significant force for further equalization. Rather, given a country's resource endowment, the extent of the public sector and the government share in investment in infrastructure and education are the primary forces for the redistribution of income away from the top 5 per cent of income receivers.

Figure ..: Analysis of the Share of
Income of the Wealthiest ..
of the Population

Variance accounted for jointly: .65

Group 5

$\bar{y} = 42\%$

very low school
enrollment
N = 7

Group 7

$\bar{y} = 41\%$

heterogeneous
N = 3

Group 3

$\bar{y} = 34\%$

abundant natural
resources
N = 26

Human Resources (.26)[b/]

Group 4

$\bar{y} = 31\%$

low, moderate
and high school
enrollment
N = 19

Cultural and Ethnic[d/]
Homogeneity (.26)

Group 11

$\bar{y} = 34\%$

private
enterprise
N = 7

$\bar{y} = 30\%$

N = 44

Natural Resources (.27)[a/]

Group 6

$\bar{y} = 29\%$

homogeneous
N = 16

Government Economic[e/]
Activity (.36)

Group 9

$\bar{y} = 28\%$

predominantly
private
enterprise
N = 9

Group 2

$\bar{y} = 23\%$

poor or moderate
natural resources
N = 18

Government Economic Activity (.49)[c/]

Group 10

$\bar{y} = 26\%$

mixed economies
with at least
moderate govt role
N = 9

Group 8

$\bar{y} = 18\%$

mixed economies
with large govt
role
N = 9
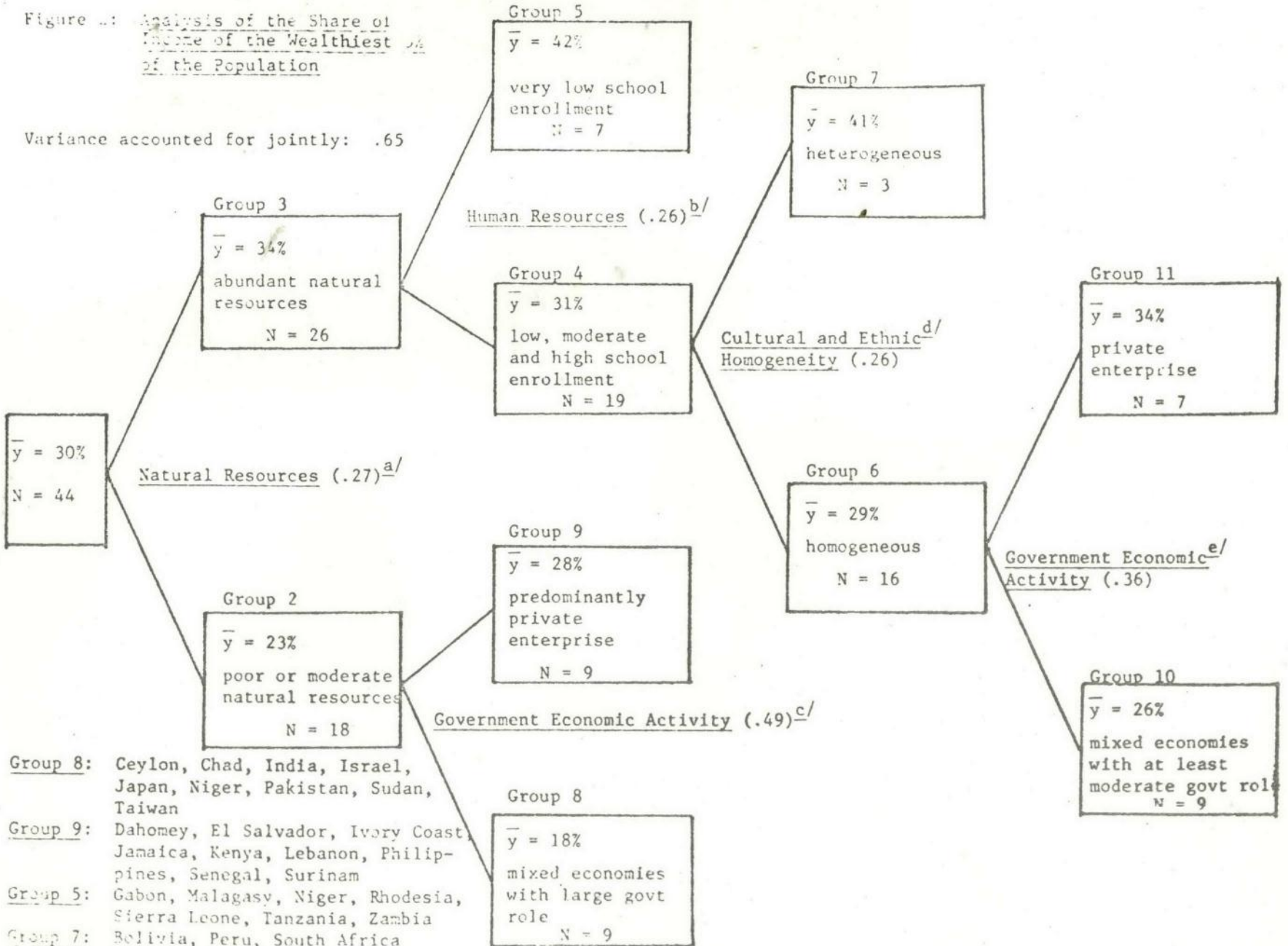
Group 8:   Ceylon, Chad, India, Israel,
           Japan, Niger, Pakistan, Sudan,
           Taiwan
Group 9:   Dahomey, El Salvador, Ivory Coast,
           Jamaica, Kenya, Lebanon, Philip-
           pines, Senegal, Surinam
Group 5:   Gabon, Malagasy, Niger, Rhodesia,
           Sierra Leone, Tanzania, Zambia
Group 7:   Bolivia, Peru, South Africa
Group 10: Argentina, Burma, Chile, Costa Rica, Ecuador, Mexico, Morroco, Tunisia, Venezuela
Group 11: Brazil, Colombia, Greece, Iraq, Libya, Panama, Trinidad

Footnotes to Figure 2

(a) Two alternative candidate variables (each explaining 19% of variance) show that the greater the extent of government participation in economic activity and the broader the popular participation in political processes the lower is the share of the top income families. Five other variables, each of which "explains" 15% of variance, indicate that the less powerful the traditional elite, the larger the middle class, the greater the leadership commitment to economic development, the higher the rate of improvement of human resources, and the greater the political strength of the labor movement---the smaller is the concentration of income at the top.

(b) The next-best candidate variables indicate that the larger the middle class (25%), the more rapid the industrialization (24%), the higher the level of socio-economic development (23%), the greater the extent of popular political participation (22%), the higher the literacy rate (21%), and the greater the strength of the labor movement (20%)---the lower is the share of income of the wealthiest 5%.

(c) At this split, other statistically significant candidate variables indicate that the less the potential for economic development (34%), the greater the popular participation in the political process (32%), and the higher the rate of improvement of human resources (32%), the smaller is the concentration of wealth at the top.

(d) There are no significant alternative candidate variables at this step in the analysis.

(e) Other candidate variables at this step are the level of socio-economic development (33%), level of effectiveness of financial institutions (33%), level of modernization of techniques in agriculture (33%), size of traditional agricultural sector (33%), type of colonial experience (33%), extent of political participation (29%), and structure of foreign trade (29%).

SUMMARY OF CHARACTERISTICS (ABOUT 1961) OF SUBGROUPS IN
ANALYSIS OF SHARE OF INCOME OF WEALTHIEST 5% OF THE POPULATION

Group 2 ($\bar{y}$ = 23%): 18 countries not very well endowed with natural resources
-have at best either fairly abundant agricultural resources (1 acre or more
of agricultural land per capita) with no significant mineral resources or
limited agricultural resources (less than 1 acre of agricultural land per
capita) with some but not abundant mineral resources
-span entire range of levels of socio-economic development and of develop-
ment policies covered by the sample

Group 8 ($\bar{y}$ = 18%): 9 countries with mixed government-private enterprise economies
-direct economic role of government of major importance in the economy as
indicated by substantial government investment in infrastructure, health,
and education and by shares of net investment undertaken by the government
which large and often greater than share of private industry
-span all levels of development and development policies

Group 9 ($\bar{y}$ = 28%): 9 countries with predominantly private enterprise economies
-have small public sectors and relatively small contributions of government
to net investment (except Senegal and Kenya in which direct role of govern-
ment moderately important)
-span all levels of development and development policies

Group 3 ($\bar{y}$ = 34%): 26 countries which very well endowed with natural resources
-rich in agricultural resources as well as in either fuel or nonfuel
resources (or both)
-span entire range of levels of socio-economic development and of develop-
ment policies covered by the sample

Group 5 ($\bar{y}$ = 42%): 7 resource-rich African countries with very low rates of
improvements in human resources
-have literacy rates less than 30%
-agricultural sectors characterized by predominance of either small subsis-
tence farms or communally owened and operated lands
-per capita GNP in 1961 less than $216
-low factor scores on socio-economic development (except Rhodesia)
-expatriate entrepreneurial, commercial, administrative and technical groups
dominated middle class (except Nigeria)
-tradition-oriented elites still influential politically though in most no
longer dominant (except Gabon and Malagasy)

Group 4 ($\bar{y}$ = 31%): 19 resource-rich countries characterized by at least minimal
efforts to improve human resources
-most have literacy rates over 30 per cent (except Bolivia, Morocco, Tunisia,
Iraq and Libya)
-most have factor scores on socio-economic development ranging throughout
upper two-thirds of the sample (except Morocco and Libya)

Group 7 ($\overline{y}$ = 41%): 3 resource-rich countries which ethnically heterogeneous
          -have prohibitive ethnic-cultural barriers affecting significant segments
          of the population and/or sharp socio-cultural dualism effectively
          barring mobility to large segments of the population
          -in none was there a politically strong indigenous middle class; Peru, the
          only one with an indigenous middle class of any significance, dominated
          by tradition-oriented oligarchy

Group 6 ($\overline{y}$ = 29%): 16 resource-rich countries which not ethnically very
                          heterogeneous
        -most have literacy rates over 30% and factor scores on socio-economic
        development ranging throughout the upper two-thirds for the sample
        (exceptions as noted for Group 4)

Group 10 ($\overline{y}$ = 26%): 9 countries with a major direct economic role for the
                          government

Group 11 ($\overline{y}$ = 34%): 7 countries with, at most, moderate direct economic role
                          of government
        -most predominantly private enterprise (except Colombia and Iraq in which
        government role moderate)

ANALYSIS OF SHARES OF INCOME ACCRUING TO THE MIDDLE 20% OF THE POPULATION

The average share of income accruing to the middle 20% of the population (i.e., the two deciles clustered around the median income) in our sample is 12%, with a standard deviation of 4%. The share ranges from 1.3% for Libya[63] to 18.6% for Ecuador[64]. In no country in the sample do middle-income families get as much as they would with a uniform income distribution.

The portion of income allocated to the middle groups in the income distribution is the only share which appears to vary systematically with level of development. The countries with the highest average share to the middle quintile (groups 7 and 11) are among the more developed in the sample socially and economically[65]; while countries in the group with the smallest average share (group 8) are among the least developed[66]. Not unexpectedly, the importance of the indigenous middle class is the primary influence differentiating among countries with respect to the income share of the middle quintile.

Given the level of socio-economic development, the abundance of natural resources accounts best for intercountry differences in the portion of income going to middle income groups, with smaller income shares associated with more abundant natural resourcs. It is not surprising that middle income groups do less well where resources are relatively abundant, given the finding above that income concentration at the top tends to be greater in resource-rich countries. In this analysis, the characteristics best differentiating among countries with relative resource abundance vary with level of development. Among more developed countries, those with exceptionally high scores on human resource improvement (group 11) have an average income share to the middle quintile almost 40 per cent higher than those with only moderate scores (group 10). Among very underdeveloped countries with more abundant natural

resources (group 4), political participation correlates most closely with income share to the middle income groups.

Two rather different paths of change tending to benefit the middle income groups are suggested by our results for countries which are moderately developed for low-income nations, neither possible where the middle class is dominated by expatriates. One path, available to countries with at least fair resource endowments, involves broad based social and economic development simultaneous with quite widespread political participation. This path is represented by the countries in group 11 which not only make exceptional educational efforts but in addition almost all score in the highest categories of political participation[67] and rank in the upper quartile on socio-economic development[68]. The alternative path is represented by the countries in group 7 which are poorly endowed with natural resources, show a wider range of development levels (although most are above the median) as well as poorer average scores on both educational effort and political participation. In all but two of these countries[69] the direct economic role of the government is extremely important, while the average income share to the middle quintile is the highest for the entire sample. This finding suggests that for countries with poor resource endowments and important constraints on socio-economic development, the establishment of a large public sector and a significant government investment effort provide an effective path for increasing the income share for the middle sector.

The spread of political participation appears to benefit the middle quintile most, relatively speaking, at very low levels of development. Among low income countries with at least fair natural resources (group 4), those in which political participation is extremely limited or nonexistent (group 8)

have the smallest average income share to the middle quintile for the whole
sample.   In contrast, the middle quintile does 30% better, on the average,
in the countries in group 9 in which political participation, although defec-
tive in offering little choice among political parties, probably involved at
least one quarter of the population minimally in national political life and
did not exclude cultural-ethnic groups comprising more than one-third of the
population during the period studied here (1957-62).   Thus, at the lowest
level of development where income distributions are highly skewed, increased
political participation offers a feasible mechanism for the relative better-
ment of the middle quintile of the population.

Figure 3: Analysis of the Share of Income of the Middle
Income Groups (40-60%)
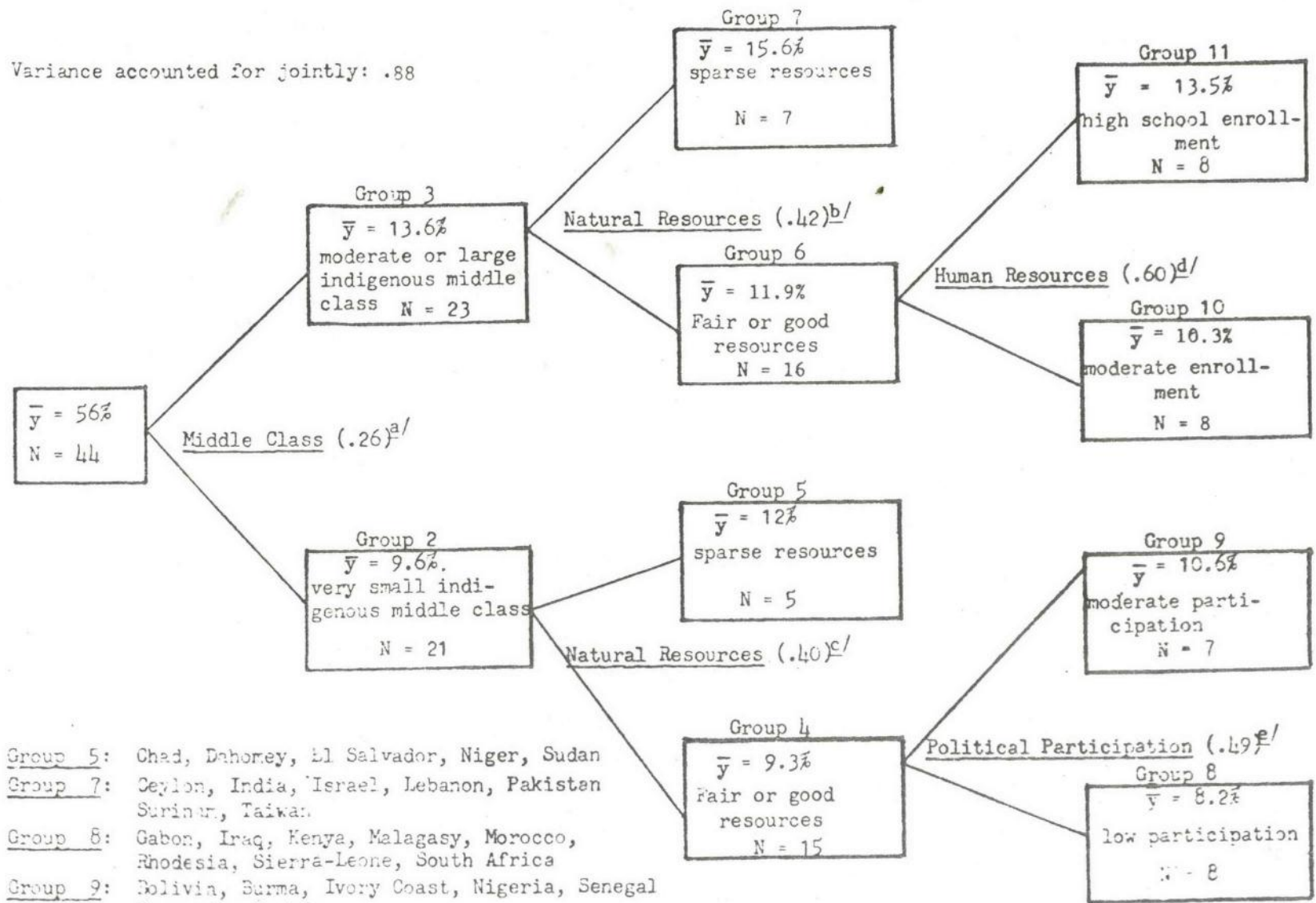
Variance accounted for jointly: .88

$\bar{y} = 56\%$
N = 44

Middle Class (.26)[a]

Group 3
$\bar{y} = 13.6\%$
moderate or large
indigenous middle
class   N = 23

Natural Resources (.42)[b]

Group 7
$\bar{y} = 15.6\%$
sparse resources
N = 7

Group 6
$\bar{y} = 11.9\%$
Fair or good
resources
N = 16

Human Resources (.60)[d]

Group 11
$\bar{y} = 13.5\%$
high school enroll-
ment
N = 8

Group 10
$\bar{y} = 10.3\%$
moderate enroll-
ment
N = 8

Group 2
$\bar{y} = 9.6\%$
very small indi-
genous middle class
N = 21

Natural Resources (.40)[c]

Group 5
$\bar{y} = 12\%$
sparse resources
N = 5

Group 4
$\bar{y} = 9.3\%$
Fair or good
resources
N = 15

Political Participation (.49)[e]

Group 9
$\bar{y} = 10.6\%$
moderate parti-
cipation
N = 7

Group 8
$\bar{y} = 8.2\%$
low participation
N = 8

Group 5: Chad, Dahomey, El Salvador, Niger, Sudan
Group 7: Ceylon, India, Israel, Lebanon, Pakistan
           Surinam, Taiwan
Group 8: Gabon, Iraq, Kenya, Malagasy, Morocco,
           Rhodesia, Sierra-Leone, South Africa
Group 9: Bolivia, Burma, Ivory Coast, Nigeria, Senegal
           Tanzania, Zambia
Group 10: Brazil, Colombia, Jamaica, Tunisia, Mexico
           Peru, Trinidad, Eduador
Group 11: Argentina, Chile, Costa Rica, Greece, Japan
           Panama, Philippines, Venezuela

Footnotes to Figure 3

a = Other candidate variables of importance indicate that the lower the
degree of dualism (24% of variance), the higher the rate of improvement
of human resources (22% v.), the greater the extent of government
participation in economic activity (22% v.), and the higher the literacy
rate (20% v.)---the higher is the portion of income accruing to the
middle class.

b = The next-best candidate variables indicate that the more diversified and
less primary-oriented the foreign trade (34%), the higher the rate of
improvement of human resources (29%), the higher the development
potential (28%), and the higher the level of modernization in agricultural
techniques (25%)---the greater is the income of the middle sector. It is
also the greater the more directly the government is involved in the
economy.

c = Secondary variables which distinguish among countries in this group show
that the greater the political role of the military (31% of variance),
the greater the degree of cultural and ethnic homogeneity (27% v.), and
the lower the per capita GNP (26% v.)---the greater is the income accruing
to the middle sectors. It is less, however, in countries with relatively
more emphasis on industrial exports.

c** = Omitting Libya at split into groups 4 and 5.

d = Next important candidate variables are extent of development potential
(45%) and level of socio-economic development (43%). The higher the
development level and the better the potential for further development,
so the larger is the share of income of the middle class.

e = There are no significant alternative candidate variables at this step.

SUMMARY OF CHARACTERISTICS (ABOUT 1961) OF SUBGROUPS IN
ANALYSIS OF THE SHARE OF INCOME OF THE MIDDLE 20% OF THE POPULATION

Group 2 ($\bar{y}$ = 9.6%): 21 countries with very small or negligible middle class
    -most had middle class dominated by expatriates (except Iraq, Bolivia,
    El Salvador, and Nigeria)
    -most (14) have factor scores on socio-economic development in lowest
    third for full sample; remainder (7) have them in middle third
    -none ranked high on political participation during 1957-62: that is,
    none had significant choice of channels for national political
    representation, and in none was it probable that at least one-quarter
    of the adult population participated in some minimal way in national
    political institutions
    -almost all characterized by the predominance of small subsistence farms
    or communally owned and operated lands (except El Salvador and South
    Africa)

Group 5 ($\bar{y}$ = 12%): 5 countries having very small indigenous middle class with
                    sparse natural resources
    -none has abundant mineral resources; those with abundant agricultural
    resources have no significant nonagricultural ones

Group 4 ($\bar{y}$ = 9.3%): 15 countries having very small indigenous middle class
                  with at least moderately abundant natural resources
    -most have an abundance of agricultural resources with either significant
    fuel or significant nonfuel mineral resources.

Group 8 ($\bar{y}$ = 8.2%): 8 countries with small indigenous middle class, abundant
                  natural resources, and low political participation
    -in these countries there was little or no choice between different
    political parties; less than 1/4 of adults participated minimally in
    national political life; and national political representation was
    either seriously defective or nonexistent
    -the income share of the upper 20% of the population ranged from 51 to
    71% (in most between 63 and 69%)

Group 9 ($\bar{y}$ = 10.6%): 7 countries with small indigenous middle class, abundant
                  natural resources and moderate political participation
    -political participation, while defective in providing little or no choice
    between political parties (except Burma for a short time), did probably
    involve minimally at least one-quarter of the adult population (except
    Senegal); and national political representation at least fair without
    exclusions of cultural-ethnic or socio-economic groups comprising more
    than 1/3 of the population
    -income share of upper 20% ranged from 48 to 64% (in most was between 50
    and 60%)

Group 3 ($\overline{y}$ = 13.6%):   23 countries with moderate or large indigenous middle
                                    class
        -in none was the middle class dominated by expatriates; in about half, at
         least 20% of the active male population was engaged in white collar
         employments, while in the remainder, between 10 and 20% were so engaged
        -most have factor scores on socio-economic development in the upper half
         for the full sample (except India and Pakistan)

Group 7 ($\overline{y}$ = 15.6%):   7 countries having relatively large indigenous middle
                                    class with sparse resources
        -none has abundant mineral resources. At most, they have either some
         fuel or some nonfuel mineral resources (but not both)
        -in most, the government has an important direct economic role as indicated
         by large public sectors and important shares of government in net invest-
         ment (except Lebanon and Surinam)
        -all making at least moderate improvements in human resources
        -in all but Pakistan, there is minimal political participation by at least
         1/4 of the adult population and national political representation for
         major cultural-ethnic and socio-economic groups representing over 2/3
         of the population

Group 6 ($\overline{y}$ = 11.9%):   16 countries having fairly large indigenous middle class
                                    with fairly abundant natural resources
        -most have either (1) abundant agricultural resources with significant
         fuel or nonfuel mineral resources or (2) overall abundance of fuel and
         nonfuel mineral resources with limited agricultural resources (except
         Jamaica, Japan and the Philippines)

Group 10 ($\overline{y}$ = 10.3%):   8 fairly resource-rich countries with moderate improve-
                                     ments in human resources
        -all but Tunisia rank in second highest of four categories of improvements
         in human resources
        -as for factor scores on socio-economic development, only two lie in top
         quartile for sample, four lie in second quartile, and 1 in third quartile
         (Tunisia)

Group 11 ($\overline{y}$ = 13.5%):   8 resource-rich countries with exceptionally high
                                     improvements in human resources
        -all rank in highest category on improvements in human resources
        -factor scores on socio-economic development in upper quartile for full
         sample (except the Philippines and Costa Rica in upper half only)
        -all but two rank in highest category on extent of political participation
         (the Philippines ranks in second highest and Panama in one of lowest)

V. ECONOMIC DEVELOPMENT AND THE DISTRIBUTION OF INCOME

The three cross-section analyses of income distribution discussed here suggest a set of multifaceted and highly nonlinear interactions over time between the dynamic process of economic development and changes in the distribution of income[70]. When economic growth begins in a subsistence agrarian economy through the expansion of a narrow modern sector, inequality in the distribution of income typically increases greatly, particularly where expatriate exploitation of rich natural resources privides the motivating force. The income share of the poorest 60% declines significantly, as does that of the middle 20%[71] and the income share of the top 5% increases strikingly.

The gains of the top 5% are particularly great in countries where a politically dominant elite forms a distinct cultural and ethnic group. In these countries the path toward sustained economic growth is eventually blocked unless either the country is sufficiently large or redistributive policies are sufficiently important to generate an internal market adequate for growth. Once countries move successfully beyond the stage of sharply dualistic growth, further social and economic development per se operate systematically neither to the relative advantage nor disadvantage of the elite 5% of income receivers. Rather, their share varies positively with the extent of natural resources available for exploitation and negatively with the size of government direct actions to improve infrastructure and education and to promote industrial and agricultural expansion.

The middle income receivers are the primary beneficiaries of the widening of the base for economic growth which occurs as developing countries become less dualistic. Their relative gains from growth are most reliable when broad based social and economic development, facilitated by reasonable

availability of natural resources, is accompanied by a significant spread of both educational improvements and political participation. Where resources are sparse and the pace of social and economic development slower, the middle sector may nevertheless make substantial relative gains as a result of direct government actions in the economic arena.

The position of the poorest 60% typically worsens both relatively and absolutely when an initial spurt of narrowly based dualistic growth is imposed upon an agrarian subsistence economy. Indeed, our study suggests that, in an average country experiencing the earliest phases of economic development it takes at least a generation for the poorest 60% to recover the loss in absolute income associated with the typical spurt in economic growth[72/]. Even where a transition from sharply dualistic growth to more broadly based economic growth is accomplished, the beneficiaries are usually the middle sector rather than the poorest segment of the population. Indeed, the poorest 40% continue, on the average, to lose both absolutely and relatively. To predict by how much their income position worsens with given increases in economic growth rates requires assumptions about the nature and time path of development of a typical country in this transitional phase of economic growth. Along what appears to be the most likely transition path, drops of between two and three percentage points in the share of the poorest 40% are, on the average associated with increments in growth rates of less than 1 percentage point; under these circumstances, close to two generations may be required before the poorest sector can recover its absolute position[73/]. Even in the last phase of the pre-takeoff stage in which relatively high levels of development have been attained and capacity for more broadly based economic growth has been established, the poorest segments of the population typically benefit from economic growth only where the

government plays an important direct role in economic activity and where widespread efforts are made to improve the human resource base.

It is of interest to speculate upon the mechanisms which operate throughout the pre-take-off period to depress both relative and absolute standards of living of the poorest 40% of the population. In the very earliest stage of dualistic growth, increased wage payments to indigenous workers in modern plantation, extractive and industrial enterprises tend to be more than offset by concurrent changes in population, relative prices, tastes, and product availability. The introduction of modern health measures, such as malaria control, by lowering death rates, accelerates population growth and thus, tends to depress the per capita income of the indigenous population. Since increased cash wages are not immediately matched by increased availability of consumers' goods, higher prices erode gains in money income. Subsistence farmers, shifting to cashcrops are particularly hard hit by rising prices and typically suffer both declines in real income and nutritional deficiencies as they become dependent upon the market for major necessities previously produced at home.

Even when the process of economic growth becomes significantly less dualistic as it spreads beyond the bounds of a narrow expatriate enclave, the relative and even the absolute positions of the poorest 40% continue to worsen as changes in product mix and technology within both agricultural and non agricultural sectors, rapid expansion of the urban industrial sectors, continued rapid population increases, migration to the cities, lack of social mobility and inflation all operate to the detriment of urban and rural poor.

As economic growth spreads, regional income inequality typically increases as the concentration of rapidly growing, technologically advanced

enterprises in cities widens the gap between rural and urban per capita income. Within the urban sector, income inequality also intensifies with the accumulation of assets in the hands of a relatively small number of owners (usually expatriate) of modern enterprises. This process of income concentration in the cities is accelerated by the spread of capital-intensive industrial technology. The spread of capital-intensive methods results from the ease with which owners of modern enterprises obtain capital abroad, together with the inability of small-scale enterprises to obtain financing, and from the growing preferences of middle- and upper-income entrepreneurs for advanced modern technologies. This labor-saving bias of technological advance, the rapidity of urban population growth, the migration to cities of unemployed rural workers and the lack of social mobility all tend to swell the numbers of urban impoverished and decrease the income share of the poorest segments of the urban population.

Not only do the relative positions of both urban and rural poor continue to deteriorate as economic modernization and commercialization spread throughout the economy, but in addition, several concomitants of the growth process characteristic of the pre-take-off period operate to worsen their absolute position. As agricultural output expands, the inelasticity of international and domestic demand for many agricultural products tends to reduce the real income of agricultural producers. Import substitution policies which raise domestic consumers' goods prices above international levels contribute further to decreases in real income among the poorest groups. Simultaneously, mechanization in industry tends to reduce greatly the earnings of large numbers of artisans and cottage workers; where cheap manufactures are permitted to flood domestic markets, the destruction of handicraft industries contributes further to reduced incomes and increased unemployment among rural and urban poor. Finally, inflation, the product of investment efforts

typically well beyond capacities to save, depresses the real income of the large groups of low-income workers whose bargaining power is insufficient to force wages up as rapidly as prices; while profit receivers tend to gain both absolutely and relatively from rising prices for the products they sell.

Thus, in very-low-income countries in the pre-take-off stage of development, inflation, population growth, technological change, the commercialization of the traditional sector and urbanization all combine to reduce the real income of the poorest 40% of the population, while benefiting those middle- and upper-income groups better able to finance the application of more advanced capital-intensive techniques of production.

Our findings and speculations on interactions between economic growth and the distribution of income in the pre-take-off stage of economic development are, broadly speaking, consistent with other studies, both cross-sectional and time-series. Sketchy evidence cited by Kuznets on the early stages of economic growth in currently advanced nations suggests a relative worsening of the position of the poor[74]. Cross-section and time-series studies of contemporary underdeveloped countries also lend support to the hypothesis that the initial phases of economic growth increase the inequality of income distribution[75]. It is only very recently, however, that the possibility of absolute declines in the average income of the poorest 40-60% of the population as a consequence of economic growth has been recognized and evidence in support of the likelihood of such declines brought forward.

VI.   SUMMARY AND CONCLUSIONS

In the present paper, we have discussed only three of six significant analyses of income distribution performed with our data.   The summary here will refer, however, to the full set of results.

The most important variables affecting income distribution are ecological, socio-economic and political.   Table 1 lists them in the order of the frequency with which they are significant candidates for splitting parent groups into subgroups.   The number of times each variable appears as the primary variable in binary splits is also given.[76]   The six most important variables associated with intercountry differences in patterns of income distribution, as judged by frequency of significance, are the rate of improvement in human resources, the extent of direct government economic activity, the abundance of natural resources, the extent of political participation and the extent of socio-economic dualism.

Of the variables of greatest significance to the present study, the most reliable policy instruments for increasing the equality of income distributions appear to be the rate of improvement in human resources and the extent of direct government economic activity.   Increased access to the acquisition of middle-level skills and professional training appear from our results to be quite predictable in their equalizing effects on the income distribution.   The distributional effects of increasing the proportion of government investment in total investment also appear to be systematically favorable to lower and middle income recipients.   As policy instruments, measures to increase political participation are probably less reliable because of their unpredictable impact upon the stability of social and political institutions.

Table 2: SUMMARY OF SIGNIFICANT VARIABLES

	Frequency of significance	Frequency of appearance as primary variable
Rate of Improvement in Human Resources	10	5
Abundance of Natural Resources	9	5
Extent of Direct Government Economic Activity	9	4
Extent of Dualism	5	4
Extent of Potential Economic Development	9	2
Extent of Political Participation	6	1
Strength of Labor Movement	4	0
Factor Scores on Level of Socio-economic Development	4	0
Per Capita GNP	3	1
Level of Modernization of Techniques in Agriculture	3	1
Structure of Foreign Trade	3	0
Importance of Indogenous Middle Class	3	1
Extent of Literacy	3	0
Degree of Cultural and Ethnic Homogenity	3	2
Extent of Social Mobility	1	1
Political Strength of the Traditional Elite	2	0
Political Strength of the Military	1	0
Extent of Leadership Commitment to Development	1	0
Character of Agricultural Organization	1	1
Level of Modernization of Industry	1	0
Change In Degree of Industrialization	1	0
Level of Effectiveness of Financial Institutions	1	0

While the extent of socio-economic dualism cannot be considered directly as a policy instrument, our results suggest strongly that policy measures tending to reduce dualism by widening the base for economic growth can be very important for increasing income equality, particularly in improving the positon of the middle income groups; among instruments having this effect might be, for example, measures to provide credit to small indigenous rural and urban entrepreneurs, or agricultural technical services to promote the wider spread of new seeds throughout agriculture.

The consequences for income distributions of increasing economic development potential by speeding growth rates and improving economic institutions are not fully predictable, probably because of the unfavourable effects discussed above of speeding growth rates per se. Nevertheless, our results suggest that, once some minimum level of development is reached, the wider the coverage of improvements in economic institutions, the more likely the middle income groups are to increase their share in total income. While natural resources do not form, of course, a policy instrument, the coincidence of abundance of natural resources with sharp dualism, expatriate middle classes, and extreme income inequality at very low income levels suggest that measures to reduce colonial exploitation of rich resources would quite predictably improve the distribution of income.

It is very striking that several variables most closely associated with variations in patterns of income distribution proved to have little importance in our earlier studies of influences associated with differences in growth rates of per capita GNP. Variations in natural resource abundance, the extent of the direct economic role of the government, the degree of political participation, and even rates of improvement in middle and higher level human resources showed little association with differences in economic growth rates.[77] Yet, our present study

underlines their major relevance to differences in the extent of income
inequality, and thus reinforces the view that the policy instruments which are
most effective in improving income distributions are different from those which
are best for raising economic growth rates.

FOOTNOTES

1. See, R. H. Tawney, Equality (London: Unwin Books, 1964) for a well-known statement of egaliterian philosophy. See Herman P. Miller, Rich Man, Poor Man (New York: Thomas Y. Crowell, 1964), Chap. IV, for a discussion of the common "myth" that recent economic growth in the United States has led to more equal income distribution. For an excellent discussion of the various rationales for income equality see Michael Lipton, Assessing Economic Performance (London: Staples Press, 1968), pp. 85ff.

2. See, for example, Michael Harrington, The Other America: Poverty in the United States. rev. ed. (Baltimore, Md.: Pelican Books, 1971), passim.

3. See, for instance, Stephan Michelson, "The Economics of Real Income Distribution," Review of Radical Political Economics, Vol. (Spring 1970) pp.

4. See James E. Meade, Efficiency, Equality, and the Ownership of Property (London: Allen and Unwin, 1964). There is relatively little disagreement over the proposition that the total economic welfare of a community with marked income inequality can be increased significantly by income transfers from wealthier to substantially poorer persons, given the presence of eventually diminishing marginal utility of commodities as a whole to individuals. This is so even without the assumption that interpersonal comparisons of utility are possible for all persons in an income distribution. The proposition only requires the weaker assumption that the marginal utility of commodities as a whole for persons at the extremes of the income distribution can be ranked. For a defense of comparing marginal utilities for the purpose of measuring the effects on welfare of distributional changes, see James E. Meade, Trade and Welfare (London: Oxford University Press, 1955), Chap. 5. A now classic discussion of interrelationships between economic welfare and income distribution can be found in I.M.D. Little, A Critique of Welfare Economics, 2nd ed. (Oxford: Clarendon Press, 1957).

5. For a survey of recent theories of the functional income distribution, see Tibor Scitovsky, "A Survey of Some Theories of Income Distribution," in National Bureau of Economic Research, The Behavior of Income Shares: Selected Theorectical and Empirical Issues (Princeton: Princeton University Press, 1964), pp. 15FF. See also Martin Bronfenbrenner, Income Distribution Theory (Chicago: Aldine-Atherton, 1971).

6. See John Stuart Mill, Principles of Political Economy, new ed., Ed. W. J. Ashley (New York: Augustus M. Kelley, 1961), Book IV, Chap III, especially pp. 720-724.

7. See Karl Marx, Capital, The Communist Manifesto, and Other Writings, Ed. Max Eastman (New York: Modern Library, 1932), especially pp. 141-146 and 161-182.

8. See, for example, John Bates Clark, The Distribution of Wealth (New York: Kelley and Millman, 1956), esp. Chapt 2; and J.R. Hicks, The Theory of Wages 2nd. ed. (London: MacMillan, 1964), Chap. 6.

9. See Nicholas Kaldor, "Alternative Theories of Distribution," Review of Economic Studies, Vol. 23 (No. 2, 1956), pp. 83-100.

10. See D. G. Champernowne, "A Model of Income Distribution," Economic Journal, Vol. 63 (June 1953), pp. 318-351; and B. Mandelbrot, "Stable Paretian Random Functions and the Multiplicative Variation of Income," Econometrica, Vol. 29 (Oct. 1961), pp. 517-543. An exception is J.E. Stiglitz, "Distribution of Income Wealth Among Individuals," Econometrica, Vol. 37 (July 1969), pp. 382-397, in which the impact of alternative assumptions about savings, reproduction, inheritance policies, and labor homogeneity are analyzed within the framework of simple model of capital accumulation. For a summary of a variety of hypotheses which have been put forth to explain the skewness in the size distribution of income, see Stanley Lebergott, "The Shape of the Income Distribution," American Economic Review, Vol. XLIX (June 1959), pp. 328-347.

11. See Simon Kuznets "Economic Growth and Income Inequality," American Economic Review, Vol. 65 (March, 1955), pp. 1-28.

12. See, for example, Gary S. Becker and Barry R. Chiswick, "Education and the Distribution of Earnings," American Economic Association, Paper and Proceedings, Vol. 56 (May, 1966), pp. 358-369.

13. See Robert J. Lampman, The Share of Top Wealth-holders in National Wealth (Princeton: Princeton University Press, 1962).

14. See Roger A. Herriot and Herman P. Miller, "Who Paid the Taxes in 1968?" (Paper prepared for the National Industrial Conference Board Meeting in New York on March 18, 1971, mimeographed) for an attempt to measure the total tax burden (Federal, State, and local) by income levels. The results indicate very little progressivity in the U.S. tax structure below the very highest income levels.

15. For an interesting application of the technique used in this paper to "explain" differential changes in money income for a sample of 1,274 family units in terms of the characteristics of heads of families, see James D. Smith and James N. Morgan, "Variability of Economic Well-Being and Its Determinants," American Economic Association, Paper and Proceedings, Vol. 60 (May 1970), pp. 286-295.

16. See, however, H. T. Oshima, "The International Comparison of Size Distribution of Family Incomes with Special Reference to Asia," Review of Economics and Statistics, Vol. 44 (Nov. 1962), pp. 439-445, and Irving B. Kravis, "International Differences in the Distribution of Incomes," Review of Economics and Statistics, Vol. 42 (Nov. 1960) pp. 408-416.

17. Simon Kuznets, "Economic Growth and Income Inequality," American Economic Review, Vol. 45 (March 1955), p. 4. This generalization is based on data for the U.S., U.K., and Germany; data on Norway and Sweden also show the same broad pattern, according to the same author in Modern Economic Growth: Rate, Structure, and Spread (New Haven: Yale University Press, 1966), pp. 206ff. For further data supporting this generalization, see Irving Kravis, The Structure of Income: Some Quantitative Essays (Philadelphia: The Wharton School, University of Pennsylvia, 1962), Chap. 7; and Simon Kuznets, assisted by Elizabeth Jenks, Shares of Upper Income Groups in Income and Savings (New York: National Bureau of Economic Research, 1953). A recent study indicating a slight positive effect of growth in equalizing incomes is Andrew F. Brimmer, "Inflation and Income Distribution in the United States," Review of Economic and Statistics, Vol. 53 (Feb., 1971), especially pp. 40-41.

18. Kuznets suggests that relative income inequality may well have widened in England between about 1780 and 1850 and in the United States and Germany between 1840 and 1890. "Economic Growth and Income Inequality," pp. 16-19. Even the most optimistic estimates for Great Britain during the industrial revolution conclude that little, if any, absolute better-ment in workers' standards of living occurred before the 1820's at the earliest. See E. J. Hobsbaum (Part A) and R. M. Hartwell (Part B), "The Standard of Living During the Industrial Revolution: A Discussion," Economic History Review, Vol. 16 (August, 1963), reprinted in The Economic Development of Western Europe: The Eighteenth and Early Nineteenth Centuries, eds. Warren C. Scoville and J. Clayburn LaForce (Lexington, Mass.: D. C. Heath and Co., 1969), pp. 135-169. A recent note on "Trends in Wealth Concentration Before 1860" by Jackson Turner Main indicates that a striking increase in the concentration of wealth took place in the United States between 1780 and 1860: Journal of Economic History, Vol. 31 (June, 1971), pp. 445-447; it may be presumed that greater inequality of income resulted.

19. Kuznets conjectured in 1955, that in contemporary underdeveloped countries the cumulative effect of concentration of past savings combined with the absence of dynamic forces for equalization and of government policies to improve the conditions of the poor had created "a possibility that inequality in the secular income structure of underdeveloped countries may have widened in recent decades," (Economic Growth and Income Inequality, p. 24). A recent study by Richard Weisskoff indicates that in Puerto Rico, Argentina and Mexico between 1950 and 1963, the income share of lower income groups has declined while per capita GNP was rising. "Income Distribution and Economic Growth in Puerto Rico, Argentina and Mexico,"

20. For a discussion of the independent variables used in the present studies, see Irma Adelman and Cynthia Taft Morris, Society, Politics, and Economic Development, 2nd ed. (Baltimore: The Johns Hopkins Press, 1971), the prefatory chapter titled "Methodological Considerations: The Measurement of the Institutional Characteristics of Nations." Chap. 2 contains a detailed description of the variables.

21. For a more detailed discussion of empirical approaches to the use of quantitative techniques, see Irma Adelman and Cynthia Taft Morris, "Analysis-of-Variance Techniques for the Study of Economic Development," Journal of Development Studies, Vol. 8 (Oct., 1971), pp. 99 - 106.

22. For an anlysis of the biases of cross-section statistical analyses, see Edwin Kuh, "The Validity of Cross-Sectionally Estimated Behavior Equations in Time Series Applications," Econometrica, Vol. 27 (April, 1959), pp. 197-214.

23. We might say with Kuznets ("Economic Growth and Income Inequality", p. 4) that "the trends in the income structure can be discerned but dimly, and the results considered as preliminary informed guesses."

24. For a description of the technique, see J. Sonquist and J. Morgan, The Detection of Interaction Effects (Ann Arbor, Mich.: Institute for Social Research, Univeristy of Michigan, 1964). The only applications of the technique which have come to our attention are two papers by James N. Morgan and James D. Smith: "Measures of Economic Well-Offness and Their Correlates," American Economic Association, Papers and Proceedings, Vol. 59 (May, 1969), pp. 450-62; and "Variability of Economic Well-Being and Its Determinants," American Economic Association, Papers and Proceedings, Vol. 60 (May, 1970), pp. 286-95.

25. For example, if the independent variable X assumes r distinct values X_r then the parent group is arranged initially so that all observations which have values $X_r \leq X_1$, are in Group 1, and all observations which have values $X_2, \ldots, X_r$ are in Group 2. The means of thw two subgroups are then calculated as well as the variance from the overall sample means which is due to the group means (the "regression" sum of squares); this latter variance is equivalent to the variance attributable to (or "explained" by) the partition. Next the partition which places the values of $X_r \leq X_2$ in Group 1 and the remaining data in the parent group in Group 2, is tried and the same calculations are carried out. The process is repeated then for $X_r \leq X_3$, $X_r \leq X_4$, etc. For each independent variable, that binary partition of the parent group which provides the largest reduction in the unexplained sum of squares becomes a candidate for splitting the parent group. The same analysis is carried out for each of the independent variables in turn, and the reduction in the variance provided by the best partitions associated with each independent variable are compared then with one another. At each step of the analysis, that split of the parent group is chosen which maximizes the sum of squares explained by the partition over all possible binary, non-overlapping partitions and over all the independent variables included in the analysis.

26. For discussions of various measures of income distribution, see, among others, James N. Morgan, "The Anatomy of Income Distributions," Review of Economics and Statistics, Vol. 44 (Aug. 1962), pp. 270-83; Simon Kuznets, "Economic Growth and Income Inequality," esp. pp.   ; and Anthony B. Atkinson, "On the Measurement of Inequality," Journal of Economic Theory, Vol. 2 (1970), pp. 244-63.

27. See Irving Kravis, The Structure of Income (Philadelphia, Pa.: University of Pennsylvania Press, 1962), esp.

28. Strictly speaking, it is not correct to use ordinal data with statistical techniques requiring the calculation of means and variances. Sensitivity studies are needed to justify the arbitrary assumption of cardinality. In our treatment of the dependent variable in the present paper, we follow the general practice among econometricians of using index numbers in statistical analyses as if they were cardinal. It should be noted, however, that, with respect to the independent variables, their ordinality is appropriate to the technique of hierarchical interactions. See section II above.

29. In the present paper three of these analyses are reported in detail.

30. For detailed discussion of desiderata for income distribution data, see Simon Kuznets, "Economic Growth and Income Inequality," American Economic Review, Vol. 45 (March, 1955), pp. 1-3.

31. For an opinion to the contrary with respect to U.S. data, see Herman P. Miller, Rich Man, Poor Man (New York: Crowell, 1964), Chap.   The deficiencies often cited are that the basic income data are usually derived from information supplied by the income recipients themselves, the accuracy of which is a function of the recall of the respondent, his perception of the use to which the information will be put, his veracity about a sensitive subject, etc. Only where income data are based on information reported on tax returns can they be regarded as somewhat more reliable.

32. See. C. Gini, "Measurement of Inequality of Incomes," Economic Journal, Vol. 31 (March, 1921, pp. 124-6) and the Moran and Atkinson articles referred to in footnote 26 above. Like other measures of income inequality, the   Gini index is not additive; it suffers from   ambiguity when used to compare two distributions for which Lorenz curves intersect; and similarly, has the disadvantage that it weighs equally forms of income inequality judged by most to be quite incomparable.

33. This point is found by locating the point of tangency on the Lorenz curve of a line parallel to the diagonal (even-distribution) line. The definition in the text assumes that the same scale is used to measure percentage points of income and of households.

34. The results for (1), (2), and (5) are available upon request; those for (7) are not interesting.

35. Adelman and Morris.

36. The score given each country for this variable is the size of its population in millions according to latest census data.

37. For this variable, each country is given its factor score on a factor summarizing the level of social and economic development. See Chapter IV of Adelman and Morris, Society, Politics, and Economic Development for individual country scores and a description of the factor analysis from which these scores are taken.

47. Kaplan, The Conduct of Inquiry, p. 199. To illustrate, the use of GNP as a measure of national productive capacity might be validated by the extent to which it can be used to predict other aspects of productive capacity such as constraints revealed by input-output studies or constraints on consumption revealed by budget studies.

48. See below section IV.

49. For a more detailed discussion of the validity of our independent variables, see the prefatory chapter to the second edition of Society, Politics, and Economic Development, (Baltimore: The Johns Hopkins Press, 1971) entitled "Methodological Considerations: The Measurement of Institutional Characteristics of Nations."

50. See the next section below, especially

51. The present discussion follows Kaplan, The Conduct of Inquiry, pp. 199-201.

52. As described in detail in the chapter on "Methodological Considerations ..." referred to in footnote 49, the application of the method of successive definition together with the use of expert opinion to eliminate inconsistencies between preliminary operational definitions and actual observations would seem to have reduced variability to a scale not likely to alter the broad picture of interactions obtained in our statistical results.

53. In selecting the number of categories for our qualitative indicators, we compromised between two desiderata: the desirability of obtaining sufficient discrimination between our observations and the desirability of obtaining categories sufficiently broad so that judgmental information could be used to classify reliably countries for which point information was unavailable. The extent of discrimination in the income distribution data was dictated by data availability.

54. While a number of biases may be present in our basic data, systematic bias due to our use of expert opinion and qualitative evidence would seem to be absent. We obtained marked differences in simple correlations for subsamples representing different levels of development (subsamples were constructed after data preparation was complete); to maintain that there is systematic bias in expert opinions requires the assumption that such bias varies systematically with level of development---a somewhat implausible contention.

55. See Adelman and Morris, "Methodological Considerations ..." referred to in footnote 49 above.

56. The three dependent variables studied here are the share of income of the poorest 60% of the population, the share of income of the upper 5% of the population, and the share of income of the middle 20% of the population.

57. These summaries are based upon country classifications with respect to a wide range of social, economic and political characteristics given in Chapter 2 of Adelman and Morris, Society, Politics, and Economic Development.

58. For a classic discussion of the respective biases of cross-section and time-series data, see Edwin Kuh, "The Validity of Cross-Sectionally Estimated Behavior Equations in Time Series Applications," Econometrica, Vol. 27 (April, 1959), pp. 197-214.

59. See below for summaries of the common characteristics of the countries in the various subgroups obtained in our results.

60. The source for this and the following summaries is Chapter 2 of Adelman and Morris, Society, Politics, and Economic Development.

61. See Paul A. Baran, "On the Political Economy of Backwardness," in The Economics of Underdevelopment, eds. A.N. Agarwala and S.P. Singh (New York: Oxford University Press, 1958), pp. 75-92.

62. When countries are ranked by scores on a factor representing level of socio-economic development. See footnote 37 above.

63. The next highest figure is 7%, for Kenya.

64. The next highest figure is 15.8%, for Japan.

65. All but Pakistan and India have factor scores on level of socio-economic development above the median for the sample. Pakistan and India fall just below the median.

66. All but South Africa have factor scores below the median for the full sample.

67. The exception is Panama.

68. The exceptions are the Philippines and Costa Rica which rank in the upper half of the sample only.

69. The exceptions are Lebanon and Surinam.

70. As noted in the text above, the "conclusions" presented here are tentative hypotheses about the dynamic interactions suggested by our cross-section results and are derived through the use of a priori reasoning and historical evidence together with hypotheses suggested by our statistical findings. It is well-known that there is no statistical justification for causal dynamic interpretations of cross-section results.

71. There is an overlap, obviously, between the income share of the poorest 60% and that of the middle 20%. The former measure is of interest when one is concerned with the position of the poorer "majority" of the population. The latter is of most interest when one's concern is with those middle groups which are assumed by both political and economic historians to plan key political and economic roles in national development.

72. This hypothesis is suggested strongly by a study of Figure 1 (the analysis for the poorest 60% of the population). In the relatively less dualistic subsistence economies of group 5, an average growth rate of per capita GNP in the neighborhood of 0% is associated with an average share to the poorest 60% of the population of 36%. In the more sharply dualistic economies of group 2, an average growth rate of per capita GNP of about 3% is associated with an average income share to the poorest 60% of 20%. If we hypothesize that the typical path of change is represented by a movement from group 7 to group 2, and assume that the income share of the poorest 60% drops from 36% to 20%, it follows that it would take at least a generation for the poorest 60% in an average country with a hypothesized increase in growth rate of 3 percentage points to recover the absolute loss associated with a decline in income share of 16 percentage points.

73. With reference to Figure 1, assume that the average country in group 5 is that most likely to proceed beyond the stage of sharply dualistic growth to the level of development of the average country in group 6, or more realistically, to the level of the average country in group 8. Computations from data for countries in groups 5 and 8 give an average share to the poorest 40% of 15.7% for group 5 and 13.0% for group 8; the average growth rate of per capita GNP for group 8 is about 2.0% compared with approximately 1.5% for group 5. To regain the implied absolute loss in income share of 2.5 percentage points with an increment in average growth rates of per capita GNP of only 1/2 percentage point requires almost 35 years.

74. See footnote 18 above.

75. For time series studies, see Subramanian Swamy, "Structural Changes and the Distribution of Income by Size: The Case of India," Series 2 (June, 1967), pp. 155-74; Richard Weisskoff, "Income Distribution and Economic Growth in Puerto Rico, Argentina, and Mexico." and the references cited on p. 305 of the latter article. For examples of cross-section studies, see T. Morgan, "Distribution of Income in Ceylon, Puerto Rico, the United States and the United Kingdom," Economic Journal, Vol. 43 (December, 1953), pp. 821-35; and Harry T. Oshima, "The International Comparison of Size Distribution of Family Incomes with Special Reference to Asia," Review of Economics and Statistics, Vol. 44 (Nov. 1962), pp. 439-45.

76. There were 28 splits in all the six analyses summarized here. For many of these splits, there were statistically significant alternative candidate variables. The total frequency of significant variables for all splits for the six analyses was 84.

77. See Adelman and Morris, Society, Politics, and Economic Development, Chapters 5 - 7.

APPENDIX

DATA AND SOURCES

COUNTRY	LOWEST 20%		21 - 40%		41 - 60%		61 - 80%		81 - 95%		96 - 100%	
	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income
Argentina[1]	7.00	7.00	10.30	17.30	13.10	30.40	17.60	48.00	22.60	70.60	29.40	100.00
Bolivia[2]	4.00	4.00	13.70	17.70	8.90	26.60	14.30	40.90	23.40	64.30	35.70	100.00
Brazil[3]	3.50	3.50	9.00	12.50	10.20	22.70	15.80	38.50	23.10	61.60	38.40	100.00
Burma[4]	10.00	10.00	13.00	23.00	13.00	36.00	15.50	51.50	20.29	71.79	28.21	100.00
Ceylon[5]	4.45	4.45	9.21	13.66	13.81	27.47	20.22	47.69	33.93	81.62	18.38	100.00
Chad[6]	12.00	12.00	11.00	23.00	12.00	35.00	22.00	57.00	20.00	77.00	23.00	100.00
Chile[7]	5.40	5.40	9.60	15.00	12.00	27.00	20.70	47.70	29.70	77.40	22.60	100.00
Taiwan[8]	4.50	4.50	9.70	14.20	14.80	29.00	19.00	48.00	27.90	75.90	24.10	100.00
Colombia[9]	2.21	2.21	4.70	6.91	8.97	15.88	16.06	31.94	27.70	59.64	40.36	100.00
Costa Rica[10]	6.00	6.00	7.30	13.30	12.10	25.40	14.00	40.00	25.00	65.00	35.00	100.00
Dahomey[11]	8.00	8.00	10.00	18.00	12.00	30.00	20.00	50.00	18.00	68.00	32.00	100.00
Ecuador[12]	6.30	6.30	10.60	16.50	13.50	30.00	15.60	58.20	20.30	78.50	21.50	100.00
El Salvador[13]	5.50	5.50	6.70	12.20	11.30	23.50	15.10	38.60	28.40	67.00	33.00	100.00
Gabon[14]	2.00	2.00	6.00	8.00	7.00	15.00	14.00	29.00	24.00	53.00	47.00	100.00
Greece[15]	9.00	9.00	12.80	21.80	12.30	34.10	16.40	50.50	26.50	77.00	23.00	100.00
India[16]	8.00	8.00	12.00	20.00	16.00	36.00	22.00	58.00	22.00	80.00	20.00	100.00
Iraq[17]	2.00	2.00	6.00	8.00	8.00	16.00	16.00	32.00	34.00	66.00	34.00	100.00
Israel[18]	6.80	6.80	13.40	20.20	18.60	38.80	21.80	60.60	28.20	88.80	11.20	100.00

COUNTRY	LOWEST 20%		21 - 40%		41 - 60%		61 - 80%		81 - 95%		96 - 100%	
	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income
Ivory Coast[19]	8.00	8.00	10.00	18.00	12.00	30.00	15.00	45.00	26.00	71.00	29.00	100.00
Jamaica[20]	2.20	2.20	6.00	8.20	10.80	19.00	19.50	38.50	30.30	68.80	31.20	100.00
Japan[21]	4.70	4.70	10.60	15.30	15.80	31.10	22.90	54.00	31.20	85.20	14.80	100.00
Kenya[22]	7.00	7.00	7.00	14.00	7.00	21.00	15.00	36.00	41.80	77.80	22.20	100.00
Lebanon[23]	3.00	3.00	4.20	7.20	15.80	23.00	16.00	39.00	27.00	66.00	34.00	100.00
Lybia[24]	0.11	0.11	0.39	0.50	1.28	1.78	8.72	10.50	43.10	53.60	46.40	100.00
Madagascar[25]	7.00	7.00	7.00	14.00	9.00	23.00	18.00	41.00	22.00	63.00	37.00	100.00
Mexico[26]	3.66	3.66	6.84	10.50	11.25	21.75	20.21	41.96	29.52	71.48	28.52	100.00
Morocco[27]	7.10	7.10	7.40	14.50	7.70	22.20	12.40	34.60	44.50	79.10	20.60	100.00
Niger[28]	12.00	12.00	11.00	23.00	12.00	35.00	23.00	58.00	19.00	77.00	23.00	100.00
Nigeria[29]	7.00	7.00	7.00	14.00	9.00	23.00	16.10	39.10	22.50	61.62	38.38	100.00
Pakistan[30]	6.50	6.50	11.00	17.50	15.50	33.00	22.00	55.00	25.00	80.00	20.00	100.00
Panama[31]	4.90	4.90	9.40	14.30	13.80	28.10	15.20	43.30	22.20	65.50	34.50	100.00
Peru[32]	4.04	4.04	4.86	8.90	8.30	17.20	15.20	32.40	19.30	51.70	48.30	100.00
Philippines[33]	4.30	4.30	8.40	12.70	12.00	24.70	19.50	44.20	23.30	72.50	27.50	100.00
N. Rhodesia[34] (Zambia)	6.27	6.27	9.55	15.82	11.10	26.95	15.95	42.90	19.60	62.50	37.50	100.00
Rhodesia[35]	4.00	4.00	8.00	12.00	8.00	20.00	15.00	35.00	5.00	40.00	60.00	100.00
Senegal[36]	3.00	3.00	7.00	10.00	10.00	20.00	16.00	36.00	28.00	64.00	36.00	100.00

COUNTRY	LOWEST 20%		21 - 40%		41 - 60%		61 - 80%		81 - 95%		96 - 100%	
	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income	% income	% cum. income
Sierra Leone[37]	3.80	3.80	6.30	10.10	9.10	19.20	16.70	35.90	30.30	66.20	33.80	100.00
South Africa[38]	1.94	1.94	4.17	6.11	10.16	16.27	26.37	42.64	17.98	60.62	39.38	100.00
Sudan[39]	5.60	5.60	9.40	15.00	14.30	29.30	22.60	51.90	31.00	82.90	17.10	100.00
Surinam[40]	10.70	10.70	11.56	22.26	14.74	37.00	20.60	57.60	27.00	84.60	15.40	100.00
Tanzania[41]	9.75	9.75	9.75	19.50	9.85	29.25	9.75	39.00	18.10	57.10	42.90	100.00
Trinidad and Tobago[42]	3.60	3.60	5.76	9.36	9.16	18.52	24.48	43.00	30.40	73.40	26.60	100.00
Tunisia[43]	4.97	4.97	5.65	10.62	9.95	20.57	14.43	35.00	42.56	77.56	22.44	100.00
Venezuela[44]	4.40	4.40	9.00	13.40	16.60	30.00	22.90	52.90	23.90	76.80	23.20	100.00

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Development Digest

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An Anatomy of Income Distribution Patterns in Developing Nations

Irma Adelman and Cynthia Taft Morris

[Statistical analysis of income distributions in 44 developing countries shows that important factors associated with inequalities in income are the existence of relatively rich mineral or land resources and the intensive exploitation of them that leads to a "dualistic" society. Factors associated with greater equality are wider educational opportunities and government ownership. Greater income equality tends to appear in the most developed and in the very least developed countries.]

The distribution of income among the individuals and households of a nation is central to its economic welfare. An understanding of the interactions between the inequalities of income distribution and various aspects of economic and social modernization is therefore essential for the formulation of appropriate development policy. This study is an empirical investigation into the sources of intercountry variation in various facets of income distribution in 44 underdeveloped nations, which span the range from predominantly subsistence economies to those rapidly approaching a developed state; Japan is also included.

Most of the theoretical discussion on income distribution refers to the manner in which functional shares are determined, i.e., shares accruing to the factors of production—land, labor, capital, and entrepreneurship. The establishment of functional shares, and the quantities of these factors possessed by individuals, then ipso facto determine the distribution of personal

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incomes. But many qualifications must be introduced in the applica-
tion of such a theory, especially in developing countries. Differences
in individual wages are often the result of non-market considerations—
norms set by the previous colonial power or a politically powerful tra-
ditional elite, and influenced by semiarbit rary scales for government
employees, the social philosophy of the government, minimum wage
laws, the degree of unionization, and the role of expatriates. The ex-
tent of concentration of income in underdeveloped nations should there-
fore depend not only on various aspects of the structure of the economy,
its factor endowments, institutions, and linkages with the rest of the
world, but also on the political complexion of the government, the
country's colonial heritage, the structure of political power and pres-
sure mechanisms, and the recentness of independence. Various in-
dices of economic, political and social forces which could on a priori
grounds be expected to exert an impact upon the distribution of income
were therefore introduced into the analysis as independent variables.

The Dependent Variables

Data on income distribution are notoriously unreliable, even in de-
veloped countries. The raw data are usually derived from information
supplied by the income recipients themselves; its accuracy is there-
fore a function of the recall of the respondent, of his perception of the
use to which the information will be put, of his veracity about a sensi-
tive subject, etc. Three types of sources were used to construct the
income distribution tables in this study: budget or income-expenditure
studies which sample different strata of the population; income infor-
mation compiled from national censuses; and tax returns. This last
source may be somewhat more reliable, but was available in very few
countries. In some cases, the results of budget studies referring to
particular segments of the population (e.g. , only urban, or only wage
earners) were used in conjunction with data from the national accounts
statistics and from other sources to construct the overall picture of
income distribution. In some cases, the basic information was ex-
ceedingly coarse; a finer breakdown into class intervals was achieved
by fitting the distributions to similar empirical or theoretical distri-
butions. Whenever the lowest end of the lowest income class was not
given, the minimum income was estimated by fitting a Pareto curve
to the data. Whenever the average income in the upper class interval
was not given, it was estimated by selecting a value which would
equate the average per capita (or per household) income estimated
from the income distribution to the corresponding value estimated
from the national accounts.

There were other sources of incompatibility in the basic data.
Some of the information for example referred to households, some to
individuals, and some to active population. Information on households
was preferred because of theoretical considerations. It should be

noted however that for a given country the distribution based on active population indicates less concentration than the distribution based on households; the latter, in turn, shows less concentration than data for individuals. Since the percentage adjustment differs with the nature of the distribution, no adjustment on this score was attempted. Also, our data refer to various years in the late fifties and through the sixties; income distributions do not change very rapidly, however. What is more serious is that the extent of detail differs substantially among countries, varying from 28 class intervals for Zambia to 5 class intervals for some African and Latin American nations; the more detail provided, the greater is the estimate of concentration.

The basic data for the study are summarized in Table 1. [For the list of sources for the data, together with the estimates of country income distributions used to obtain figures in this table, readers should consult the original document.] Six different dependent variables were constructed from the data:

1. The income share of the poorest 20 percent of the population.
2. The proportion of the total product accruing to the lowest 60 percent of the population.
3. The ratio of income of the middle 40-60 percent quintile (i.e., the households 10 percent below and 10 percent above the median income households).
4. The share of total output accruing to the wealthiest 5 percent of the population.
5. The percentage of national income accruing to the upper 20 percent of the population.
6. The concentration (GINI) coefficient. This index is a measure of the extent of departure of the actual income distribution from a uniform income distribution, and represents the best single index of overall concentration. However, income distributions with very different properties can have the same concentration ratio. [NOTE: Since results of analysis with the GINI coefficient added little to those using measures (1) to (5), such results are not described in this excerpt.]

The Independent Variables

A wide range of independent variables, chosen as having some possible relationship with the aspects of income distribution described above, were tested in the analysis. They include 18 economic indicators, five socio-cultural indicators, and eight political indicators. For the most part, indicators refer to conditions in the early 1960s. Of this array of 31 variables, the following 12 (not listed in order of importance) proved to be the most significant in explaining one or more of the breakdowns in income distribution:

Table 1: Income Distribution Estimates

Percentage Shares in Total National Income
Going to Population Groups of Different
Income Levels in 44 Countries

	Poorest 20%	Poorest 60%	Middle 40-60%	Highest 20%	Highest 5%
Argentina	7.00	30.40	13.10	52.00	29.40
Bolivia	4.00	26.60	8.90	59.10	35.70
Brazil	3.50	22.70	10.20	61.50	38.40
Burma	10.00	36.00	13.00	48.50	28.21
Ceylon	4.45	27.47	13.81	52.31	18.38
Chad	12.00	35.00	12.00	43.00	23.00
Chile	5.40	27.00	12.00	52.30	22.60
Colombia	2.21	15.88	8.97	68.06	40.36
Costa Rica	6.00	25.40	12.10	60.00	35.00
Dahomey	8.00	30.00	12.00	50.00	32.00
Ecuador	6.30	42.60	26.10	41.80	21.50
El Salvador	5.50	23.60	11.30	61.40	33.00
Gabon	2.00	15.00	7.00	71.00	47.00
Greece	9.00	34.10	12.30	49.50	23.00
India	8.00	36.00	16.00	42.00	8.00
Iraq	2.00	16.00	8.00	68.00	34.00
Israel	6.80	38.80	18.60	39.40	11.20
Ivory Coast	8.00	30.00	12.00	55.00	29.00
Jamaica	2.20	19.00	10.80	61.50	31.20
Japan	4.70	31.10	15.80	46.00	14.80
Kenya	7.00	21.00	7.00	64.00	22.20
Lebanon	3.00	23.00	15.80	61.00	34.00
Libya	0.11	1.78	1.28	89.50	46.40
Malagasy	7.00	23.00	9.00	59.00	37.00
Mexico	3.66	21.75	11.25	58.04	28.52
Morocco	7.10	22.20	7.70	65.40	20.60
Niger	12.00	35.00	12.00	42.00	23.00
Nigeria	7.00	23.00	9.00	60.90	38.38
Pakistan	6.50	33.00	15.50	45.00	20.00
Panama	4.90	28.10	13.80	56.70	34.50
Peru	4.04	17.10	8.30	67.60	48.30
Philippines	4.30	24.70	12.00	55.80	27.50
Rhodesia	4.00	20.00	8.00	65.00	60.00
Senegal	3.00	20.00	10.00	64.00	36.00
Sierra Leone	3.80	19.20	9.10	64.10	33.80
South Africa	1.94	16.27	10.16	57.36	39.38
Sudan	5.60	29.30	14.30	48.10	17.10
Surinam	10.70	37.00	14.74	42.40	15.40
Taiwan	4.50	29.00	14.80	52.00	24.10
Tanzania	9.75	29.25	9.85	61.00	42.90
Trinidad & Tobago	3.60	18.52	9.16	57.00	26.60
Tunisia	4.97	20.57	9.95	65.00	22.44
Venezuela	4.40	30.00	16.60	47.10	23.20
Zambia	6.27	26.95	11.10	57.10	37.50
Averages	5.6	26	12	56	30

1. Per capita GNP (1961) in 1961 dollars.

2. Abundance of natural resources. This grouping of countries was based upon information regarding the quantity and variety of fuel and other mineral resources, together with data on the amount of agricultural land available per capita.

3. Extent of dualism (about 1960). This index stratifies countries by the presence and extent of socio-economic and technical dualism. At one pole are the largely agrarian societies having subsistence farming with extremely small exchange sectors. At the other pole are countries with concentrated development of a limited modern sector (especially in petroleum), often by foreign capital, contrasting with backward, traditional agriculture. Intermediate are societies where a widely developed modern sector is superimposed upon a predominantly agrarian society, and countries in which the growth of an indigenous small-farm cash-crop sector using modern techniques has evolved at the expense of a traditional subsistence sector.

4. Level of modernization of techniques of agriculture (about 1961). This indicator is a composite based upon the extent of use of mechanical power, fertilizer, and other modern techniques in agriculture, and the relative weight of traditional and of modern agriculture.

5. Character of agricultural organization (about 1960). This index combines indices of land tenure patterns and the size and viability of farming units. Various types of agrarian structure are viewed as located along a scale, one end of which is represented by communally owned agricultural lands on which the marketing of crops is only of incidental importance, and the other end of which is depicted by commercial agriculture in which owner operated farms are sufficiently large to be economically viable. Intermediate on the scale are tenant-operated subsistence farms and large owner-absentee commercial farms or plantations.

6. Rate of improvement in human resources (1961). This indicator is a weighted average of secondary and higher level school enrollment ratios as a percentage of the relevant age group. We call this index the rate of improvement in human resources since it measures the rate of additions to the stock of education rather than the total stock of education.

7. Potential for economic development. Seventy-four underdeveloped countries are grouped into three categories according to their performance during the period 1950/51 to 1963/64 in raising rates of growth of per capita GNP and improvements in seven areas of economic institutions and activities [described in an earlier work by the same authors].

8. Importance of the indigenous middle class (about 1960). This classification is based upon the relative size and political importance of indigenous people in middle class occupations in less developed countries, including entrepreneurs, and managerial, technical, administrative, commercial and banking employees.

9. Extent of social mobility (about 1960). This classification is based upon a composite measure of several aspects of social mobility, including the extent of racial or cultural barriers to mobility, the extent of educational opportunity, and access to membership in the middle class.

10. Degree of cultural and ethnic homogeneity (about 1960). Countries are ranked into groups differentiated by the proportion of the population which speaks the dominant language; distinctions within categories are based upon the extent of ethnic and religious heterogeneity.

11. Extent of political participation (1957-1962). This variable is an aggregate of three elements: the extent to which the major socio-economic and cultural-ethnic groups have their interests represented in national political decisions; the extent of choice among political channels for national representation; and the extent of actual participation in national political processes.

12. Extent of direct government economic activity (about 1960). This classification is based upon the share of government investment in total net investment.

In addition, the following variables were found to have significant relationships with one or more aspects of income distribution, but in each case less significant than one of the 12 variables just enumerated. They were: degree of improvement in agriculture since 1950; level of modernization in industry; increase in industrialization since 1950; structure of foreign trade (primary vs. processed exports); effectiveness of financial institutions; level of socio-economic development (index with 24 components); percentage of literacy; political strength of the traditional elite; strength of the labor movement; political strength of the military; and the degree of commitment of the leadership to promoting economic development.

Finally, of the 31 variables chosen as having on a priori grounds some possible relevance to income distribution, the following were found not to yield significant relationships in this analysis: proportion of the population in traditional subsistence agriculture; size and pattern of development (population size combined with industrial orientation); adequacy of physical overhead capital; effectiveness of the tax system; population numbers; urbanization (percentage of population in centers over 20,000); colonial experience (whether British, French, or other); and number of years of self-government.

Statistical Method

The technique of analysis used here is suited to the study of systematic interactions among a dependent variable, on the one hand, and a set of independent variables on the other, when there is reason to believe that the phenomenon to be analyzed affects different parts of the data differently, but when the best principles for stratifying the original data into subsamples are not known a priori. In this case the variables, interactions, and coefficients which best "explain" the variations in the dependent variable, i.e., one of the aspects of income distribution, can be quite different for high values of the dependent variable from those which are required to account for the same difference at low or intermediate values of the dependent variable. (For example, where a country's population is 65 percent agricultural, industrialization may shift the distribution of incomes against the lower 60 percent of the population and in favor of the upper 20 percent; but in more industrialized countries, further growth of manufacturing may well shift income distribution in favor of the middle 40-60 percent of the population.) Furthermore, unlike regression analysis, the independent variables need not be assumed to be uncorrelated with one another; the method used here can accommodate interactions among independent variables.

The technique is an analysis of variance employing an asymetrical branching process to divide the original sample into a series of subgroups constructed to facilitate prediction of the dependent variable with the least error. The initial sample (44 countries arrayed according to income distribution—e.g., the share of the lowest 20 percent) is tested against each of the independent variables (e.g., per capita GNP) with the latter divided in two mutually exclusive groups (e.g., countries with GNP above X, and countries with GNP below X). Mean values for the dependent variable in both groups (i.e., average shares of the lowest 20 percent of population in the high per capita GNP countries, and a similar average for the low GNP countries) and the variances of these means from the overall mean of the group are compared for each split (i.e., for each possible X value of per capita GNP used to split the group in two). For every independent variable, that partition is selected which explains the largest fraction of total variance in the dependent variable (i.e., maximizes the sum of the squared deviations of the group means from the overall mean). That variable is chosen for which the best split accounts for the greatest portion of overall variance in the dependent variable. After the initial split, the two groups of countries are then further subdivided, using the same method. This subdividion is continued, using the best variable for splitting of groups in each case, until subgroups of 10 or less are reached—or until a subgroup of more than 10 cannot be split by using any variable to produce a statistically significant result (at least 10 percent of the variance by an F test).

In the charts below, showing the results of this analysis for the five measures of income distribution, the splitting of groups and subgroups is presented in pictorial form. The box on the left shows the original group of 44 countries and its average value for the dependent variable (on Figure 1: N = 44, and $\bar{y}$ = 5.6 percent which is the average of the shares in income of the poorest 20 percent of the population in each country). Lines branch out to the right to two boxes, in which the same N (number of countries) and $\bar{y}$ (average share of the poorest 20 percent) values for each group of countries appear, along with a statement of characteristics that differentiate the two groups. Next to the point where the two lines move apart is the name of the variable used to make the split, and the proportion of variance accounted for by the split (on Figure 1: the first variable used is "Dualism," accounting for 35 percent of the variance). As these groups of countries are further split into subgroups, more lines and boxes appear with the same notations, moving to the right on the chart. In the upper left corner, the percentage of variance accounted for by the entire analysis (coefficient of multiple determination, R^2 adjusted for degrees of freedom) is shown. Names of countries are given for the box that represents the smallest subgroup in which they appear.

The Share of Income Accruing to the Lowest 20 Percent of the Population

We will now discuss the forces affecting the distribution of income at the lowest end of the income scale. The average share of GNP accruing to the poorest 20 percent in the countries in our sample is 5.6

Figure 1: The Share of Income of the Poorest 20% of the Population

Variance accounted for jointly: .56
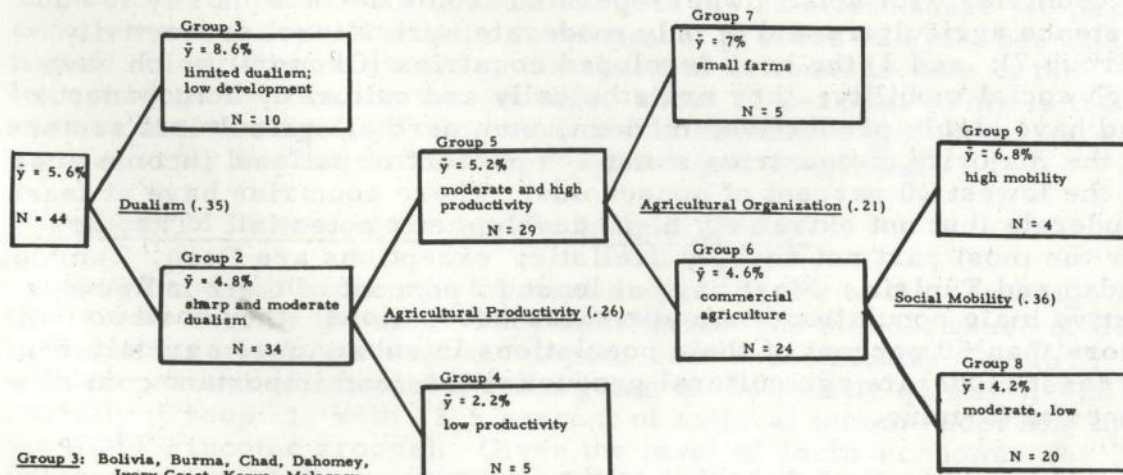
Group 3: Bolivia, Burma, Chad, Dahomey, Ivory Coast, Kenya, Malagasy, Niger, Nigeria, Surinam

Group 4: Gabon, Iraq, Libya, Senegal, Sierra Leone

Group 7: Ecuador, India, Morocco, Pakistan, Tanzania

Group 9: Argentina, Greece, Israel, Japan

Group 8: Brazil, Ceylon, Chile, Colombia, Costa Rica, El Salvador, Jamaica, Lebanon, Mexico, Panama, Peru, Philippines, Rhodesia, South Africa, Sudan, Taiwan, Trinidad, Tunisia, Venezuela, Zambia

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percent, or about one fourth of what it would receive had income been distributed completely uniformly throughout the population.

The important characteristics which distinguish among countries with respect to the share of income accruing to the poorest 20 percent of households are the extent of dualism and various aspects of foreign trade and agricultural policy. The relationship between the share of income in the lowest 20 percent and economic development varies with the level of development. Economic development is associated with increases in the share of the bottom 20 percent only after relatively high levels of socio-economic development have been attained. At the early stages of the development process, economic development works to the relative disadvantage of the lowest income groups.

The countries of group 3, in which the highest share of national income appears (8.6 percent), are characterized by low or moderate degrees of dualism, by the pursuit of agriculturally oriented foreign trade policies, and (except for Kenya) by agriculturally oriented development patterns. They are also relatively low in the extent of their socio-economic development and in the extent of their development potential. The countries of group 4, in which the very smallest portion of national income (2 percent) accrues to the lowest 20 percent, are likewise rather underdeveloped. However, they are characterized by sharp dualism, and have economies centered on the foreign-financed and foreign managed exploitation of natural resources.

Between these extremes there are two types of countries in which a relatively large share of national income (around 7 percent) is channeled to the lowest 20 percent of their respective populations: 1) countries with small owner-operated farms devoted mostly to subsistence agriculture and of only moderate agricultural productivity (Group 7); and 2) the best developed countries (Group 9) which have high social mobility; they are ethnically and culturally homogeneous and have highly productive, modern, commercial agricultural sectors. In the majority of countries some 4-5 percent of national income goes to the lowest 20 percent of households. These countries have at least moderate (but not extremely high) development potential. They are for the most part not sharply dualistic; exceptions are Peru, Zambia, Sudan and Tunisia. Most have at least 10 percent of their indigenous active male population in middle class occupations; they have no more than 50 percent of their populations in subsistence agriculture, at least moderate agricultural productivities, and important commercial farming.

The Share of Income Accruing to the
Lowest 60 Percent of the Population

The allocation of income to the poorest 60 percent of the population is related to both the extent of dualism and the level of modernization.

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Variance accounted for jointly: .74

Group 7
$\bar{y}$ = 36%
low development
potential

N = 6

Group 9
$\bar{y}$ = 30%
high school enroll-
ment

N = 11

Group 3
$\bar{y}$ = 28%
low and moderate
dualism

N = 31

Development Potential (.34)

Group 6
$\bar{y}$ = 26%
moderate and high
development
potential
N = 25

Human Resources (.40)

$\bar{y}$ = 26%

N = 44

Dualism (.26)

Group 5
$\bar{y}$ = 24%
low GNP per capita

N = 7

Group 8
$\bar{y}$ = 23%
low school enroll-
ment

N = 14

Group 2
$\bar{y}$ = 20%
sharp dualism

N = 13

GNP (.59)

Group 4
$\bar{y}$ = 17%
medium GNP per
capita

N = 6

Group 5: Malagasy, Morocco, Sierra-Leone, Sudan, Tanzania,
Tunisia, Zambia

Group 4: Gabon, Iraq, Libya, Peru, Senegal, South Africa

Group 7: Burma, Chad, Dahomey, Ecuador, Niger, Surinam

Group 8: Bolivia, Brazil, Ceylon, Colombia, El Salvador, Ivory Coast,
Jamaica, Kenya, Lebanon, Mexico, Nigeria, Pakistan,
Rhodesia, Trinidad

Group 9: Argentina, Chile, Costa Rica, Greece, India, Israel, Japan, Panama, Philippines, Taiwan, Venezuela

The share of the national product accruing to the poorer 60 percent of
households is high under two distinctly different sets of circumstances:
reasonably pervasive underdevelopment (Group 7) and very substantial
development (Group 9). Under both of these circumstances, the share
of the lowest 60 percent is, on the average, between 30 and 40 percent.
The bottom 60 percent of households gets the smallest share (20 per-
cent) when a sharply dualistic development process has just been ini-
tiated. In all other instances, the share of national income of the
lowest 60 percent is, on the average, about 25 percent. This is the
case in moderately dualistic, moderately developed countries, as well
as in sharply dualistic more poorly developed countries.

The Share of Income of the Middle Income Groups

Social and economic development are uniformly to the advantage of
the middle income groups. They appropriate the highest share of GNP
in countries which are well developed, both economically (Group 7,
with 16 percent of national income going to the middle quintile), and
socially (Group 11, with 13.5 percent of national income accruing to
the middle income groups). Given the level of socio-economic de-
velopment, natural resource abundance is associated with a lower
share for the middle income groups and a higher share to the top in-
come groups. Greater political participation is correlated with higher
shares for the middle-income households, even when the indigenous
middle class accounts for less than 10 percent of active males.

Variance accounted for jointly: .88

Group 3
ȳ = 13.6%
large indigenous
middle class
N = 23*

Group 7
ȳ = 15.6%
sparse resources
N = 7

Group 11
ȳ = 13.5%
high school enroll-
ment
N = 8

Natural Resources (.42)

Group 6
ȳ = 11.7%
good resources
N = 15

Human Resources (.60)

Group 10
ȳ = 9.8%
moderate enroll-
ment
N = 7

ȳ = 12%
N = 44

Middle Class (.26)

Group 2
ȳ = 9.6%
small indigenous
middle class
N = 21*

Group 5
ȳ = 12%
sparse resources
N = 5

Group 9
ȳ = 10.6%
moderate partici-
pation
N = 7

Natural Resources (.40)

Group 4
ȳ = 9.3%
good resources
N = 15

Political Participation (.49)

Group 8
ȳ = 8.2%
low participation
N = 8

Group 5: Chad, Dahomey, El Salvador, Niger, Sudan
Group 7: Ceylon, India, Israel, Lebanon, Pakistan, Surinam, Taiwan
Group 8: Gabon, Iraq, Kenya, Malagasy, Morocco, Rhodesia, Sierra Leone, South Africa
Group 9: Bolivia, Burma, Ivory Coast, Nigeria, Senegal, Tanzania, Zambia
Group 10: Brazil, Colombia, Jamaica, Mexico, Peru, Trinidad, Tunisia
Group 11: Argentina, Chile, Costa Rica, Greece, Japan, Panama, Philippines, Venezuela
*Ecuador and Libya omitted after first split.

The Share of Income Accruing to the Upper 5 Percent

Two variables emerge as important in distinguishing reliably among
countries with respect to the income share accruing to the upper 5 per-
cent of families: abundance of natural resources, and the role of
government in economic activity. The share of income accruing to the
top 5 percent is larger in resource-rich countries and in countries in
which private enterprise predominates. Except for Group 5, the
natural-resource-rich, human-resource-poor group in which the share
of national product accruing to the top 5 percent is the highest, all the
final groups combine wide variations in levels of social and economic
development. The countries in Group 7 have racial problems related
to ethnic majorities of very poor people.

The Share of Income Accruing to the
Upper 20 Percent of the Population

The factors which explain intercountry differences in the share of
the upper 20 percent are quite similar to those which account for the
share of the upper 5 percent: the extent of socio-economic dualism,
the share of nationalized enterprise, the abundance of natural re-
sources, and policies with respect to human resource development.

The countries in which over 60 percent of income accrues to the
top 20 percent fall into one of two categories. They are either
sharply dualistic (Group 3), or have neither strongly socialist govern-
ments nor generalized access to education (Group 9). The countries

Figure 4: Analysis of the Share of Income of the Wealthiest 5% of the Population

Variance accounted for jointly: .65

Group 5
$\bar{y}$ = 42%
low school enrollment
N = 7

Group 7
$\bar{y}$ = 41%
heterogeneous
N = 3

Group 3
$\bar{y}$ = 34%
abundant natural resources
N = 26

Human Resources (.26)

Group 4
$\bar{y}$ = 31%
moderate and high school enrollment
N = 19

Cultural and Ethnic Homogeneity (.26)

Group 11
$\bar{y}$ = 34%
private enterprise
N = 7

$\bar{y}$ = 30%
N = 44

Natural Resources (.27)

Group 9
$\bar{y}$ = 28%
predominantly private enterprise
N = 9

Group 6
$\bar{y}$ = 29%
homogeneous
N = 16

Government Economic Activity

Group 2
$\bar{y}$ = 23%
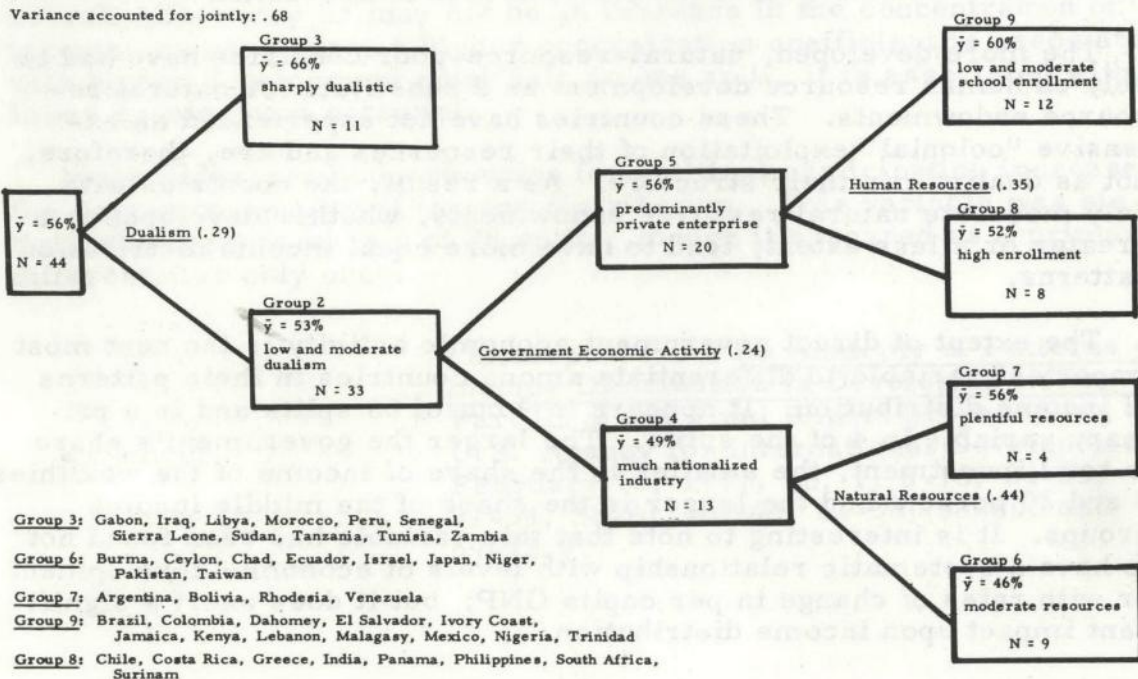moderate natural resources
N = 18

Government Economic Activity (.49)

Group 10
$\bar{y}$ = 26%
mixed economies
N = 9

Group 8
$\bar{y}$ = 18%
mixed economies
N = 9

Group 8: Ceylon, Chad, India, Israel, Japan, Niger, Pakistan, Sudan, Taiwan

Group 9: Dahomey, El Salvador, Ivory Coast, Jamaica, Kenya, Lebanon, Philippines, Senegal, Surinam

Group 5: Gabon, Malagasy, Nigeria, Rhodesia, Sierra Leone, Tanzania, Zambia

Group 7: Bolivia, Peru, South Africa

Group 10: Argentina, Burma, Chile, Costa Rica, Ecuador, Mexico, Morocco, Tunisia, Venezuela

Group 11: Brazil, Colombia, Greece, Iraq, Libya, Panama, Trinidad

at the other extreme, with 50 percent or less of the total product in the hands of the wealthy, have "socialist" governments and not too abundant natural resources (Group 6). In the other intermediate groups of countries, the share of the upper 20 percent is approximately 55 percent. There is less variance among groups in the average share of income accruing to the wealthiest 20 percent than in the shares of the top 5 percent.

Figure 5: Analysis of the Share of Income of the Wealthiest 20% of the Population

Variance accounted for jointly: .68

Group 3
$\bar{y}$ = 66%
sharply dualistic
N = 11

Group 9
$\bar{y}$ = 60%
low and moderate school enrollment
N = 12

Group 5
$\bar{y}$ = 56%
predominantly private enterprise
N = 20

Human Resources (.35)

Group 8
$\bar{y}$ = 52%
high enrollment
N = 8

$\bar{y}$ = 56%
N = 44

Dualism (.29)

Group 2
$\bar{y}$ = 53%
low and moderate dualism
N = 33

Government Economic Activity (.24)

Group 7
$\bar{y}$ = 56%
plentiful resources
N = 4

Group 4
$\bar{y}$ = 49%
much nationalized industry
N = 13

Natural Resources (.44)

Group 6
$\bar{y}$ = 46%
moderate resources
N = 9

Group 3: Gabon, Iraq, Libya, Morocco, Peru, Senegal, Sierra Leone, Sudan, Tanzania, Tunisia, Zambia

Group 6: Burma, Ceylon, Chad, Ecuador, Israel, Japan, Niger, Pakistan, Taiwan

Group 7: Argentina, Bolivia, Rhodesia, Venezuela

Group 9: Brazil, Colombia, Dahomey, El Salvador, Ivory Coast, Jamaica, Kenya, Lebanon, Malagasy, Mexico, Nigeria, Trinidad

Group 8: Chile, Costa Rica, Greece, India, Panama, Philippines, South Africa, Surinam

Summary and Conclusion

The most important variables affecting income distribution are ecological, socio-economic and political. Among socio-economic indicators, the rate of improvement of human resources is the variable most frequently associated with differences in patterns of income distribution. This variable is statistically significant in 10 of the 28 splits and is the primary differentiator in five. The rate of improvement of human resources is essentially an index of the equality of access to middle level and university education, and therefore reflects the extent of political commitment to equalizing economic and social opportunities throughout the society: when access is limited, education is solely an elitist activity. In the analysis, higher school enrollment ratios are uniformly associated with less concentration in income distribution and with larger shares accruing to the lower and middle income strata.

The variable to appear next most frequently in the analysis is the abundance of natural resources. This indicator is statistically significant in a third of the splits, and it appears as primary differentiator in 5 of 28. At all levels of social and economic development, wealth in natural resources is associated with a shift in the allocation of income towards the wealthiest 20 percent and 5 percent and against the middle income groups, thereby increasing the concentration of income and wealth. Among the least developed countries, most of which are in subSaharan Africa, there is, of course, an association between the extent of dualism and the abundance of natural resources; this association is the result of colonial settlement and exploitation patterns which these countries have not yet been able to overcome.

The more developed, natural-resource-poor countries have had to rely on human resource development as a substitute for natural resource endowments. These countries have not experienced as extensive "colonial" exploitation of their resources and are, therefore, not as dualistic in their structure. As a result, the countries with only moderate natural resource endowments, whether developed to a greater or a less extent, tend to have more equal income distribution patterns.

The extent of direct government economic activity is the next most important variable to differentiate among countries in their patterns of income distribution. It appears in 9 out of 28 splits and is a primary variable in 4 of the splits. The larger the government's share in total investment, the smaller is the share of income of the wealthiest 5 and 20 percent and the larger is the share of the middle income groups. It is interesting to note that this variable has been found not to have a systematic relationship with levels of economic development or with rates of change in per capita GNP; but it does exert a significant impact upon income distribution.

The extent of dualism appears as the first variable to differentiate among countries in four out of the six analyses. Higher dualism increases the concentration of income by lowering the shares of the least privileged 20 percent and 60 percent, by decreasing the share of income of the middle class, and by increasing the share of the wealthiest 20 percent. Furthermore the analysis indicates that, once a sharply dualistic development pattern has been initiated, further economic growth actually reduces the share of the lowest 60 percent. When the dualistic development pattern is primarily foreign-managed and financed, higher GNP tends to lower the share of the middle income households as well. In the absence of government intervention, dualistic growth therefore increases the concentration of income. The extent of cleavage in technology and life styles thus exerts a profound effect upon income distribution, not only in itself, but also by influencing the way in which further development affects the distribution of income.

The extent of potential for economic development is statistically significant in nine of the splits, but appears as a primary variable only twice. Faster growth, when accompanied by improvements in economic institutions, tends to redistribute income away from the two extremes of the income distribution towards the families in the 60-95 percent income brackets. The more dynamic the economy, and the more malleable its institutions, the larger is the share of the middle income groups. However, the more rapid economic growth also increases the proportion of income accruing to the upper 20 percent, even though it decreases the share of income of the upper 5 percent. The effect of economic growth on the share of the lowest 20 percent is not very systematic, but there is an indication that better growth performance tends to lower the share of the poorest households. The overall effect may or may not be an increase in the concentration of income: in two splits, a higher concentration coefficient is associated with higher development potential; in one split, it is associated with lower development potential.

More widespread opportunities for political participation increase the degree of equality of income distribution. This variable was statistically significant in 6 of 28 splits, though it appeared as a primary differentiator only once.

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