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Income Inequality and Economic Growth:
Examining the Evidence

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ABSTRACT

Many neoclassical economists hold that relative income inequality increases during the early stages of economic growth before ultimately decreasing as the later periods of growth are reached (the divergence-convergence hypothesis). The early phase of divergence has a parallel in Marx' writings. The present article uses recent empirical evidence to show that such a pattern cannot be affirmed as a general historical phenomenon and that variations in income levels explain very little of the present variation in inequality among countries. The analysis shows that other patterns occur as countries develop, and that institutional structures and government policies rather than per capita income are the chief determinants of inequality.

"Income Inequality and Economic Growth:
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Introduction

The relationship of income distribution to economic growth is a topic of increasing concern to economists and economic planners. Conventional analysis holds that the distribution of income worsens during the earlier stages of economic growth, then improves as a country reaches the latter growth stages (the divergence - convergence hypothesis). Increased savings by the wealthy underlie the initial worsening of the distribution. They are, however, the engine of growth, so that a "growth versus equity" issue emerges.

Recently several scholars have challenged the prevailing view. Chase-Dunn analyzes the structure of international relations as an influence¹ on levels of inequality. Fishlow cites government policy, rather than income levels, as the major source of Brazil's worsening income distribution² during the 1960's. Cline, Lopes and Figueroa find that the poor would be better off with a more equal income distribution even over a long time period³ with a reduction in growth rates. Adelman and Morris do not find income levels⁴ to be an important determinant of inequality. Reynolds suggests that the distribution question often involves the ability of different economic groups⁵ to obtain economic rents.

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The present article complements and extends the above arguments. It critically reexamines the data and arguments used by proponents of the divergence - convergence hypothesis. For the first time, the key statements on the topic are systematically developed as formal propositions subject to logical analysis (and often statistical tests). This approach reveals that the existence of a divergence - convergence pattern of growth and inequality cannot be affirmed as a general historical phenomenon, and that variations in income levels explain very little of the current variation in inequality among countries. The poor performance of the hypothesis indicates the need to study alternative explanations for (and patterns of) income inequality, some of which are suggested in the text.

The Divergence - Convergence Hypothesis in
Neoclassical and Marxian Economics

The divergence - convergence hypothesis in neoclassical economics dates from Simon Kuznets' Presidential Address to the American Economic Association in 1954.⁶ He stated as a conjecture that income inequality increases in the early stages of economic development, stabilizes at some peak level, then decreases as the latter stages of development are reached. Kuznets saw this as a secular historical phenomenon in which the initial worsening of the distribution of income is associated with rapid early industrial growth. The historical starting point is an agrarian or pre-industrial state where incomes are too low to permit substantial inequality. As technical change and industrialization increase national wealth, earning differentials emerge as a consequence of structural changes in the economy. Since only the upper

percentiles of recipients save, the resulting concentration of assets and investments among the rich leads to increasing income inequality.⁷

There are a number of similarities between the Kuznets' analysis and Marx' interpretation of the growth process. Marx termed savings "surplus" and conceived of the surplus as the engine of economic growth. Improved technology increased the surplus and transformed the basis of society from primitive communism through successive stages of slavery, feudalism and capitalism.⁸ The expropriation of the ever-growing surplus by an elite led to the increasing concentration of income, continuation of subsistence wages for workers and the creation of an army of unemployed. In the final phases of capitalism, the skewness would become so pronounced as to precipitate a "realization crisis" and the collapse of the capitalist system.

While both Kuznets and Marx envisioned increasing income concentration as a natural outgrowth of economic development and savings (surplus) accumulation, Kuznets reasoned that concentration would stabilize at some peak level and then gradually decline with continued economic growth, due to demographic changes, the dynamics of growth (mortality of entrepreneurs and industries), the increasing importance of service income and political intervention.⁹ Marx, in contrast, envisioned the abolition of property after the peak of inequality had been reached, and thus most income inequality would be eliminated upon the collapse of the capitalistic system.

Although dualistic growth models largely neglect questions of income distribution, the shift from agriculture to industry is entirely consistent with the development of earnings differentials and increasing inequality in the early stages of development.¹⁰ Therefore, the tendency among both neo-classical and Marxist economists has been to refine and extend rather than challenge the divergence - convergence hypothesis.

A schematic presentation of the view of both schools is given in Figure 1. In both cases, the relation between inequality and per capita income is seen as an inverted 'U'.

Measures of Inequality

Many data problems exist in the calculation of income distribution statistics, and there is a degree of arbitrariness in the selection of indices.¹¹ This article, however, questions the analysis and conclusions of proponents of the inverted 'U' hypothesis rather than the estimates contained in their data sets, which are accepted as presented.

In order to make the analysis comparable with that of the studies reviewed in this paper, two measures of income inequality are used: the Gini index and the income shares of given percentiles of income recipients. The Gini index is a measure of the overall inequality of the distribution of income. Its theoretical value ranges from zero (when all recipients would obtain exactly the same income) to unity (when one recipient would receive all the income).

Atkinson has argued for the use of a weighted index to explicitly assign a welfare weight to a given group of recipients, such as the poorest 20% of recipients.¹² This paper, however, uses the income share of percentiles of recipients as a direct measure of the relative welfare of the income groups analyzed. This achieves the same result as the weighted index while retaining comparability with previous studies (including historical data from which neither the Gini nor weighted indices may be calculated).

Evidence on the Hypothesis and Related Propositions

In his 1954 address, Kuznets emphasized the tentative nature of his analysis and the need for "additional evidence that might lead to reformulation and revisions."¹³ The first phase of the search for additional evidence probably terminated with the publication of Felix Paukert's unified and corrected list of previously scattered statistics on income distribution and income levels.¹⁴ Paukert, however, did not perceive the potential for radical reformulation of the hypothesis which the data provided, using them instead to refine and extend the divergence - convergence hypothesis. He concluded that the evidence supported the hypothesis as well as a series of related propositions.

Chenery et al. and Adelman and Morris appear to accept the hypothesis without considering income levels to be an important determinant of inequality,¹⁵ a point challenged by Paukert. Lecaillon and Germidis, along with Langoni, accept Paukert's analysis as definitive and as a valid basis for policy recommendations.¹⁶

The impressive list of statistics presented by Paukert consists of historical data (estimates of income inequality within given countries over time), and cross-country comparisons of income inequality and Gross Domestic Product (GDP) per capita for 56 countries cerca 1965. The time series information provides little evidence that the inverted 'U' pattern characterized the historical experience of currently developed areas. Conspicuously absent from the estimates is evidence of a phase of increasing inequality in the early phases of economic growth and industrialization (there is one clear exception - Prussia - and a possible exception - Saxony).

In Great Britain and Norway, income shares show a long term trend towards equality, with some evidence of recent reversals. Attempts to estimate inequality for Great Britain as far back as 1436 reveal no period of increasing skewness. Income shares indicate a general trend toward equality for Germany, the Netherlands, Denmark and Sweden.¹⁷ Gini indices for males in eight Norwegian cities declined steadily from the mid-1800's on.

Gini coefficients for recent decades on the United States and India, countries at radically different levels of development, present a slight trend towards equality. The inverted 'U' hypothesis would predict an increase in inequality for India due to its per capita income level (as specified by Paukert and reproduced herein as Figure 2). For Mexico, Argentina and Puerto Rico, there was an apparent worsening of the Gini indices during the 1950's, although their per capita income positions would place them on the declining side of the parabola of skewness (Table 1 and Figure 2).

Paukert notes that the historical data is open to conflicting interpretation and rests his argument in support of the hypothesis on the cross-sectional data. He justifies the use of international comparisons of distribution of income by size as "a generally accepted procedure and one which is to some extent forced on us by the scarcity and quality of historical data."¹⁸ This analysis rests on the premise that changes in income distributions in the course of economic growth can also be traced "by comparing income distributions in countries at different levels of development."¹⁹

As Adelman and Morris observe, there is no statistical justification²⁰ for interpreting a cross-section as representative of changes over time. An equally serious problem is the implicit assumption that the less developed countries (LDCs) are characterized by the same conditions as found in the current developed countries (DCs) at the start of their industrial development. There is no reason to suppose that the experience²¹ of the DCs will merely repeat itself in the LDCs with a time lag. Even if one accepts these assumptions, however, Paukert's cross-sectional estimates do not support several of his conclusions. The figures on GDP per capita and Gini ratios which he cites in support of the inverted 'U' hypothesis are reproduced in Table 1. His statistical treatment of the data is limited to calculating the mean Gini ratio and GDP/capita for seven income groups, plotting the points and connecting them with line segments (yielding Figure 2). Paukert's conclusions from this²² exercise are quoted as Proposition 1:

"There is a sharp increase in inequality as one moves from countries in the lowest income group to those in the \$101-200 group, and a further but less pronounced increase as one moves on to the \$201-300 group. This group and the next (\$301-500) represent the peak of inequality. There is then a substantial reduction in inequality in the \$501-1,000 group, whose general level of inequality corresponds to that of the lowest income group (under \$100). As one moves further along the developed path, to the \$1,001-2,000 and to the above \$2,000 groups, there is a clear reduction in the extent of inequality."

Lecaillon and Germidis integrate these conclusions into their work on the wage share, adding that \$250 marks the Gini ratio peak, with a sharp decline coming after \$500.²³

Langoni states that for the early stages of development, Paukert's data provide "irrefutable empirical evidence (that) increasing inequality is an inevitable consequence of economic development."²⁴ Langoni also asserts that the declining phase of inequality found at higher income levels proves that income inequality will "automatically" correct itself as the country becomes richer. Therefore, the cure for inequality is not legislation but accelerated economic growth, so that a country reaches the declining side of the parabola of skewness as quickly as possible.²⁵

None of these conclusions is warranted by the cross-sectional estimates. In order to obtain the artificial parabola of Figure 2, one must ignore the predominant feature of the observations on inequality, that is, their tremendous dispersion at all income levels. This is immediately

apparent when the actual observations of Table 1 are graphed (Figure 3). Both visual and statistical analysis of the data question the significance of the relationship hypothesized in Proposition 1 and Figure 2.

Da Silva has made a statistical test on the proposition using a multiple linear regression model for Paukert's data, with dummy variables to represent the suggested changes in slope upon passing from one income group to the next. The \bar{R}^2 is only 0.19 and none of the slope coefficient estimates are significantly different from zero at the 20% level, results which offer no support for the relations of Proposition 1 and Figure 2.

Other tests on the non-linearity of the relationship between the Gini index and GDP per capita include quadratic and logarithmic functions. Both types of regression contain unacceptable levels of multicollinearity and not surprisingly lead to conflicting interpretations (see appendix). In all cases, the adjusted coefficient of determination is less than 0.20, indicating that over 80% of the variation in inequality among countries is "unexplained" by the variation in income per capita.

Two Related Hypotheses

Some researchers have used income shares as evidence in favor of the following two hypotheses: 1) the income shares of the lower quintiles of recipients follow a 'U' pattern as per capita income increases; and 2) the share of the richest percentiles exhibits an inverted 'U' pattern as per capita income increases. Together, these statements are little more than a restatement of the divergence - convergence hypothesis. They need to be discussed separately, however, due to their theoretical

relevance to the inequality issue and because they have been explicitly accepted by prominent researchers.

Adelman and Morris affirm that plotting the means of groups of countries with increasing levels of income against the income shares of the poorest 60% of recipients "yields an almost perfectly U-shaped relationship." Ahluwalia finds a significant 'U' relationship between the share of the lowest 40% of recipients and income and an inverted 'U' for the highest 20% of recipients. ²⁷

The analysis of these propositions yields results similar to those of the previous section where Gini ratios were used. Figure 4 shows the tremendous dispersion of the income shares of the lowest 60% of recipients. ²⁸ The group means and the ranges of the shares of both the lowest 60% and highest 20% of recipients are given in Table 2 (a discussion of statistical tests of the propositions is given in the appendix). Variations in income levels are associated with even less of the variation in income shares of the rich and poor than with the variation in Gini indices.

The Income Share of the Very Poor

The hypothesized 'U' pattern of the income share of the poor with economic growth deserves some additional comment due to the extensive discussion of "subsistence levels" of income in the literature on economic development, dating from the "Iron Law of Wages."

Kuznets, Paukert and others have reasoned that the rising inequality hypothesized for the early stages of economic growth is associated with extreme poverty among the lower quintiles of recipients in the poorest nations. In Paukert's words: ²⁹

"The data) confirm Kuznets' hypothesis about the share of the lower income groups in total income. The share of the lowest 20 per cent can be expected to be higher in the countries with the lowest per capita income, given a subsistence minimum which of course forms a higher percentage of average income there than elsewhere."

If a "subsistence minimum" could be defined in terms of per capita income, this would be a tautology, not a hypothesis. If the subsistence minimum were, for example, 61 dollars per capita and a country's per capita income also \$61, there could be no inequality, since any recipients of \$60 or less would perish. The lowest 20% of recipients would earn the maximum share possible for their quintile: 20% of the national income.

There is, however, no meaningful definition of "subsistence level" in a per capita dollar equivalent. The share of the poorest 20% of recipients varies widely even within the poorest nations (Table 3). The lowest quintile has 10% of income in Burma (GDP per capita = \$64), 4.8% in Tanzania (GDP = \$61) and only 3.9% in Madagascar (GDP per capita = \$92). Very low per capita incomes may imply short life spans and human suffering, but reveal little about the shares of national income.

This fact helps explain why the explanatory power of the inverted 'U' hypothesis is so low. Political intervention (in the form of tax laws, property rights, role of government in the economy etc.) is present in all countries at all levels of economic growth. It does not appear only after high levels of income per capita are attained, as implied by Kuznets (Figure 1). Political intervention may worsen as well as improve income distribution. This is why the pre-industrial stage

of development (agrarianism or primitive communism) is not characterized by low inequality.³⁰ A high degree of skewness is common among poor nations (Figures 3 and 4). For those countries, further increases in skewness with economic growth must be at least partially ascribed to institutional and policy measures favoring concentration of income among the wealthy.

Some Additional Propositions

Paukert's cross-sectional estimates allow confirmation of a more modest hypothesis than those discussed above. Defining the DCs as the 13 countries with per capita income over \$1,000 and LDCs as the other 43 (Table 1), Paukert states that there is "greater income equality"³¹ in developed countries than in developing countries. This is formally expressed as:

Proposition 2:

$$H_0: \mu \text{ Gini LDCs} = \mu \text{ Gini DCs}$$

$$H_1: \mu \text{ Gini LDCs} > \mu \text{ Gini DCs}$$

Statistical tests support this hypothesis. It should, however, be amended to read "the average level of income inequality is higher in LDCs than in DCs and subject to even greater variation."³²

A final statement by Paukert is of relevance for policy decisions on redistribution:³³

Proposition 3:

"The greater inequality in developing countries is due primarily to the high share of income received by the richest 5% of the population (rather than the share of the richest 20%)."

This proposition cannot be statistically tested for the cross-sectional data of Table 1, since it would require the regression of the Gini index on the percentile shares used in its calculation. However, one can assess its applicability for an individual country by examining the relative shares of income. For example, in Peru (Gini = 0.61) the top 5% of income earners received 48.3% of the national income, against only 19.3% for the next 15% of recipients. ³⁴ The figures for South Africa (Gini = 0.58) were 39.4% and 18.0%. In both cases, recipients in the 80th to 95th percentiles received a percentage of income only slightly higher than their percentage weight in the population.

In other countries, however, high Gini indices are due to a fairly uniform concentration among the top 20% of recipients. The top 5% of recipients in Morocco (Gini = 0.50) receive 20.6% of national income, with 44.5% going to the next 15% of recipients. The figures for Tunisia (Gini = 0.53) are 22.4% and 42.6%. In these two countries, the top 20% of recipients obtain about 65% of the national product, compared with 68% for Peru and 57% for South Africa.

Savings Ratios and Inequality

As observed earlier, the neoclassical argument concerning increasing inequality in the early stages of growth rests heavily on the belief that the marginal propensities to save of the rich are greater than those of the poor. Kuznets even states that "in the underdeveloped countries savings could be realized only at the very peak of the income pyramid, say by

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the top 5 or 3 per cent." A common extension of this analysis associates increasing skewness with rapid economic growth. Kuznets (cited earlier) specifically associates rapid industrialization with increasing inequality. Johnson and Langoni are among the neoclassical authors warning against redistribution in LDCs, fearing it would lower savings and investment and thus slow growth.³⁶

Marx' theory of economic development also depends on high propensities to save and invest on the part of the capitalist elite. The capitalists are driven by economic necessity to expropriate the economic surplus, accumulate and invest. Workers are impoverished and thus save nothing. The assumption that workers save nothing and capitalists save everything is a formal part of some neoclassical growth models, and Lecaillon and Germidis suggest it be considered when analyzing LDCs.³⁷

An analysis of the savings (or economic surplus) argument provides additional explanations for the wide variation in inequality and growth rates among countries. First, the savings-growth argument rests on three questionable assumptions: 1) personal savings are the principal source of investment; 2) expenditures can be dicotomized into consumption and investment outlays; and 3) physical capital is the only constraint on growth.

Possible differentials in the marginal propensities to save among individuals are less important to growth when government and corporations become the major savers and investors in the economy. Governments realize both savings and investment when they use taxes to improve the social

and economic infrastructure. Government corporations, even in market economies, are often among the largest corporations in a developing country. In Brazil, for example, government corporations realize massive investment programs in oil exploration and refining, hydro-electric development, mining and industry. Eight of the ten largest non-financial corporations in that country are state-sponsored enterprises.³⁸ In Peru, almost 70% of total saving is attributed to corporate and business savings.³⁹ The implication is that the savings performance of a society may bear no close relation to the marginal propensities to save of its rich.

Furthermore, the dichotomy between investment and consumption is arbitrary and especially so at low income levels. As a result, the savings potential and performance of the poor and lower middle classes may be severely underestimated. Since the poor allocate a high proportion of their expenditures to food, health care and other goods which directly improve their productive capacities, much of their consumption expenditures should be classified as investments in human capital.

This factor is of course related to the assumption that physical capital is the only constraint on growth. Human skills are equally scarce in LDCs. Seen in this light, broader access to income streams, universal literacy and availability of public health services (all related to greater income equality), promote economic development by assisting the development of a broad range of human skills. In contrast, low per capita income associated with a highly skewed income distribution implies that a large percentage of the population will suffer the effects of malnutrition, illiteracy and ill health. While these individuals do not consume

a great deal of the society's production, they also contribute little to its output and economic growth.

Secondly, the allegation that only the upper percentiles of recipients save is factually incorrect. A more reasonable hypothesis is that savings behavior, like income distribution, is heavily influenced by a country's political, financial and cultural environment. Lower income groups in several countries are impressive savers. Korea, Japan and Taiwan are examples of countries with very small farms, "equitable" distributions of land holdings and amazing records of growth and productivity. Small farmer savings in these countries have resulted in high rates of capital formation in the agricultural sector while providing loanable funds for industrial growth over long time periods. In regions as diverse as the Indian Punjab, West Malaysia, Zambia and Ethiopia, household survey data reveal high average propensities to save among small-holders (frequently the APS's are in the 0.10 to 0.30 range).

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The divergence - convergence hypothesis and the savings differential arguments contain the political danger of self-fulfilling prophecies. If policy makers believe that the early stages of economic growth are naturally accompanied by increasing skewness and that efforts to reduce inequality merely slow growth, they are likely to maintain or adopt anti-egalitarian policies. Similarly, if policy makers believe the poor are incapable of saving, little emphasis will be placed on providing them with access to savings instruments with positive rates of return. Credit and interest restrictions combined with inflation will combine to produce little savings among the poor.

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Additional arguments advanced by neoclassical theorists concerning the hypothesis of increasing inequality during the early stages of economic

growth include structural shifts and economies of scale in the economy. Structural shifts from a simple agricultural society to an industrial society may produce substantial earning differentials due to varying marginal products of workers. The demand for special skills could create monopoly rents for those who possess them.⁴⁴ Similarly, the emergence of large scale enterprises could result in concentration of earnings among entrepreneurs.

Once again, these propositions are based on certain idealized types of growth which do not reflect the experience of most LDCs. In particular, Table 1 reveals that societies often possess extremely skewed income distributions before any substantial industrialization has taken place. Whether subsequent industrialization results in increased inequality depends on specific economic and political strategies followed during industrialization. Earning differentials already exist, such as those based on land and asset ownership and among professionals and government workers. Earnings may not be closely related to marginal products, and it is not clear that increased complexity and division of labor would accentuate earnings differentials, even in the absence of redistributive policies.

Similarly, large scale enterprise may not lead to increased inequality. Large enterprises may be government owned, subject to heavy taxation and other governmental intervention, or counterbalanced by strong unions. As

seen earlier, the DCs have lower levels of inequality than LDCs, even though large scale enterprise is more common in the developed nations. If large scale enterprise is thought to increase skewness in the size distribution of income in LDCs, it is necessary to establish the existence of differential elements in the political and economic structure of LDCs which allow this to occur. This is the focus of dependency theory, which analyzes the structure of international relations as an influence on levels of inequality.⁴⁵

Finally, economic growth rates, like savings ratios, are largely unrelated to inequality of income. Data on growth rates over short periods of time compiled by the World Bank either indicate no relation or a positive relation between the income share of the lowest 40% of recipients and the rate of growth of GNP.⁴⁶ Simulations of growth under redistributive policies are in general favorable to the case for redistribution even though they overestimate savings losses due to incomplete consideration of the factors discussed in this section.⁴⁷

Other Patterns of Growth and Inequality

Among the many patterns which countries may exhibit in the course of their development are the following:

- 1) "low-to-low" and "moderate-to-low". Some DCs, such as the United States, probably never had distributions as skewed as many of the LDCs in Table 1, due to widespread land and property ownership and relatively high wage scales in their early development;
- 2) "L" patterns. The Soviet Union, China and other countries experienced extensive development after major property reallocations;

3) "high-to-high". France has the most skewed distribution of the DCs in Table 1. If its distribution has not worsened over time, it belongs to this class. Some oil-rich nations might be placed in this class if development is defined only in terms of income per capita.

Additionally, income distributions in many nations may fluctuate considerably in the course of their development. Great care should be exercised in interpreting these as part of a long-term pattern of inequality and development, or ascribing them to specific causes such as variations in the business cycle. It is also helpful to distinguish inequality in the size distribution of income from inequality among regions of a nation. The causes of regional inequality include scale economies, agglomeration economies and locational advantages (favorable location with respect to transportation and natural resources). There is no necessary relation between regional inequalities and inequalities of individual incomes. In fact, they may move in opposite directions. For example, in Brazil during the 1960's, regional inequalities decreased while individual income inequalities increased.⁴⁸

Selecting an Appropriate Hypothesis

As I pointed out elsewhere, it is very difficult to refute a hypothesis once it has been selected as the null (or working) hypothesis.⁴⁹ Those who challenge conventional views are required to present overwhelming evidence on their behalf. A typical example is given by Pang, who adds Singapore (from 1966 to 1973) to the list of countries experiencing substantial growth and reduction in inequality of incomes.⁵⁰ He observes that while the Singapore

experience "does not support the hypothesis of growing inequality in developing countries," neither does it refute the hypothesis.

In this respect, it is well to make distinction between the fact that some countries do experience increased inequality during some phase of growth, and the unconfirmed hypotheses that this characterized the development of current DCs or is "natural" or "inevitable" for developing countries presently. Furthermore, a contrary (even heretical) hypothesis proves more useful and enlightening. Assume that the "natural" tendency for a country in the course of its development is to combine growth with improvement in the relative distribution of income among recipients. Although percentile and Gini measures now indicate a decline in inequality, the rich still obtain the lion's share of the benefits of growth. They acquiesce, therefore, to redistribution of relative income rather than cause the downfall of the government which would probably occur with stagnation, since redistribution of relative incomes would then imply an absolute reduction in their incomes. From this perspective, an actual worsening of the relative distribution as measured by percentile or Gini indices is a highly "unnatural" phenomenon.

The logic of this approach is illustrated with Table 4, showing a hypothetical poor country with identical relative inequality of incomes in two periods. The real GDPs are \$100 in Period 1 and \$140 in Period 2. Although the relative income position of each quintile of recipients remains unchanged, the first quintile has an absolute gain of \$20 of real income (half of the benefits of growth). The poorest quintile receives only \$2 of additional real income (5% of the benefits of growth).

What can one now say about real countries with very skewed initial distributions whose relative distributions actually worsen during growth? Or economic growth accompanied by an absolute decline in real income for most of their populations, as Adelman and Morris found for many LDCs?⁵¹

Surely this is not due to such factors as increased marginal propensities to save by the elite. Rather, it is evidence of the effects of institutional structures and governmental policies which, intentionally or not, enable the economically privileged to appropriate an increased share of economic rents and benefits of growth.

Summary and Conclusions

The divergence-convergence hypothesis must be regarded as an unconfirmed hypothesis with little power in explaining inequality in size distributions of income. Available historical evidence indicates that a gradual decline in inequality was experienced in a number of currently developed countries, with only one state clearly showing an early phase of increasing inequality. The alledged pre-industrial phase characterized by such extreme poverty that substantial inequality would be impossible does not appear to have any relevance for the 56 modern nations analyzed in this paper. This is due to the simple fact that even the poorest nations often have extremely skewed distributions at present, perhaps more skewed than ever experienced by the developed countries. This demonstrates that political, cultural and economic variables other than income levels condition a society's income distribution. These variables are always present in any society, rather than emerging only after a peak of inequality is reached, and they do not necessarily act to reduce inequality.

The historical data do not show divergence-convergence to characterize the experience of present DCs, although it may have occurred in some of them. Other patterns probably occurred in several nations, such as "moderate-to-low", "L" and "high-to-high" patterns. In any case, there is no reason to assume that the LDCs will repeat the experience of any group of DCs except for a time lag.

Cross-sectional data do not constitute a valid base for generalizations about historical processes, although they form the basis for much of the divergence-convergence arguments. Moreover, even if their applicability is incorrectly assumed, a systematic examination of the data does not support many of the conclusions drawn from them. No statistically acceptable inverted 'U' fit can be obtained from them, and less than one-fifth of the variation in inequality is "explained" by variations in the level of per capita income. Rather, the data reveal a tremendous variation in inequality at all income levels, greater variation in the LDCs than DCs and a higher average level of inequality in the LDCs.

Given the low explanatory power of the hypothesis, it is not surprising that the savings differential and other arguments advanced to explain it also prove to have serious theoretical and empirical shortcomings. A number of such difficulties are indicated in the text.

For those countries where increased (relative) inequality occurs, the increased skewness cannot be attributed to growth of per capita income. It is necessary to specify the particular type of growth, the institutional structures and the governmental policies responsible for such an unfortunate situation.

FOOTNOTES

1

Christopher Chase-Dunn, "The Effects of International Economic Dependence on Development and Inequality: A Cross-National Study," American Sociological Review 40 (December 1975): 720 - 738.

2

Albert Fishlow, "Brazilian Size Distribution of Income," American Economic Review 62 (May 1972): 391 - 402.

3

William R. Cline, Potential Effects of Income Redistribution on Economic Growth: Latin American Cases (New York: Praeger Publishers, 1972); Francisco Lafaiete Lopes, "Desigualdade e Crescimento: Um Modelo de Programacao com Aplicacao ao Brasil," Pesquisa e Planejamento Economico 2 (December 1972): 189 - 226; Adolfo Figueroa, "Income Distribution, Demand Structure and Employment: The Case of Peru," Journal of Development Studies 11 (January 1975): 20 -31.

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Irma Adelman and Cynthia Taft Morris, Economic Growth and Social Equity in Developing Countries (Stanford: Stanford University Press, 1973).

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Clark W. Reynolds, Seminar on Central American Economic Problems, The Ohio State University, Columbus, on January 19, 1977, based on "Fissures in the Volcano?: Central American Economic Prospects," (xerox paper, The Brookings Institution, Washington, D.C., November 1976).

6

Simon Kuznets, "Economic Growth and Income Inequality," American Economic Review 45 (March 1955): 1 - 28. The address was given in December, 1954.

FOOTNOTES (2)

7

Ibid., p. 23.

8

For an interesting mathematical exposition of Marx' theories, see Irma Adelman, Theories of Economic Growth and Development (Stanford: Stanford University Press, 1971), pp. 60 - 93.

9

Kuznets, "Economic Growth", pp. 9 - 11.

10

J.C.H. Fei and G. Ranis, "Agrarianism, Dualism and Economic Development," in The Theory and Design of Economic Development, eds. Irma Adelman and Erik Thorbecke (Baltimore: The Johns Hopkins Press, 1969), pp. 3 - 41.

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This paper does not analyze such measures as the Maximum Equalization Percentage (MEP) and the Kuznets' ratio. For the data of Table 1, the simple correlation between the Gini and MEP indices is 0.98. The Kuznets' ratio is simply two times the MEP index, facts indicating that these measures provide little independent information. Kuznets' recent article, "Demographic Aspects of the Size Distribution of Income: An Exploratory Essay," Economic Development and Cultural Change 25 (October 1976): 1 - 94, gives examples of cautions necessary in using the Gini index. Such articles have produced a counterreaction, which holds that the percentile shares and the Gini index, when properly used and interpreted, are the best measures of income concentration available. See Ramonaval Augusto Costa, "Bem-Estar e Indicadores de Desigualdade," Estudos Economicos 6 (May/August 1976): pp. 1 - 12; and James Morgan, "The Anatomy of Income Distribution," The Review of Economics and Statistics 44 (August 1962), pp. 270-283.

FOOTNOTES (3)

12

Anthony B. Atkinson, "On the Measurement of Inequality", Journal of Economic Theory 2 (June 1970); 244-263.

Samuel A. Morley and Jeffery G. Williamson tried to apply the Atkinson index to the Brazilian situation (one of the rare attempts to pick up on Atkinson's idea) in "Growth, Wage Policy and Inequality: Brazil during the Sixties," (paper # 7519 of the Social Systems Research Institute, University of Wisconsin at Madison), July, 1975. When a revision of it appeared in the Brazilian Estudos Economicos 5 (September/December 1975): 107 - 139, considerable criticism appeared regarding both the index and Morley and Williamson's use of it. Rodolfo Hoffmann objected to the subjective utility index used in order to calculate the index and the unrealistic weighting system. Both Hoffmann and John Wells raised conceptual problems and problems with the data as used by Morley and Williamson. As I indicated in the text, the index is superfluous, since the relative welfare of a given income group can be seen by direct examination of their income share, rather than by calculating an index with arbitrary weights. This simplification is not a minor point. As Hoffmann shows, an incomplete understanding of the index led Morley and Williamson to calculate its values incorrectly. See Hoffmann, "Distribucao da Renda no Brasil: Um Adendo e uma Correcao a um Artigo de Morley e Williamson," Estudos Economicos 6 (May/August 1976): pp. 13 - 20; and John Wells, "A Distribucao de Renda no Brasil durante a Decada de Sessenta: Uma Nota Critica ao Artigo de Morley e Williamson," Estudos Economicos 6 (May/August 1976): 21 - 40.

13

Kuznets, "Economic Growth," p. 7.

14

Felix Paukert, "Income Distribution at Different Levels of Development," International Labour Review 108 (August/September 1973): 97 - 125.

FOOTNOTES (4)

15

Hollis Chenery et al., Redistribution with Growth (London: Oxford University Press, 1974), pp. 14 - 29; 253 - 290; Adelman and Morris, Economic Growth.

16

Jacques Lecaillon and Dimitrios Germidis, "Economic Development and the Wage Share in National Income," International Labour Review 111 (May 1975): 393 - 409, especially pp. 407 - 409; Carlos Geraldo Langoni, "Distribuicao da Renda: Resumo da Evidencia," Dados (Rio de Janeiro, 1973), p. 110.

17

Paukert, "Income Distribution." The time period covered varies widely, as do the inequality measures, making statistical tests impossible. For Prussia, the dates were 1854-1928; Saxony, 1880-1928; Germany, 1913-1959; the Netherlands, 1938-54; Denmark, 1870-1955; and Sweden, 1930-45.

18

Ibid., p. 110.

19

Ibid.

20

Adelman and Morris, Economic Growth, p.178.

21

This is also the basis for criticism of the "stage theories" of development when applied to contemporary LDCs. See Benjamin Higgins, Economic Development (New York: W.W. Norton and Co., Inc., 1968), pp. 174-294.

22

Paukert, "Income Distribution," p. 116.

23

Lecaillon and Germidis, "Economic Development," p. 402. In another article, the same authors see "...a transitional phase during which the concentration of income increases. This phenomenon is probably inevitable: when a column of vehicles accelerates, the distance between them naturally tends

FOOTNOTES (5)

to increase." "Income Differentials and the Dynamics of Development". International Labour Review 114 (July/August, 1976), p. 37. Any one of the cases of accelerated growth with decreasing inequality which we will cite later is sufficient to refute the "inevitability" of this process, and we leave it to the reader to discover the relevance of the automobile analogy.

24

Langoni, "Resumo," p. 110.

25

Ibid.

26

Jose Francisco Graziano da Silva, "Interpretacao de Alguns Recentes Estudos Sobre a Distribuicao da Renda no Brasil" (Master's Thesis, Piracicaba Branch of the University of Sao Paulo, Departamento de Ciencias Sociais, 1974), pp. 133-134. Da Silva's model is:

$$(1) Y = a + b X - b Z (X - N)$$

$\begin{matrix} 1 & & i & j & & i \end{matrix}$

Where:

Y = Gini index

X = GDP per capita

Z = dummy variable, with j = 2, 3, ..., 6

a, b = parameters, i = 1, 2, ..., 6

N = lower limit of group i

The adjusted coefficient of determination was calculated from the value of 0.31 for R² presented by Da Silva.

FOOTNOTES (6)

27

Adelman and Morris, Economic Growth, p. 196; Montek S. Ahluwalia, "Income Inequality: Some Dimensions of the Problem," in Chenery et al., Redistribution, p. 17. See the appendix for a discussion of the statistical problems which invalidate the tests.

28

The share of the highest 20% of recipients shows a similar dispersion at all levels of income. This is to be expected since the share of this group has a very high negative correlation with that of the lowest 60% of recipients ($r = - 0.94$).

29

Paukert, "Income Distribution," pp. 121-122. Again, Paukert's estimates have been accepted at face value. Errors in national income accounts might over or underestimate the cross-country variation of income shares.

30

Marx' predictions of increasing inequality also depend on a highly abstract pattern of development not subject to political intervention.

31

Paukert, "Income Distribution," p. 120.

32

The "F" ratio for the test on the difference between the two sample variances is 2.3, greater than the critical value of 2.0 for the appropriate one-tailed test at the 10% level of significance. The non-parametric Mann-Whitney test was used to test the difference in sample means. The calculated "z" value is 2.6, exceeding even the 1% significance level. Use of the "t" test, as it turns out, also confirms the average level of inequality to be greater in the LDCs ("t" = 2.7, exceeding the 1% critical value of 2.4), if the difference in variances is ignored.

33

Paukert, "Income Distribution," p.120.

FOOTNOTES (7)

34

Figures derived from Paukert's data in "Income Distribution," pp. 114-115. Paukert also states that the difference between the upper 5% of recipients' share in the LDCs (28.7%) and DCs (19.9%) is relatively more pronounced than the difference for the richest 20% (54.8% in LDCs and 45.7% in DCs). In absolute terms, however, the first difference is 8.8% and the second is 9.1% (pp. 120-121).

35

Kuznets, "Economic Growth," p. 23.

36

Harry G. Johnson, "Is There a Role for Market Forces in the Development of Developing Countries?" Selection #3 of Money, Trade and Economic Growth: Survey Lectures in Economic Theory (Cambridge: Harvard University Press, 1962), pp. 151-163; Langoni, "Resumo".

37

Nicolas Kaldor, "A Model of Economic Growth," Economic Journal 67 (December 1957), pp. 599-601; Lecaillon and Germidis, "Economic Development," pp. 407-409.

38

Conjuntura Economica (September 1975), p. 118.

39

Figueroa, "Income Distribution," p. 30.

40

Yujiro Hayami and Vernon W. Ruttan, Agricultural Development: An International Perspective (Baltimore: Johns Hopkins Press, 1971).

41

Dale W. Adams, "Mobilizing Household Savings Through Rural Financial Markets," (Columbus, Ohio: Economics and Sociology Occasional Paper No. 256, Dept. of Agricultural Economics and Rural Sociology, The Ohio State University), 1976.

FOOTNOTES (8)

42

Ibid.; also, Claudio Gonzales-Vega, "Interest Rate Policies and Small Farmer Credit Programs in LDCs," AID Spring Review of Small Farmer Credit 19 (Washington, D.C.: June 1973).

43

Kuznets, "Economic Growth."

44

Langoni, "Resumo."

45

See, for example, Chase-Dunn, "Effects,"; Theodore H. Moran, "Multi-national Corporations and Dependency: A Dialogue for Dependistas and non-Dependistas," (Paper of Johns Hopkins School of Advanced International Studies, December 1975); Paul A. Baran and Paul M. Sweezy, Monopoly Capital (New York and London: Monthly Review Press, 1969).

46

Montek S. Ahluwalia, "Income Inequality: Some Dimensions of the Problem" Redistribution, eds. Chenery et al., p. 14 presents a graph with 18 observations which indicates no relationship between rates of growth and the income share of the lowest 40% of recipients. Later, he presents regression results of 66 observations (unpublished) with a significant positive coefficient (p. 29), indicating refutation of the "growth versus equity" tradeoff. Problems involved with this regression are discussed in the appendix.

47

Cline, Potential Effects; Lopes, "Desigualdade"; and Figueroa, "Income Distribution."

FOOTNOTES (9)

48

Carlos Geraldo Langoni, Distribuicao da Renda e Desenvolvimento Economico do Brasil (Rio de Janeiro: Editora Expressao e Cultura, 1973).

49

Charles L. Wright, "A Note on the Decision Rules of Public Regulatory Agencies", forthcoming Public Choice.

50

Eng Fong Pang, "Growth, Inequality and Race in Singapore," International Labour Review 111 (January 1975), p. 27.

51

Adelman and Morris, "Economic Growth," p. 179.

APPENDIX

Statistical tests with cross-sectional data do not demonstrate the existence of the hypothesized inverted 'U' pattern, as claimed in two recent publications.¹ The low adjusted coefficients of determination in the associated regressions do reveal, however, that income levels explain very little of the international variations in inequality, whether measured by income shares or Gini indices.

Besides Da Silva's regression with dummy variables (see footnote # 26), there are two obvious ways of testing the parabolic form suggested in Figure 2:

$$(1) Y_1 = a + bX_1 + cX_1^2$$

$$(2) Y_1 = a + bX_2 + cX_2^2$$

where:

$$Y_1 = \text{Gini index}$$

$$X_1 = \text{GDP per capita}$$

$$X_2 = \log (\text{GDP/capita})$$

If an inverted 'U' pattern exists in the data, the coefficient b in the regressions should be significantly greater than zero and the coefficient c significantly less than zero. Using Paukert's data,^{*} the regression estimates are:

$$(3) Y_1 = 0.473 - 0.0000278X_1 - 0.00000001X_1^2 \quad \bar{R}^2 = 0.077$$

(23.4) (-0.56) (-0.34)

$$(4) Y_1 = -0.66 + 0.92X_2 - 0.18X_2^2 \quad \bar{R}^2 = 0.197$$

(-1.96) (3.48) (-3.63)

^{*}

Numbers in parentheses are "t" statistic values.

appendix, p. 2.

Equation (4) appears to support the hypothesis, while equation (3) appears to contradict it. Actually, both equations are useless for statistical tests due to the presence of an extreme multicollinearity problem, since the simple correlation between X_1 and X_2 is 0.939 and for X_1 and X_2 , $r = 0.996$. In simple terms, near perfect multicollinearity in regressions which explain little (\overline{R}^2) of the variation in the dependent variable leads to three situations:

- 1) invalid "t" tests, resulting from biased coefficient estimates (which are simply the numerators of the "t" tests);
- 2) estimates which are highly sensitive to the addition or deletion of a few observations; and
- 3) results extremely dependent on the functional form used.

As Johnston demonstrates, a high positive correlation between two independent variables will probably cause large and opposite errors in their coefficients. We observe that near zero "true" values of coefficients might be estimated as "large" negative and positive values if the two variables are highly correlated. This and situation (3) above are illustrated with striking clarity in equations (5-8), using Paukert's data for income shares (where Y_2 is the income share of the lowest 60% and Y_3 is the share of the highest 20% of recipients).

appendix, p. 3.

$$(5) \quad Y_2 = 0.25 + 0.00005X_1 - 0.00000001X_1^2 \\ (18.8) \quad (2.08) \quad (-1.57) \quad \bar{R}^2 = 0.053$$

$$(6) \quad Y_2 = 0.84 - 0.47X_2 + 0.09X_2^2 \\ (3.63) \quad (-2.59) \quad (2.70) \quad \bar{R}^2 = 0.106$$

$$(7) \quad Y_3 = 0.57 - 0.0001X_1 + 0.00000002X_1^2 \\ (33.0) \quad (-3.17) \quad (2.50) \quad \bar{R}^2 = 0.143$$

$$(8) \quad Y_3 = -0.09 + 0.53X_2 - 0.11X_2^2 \\ (-0.29) \quad (2.18) \quad (-2.38) \quad \bar{R}^2 = 0.122$$

The income shares versions of the inverted 'U' hypothesis (see text) predict a 'U' pattern for the share of the lowest 60% and an inverted 'U' pattern for the share of the highest 20% of recipients. Equations 6 and 8, respectively, "confirm" these hypotheses. However, if one formulates the opposite hypotheses (i.e., an inverted 'U' pattern for the lowest 60% and a 'U' pattern for the highest 20%), they are "confirmed" by the quadratic equations 5 and 7, respectively. The results are thus contradictory regarding the existence of the predicted patterns in cross-sectional data. In any case, levels of income are associated with very little of the variation in inequality, as seen by the low \bar{R}^2 values.

Ahluwalia's statistical "confirmation" of the predicted 'U' pattern for the share of the lowest 40% and the inverted 'U' for the share of the highest 20% is based on a logarithmic representation of the parabolic form with a correlation of 0.996 between X_2 and X_2^2 (the correlation between X_1 and X_1^2 for his data is 0.929).⁴ Results similar to that obtained for Paukert's data may be obtained for Ahluwalia's estimates when they are substituted in equations (5-8).

An observation is also in order regarding situation (2) above. Although economists often appear to be confident that results will be more satisfactory when more data becomes available, this is one case for which little improvement should be expected, since additional observations are likely to spuriously influence the results. The inclusion of a few of the more developed socialist countries would tend to support the divergence-convergence hypothesis (the studies cited in appendix note 1 already have a few), while the inclusion of OPEC countries would tend to detract from the hypothesis even more than presently available data (placing a series of points in the upper right corner of Figure 3).

Equations (1-8) of course omit variables which influence inequality. Adelman and Morris (see text) went beyond regression analysis using the AID analyses of variance technique to isolate important variables. They did not find income levels to be among the major determinants of inequality in cross-sectional data, which is consistent with the present analysis. Ahluwalia's model includes additional variables, but contains

appendix, p. 5.

serious specification problems. His independent variables, for example, include "share of population with primary education" and "share with secondary education." This is an inversion of causality, since maldistribution of income leads to maldistribution of education. Simultaneous equation models, rather than multiple regression, should be used to analyze such relationships.

Even more important than these considerations is the recognition of the limitations of cross-sectional data. They are important primarily in demonstrating the existence of tremendous diversity in income inequality among countries. They should be used with great caution, however, in making generalizations about historical phenomena.

FOOTNOTES TO APPENDIX

1

Ahluwalia, "Income Inequality," pp. 3-37. Calculations and regressions are based on data presented on pages 8 and 9 for the income groups indicated. Ahluwalia does not present any Gini indices nor are the income shares data as detailed as those presented by Paukert (I thus used Paukert's data exclusively in the text). The criticisms apply to a second volume with similar data and methods: Hollis Chenery and Moises Syrquin, Patterns of Development, 1950-1970 (London: Oxford University Press, 1975), pp. 49; 60-63.

2

J. Johnston, Econometric Methods (New York: McGraw-Hill Book Company, 1972), pp. 160-169. Lawrence R. Klein also points out that if a simple correlation approaches the multiple correlation coefficient in value, a high degree of indeterminacy is introduced. In all the regressions discussed in this appendix, the low "explanatory power" of the independent variables results in their simple correlation coefficients exceeding the multiple correlation coefficients, often by more than two times. See Klein, An Introduction to Econometrics (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962), pp. 64; 101.

3

At the suggestion of Dr. Francis Walker, I eliminated all observations with per capita incomes over \$1,200 to see if the quadratic estimates were more in accord with the divergence-convergence hypothesis. They were not.

4

Ahluwalia, "Income Inequality," pp. 8-9.

Table 1. Size Distribution of Personal Income Before Tax in
56 Countries and Gross Domestic Product cerca 1965.

Country and Group	GINI Index	GDP per Head in 1965	Country and Group	GINI Index	GDP per Head in 1965
Group 1. Under \$100			Group 4. \$301-500		
1. Tanzania (1964)	0.54	61	29. Costa Rica (1969)	0.50	360
2. Burma (1958)	0.35	64	30. Gabon (1960)	0.64	368
3. Chad (1958)	0.35	68	31. Barbados (1951-52)	0.45	368
4. Dahomey (1959)	0.42	73	32. Surinam (1962)	0.30	424
5. Nigeria (1959)	0.51	74	33. Lebabon (1955-60)	0.55	440
6. Niger (1960)	0.34	81	34. Mexico (1963)	0.53	441
7. Madagascar (1960)	0.53	92	35. Jamaica (1958)	0.56	465
8. India (1956-57)	0.33	95	36. Chile (1968)	0.44	486
9. Sudan (1969)	0.40	97	37. Panama (1969)	0.48	490
Mean Group 1:	0.42	78	Mean Group 4:	0.49	427
Group 2. \$101-200			Group 5. \$501-1,000		
10. Pakistan (1963-64)	0.37	101	38. Rep. of S. Africa (1965)	0.58	521
11. South Korea (1966)	0.26	107	39. Greece (1957)	0.38	591
12. Bolivia (1968)	0.53	132	40. Trinidad & Tobago (57-58)	0.44	704
13. Ceylon (1963)	0.44	140	41. Argentina (1961)	0.42	782
14. Sierra Leone (1968)	0.56	142	42. Japan (1962)	0.39	838
15. Morocco (1965)	0.50	180	43. Venezuela (1962)	0.42	904
16. Tunisia (1971)	0.53	187	Mean Group 5:	0.44	723
17. Senegal (1960)	0.56	192	Group 6. \$1001-2,000		
Mean Group 2:	0.47	148	44. Italy (1948)	0.40	1,011
Group 3. \$201-300			45. Puerto Rico (1963)	0.44	1,101
18. Ecuador (1968)	0.38	202	46. Israel (1957)	0.30	1,243
19. Brazil (1960)	0.54	207	47. Netherlands (1962)	0.42	1,400
20. Zambia (1959)	0.48	207	48. Finland (1962)	0.46	1,568
21. Ivory Coast (1959)	0.43	213	49. United Kingdom (1964)	0.38	1,590
22. Peru (1961)	0.61	237	50. Fed. Rep. Germany (1964)	0.45	1,667
23. Philippines (1961)	0.48	240	51. Norway (1963)	0.35	1,717
24. El Salvador (1965)	0.53	249	52. France (1962)	0.50	1,732
25. Colombia (1964)	0.62	275	53. Australia (1966-67)	0.30	1,823
26. Malaya (1957-58)	0.36	278	Mean Group 6:	0.40	1,485
27. Iraq (1956)	0.60	285	Group 7. Over \$2001		
28. Fiji (1968)	0.46	295	54. Denmark (1963)	0.37	2,078
Mean Group 3:	0.50	244	55. Sweden (1963)	0.39	2,406
			56. United States (1969)	0.34	3,233
			Mean Group 7:	0.37	2,572

Source: Paukert, "Income Distribution," pp. 114-115.

Table 2. Income Shares and Ranges for Lowest 60% and Highest 20% of Recipients for Groups of Nations

Income Level	Lowest 60% of Recipients		Highest 20% of Recipients	
	Mean Share (%)	Range (%)	Mean Share (%)	Range (%)
Less Than \$100	30.1	23.0-36.0	50.5	42.0-61.0
\$101-200	25.9	19.2-41.0	56.5	35.0-65.1
\$201-300	24.1	15.9-33.4	57.7	44.0-68.1
\$301-500	24.7	15.0-37.0	57.4	42.4-71.0
\$501-1000	27.9	16.3-32.6	50.1	46.0-57.4
\$1001-2000	31.1	23.5-53.7	46.6	38.8-53.7
\$2001 and above	33.8	31.4-35.5	42.7	41.1-44.0

Source: Paukert, "Income Distribution," pp. 114-115.

Table 3. Income Shares Received by Lowest Quintile of Recipients in Countries with Per Capita Incomes of Less than \$100

Country	Share of Lowest Quintile (% of GDP)	GDP Per Capita in 1965 (US\$)
1. Tanzania	4.8	61
2. Burma	10.0	64
3. Chad	8.0	68
4. Dahomey	8.0	73
5. Nigeria	7.0	74
6. Niger	7.8	81
7. Madagascar	3.9	92
8. India	8.0	95
9. Sudan	5.6	97

Source: Paukert, "Income Distribution," pp. 114-115.

Table 4. Growth and Distribution of Real Income in a
Hypothetical LDC

Quintile	Period 1		Period 2		Gain	
	GDP of Quintile	% of GDP of Quintile	GDP of Quintile	% of GDP of Quintile	(\$)	(%)
1	50	50 (50.5)	70	50	20	50
2	20	20 (19.4)	28	20	8	20
3	15	15 (13.1)	21	15	6	15
4	10	10 (10.0)	14	10	4	10
5	<u>5</u>	<u>5</u> (<u>7.0</u>)	<u>7</u>	<u>5</u>	<u>2</u>	<u>5</u>
Total:	100	100 (100.0)	140	100	40	100

Note: The percentage figures in parentheses are the group means for the 9 countries with GDP/capita under \$100 presented by Paukert, "Income Distribution," pp. 114-115. All other figures are hypothetical.

Figure 1. Schematic View of Neoclassical (NC) and Marxian (M) Hypotheses on the Relationship between Economic Growth and Income Inequality

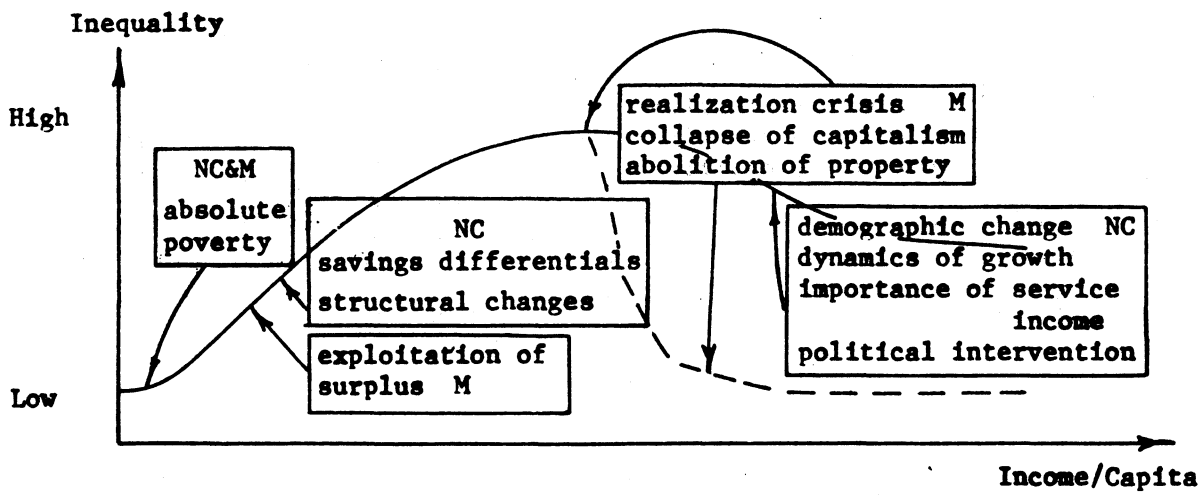
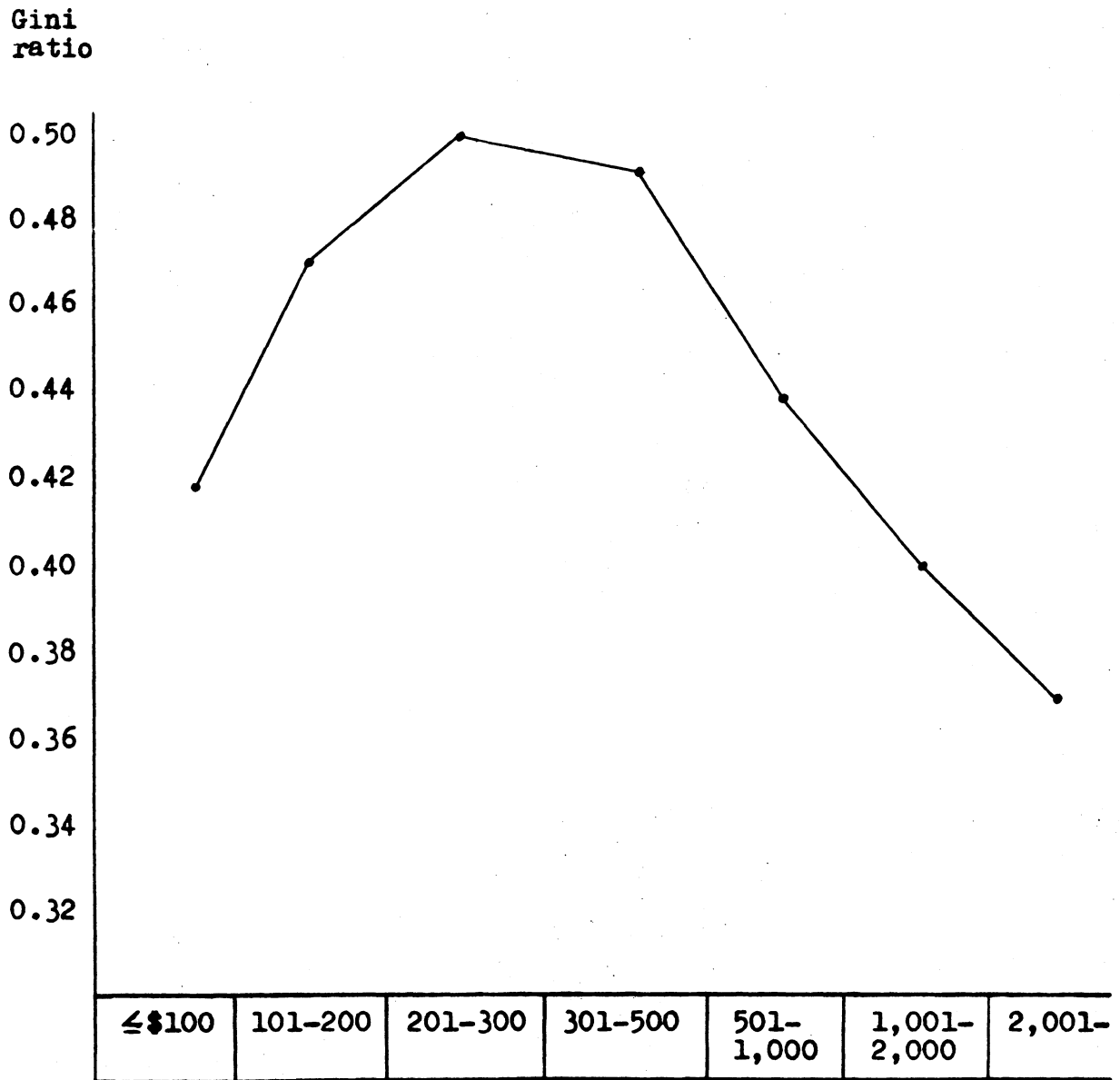
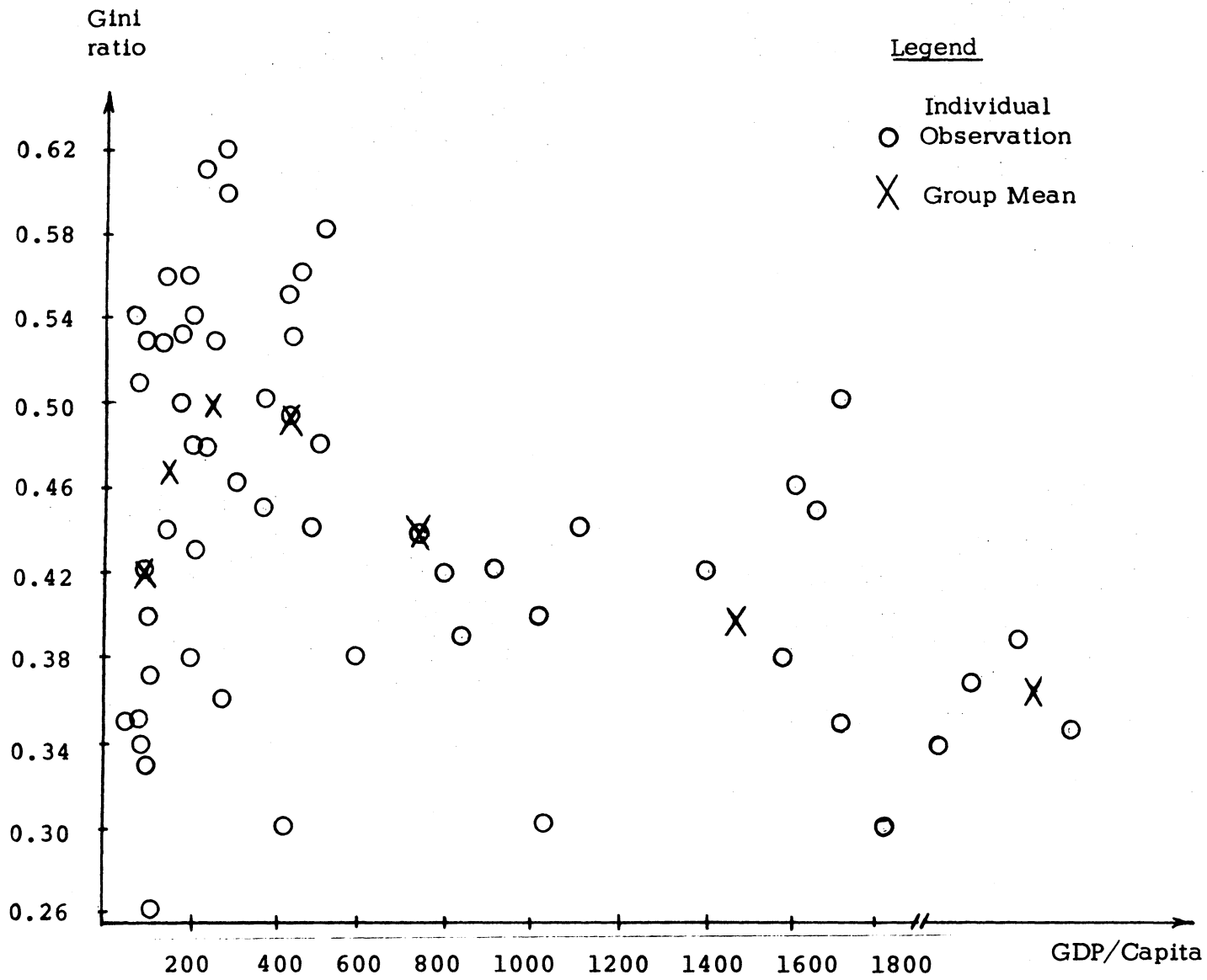


FIGURE 2. DISTRIBUTION OF INCOME AT DIFFERENT LEVELS OF PER CAPITA GDP



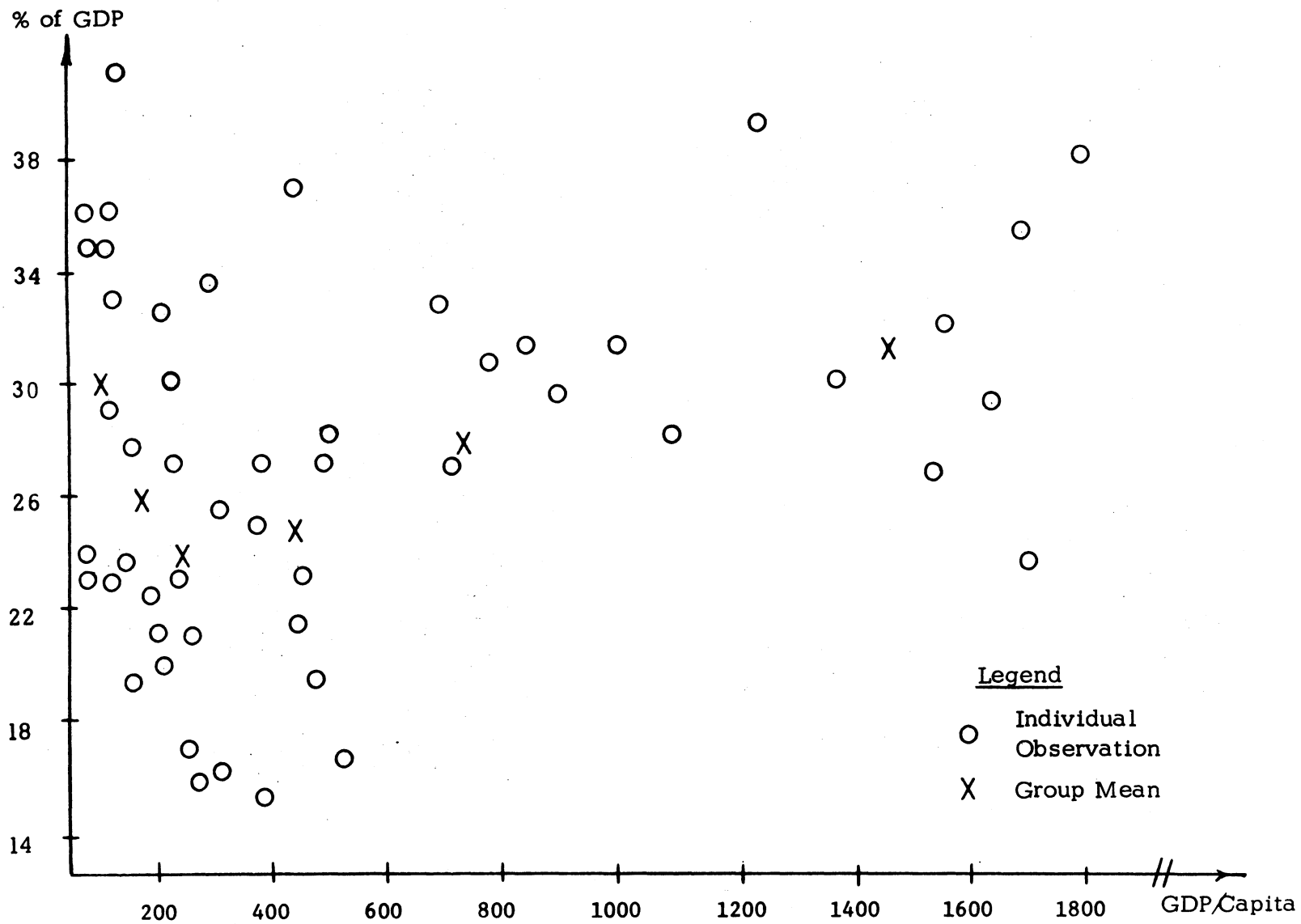
Source: Paukert, "Income Distribution," p. 119.

Figure 3. Income Inequality at Different Levels of Income



Source: Table 1

Figure 4. Income Shares of Lowest 60% of Recipients at
Different Levels of Income



Source: Paukert, "Income Distribution," pp. 114-115.