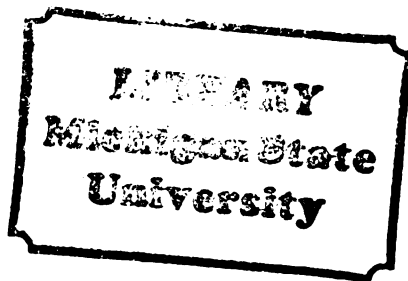


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THE IMPACT OF ECONOMIC GROWTH ON
THE DISTRIBUTION OF INCOME IN THE
LESS-DEVELOPED COUNTRIES

presented by

Abdollah Ferdowsi

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Economics

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THE IMPACT OF ECONOMIC GROWTH ON THE DISTRIBUTION
OF INCOME IN THE LESS-DEVELOPED COUNTRIES

By

Abdollah Ferdowsi

A DISSERTATION

Submitted to
Michigan State University
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ABSTRACT

THE IMPACT OF ECONOMIC GROWTH ON THE DISTRIBUTION OF INCOME IN THE LESS-DEVELOPED COUNTRIES

By

Abdollah Ferdowsi

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The past three decades have been characterized by an unprecedented and unexpected rate of economic growth in many developing countries. Most developing countries focused their attention on policies aimed at increasing the level of output and they succeeded. The preoccupation with maximizing the rate of output growth took precedence over the concept of distribution of output among all segments of the population.

The justification for growth-oriented policies is the so-called Kuznets' Hypothesis. It suggests that in the early stages of economic growth, the distribution of income tends to worsen, while at the later stages market forces and government's corrective action will improve the distribution of income in favor of the poor. A great deal of skepticism has been raised with regard to the inherent tendency and ability of market forces and governments to reduce the inequality in the distribution of income.

The main objective of this dissertation is to empirically explore the relationship between income distribution

and different socio-economic and structural changes which occur at different stages of economic growth. An unprecedented technique of estimation is used, i.e. the cubic spline function. The spline function is superior to the other form of specification in a sense which allows a curvature relationship between different variables.

Based on the empirical finding, a set of policies are proposed to improve the distribution of income. It is argued that there is no need for sacrificing economic growth for an egalitarian distribution of income. By designing and implementing economic and social policies, a better distribution of income can accompany economic growth from the start. It is also argued that any policy which attempts to improve the distribution of income may prove impossible to implement unless the poor develop sufficient consciousness and organization to provide support for redistributive policies.

TO MY PARENTS

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CHAPTER ONE

Introduction

The past three decades have been characterized by an unprecedented and unexpected rate of economic growth in many developing countries. Most developing countries focused their attention on policies aimed at increasing the level of output and they succeeded. Between 1950 and 1975 the income per capita in these countries rose by 3.4 percent per year (including China). The preoccupation with maximizing rates of output growth took precedence over the concept of distribution of output among all segments of the population.

The justification for growth-oriented policies is the so-called "trade-off" between economic growth and egalitarian distribution of income. It has been suggested that redistribution of income would lead to a smaller rate of growth of income. On the other hand, if growth is given primary emphasis, it creates a mechanism - higher productivity, rising demand for labor and consequent higher wages - through which the fruits of economic growth "trickles down" speedily. In other words, growth-oriented policies suggest that it is necessary first to build up the capital, infrastructure, and productive capacity of the economy and the fate of the poor should not be of great concern in the early stages of development.

The rationale behind this justification is the Kuznets hypothesis suggesting that in the early stages of economic growth, the distribution of income tends to worsen, while at the later stages it eventually will improve. The strong implication of the Kuznets hypothesis is that inequality in the distribution of income is a necessary condition for economic growth and at the later stages, market forces and government's corrective actions will improve the distribution of income in favor of the poor. A great deal of skepticism, supported by recent empirical data, has been raised with regard to the inherent tendency, ability, and willingness of governments to take corrective action to reduce the inequality in the distribution of income. Landlords, politicians, and other rich elites do not save and invest substantial proportions of their incomes in the local economy. Much of their incomes are spent on imported luxury goods, lavish mansions, and foreign travels. Therefore, the growth-oriented strategies are really an inaccurate justification for policies which perpetuates the conditions of income inequality in the developing countries.

✓ Recognition of these facts make it essential to reorient development priorities away from preoccupation with GNP growth and towards broader social objectives such as the provision of health, nutrition, education, and finally more equal distribution of income. Strategies designed to raise the level of living and incomes of the poor not only contribute

to material well-being of the poor but also to higher productivity and income levels of the society as a whole.

The main objective of this dissertation is to explore the relationship between economic growth and income distribution. Chapter Two presents a review of the literature on distribution of income and its pattern in the course of economic growth in developing countries. It compares and contrasts different schools of thought as they have appeared in this field.

Chapter Three deals with the important socio-economic and structural changes which occur at different stages of economic growth. After identifying these changes, inherent in the process of economic development it will be explained how these changes affect the distribution of income. Chapter Four concentrates on the empirical exploration of the impact of different variables on the distribution of income. It stressed that caution should be used in interpreting the results obtained from cross-sectional data and applying these results to the long-term growth process for an individual country.

High income inequality and substantial absolute poverty may create the conditions for ultimate rejection of the economic system by the frustrated masses and politically explosive people. Chapter Five deals with the policies to improve the distribution of income in favor of the poor. It is shown that there is no need for sacrificing economic growth to achieve an egalitarian distribution of income. By

designing and implementing economic and social policies, both growth and distributional objectives can be achieved. Chapter Five also advises that any redistributive policy necessarily requires the political process that can generate more power for the poor in the society. The achievement of political power by the poor is a necessary first step toward a better design and implementation of redistributive policies.

CHAPTER TWO

SURVEY OF LITERATURE

2.1 - Introduction

The issue of unequal distribution of income and wealth in a society has been of concern to mankind for centuries. This issue can be seen from a variety of perspectives. This chapter offers a brief review of the literature on the topics of income distribution and economic development. Section 2 presents a historical evolution of the distribution of income as it appears in the literature. Section 3 deals with the pattern of income distribution in the process of economic development. In this section the literature on the Kuznets' hypothesis is discussed. In Section 4, the skepticism with regard to the validity of the Kuznet's hypothesis is introduced. Section 5 deals with the most recent approach to the relationship between income distribution and economic development, i.e., decomposition of the Gini coefficient. Finally, section 6 offers a brief conclusion.

2.2 - Historical Presentation of the Distribution of Income

The founders of classical economics were primarily concerned with the functional distribution of income, i.e.

the distribution of income among the major factors of production. The concept of unequal distribution was considered only as a secondary issue.

The beginnings of abstract studies of distribution were made by Physiocrats. Quesnay was mainly interested in distribution between social classes i.e. "sterile" and "productive" classes. Handicrafts and trades were considered the sterile occupations while agriculture was thought to be the only productive employment.¹

In his Wealth of Nations, Adam Smith distinguished a threefold classification of the factors of production-land, labor and capital; and, naturally he distinguished three shares: rent, wages and profit. He wrote, "the whole annual produce...naturally divides itself into three parts, and constitutes a revenue to three orders of people; to those who live by rent, to those who live by wages and to those who live by profit. These are three great, original and constituent orders of civilized society."²

Smith commented that pecuniary wages and profit could be different according to the differences arising from the nature of advantages and disadvantages of different employment. But he pointed out that the other source of differences in pecuniary wages and profit was due to the policy of Europe, "which no-where leaves things at perfect liberty".³

The Ricardian law of rent, which is the first example of the marginal method, defines rent as that portion of the product which is paid for the use of the better quality or

powers of the soil. He argues that the rent of a given field is measured by the surplus of its produce over that obtainable with the same capital and labor from the poorest land in cultivation.

Ricardo believed that wages were basically governed by subsistence level with some allowances for rising standards of living, a concept which he termed "natural price of labor". As population increases, which is assumed is inevitable, poorer soil is brought under cultivation. Consequently, the rent will rise, wages remain at the "natural price of labor" and profit will correspondingly decline.

In 1848 John Stuart Mill published his Principles of Political Economy. In his book, he infused social and institutional concepts in the theory of distribution. He believed that unlike the law of production, those of distribution are the matter of human institution solely and "therefore depends on the laws and customs of society... these laws are consequences of the fundamental laws of human nature combined with the state of knowledge."⁴ He stated that law in general, and particularly laws relating to property, have profound effects upon the distribution of income among persons.

Even though Mill modified the Ricardian schema by infusing social institutions, his analysis of distribution fundamentally was the same as that of other classical writers. None of the classical economists were concerned with economic equality itself. The main thrust of their thinking appeared to be concerned with the distribution of

income among different factors of production.

V [The Utopian socialists of the early nineteenth century, influenced by the events of the French Revolution, brought the idea of economic equality to the attention of economic theorists. They espoused a belief in the possibility of a large reconstruction and reorganization of human society. St. Simon advocated distribution based on a person's work and reorganizing production by "the union of all instruments of all labour in a social fund, which shall be exploited by association."⁵ Fourier favored a more complex system of distribution which demanded a comfortable minimum income to every person, including women and children more than five years old.

In 1867 the first volume of Das Kapital was published by Marx. This volume contains the clearest exposition of the Marxian system. As regards distribution, Marx followed Ricardo's doctrines. He argued that the wages of labor were determined by the amount of the necessities just enough to maintain the labor force. Wages can never rise above this subsistence level. But labor, Marx argues, creates the whole value of the product, and receives only subsistence wage. The difference is surplus value which is taken by the capitalists.

Every increase in the laborer's efficiency, every improvement in the means of production, every new discovery of natural resources, every addition to capital by way of saving, only increases surplus value. It follows that economic progress, while leaving the condition of the laborer as miserable as ever, adds continually to the aggregate of surplus value, that is to say, to the aggregate

income of the capitalist classes.⁶

As mentioned previously, classical economists also dealt with the issue of inequality in the distribution of wealth. To Smith, the differences in the nature of employment were partly due to the absence of perfect liberty. To John Stuart Mill it was the human institution, namely the law of the inheritance of wealth, which led to unequal distribution of income. And finally, Marx believed that concentration of capital, due to rapid accumulation of surplus, had to be blamed for income inequality in the society. However, it only was after the arrival of the "law of decreasing marginal utility" that it became possible to analyze the economic and welfare effects of income inequality.

Jevons⁷ introduced a principle which later was called the law of diminishing marginal utility. The principle postulates that income and wealth are subject to diminishing marginal utility. From this principle arises a great concept, namely the extreme wastefulness of large inequality of income on economic welfare.

The quantity of happiness for a man, who already has a great quantity of property in his possession, will decline as he acquires additional units of property. This led Jevons to assert the great wastefulness of large inequality of income from the point of view of economic welfare. Ever since, it has been generally accepted that total economic welfare is increased with more equal

distribution of income.

Another view on income distribution was suggested by Pareto. He pioneered the study of distribution of income between households without reference to social class to which they belonged, the size distribution of income. From this study, Pareto developed his famous law of distribution which is known as Pareto's law. The law states that in all places and at all times the distribution of income is given by a mathematical formula. The formula is, $\log y = A - \alpha \log x$, where x is a level of income and y the number of persons receiving an income equal to, or greater than x . Pareto observed that the value of α is approximately equal to 1.5. He concludes that inequality of income is a social constant determined by forces beyond human understanding and beyond human influence. Institutional changes and egalitarian taxation cannot change this social constant.

✓ It is important to note that Pareto's law was based only on statistical evidence and did not have an economic reasoning. Modern theories have shown that income inequality is not a social constant and can be varied at different points of times and in different countries.

It was mentioned that social welfare would increase due to the more egalitarian distribution of income. However, this view has not gone unchallenged. The counter argument states that these policies might have some unfavorable effects on production because of its effect on saving. In his book, Principles of Political Economy, Sidgwick

argues that:

A more equal distribution would increase happiness. It would, in short, be more economic. But it might indirectly diminish happiness by causing a decrease in saving, a decrease in efficiency of capital, through its greater diffusion in small amounts, an excessive increase in population and a check to the growth of culture.⁸

Edwin Cannan also acknowledged the extreme wastefulness of inequality but he pointed out that the inequality provided the motive force and the regulator for the existing system. He suggested that it would not be advisable to make the ideal distribution if it led to a considerable fall in total production. He wrote that "the existing inequality, regarded broadly, is in fact a necessary evil."⁹ The idea of inequality and its relationship to growth prevailed until Keynes who gave an unexpected view. Keynes accepted the view that richer people have a higher propensity to save, meaning that poorer people have a higher propensity to consume. Thus, any redistribution of income from the rich to the poor would reduce saving but increase consumption and an increase in consumption would result in an increase in total income through the multiplier. In concluding notes on The General Theory, Keynes wrote:

Since the end of the nineteenth century, significant progress towards the removal of very great disparities of wealth and income has been achieved...Many people would wish to see this process carried much further, but they are deterred by two considerations, partly by the fear of making skillful evasions too much worthwhile and also of diminishing unduly the motive towards risk taking, but mainly I think by the belief that the growth of capital depends upon the strength of the motive towards individual saving and that for a large portion of this growth we

are dependent on the savings of the rich out of their superfluity.¹⁰

And he goes on to show that there is not any contradiction between growth and equality "up to the point where full employment prevails, the growth of capital depends not at all on a low propensity to consume but is, on the contrary, held back by it."¹¹ and "measures for the redistribution of income in a way likely to raise the propensity to consume may prove positively favorable to the growth of capital."¹²

After World War II, the attention again was focused on increasing production per head through increasing saving and investment in developing countries. In his famous article, Economic Development with Unlimited Supplies of Labor, Sir Arthus Lewis argues that underdeveloped countries cannot break the vicious circle because their capitalist sector is too small. He continues by saying "if they had a larger capitalist sector, profits would be a greater part of their national income, and saving and investment would also be relatively large."¹⁷ Lewis acknowledges that the increase of the capitalist sector involves an increase in the inequality of income, but he says that mere inequality of income is not enough to ensure a high level of saving. The argument turns against the egalitarian distribution based on the rationale that policies leading towards more equal distribution of income were considered to be inconsistent with policies to promote economic growth. The post-war period, mainly the 1950's and 1960's was characterized as being a growth-oriented era. The

prevailing strategy was to increase the size of the pie first and then to be concerned with its distribution. It was this concern which focused the attention on income distribution and its relationship to economic growth.

2.3 - Income Distribution in the Process of Economic Development

Kuznets pioneered a study to determine the relationship between distribution of income by size and different stages of economic growth. He raised the question of whether inequality in the distribution of income increases or decreases in the course of a country's economic growth. He explored those factors which determine the secular level and trends of income inequalities. In his 1955 article¹⁴ Kuznets used the data for the United States, England and Germany. He later expanded his data for other countries in 1963.¹⁵

In 1955, he found that in the U.S., the shares of the top 20% of the population declined from 54% in 1929 to 45% in the years after the second world war, whereas the share of the lowest 60% rose from 26 to 32%. The share of the top 5% declined from 31 to 20%. In the United Kingdom, the share of the top 5% of units declined from 46% in 1880 to 43% in 1913, then to 33% in 1929, to 31% in 1938 and finally to 24% in 1947. The share of the lower 85% remained fairly constant, 41-43%, between 1880 and 1913, but then rose to 46% in 1929 and 55% in 1947. (See table 2.1 on page 14.)

TABLE 2.1
SHARE OF ORDINAL GROUPS OVER LONG PERIODS

		SUCCESSIVE DATES AND ENTRIES									
<u>United States:</u>		1929	1936	1941	1947	1954	1959				
<u>Dates:</u>											
<u>Income before tax</u>											
Top 5%		30	26.5	24	21	21	20				
Top 20%		54	52	49	46	45	45				
Lowest 60%		26	27	29	32	33	32				
<u>Income after federal tax</u>											
Top 5%		29.5		21.5		18	18				
Top 20%		54		47		43	44				
Lowest 60%		26.5		30		34	34				
<u>United Kingdom:</u>		1880	1913	1929	1938	1947	1938	1949	1957		
<u>Dates:</u>											
<u>Income before tax</u>											
Top 5%		48	43	33	31	24	29	23.5	18		
Top 20%		58	59	51	52	46	50	47.5	41.5		
<u>Income after tax</u>											
Top 5%					26	17	24	17	14		
Top 20%					48	39	46	42	38		
<u>Germany-West Germany:</u>		1913	1928	1928	1936	1936	1950	1955	1959		
<u>Dates:</u>											
Top 5%		31	27	20	23	28	24	18	18		
Top 20%		50	49			53	48	43	43		
Lowest 60%		32	31			26.5	29	34	34		

Source: S. Kuznets, "Quantitative Aspects of Economic Growth," p. 60.

Following his expanded data for developed countries, Kuznets concludes that the shares of the upper income groups have declined perceptibly and shares of the lower income groups have risen somewhat. He cites that this trend is somewhat more pronounced in the distribution of income after taxes than the distribution of income before taxes. He speculates that the inequality in the size distribution of income has narrowed over time. Kuznets acknowledges that there is not adequate data for the exact turning point, however he identifies the early phases in which inequality might have been widening, "from about 1780 to 1850 in England, from about 1840 to 1890, and particularly from 1870 on in the United States and from the 1840's to 1890's in Germany."¹⁶ For the narrowing income inequality he cites that England's income distribution started to become more equal in the last quarter of the 19th century. For the U.S. and Germany the turning point was later than England's.

Kuznets made an attempt to explain these secular trends in income distribution in the process of economic growth. In doing so, he distinguishes between two groups of forces in the long term that create increasing inequality in the distribution of income before taxes (excluding contribution by government). The first group, Kuznets says, relates to the concentration of savings in the upper-income brackets, "only the upper-income groups save; the total savings of groups below the top decile are fairly

close to zero."¹⁷ Further, Kuznets argues that the cumulative effect of such inequality in savings would be the concentration of an increasing proportion of income-yielding assets in the hands of the upper groups--"a basis for larger income shares of these groups and their descendants."¹⁸

One phenomenon accompanying the economic growth is the reallocation of labor from agricultural activities to non-agricultural activities which Kuznets refers to as industrialization or urbanization. The second group of forces relates to this process. Kuznets contends that the average per capita income of the rural population is usually lower than that of the urban and inequality in the percentage shares within the distribution for the rural population is somewhat narrower than the urban population. Operating with this simple model, he concludes that "the increasing weight of urban population means an increasing share for the more unequal of the two component distributions...(and) if this is so, inequality in the total income distribution should increase."¹⁹

After giving the explanation for forces that create widening in income inequality, Kuznets attempts to find the counteracting forces, i.e., forces that cause for narrowing of income inequality in the later stages of economic growth.

One group of factors counteracting the cumulative effect of concentration of savings, Kuznets asserts, is

legislative interference and political decisions. These policies may be aimed at limiting the accumulation of property through inheritance taxes or they may produce similar effects indirectly, "by government-permitted or induced inflation which reduces the economic value of accumulated wealth stored in fixed-price securities or other properties not fully responsive to price changes; or by legal restriction of the yield on accumulated property as happened recently in the form of rent controls or of artificially low long-term interest rates maintained by the government to protect the market for its own bonds."²⁰ The reason which Kuznets offers for these legal and political decisions are the changes in the old ideas of the need for income inequalities as a source of savings for economic growth.

The other group of factors offsetting the widening of income inequality associated with the shift from agriculture to industry is, Kuznets concludes, a rise in the income share of the lower groups within the non-agricultural sector of the population.

Classifying the factors that potentiate the increase in the income share, Kuznets argues that the immigrant's children, born in cities, are more able to take advantage of a better chance for organization and adaptation. "The growing political power of the urban lower-income groups led to a variety of protective and supporting legislation, much of it aimed to counteract the worse effects of rapid

industrialization and urbanization and to support the claims of the broad masses for more adequate share of the growing income of the country."²¹

The data which is provided by Kuznets is not enough to draw a definitive conclusion and he himself admits this fact. However, since his work was the first systematic study of distribution of income in the course of economic growth, he made a great contribution to this field. This classical study shows that the relative income inequality increases in the early stages of economic growth, then decreases in later stages of growth. This behavior is known as Kuznets' hypothesis which has constituted an intellectual school of thought. This work became a cornerstone for future studies by other development economists and a number of them have accepted this hypothesis.

In his 1960 article, Kravis attempted to test Kuznets' hypothesis by using five different indexes of income inequality. With the United States as the basis of comparison, he shows that Denmark, Israel (Jewish population only) and the Netherlands have less inequality than the United States; in Great Britain, Japan and Canada distribution of income is as unequal as the United States; and Italy, Puerto Rico, Ceylon (now Srilanka) and El Salvador have more inequality than the United States. Based on this finding, he confirms that Kuznets' hypothesis indicating greater inequality in underdeveloped countries than in developed countries.

He submits that even though the United States has the highest real income it does not have the greatest degree of equality. On the other hand, Japan has a per capita income much lower than Italy or Puerto Rico, but it has a relatively high degree of equality. Despite his finding, he states that "there is a discernible tendency for underdevelopment, low income and inequality to go hand in hand and for development, high income and relative equality to be associated with one another."²²

The reasons Kravis offers for the differences in the degree of inequality are: 1) human characteristics affecting economic performance relating to economic motivation and to ability, 2) barriers to economic mobility, either imposed by government or embedded in the mores of the people, such as racial discrimination and social structure, 3) economic structure which does not provide for highly differentiated forms of work accompanied by large income differentials, and 4) social and political organization.

Though Kravis uses a greater amount of empirical evidence, data for ten countries, the sets of reasons he believes lead to an inverted U-shape relationship between economic growth and income inequality are not derived from his empirical evidence and they are overlapping. This makes it difficult to identify the most crucial factors affecting distribution of income in the course of economic growth.

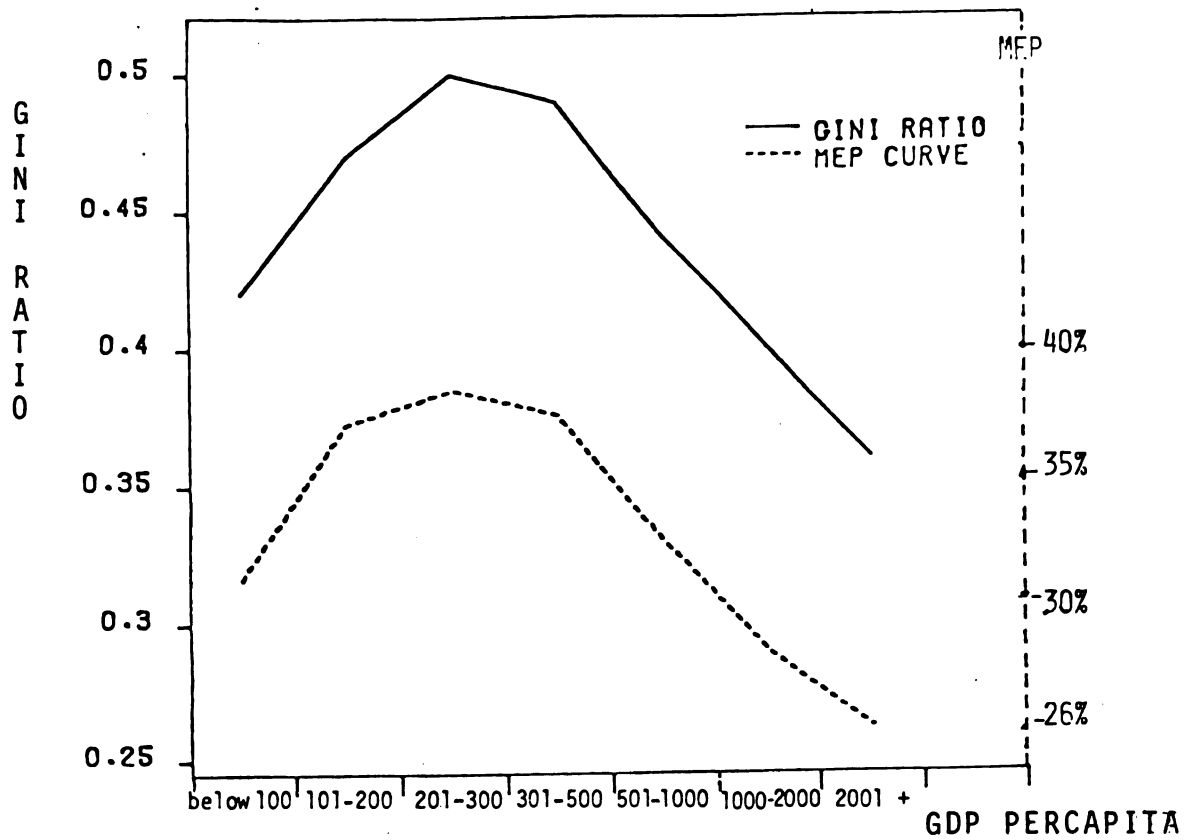
✓ Oshima, who was skeptical of Kravis's technique, showed that inequality indexes used by Kravis led to conflicting results about relative distribution of income. He proposes a new technique to measure inequality. Based on this measure he contends that the major determinant of income dispersion is "the weight of the farm or rural sector in the total economy. Other factors appear to be trivial."²³ This is very strong and at the same time a naive conclusion. There are many factors which affect the distribution of income and these factors are more important in determining the distribution of income than the weight of the rural sector.

✓ Paukert provided income distribution data for a larger number of countries. His data was based on a modification of Adelman's and Morris's.²⁴ Paukert's data contains the information about the share of personal pre-tax income accruing to the lowest 20 percent of households, then to the second, third and fourth quintiles, and finally to the next 15 percent and to the top 5 percent. He uses two measures of inequality; Gini ratio and the maximum equalization percentage. Paukert arbitrarily divides the countries into different groups according to their level of gross domestic product per head as a proxy for economic development. The first finding on the basis of his data, Paukert observes, is "a sharp increase in inequality as one moves from countries in the lowest income group to those in the \$101-200 (in 1965 U.S. dollars) group and a

further but less pronounced increase as one moves into 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 \$501-1000 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 \$1000-2000 and to the above \$2000 group, there is a clear reduction in the extend of inequality."²⁵

✓ Considering the shares of different classes, Paukert confirms Kuznets' conclusion that the income share of the poorest classes in the least developed countries is higher than developed countries; with an average of 7 percent in the countries below \$100 and 5.3 percent in those of \$101-200 group. He also shows that the share of total income accruing to the top 5 percent is highest in countries in the \$201-300 and \$301-500 group. These are countries with the greatest inequality. Then from his finding, he concludes that "the greater inequality in developing countries is due primarily to the high share of income received by the richest 5 percent of the population,"²⁶ Using a graph to represent all of his findings, he plots the mean Gini and mean shares of different groups against mean income per capita. This graph is presented in Figure 2.1. Based on these findings, Paukert states that his data "shows clearly that there is an increase in inequality as countries progress from the below \$100 level to the

✓



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

Figure 2.1

DISTRIBUTION OF INCOME AT DIFFERENT LEVEL
OF PERCAPITA GDP

\$101-200 and beyond." He believes that his work supports Kuznets' hypothesis.

✓ One flaw to Paukert's study is the technique which is used to test the Kuznet's hypothesis. As it was mentioned, Paukert uses the mean Gini, mean shares of income in each group. This averaging technique ignores the dispersion of observations among each group and causes a very neat relationship between Gini and GDP per capita. If this technique is discarded, we can see a substantial variation in inequality at each income level. For example, France and some of the Latin American countries have a very high level of inequality with regards to their level of incomes. Even though he acknowledges that at each level of development there are some countries whose income distribution is in sharp contrast with the prevailing inverted U-shape pattern, it seems he placed a heavy emphasis on per capita income itself. Paukert raises the question of what those factors are which attribute to the differences in inequality and its changes in the course of economic development.

- ✓ This question, however, is not answered in his article.
- ✓ The answers can be so crucial that they might challenge the nature of the inverted U-shape relationship between inequality and economic growth.

In May 1976 Ahluwalia used a multiple regression model to estimate a cross-country relationship between inequality and selected variables reflecting different aspects of the development process. In December 1976 he

extended his previous study. In both articles he warns that the relationships in his regression model are primarily associational and they "do not establish causality." He described them as "stylized facts; which can be observed, but which then need to be explained by an appropriate theory."²⁷

Ahluwalia's regression model is based on a sample of 60 countries including 40 developing countries, 14 developed countries and 6 socialist countries. He estimates different equations, where income shares of different percentile groups are considered as the dependent variables and the logarithm of per capita G.N.P. as independent variables. The results of these estimations are shown in Table 1-2 on page 25.

Based on this finding, he concludes that his study supports the inverted U-shape pattern or Kuznets' hypothesis. He argues that "income shares of all percentile groups except the top 20 percent first decline and then increase as per capita G.N.P. rises. Income shares of the top 20 percent display a corresponding opposite pattern."²⁸

Ahluwalia admits that the true relationship between inequality and development is very complex and it depends on a number of processes of structural changes that occur in the process of development. He suggests three different variables that affect the degree of inequality in the process of development and then he uses regression models by including these variables. Ahluwalia argues, as Kuznets

TABLE 2.2
CROSS-COUNTRY REGRESSION MODEL

Explanatory Variables	DEPENDENT VARIABLE: PERCENTAGE INCOME SHARES									
	Top 20 Percent		Middle 40 Percent		Lowest 60 Percent		Lowest 40 Percent			
	Eq. (1a)	Eq. (1b)	Eq. (2a)	Eq. (2b)	Eq. (3a)	Eq. (3b)	Eq. (4a)	Eq. (4b)		
1. Constant	-65.27 (2.28)	- 9.07 (0.27)	89.47 (4.68)	31.15 (1.34)	128.60 (5.95)	110.20 (4.14)	75.77 (5.47)	77.93 (4.11)		
2. log per capita GNP	96.94 (4.47)	50.35 (2.13)	-48.21 (3.33)	-3.07 (0.19)	-81.39 (4.98)	-62.66 (3.40)	-48.70 (4.65)	-47.28 (3.60)		
3. [log per capita GNP] ²	-18.86 (4.85)	-8.16 (1.98)	9.76 (3.76)	0.52 (0.19)	15.48 (5.28)	10.14 (3.16)	0.09 (4.84)	7.65 (3.35)		
4. Growth rate of GDP	-0.22 (0.48)	-0.11 (0.32)	0.13 (0.44)	0.001 (0.01)	0.19 (0.54)	0.18 (0.63)	0.08 (0.37)	0.11 (0.55)		
5. Literacy Rate		-0.09 (2.21)		.03 (1.16)		0.09 (2.87)		0.06 (2.56)		
6. Secondary school enrollment		-0.14 (2.48)		0.12 (3.02)		0.07 (1.6)		0.02 (0.74)		
7. Growth rate of population		3.59 (4.29)		-2.40 (4.20)		-2.54 (3.89)		-1.19 (2.56)		
8. Share of agriculture in GDP		-0.25 (2.23)		0.21 (2.70)		0.13 (1.43)		0.04 (0.65)		
9. Share of urban population		-0.10 (1.68)		0.04 (1.00)		0.08 (1.82)		0.06 (1.79)		
10. Dummy for socialist countries	-20.27 (6.72)	-9.41 (3.27)	8.14 (4.04)	0.85 (0.40)	17.76 (7.80)	10.24 (4.56)	12.13 (8.32)	8.57 (5.35)		
$\bar{R}^2$	.58	.76	.46	.68	.60	.76	.59	.69		
F	21.6	22.3	14.1	15.5	24.16	22.4	22.86	16.21		
SEE	6.4	4.6	4.3	3.2	4.9	3.6	3.11	2.6		
Estimated turning point of quadratic (per capita GNP in US\$)	372	1217	294	---	425	1230	477	1231		

Value in parentheses are T ratios.

Source: Ahluwalia, "Income Distribution," p. 131.

This table is reproduced with no change to be compared with estimated results in Chapter Four.

did, that one aspect of the development is the shift of population from the traditional agricultural sector to the modern sector. Then he speculates that this process leads to an increase in relative inequality in the early stages of development. But in the later stage, as the modern sector expands, it absorbs higher amounts of labor and causes the income differential between the two sectors to narrow.

Improvements in the quality of human resources, Ahluwalia asserts, provides another mechanism to decrease income inequality. Faced with the lack of data on the skill structure of the labor force, he uses the literacy rate and the secondary school enrollment rate as right hand side variables approximating the investment in human capital. After estimating this equation, Ahluwalia finds that "improvements in literacy have a beneficial impact on the income share of the lowest 40 percent while the secondary school enrollment rate has a beneficial impact on the income share of the middle 40 percent, probably reflecting the exclusion of the lower income groups from access to schooling."²⁹

The third factor affecting the long run pattern of income equality, Ahluwalia proposes, is the demographic factor. He argues that the population growth has an important effect on income equality by prolonging "the phenomenon of surplus labor in the sense that a large proportion of the work force remains locked into low income employment in the traditional or informal sector of the

economy."³⁰ The estimated equations based on the cross-section shows substantial support for his hypothesis that the rate of growth of population has a significant impact on income inequality. He shows that this rate of growth has a negative effect on the income shares of the lower and middle groups, but a positive effect on the top 20 percent income share.

After establishing and explaining the secular relationship between level of economic development and income inequality, Ahluwalia investigates the short term relationship between growth and inequality. He speculates that there are some economic factors associated with a high rate of growth in the short run, i.e. factor market disequilibria due to the economic expansion. These disequilibria, Ahluwalia argues, cause significant income differentials. He points out that these disequilibria are stronger with a high rate of economic growth.

He tests the relationships between income inequality and rate of growth by using a regression model. The results obtained from this regression model shows no evidence confirming that a faster rate of growth leads to greater inequality. The interesting policy implication that Ahluwalia suggests is to emphasize increasing rate of growth to pass the transitional period of severe inequality as quickly as possible. He explains: "higher growth rates accelerate this transition without necessarily generating greater inequality than can be expected given the structural

characteristics of the economy at each level of development."³¹ But in the same page he questions his own finding and states that it is naive to draw such a sound relationship between inequality and the rate of growth. He gives two contradictory examples: "the experience of Brazil, where the high growth was accompanied by worsening relative inequality...The experience of Taiwan, where substantial growth has taken place with an actual reduction in income inequality."³²

✓ It seems that Ahluwalia fails to recognize the effect of other structural factors affecting the inequality of income during a rapid economic growth. In spite of the above two contradictory examples, he insists that his cross section results show no systematical relationship between higher inequality and a faster rate of growth. His statement implies that he truly supports the idea of a faster rate of growth for passing the transitional stage of inequality.

Charles Wright³³ questions the estimated results obtained by Ahluwalia using the same technique as Ahluwalia used, but he omits the socialist countries from the data. He shows that when socialist countries are omitted, there exists a considerable doubt to believe an inverted U-shape relationship between growth and inequality. Wright concludes that institutional structures and government policies are the main determinant of relative inequality in every country.

Kakwani³⁴ uses an unusual and interesting way to

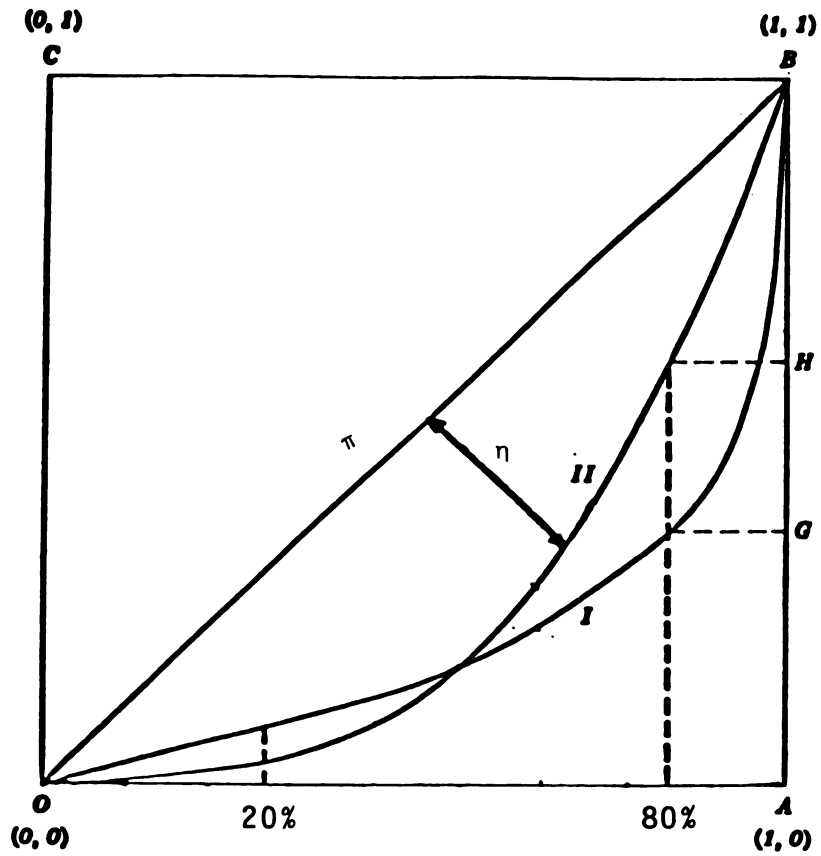
test the Kuznets' hypothesis. His methods are purely technical and he does not give any explanation for the inverted U-shape relationship between growth and equality. He uses two Lorenz curves; Lorenz curve I is skewed toward (0, 0) and Lorenz curve II is skewed toward (1, 1). It is obvious that the income share of the bottom 20 percent is larger with Lorenz curve I than Lorenz curve II. And the shares of the upper 20 percent is also greater with Lorenz curve I than with Lorenz curve II (BG and BH respectively). By considering these results, it will be obvious the intermediate group has a smaller income share with Lorenz curve I than with Lorenz curve II. This is illustrated in Figure 2.2.

In the process of economic development, when the share of the intermediate income group rises, one expects that the shape of the Lorenz curve changes from one skewed toward (0, 0) to one skewed toward (1, 1). Kakwani proposes that "Kuznets' hypothesis will be sufficiently established if it can be shown that the Lorenz curves for the developing countries are, in general, skewed toward (0, 0), whereas the Lorenz curves for the developed countries are skewed toward (1, 1).³⁵

In order to measure the degree of skewness of a Lorenz curve, he uses the following equation:³⁶

$$\eta = a\pi^{\alpha} (\sqrt{2} - \pi)^{\beta}$$

where; η is the length of the ordinate of a point on the



Source: Kakwani, "Income Inequality," p. 383.

Figure 2.2

SKEWNESS OF THE LORENZ CURVE
AND ITS RELATION TO DEVELOPMENT

Lorenz curve and the egalitarian line and π is the distance of the ordinate of η from the origin along the egalitarian line.

If $\alpha = \beta$ Lorenz curve is symmetric; skewed toward (0, 0) if $\alpha > \beta$, and if $\alpha < \beta$ then it is skewed toward (1, 1). He estimates the value of α and β for fifty countries and he shows that the ratio of α/β is greater than unity ($\alpha > \beta$) for all developing countries or countries with Lorenz curves skewed toward (0, 0). But for most developed countries α/β ratio is smaller than one ($\alpha < \beta$), indicating that Lorenz curves are skewed toward (1, 1). Based on his finding, he concludes that "this observation supports Kuznets' hypothesis that the income share of the middle group is higher in the developed than in the developing countries."³⁷

✓ 2.4 - Rise of Skepticism

One implication of the inverted U-shape relationship is the nature of a trade off between equality and economic growth. Specifically, the worsening of inequality is inevitable in the early stages of economic growth, and then in the later stages, the fruit of economic growth will automatically trickle down to the poor. Also government may take an active role to correct the distribution of income in favor of the poor (as Kuznets pointed out). The inverted U-shape hypothesis implicitly accepts that in the poor society inequality can be eliminated only through

increased production. But the growth experience in most of the developing countries has revealed that the fruits of growth have been concentrated in the modern sector of the economy reinforcing inequalities in income, assets and power. At the same time the modern and industrial sector has not been able to absorb the rapidly growing labor force from the agricultural sector (as Lewis anticipated).

After failure of growth-oriented strategies to achieve an equitable society and to reduce poverty, new strategies have been proposed. These new strategies are concerned with achieving more equality in distribution of income, with growth regarded as a necessary but not a sufficient condition.

Stewart and Streeten are among those skeptical of growth-oriented strategies. They claim that government intervention, which was considered to be used to correct the distribution of income is in fact in favor of the upper-income groups rather than the poor. The reason which they offer is that government is comprised of the elite who are reluctant to take actions to correct the distribution of income. They write, "The elite, against whom redistributive measures must be aimed, form the personnel who administer the measures. They capture the machine and render it ineffective."³⁸

They also argue that modern technology which is used in developing countries leads to unequal distribution of income. Modern technology needs a highly skilled

personnel, and efficient, disciplined and literate workers. In order to achieve these standards, public and private expenditure must be concentrated on the modern sector. Meanwhile, an unequal distribution of income is required for generating market for the goods produced by modern technology, i.e. goods produced for consumers with high incomes.

By considering these factors, Stewart and Streeten refute the existence of an inverted U-shape relationship. They conclude that "the high-growth policy thus tends not only to generate inequalities, but also to establish positions of power that make it extremely difficult to combat these inequalities by government redistribution policies."³⁹ So they demand more direct actions to reduce inequality of income in the developing countries. They present a list of direct strategies to alleviate poverty and to reduce income inequality.

They assert that progressive taxation of income has not been successful to correct inequality, so they suggest a policy for redistribution of existing assets. Redistribution of assets, they argue, includes policies of land reform, spread of ownership or nationalization of industries, and greater access of educational and health services to the poor. But they acknowledge that this strategy is a radical one and "it does not normally form part of the advice given to existing governments,"⁴⁰

The other strategy which they present is called

redistribution through growth. This strategy was originated by I.L.O., then was modified by Chenery and Ahluwalia.⁴¹ Chenery and Ahluwalia collaborated to construct a model which incorporated the distributional objectives into development strategy. Their strategy is simply to transfer the extra income resulting from growth to the poor. Chenery and Ahluwalia assert that this strategy can achieve substantial improvements in pattern of concentration of assets and a considerable potential for raising the income of the poor. This form of redistribution involves the transfer of investment resources to low-income groups, providing the poor with a source of income. This strategy does not reduce the overall G.N.P. because "it means a lower rate of growth of incomes at the upper end, and a higher rate of growth at the lower end, without any absolute reduction of income."⁴²

2.5 - Decomposition of the Gini Coefficient

Perhaps one of the most interesting approaches to detect the relationship between economic growth and income distribution is the decomposition of Gini ratio. This approach was fruitfully used by John Fei, Gustav Ranis and Shirley Kuo.⁴³ Their purpose was to set out a methodology for the decomposition of family income inequality by distinguishing among different components of family incomes and their change in the process of economic development.

As the measure of inequality, they chose the Gini

coefficient. They also assumed that the total income pattern of n families, $Y = (Y_1, Y_2 \dots Y_n)$ have been comprised of different income components. For simplicity they assume that income of families are composed of wage, property income and transfer income. And consequently overall inequality measure, G_y , can be decomposed into the various sub G_i (i.e. G_w indicates the inequality in wages among families).

In order to estimate overall inequality, they use the weighted sum of the factor Ginis:

$$G_y = \phi_1 G(Y^1) + \phi_2 G(Y^2) + \dots \phi_r G(Y^r)$$

and ϕ_i can be defined as the distributive shares and is calculated as:

$$\phi_i = \frac{Y^i}{Y} \quad \text{and} \quad \sum_{i=1}^r \phi_i = 1$$

The above formula simply states that total family income inequality, G_y , is the weighted average of the factor Ginis $G(Y^i)$. Depending on how $G(Y^i)$ affects the overall inequality, they distinguish among the different types of income components.

They argue that type one income, property income, is distributed less equally than total income ($G_1 > G_y$). Type two income is distributed more equally than total income ($G_2 < G_y$). Wage income is considered as a type two income. They consider transfer income as type three income.

The important feature of type three is its role to

narrow the inequality of income. As they point out "a large welfare budget (a large ϕ_T) will certainly contribute to the overall equality rather than inequality,"⁴⁴ so a negative sign has to be attached to $\phi_T G(Y^T)$.

They also recognize the phenomenon of urbanization in a dualistic economy i.e. reallocation of labor from agricultural sector to industrial sector. They argue that if agricultural income is distributed more equally than total income, the phenomenon of urbanization will contribute to a higher inequality of total income. But if agricultural income is distributed less equally than total income, its declining share would result in the equality of total income.

They apply their model to Taiwan. Its economic structure was characterized by labor surplus dualistic economy. They point out that though Taiwan's family distribution of income in the 1950's was unfavorable to the poor, that distribution has improved substantially during two decades of rapid growth. The factors involved in this process, they assert, were a combination of activities to correct the distribution of income in urban and rural sector. In the rural sector these policies included agricultural reforms, rapid spread of secondary crops, rural industrial activities, reducing rent payments and more labor intensive cropping patterns. In the urban sector, they assert "that urban income inequality cannot decline very much until after the turning point,"⁴⁵ By

turning point, it is meant the end of surplus labor. In urban sector the policies have to be concerned with the rapid absorption of labor by using more labor intensive technology.

Decomposition of overall inequality into factor components is a very useful method in detecting the source of income inequality and introducing policies to improve the distribution of income. The use of the method requires details and comprehensive data on different components of family incomes. The lack of data in most developing countries hinders the application of this method.

2.6 - Conclusion

In concluding, it will be helpful to classify different schools of thought as they appeared in this field. The classical economists were concerned with the distribution of income among workers, capitalists, and land owners. It was the prevailing approach until the beginning of the present century. Around this period, Pareto suggested the size distribution of income. His statistical studies led him to assert that the inequality of income was a social constant determined by basic economic and social forces and this inequality could not be influenced by differing national institutions and government policies.

Kuznets (1955) pioneered a study which negated Pareto's law. In his study, Kuznets developed a dynamic relationship between distribution of income by size and

different stages of economic growth. Based on provided data, he concluded that income inequality is not constant, as Pareto suggested, but it would increase in the early stages of economic growth, then decrease in later stages. This behavior in income inequality at different stages of economic growth is termed Kuznets' hypothesis and constituted a new intellectual school of thought. After this study, there have been a large number of studies that have accepted Kuznets' hypothesis as a general law.⁴⁶ This hypothesis implies that the worsening of inequality is inevitable in the early stages of growth and then at the later stages, inequality will narrow down. This hypothesis implicitly accepts that in the poor society income inequality can be eliminated only through increases in production. It was this behavior in income inequality which led some development economists to emphasize the growth-oriented strategies with the presumption that an equitable society can be achieved automatically.

FOOTNOTES

CHAPTER TWO

FOOTNOTES

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⁴John Stuart Mill, Principles of Political Economy, 2 Vol., Vol. 1 7th ed. (London: Longmans, Green, Reader and Dyer, 1871) p. 250.

⁵Thomas Kirkup, History of Socialism, 5th ed. rev. (London: A. and C. Black, 1913) p. 28.

⁶Dalton, Some Aspects of the Inequality, p. 81.

⁷Jevons admits that he was not the first person to bring the subject of marginal utility. It had been already discovered by J. Bentham in his writing about "principles of utility".

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⁹Edwin Cannan, "The Division of Income," Quarterly Journal of Economics, (May 1905) p. 368.

¹⁰John Maynard Keynes, The General Theory of Employment, Interest and Money, First Harbinger ed. (New York: Harcourt, Brace, and World, Inc., 1964) pl 372.

¹¹Ibid, p. 373.

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¹³W. Arthur Lewis, "Economic Development with Unlimited Supplies of Labor," The Manchester School, 22 (May 1954) pp. 139-192.

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³²Ibid, p. 337.

³³Charles L. Wright, "Income Inequality and Economic Growth: Examining the Evidence," The Journal of Developing Areas (October 1978) pp. 49.

³⁴Nanak C. Kakwani, Income Inequality and Poverty: Methods of Estimation and Policy Applications (New York: Oxford University Press, Published for World Bank, 1980).

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³⁶Kakwani imposes several restrictions on the formula: But R.H. Rasche, J. Gaffney, A.Y.C. Koo and N. Obst show that these restrictions are inadequate. Even with imposing these restrictions, Gini coefficient might be greater than one. For further details see Rasche, Gaffney, Koo and Obst, "Functional Forms for Estimating the Lorenz Curve," Michigan State University, Econometrics Workshop Papers No. 7706, (February 1978).

³⁷Kakwani, Income Inequality, p. 385.

³⁸France Stewart and Paul Streeten, "New Strategies for Development: Poverty, Income Distribution and Growth," Oxford Economic Papers 28 (November 1976) p. 391.

³⁹Ibid, p. 393.

⁴⁰Ibid, p. 395.

⁴¹Montek S. Ahluwalia and Hollis Chenery, "A Model of Distribution and Growth," in Redistribution with Growth, ed. Hollis Chenery et al., (London: Oxford University Press, 3rd Printing 1976) pp. 209-235.

⁴²Stewart and Streeten, "New Strategies," p. 395.

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⁴⁵Ibid, p. 37.

⁴⁶Sherman Robinson, "A Note on the U-Hypothesis Relating Income Inequality and Economic Development," American Economic Review (June 1976), p. 437.

¹⁴Simon Kuznets, "Economic Growth and Income Inequality," American Economic Review, 45 (March 1955), pp. 1-28.

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²⁷Montek S. Ahluwalia, "Income Distribution and Development: Some Stylized Facts," American Economic Review 66, No. 2 (May 1976) p. 128.

²⁸Idem, "Inequality, Poverty and Development," Journal of Development Economics 3 (December 1976) p. 309.

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³⁰Ibid, p. 132.

CHAPTER THREE

DETERMINANTS OF INCOME DISTRIBUTION IN THE PROCESS OF ECONOMIC GROWTH

✓ There are many factors which affect the distribution of income and its pattern during the course of economic development. To investigate the relationship between growth and income distribution, the best point of departure is the recognition of the main characteristic of an underdeveloped economy, that is, the socio-economical and structural changes which occur at different stages of economic growth. After identifying these changes, the second step will be to find how these changes affect income distribution.

These main characteristics include a broad selection of variables that attempt not only to describe different aspects of a developing country, but also the trend in the distribution of income during the course of development.

In Section 2 of this chapter, a dynamic production function is introduced. The production function explains the functional distribution of income between laborers and capitalists under a dualistic economic regime. In Section 3, the relationship between the distribution of human capital and income is considered. In Section 4, the concentration of holdings of physical capital and its impact on income is analyzed. In Section 5, there is a discussion of the

population growth and change in its age structure. Section 6 deals with the external aspects of the economy. The impact of trade policies on internal terms of trade and employment will be discussed. Finally, Section 7 is concerned with the government policies in attempting to achieve the distributive justice in the economy.

3.2 - Functional Distribution of Income Under a Dualistic Economic Regime

Perhaps one of the most observable characteristics of many underdeveloped countries is the coexistence of a overpopulated agricultural sector and a rapidly growing modern or industrial sector. This phenomenon has been termed "dualistic development" in the literature. The agricultural sector is characterized by widespread disguised underemployment with a high rate of population growth. In this sector the traditional techniques of production are being used. The industrial sector, on the other hand, enjoys advanced technology which is usually the result of foreign investments.

In the process of economic growth as output per capita increases, it has been observed that output per capita in the industrial sector increases at a rate much higher than the output per capita in the agricultural sector.¹ This uneven rate of growth in two sectors can be explained by the differences in income elasticity for agricultural products and industrial products. Income elasticity for food and other agricultural products are very low, whereas the inverse is true for industrial goods.

As average income increases, the percentage change in demand for agricultural products is less than the percentage increase of income. Correspondingly, the percentage change in demand for industrial products is greater than the percentage change in income. This phenomenon causes more demand for industrial products and less demand for agricultural products. Since demand for factors of production is derived demand, the differences in output demand lead to a rapid increase in demand for labor in the industrial sector. The agricultural sector will supply the greatest part of this labor to the industrial sector.

The movement of the labor force from the agricultural sector to the industrial sector due to structural change in final output can be shown by a very simple graph. The graph only presents the demand for labor in the industrial sector under the assumption of the dualistic economy with unlimited supply of labor (at least up to a certain level of employment). In Figure 3-1, the wage rate is measured on the vertical axis and the level of industrial employment on the horizontal axis.

Demand for labor is downward sloping, reflecting the law of diminishing marginal product. The most important feature of this sector under the assumption of unlimited supply of labor is the labor supply curve. The supply of labor is perfectly elastic up to L_c and beyond L_c it is upward sloping. The horizontal portion of labor supply reflects the rapid increase of labor from the agricultural to the industrial sector. This prevents the institutionally

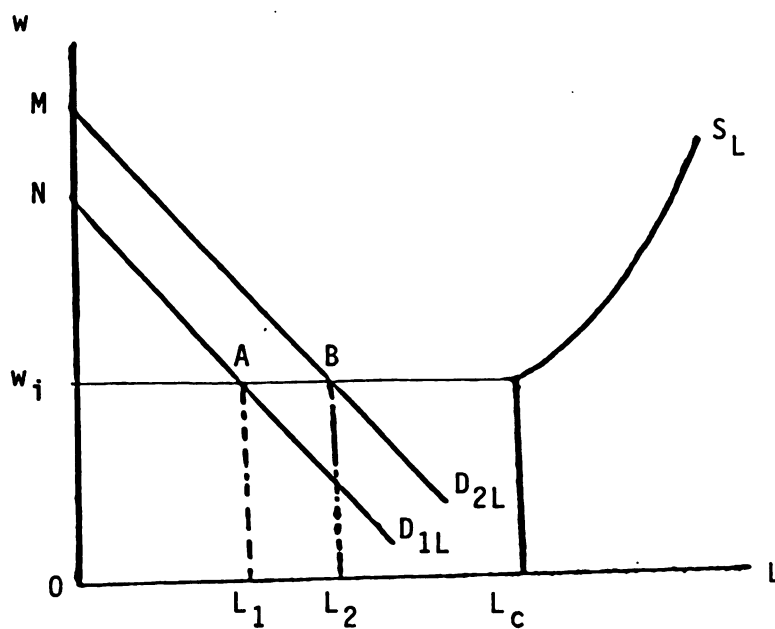


Figure 3.1

INDUSTRIAL LABOR MARKET UNDER
DUALISTIC ECONOMIC REGIME

determined wage rate (W_i) to increase up to L_c , where the unlimited supply of labor is eliminated.² In the industrial sector, firms maximize their profit by employing labor where marginal revenue product of labor (demand for labor) is equal to the institutional wage rate. If demand for labor is D_{1L} , then the amount of employment will be L_1 . Since wage is constant, this level of employment leads to the surplus or profit of WNA , and total wage income of $OWAL_1$. The amount of surplus will be the main source of investment and capital accumulation in the industrial sector. In the next period, this surplus will be added to capital stock which leads to a greater demand for labor (D_{2L}) and the labor employment of L_2 . The new employment level will create $ABMN$ amount of surplus which results in a higher amount of investment and capital accumulation. This continuous process of reinvesting surplus and increase in capital stock causes continuous shifts in demand for and increase in employment of labor. As it is shown, the agricultural sector has constituted the main source of labor supply to the industrial sector.

✓ The allocation of labor from the agricultural sector to the industrial sector has established a pattern of industrialization in the process of economic development. This pattern is common to many dualistic developing countries. In order to investigate how this pattern or structural change affects income distribution, a dynamic production function for the industrial sector is used. This production function can be specified as:

$$Q = f(K, L, t).$$

The above production function shows a technological relationship between output and inputs. As it is revealed by the production function, the essential factor inputs in the industrial sector are labor (L) and capital (K). t shows the increase in output due to improvement in technology over time. Q represents the quantity of industrial output.

Assumptions:

a. The production function is homogeneous of degree one, continuous and twice differentiable.

b. K and L take non-negative magnitudes, and their marginal productivities are positive, i.e.

$$f_L = \frac{\delta Q}{\delta L} > 0, \quad f_K = \frac{\delta Q}{\delta K} > 0$$

c. The law of diminishing return is applied to both factors:

$$f_{LL} < 0, \quad f_{KK} < 0$$

d. The rate of change of f_L with respect to a change in K is equal to the rate of change of f_K with respect to L , i.e.

$$f_{KL} = f_{LK}$$

e. It is assumed that labor and capital are purchased in a competitive market, so

$$w = f_L \quad \text{and} \quad r = f_K$$

Definitions:

In the outset it will be convenient to define the concepts which are used throughout this section.

a. R is defined as the rate of technological progress and it is measured as:

$$R = \frac{Q_t}{Q_0}$$

where Q_t is output at time t, and Q_0 is output in time zero.

b. The nature of the bias in technological progress can be defined in terms of the Hick's concept of factor saving (using) biasedness and is represented as:

$$B = \frac{f_{Kt}}{f_K} - \frac{f_{Lt}}{f_L}$$

if $B = 0$ Hick's neutral technological progress and if $B > 0$, capital using (labor saving) technological progress.

c. Labor and capital share can be defined, respectively, as

$$\phi_L = \frac{Lf_L}{Q}$$

$$\phi_K = \frac{Kf_K}{Q}$$

Then homogeneity of degree one implies that $\phi_L + \phi_K = 1$ (Euler's Theorem).

d. Elasticity of substitution between capital and labor is

$$\sigma = \frac{f_K f_L}{Q f_{KL}} .$$

Proportional time change and rate of growth in marginal

physical product of capital and labor can be specified, in terms of B , R , and ϕ_L as: (Proof in Appendix to Chapter 3.)

$$\frac{\dot{f}_{Kt}}{\dot{f}_K} = R + \phi_L B$$

$$\frac{\dot{f}_{Lt}}{\dot{f}_L} = R - (1 - \phi_L) B$$

$$\frac{\dot{f}_K}{\dot{f}_K} = R + \phi_L B - \frac{\phi_L}{\sigma} \cdot \frac{k}{k}, \quad \frac{\dot{f}_L}{\dot{f}_L} = R - (1 - \phi_L) B + \frac{(1 - \phi_L)}{\sigma} \cdot \frac{k}{k}$$

and finally rate of growth of national income can be derived as

$$\frac{\dot{Q}}{Q} = R + (1 - \phi_L) \frac{k}{k} + \frac{L}{L}$$

Since the wage receivers are in the lower income bracket, any factor which increases labor share will change the distribution of income. Therefore, in order to investigate the functional distribution of income under this dualistic model we turn our attention to labor share and its rate of growth in the process of economic growth. In order to see how the labor share can be affected we have to distinguish between two developmental phases, i.e. when labor is still in excess supply or prior to and after the point when surplus labor has been fully absorbed into productive employment. Before this turning point, there exists a horizontal supply curve of labor to the industrial sector signifying the prevalence of a constant real wage. This constant wage implies that $\frac{\dot{w}}{w}$ will be zero, so the growth of labor share over time can be written as:

$$\frac{\dot{\phi}_L}{\phi_L} = \frac{\dot{w}}{w} + \frac{\dot{L}}{L} - \frac{\dot{Q}}{Q}$$

or

$$\frac{\dot{\phi}_L}{\phi_L} = -R - (1 - \phi_L) \frac{\dot{k}}{k}$$

So long as the unlimited supply of labor exists $\frac{\dot{\phi}_L}{\phi_L}$ decreases as R (rate of technological progress) and $\frac{\dot{k}}{k}$ (rate of capital deepening) increases. The other implication of this phase is the capital share will increase. The decrease in labor share and increase in capital share will contribute to deterioration in the distribution of income.

After the turning point, $\frac{\dot{w}}{w}$ is not equal to zero, so the growth of labor share will change to

$$\frac{\dot{\phi}_L}{\phi_L} = - (1 - \phi_L) \left[B - \left(1 - \frac{1}{\sigma}\right) \frac{\dot{k}}{k} \right]$$

When the supply of labor is no longer perfectly elastic, $\frac{\dot{\phi}_L}{\phi_L}$ increases if the nature of technology is labor using ($B < 0$) and the elasticity of substitution between labor and capital is less than unity ($\sigma < 1$). One of the implications of the above model is a rapid growth of employment due to the rising profit share and capital accumulation. This process is significantly related to the nature or bias of technological progress.

✓ The above model is also capable of explaining the Kuznet's hypothesis. Rapid growth of employment in the industrial sector leads to a shift in population from the agricultural to the non-agricultural sector. It is sound

to speculate that the inequality of income in the rural sector is much less than the inequality in the urban sector. The increase in the relative weight of the urban population (more unequal income) in comparison with the total population will lead to a higher overall inequality in distribution of income.

At the same time the increase in urbanization has a significant effect in increasing political participation and political power of the urban low income groups. The political participation will lead to legislation aiming toward the provision of equal opportunities and educational institutions. These steps lead to increase in income share of urban migrants and low income residents.

3.3 - Distribution of Income and Education

The prevailing framework to investigate the effect of education on income distribution is the human capital model. Based on this model, education is treated analogous to physical assets. Investment in oneself is considered as a source of productivity and growth and so it influences the stream of individual earning. All economists acknowledge that level of education can influence the level of income. However, effect of education on the size distribution of income as an equalizing factor has been subjected to a great deal of controversy. The source of the controversies is the different assumptions made on the dependency or independency between the level of schooling and the rate of return to it. For instance, according to Chiswick, "The

higher the average level of schooling in a region, the greater the inequality of income in that region."³ Other authors, namely Marin and Psacharopoulos⁴ criticized Chiswick's assumption of independency between the level of schooling and the rate of return to it. They claim that there is a negative correlation between rate of return and the level of schooling and they hypothesize that education has an equalizing effect on income distribution.

To find the direction of the effect of education on the size distribution of income, the Chiswick's (1968) approach is discussed. The use of this approach is very convenient because it related a measure of education to a measure of income distribution. The model has been specified as:

$$\text{Ln } (Y_{si}) = \text{Ln } (\bar{Y}_0) + r_i S_i + U_i \quad (3.3.1)$$

where: Y_{si} $\equiv$ personal income after S_i years of investment in schooling;

$\bar{Y}_0$ $\equiv$ average income with zero level of schooling;

r_i $\equiv$ rate of return of schooling;

U_i $\equiv$ error term.

By making the assumption that all income beyond $\bar{Y}_0$ is due to investment in human capital,⁵ the above expression will be:

$$\text{ln } (Y_{si}) = \text{Ln } (\bar{Y}_0) + r_i S_i \quad (3.3.2)$$

and by taking variances of both sides, one can associate the level of income inequality to the level of education.

$$1. \text{ Var (Ln } Y_i) = \text{ Var } (r_i S_i) \quad (3.3.3)$$

The variance of the logarithms of income is commonly used as a measure of income inequality. So, the above expression in this case shows that the income inequality is a function of the variance of education and the rate of return to it.

The source of the controversy lies on the expansion of the $\text{Var}(rs)$: namely whether r and s are independent or not, $\text{Var}(rs)$ results to two different expressions.

If r_i and s_i are independent, (the assumption which Chiswick makes), then the variance of a product of two independent random variables is:

$$\text{Var}(r_i S_i) = \bar{r}^2 \text{ Var}(s_i) + \bar{s}^2 \text{ Var}(r_i) + \text{Var}(s_i) \text{ Var}(r_i) \quad (3.3.4)$$

and expression (3.3.3) can be expanded as

$$\text{Var}(\text{Ln} Y_i) = \bar{r}^2 \text{ Var } (S_i) + \bar{s}^2 \text{ Var}(r_i) + \text{Var}(s_i) \text{ Var}(r_i) \quad (3.3.5)$$

All of the variables on the right hand side of (3.3.5) are positive, so equation (3.3.5) implies that the variance of the logarithms of income (relative inequality) is positively related to the level of education. In other words, if r and s are assumed to be independent, then the increase in the level of education increases income inequality.

✓ One implication of this model, which Chiswick himself mentions, is that the change in distribution of schooling in the process of economic growth could lead to a more unequal

income distribution. The assumption of dependency between r and s is rather an unrealistic one. If human capital is treated as any other productive assets, then if its supply increases, the rate of return to it will decrease. This negative relationship is very strong in developing countries where the access to education is limited and there is an unequal distribution of schooling. In these countries income differential between skilled (educated) and unskilled (uneducated) is very great. The major part of this income differential is due to the fact that at low levels of development and unequal access to education, supply of highly educated and skilled individuals is very inelastic, if not perfectly so, and these individuals receive quasi-rent for their scarce abilities. Unlike other forms of physical assets, the scarce abilities of these individuals cannot be confiscated. The provision of educational institutions which facilitate the equal access to education will lead to elimination of this quasi-rent, and consequently, the earning differential due to this factor will narrow down.

As it is suggested above, the rate of return to education declines for two reasons. First, the values of the rates of return are inversely related to the educational level for each individual. For instance, Psacharopoulos⁷ has shown that the average social rate of returns to investment in education are 25.1 percent for primary and only 13.5 percent for secondary level, a decline of 11.6

percent.

The second reason for a decline in rate of return to education can be related to the increase in the numbers of educational institutions which facilitate the easy access to education. As it was mentioned earlier, an unequal access to education will lead to a quasi-rent received by an elite group. So, there might exist a negative relationship between rate of return to investment in education and the provision of educational institutions as reflected by enrollments at different educational levels.

The inverse relationship between rate of return and provisions of new educational institutions to create equal distribution of schooling is very crucial in establishing the relationship between education and income distribution in the process of economic development. It is evident⁸ that there is a close relationship between increase in the level of per capita G.N.P. and the increase in the enrollments at different educational levels. At the early stage of economic growth, there is not equal access to educational institutions, and as a result there is a significant wage differential and a high inequality in distribution of income. At the later stage, enrollments at different educational levels increases. This increase in enrollment leads to the elimination of quasi-rent and consequently to a lower degree of income inequality.

3.4 - Inequal Distribution of Assets

In most developing countries, the distribution of physical assets shows considerably more inequality than the distribution of income. The inequality in the ownership of assets will still result in more inequality in the distribution of income received to their owners. In these countries, the differences between the income accruing from privately owned assets are the main sources of overall inequality.

The greater degree of inequality of income from assets can be explained by fragmented financial markets in these countries. The wealthier people have better access to and better information about the financial system. With better information and larger assets the investors can assume risk and consequently a higher average return will accrue to them. This fragmented financial market tends to discriminate against the predominant traditional sector of the economy.⁹

The concentration of physical assets and hence the receipt of property incomes has a very significant effect on the size distribution of income. How the distribution of physical assets changes in the course of economic growth depends, partially, on the change in the saving rates in various income groups. The accumulation of physical assets is positively correlated with the amount of savings, and since the amount of savings is likely to be higher among the wealthier people than among the poor, the distribution of physical assets will not change in favor of the poor.

Although the income is the main determinant of saving, there are other factors which can affect the people's willingness to save. One of these factors is the improvement in the financial institutions which create easy access to the saving and credit markets. Also the improvement in these institutions will increase the public's confidence and trust in their integrity. As the per capita income increases, the governments of developing countries are able to insure all the funds deposited into financial institutions and this increases the public's confidence. The rate of saving is highly responsive to these institutional improvements. This aspect of economic development is a very encouraging process which facilitates capital accumulation for the low income groups.

Perhaps one of the most important components of wealth in rural areas of developing countries is land. In the rural sector, agricultural land accounts for a large proportion of the total wealth. And it is usually the most significant determinant in the distribution of income and power. In these countries the large landowners often dominate both financial institutions and government. It is evident that the countries which have less income inequalities in the process of economic growth are characterized by a fairly even distribution of land in rural areas.

The change in the distribution of land depends on radical land reform which changes the prevailing structure of land ownership to improve the distribution of land and

income.

3.5 - Population Growth and Income Determination

Population growth can and does affect the distribution of income. This effect can be examined by exploring how economic growth affects population growth through changes in the pattern of death rates and birth rates. For the purposes of the following discussion, population growth is defined as the difference between birth rate and death rate.

Historically, it has become evident that in the earlier stage of economic growth both birth and death rates are very high and consequently there is a low rate of population growth. As the level of income rises, public and private health services become more available and affordable. Also, the introduction and practice of preventive medicine causes the death rate to fall. Birth rate, however, starts declining long after the decline in death rates. This pattern has been termed as "the demographic transition". The decline in the death rates and the lag in birth rates is the most conspicuous and major cause of the acceleration and high level of population increase in the early stages of economic growth.

Although the relationship between income level and decline in death rates is fully understood, the decline in birth rate is not so obvious. The decline in birth rate can be explained by the process of change in economic and social structure such as increase in income, urbanization, industrialization, and education. Several explanations

have been given for the pattern of birth rates in the process of economic growth. They are as follows:

a. Children as productive agents: In the rural agriculture, the children provide a significant amount of labor to the family. Their benefit will exceed their low cost, due to the extended family system. But as urbanization proceeds, children become less valuable, as productive agents, and birth rate consequently falls.

b. Old age securities for parents: In the absence of social welfare, the parents may expect their children to support them in their old age. The introduction of old age pension and retirement payment might decrease the need for children for this purpose and consequently a decline in birth rate.

c. The perpetuation of the family: An optimum number of children might be desired due to the importance which is placed on perpetuation of the family. Based on this theory, a decline in infant and child deaths leads to the decline in the number of births necessary to assure the optimum number of children that will grow to parenthood.

The above arguments explain why birth rates will fall after the initial decline in the death rates. The lag between these two rates leads to a significant increase in the rate of population growth. So far, a demographic pattern has been established during the process of economic growth; high rates of birth and death in the earlier stage, then decline in death rate due to provision of public and private health services. There is a consequent decline in

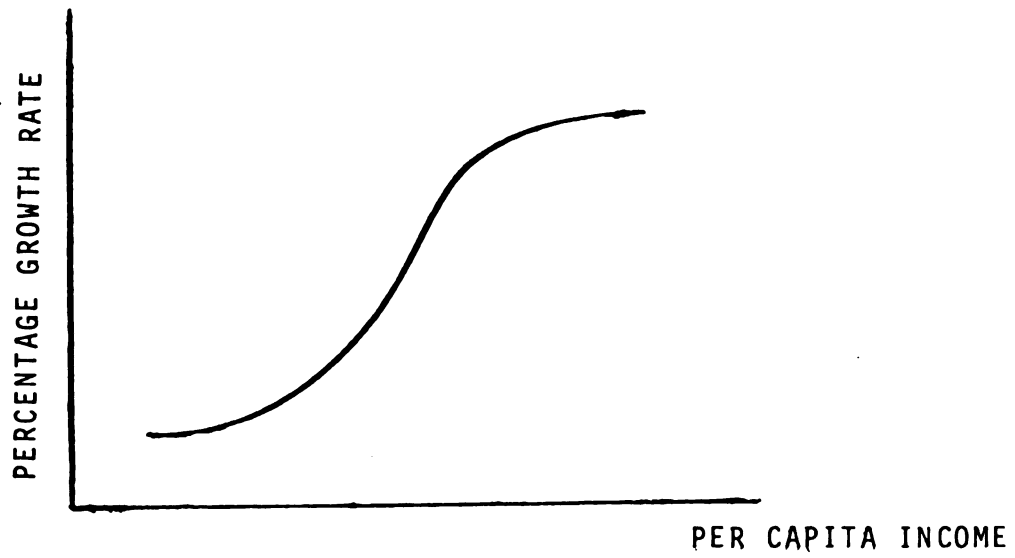


Figure 3.2
RATE OF POPULATION GROWTH
AND LEVEL OF INCOME

the birth rate at the latter stages of economic growth.

Two important aspects of this pattern have to be noted. First, the decline in death rates is more conspicuous in the younger age groups. This difference in mortality rate leads to the extremely young population which includes a large proportion of children below the working age (15 years old). In other words, the ratio between the number of economically inactive and active persons will increase. Second, there are differentials in birth rates and death rates within the country. In the early stage of economic growth, when the birth rate begins to drop, this reduction is likely to be evident first among families in the modern occupations and in the upper income brackets. But the high birth rate still continues among families in rural areas and lower income brackets. This differential in birth rates leads to inequality in size of households, as measured by number of persons. Families in the lower income bracket are larger in size and families in the upper income bracket are smaller in size.

After establishing the pattern of population growth during the course of economic growth, and considering the important aspects of population structure, it can be explained how this process affects the distribution of income in a country. The relationship between the population growth and functional distribution of income was first discussed by Malthus and Ricardo. They argued that increase in population would force wages to stay at the

level of bare subsistence. This theory was frequently referred to as "the iron law of wages". Increase in population would raise the rent in the national income in the expense of profit. As it was seen in the first section, the population growth would prolong the existence of unlimited supply of labor and would delay the level of employment where wage rate starts to increase. As it was argued in the same section, the change in labor share as a result of population growth depends on the rate of growth of capital, the substitutability of capital and labor for one another, and the biasedness of technology. There are a number of mechanisms through which the population growth can influence the size distribution of income. One of these mechanisms is the impact of population growth on the accumulation of physical and human capital. As it was mentioned, rapid rate of population growth changes the age structure of the population. This phenomenon increases the ratio of dependents to adult members of the labor force, thereby increasing the consumption by a larger number of children. The result is a lower saving/income ratio. The reduction in saving will lead to reduction in capital accumulation for households. By assuming the fertility differential among rich and poor families, the population growth will enhance the concentration and ownership of physical capital.

The increase in dependency ratio can also affect the expenditure on education for each child. It has been noted that there is an inverse relationship between the size of

family and the amount spent on education per child.¹⁰ The decrease in amount expended on education will impede the improvement in the education of children in low income bracket, and consequently leads to the expansion of the supply of unskilled workers relative to the supply of better trained and educated workers, thus increasing skill-unskilled wage differentials.

Population growth and fertility differential can lead to a higher degree of inequality if the basis of income distribution is changed from income per household to the ✓ income per person. Kuznets (1976)¹¹ suggests that there is a negative correlation between size of family and per person income. The fact that the upper income classes have smaller family size and the lower income classes are characterized ✓ by large family size, makes it essential to distinguish between size distribution of income among households and ✓ among persons. The inequality in the distribution of income will be much higher if the per person income is used as a basis for calculating the inequality indicators.

In summary, the population growth contributes to a deterioration of income distribution in the early stage of economic growth. In the later stage, as population growth slows down, it is expected to have a smaller degree of income inequality.

3.6 - Trade Policies and Income Distribution

The foreign trade policies as well as the domestic policies can affect the income distribution. The impact of these policies on income distribution can be examined by investigating how these policies affect the internal term of trade and employment.

Most of the LDC's have appealed to import substitution in pursuing their industrialization. Especially since the second world war, industrialization strategies have been setting up industries to produce goods that were previously imported. These strategies have been implemented by governments through protective tariffs and controls. The justification for these protective measures is the learning time needed for the new domestic industries to establish themselves. Temporarily shielding young domestic firms from the severe competition afforded by more mature and therefore more efficient foreign firms will give the infant industry a learning time to develop and become more efficient.

✓ The protection of infant industries aiming at the establishment and development of manufacturing industries can affect the distribution of income in several ways.

a. Distorting the internal term of trade. By keeping out low-cost foreign-made products, it hurts the farmers by raising the prices they pay for domestically manufactured goods and depresses the prices they receive for their products. In other words, the import substitution policies which cause the ratio of manufacturing prices to agricultural

prices to be higher than the world markets, redistributing income from agriculture to industry. For example, S.R. Lewis¹² has estimated that distribution of income from farm price distortion (due to protection) amounted to \$500 million per annum of income from farming to manufacturing in Pakistan over most of the 1950s. The same redistributive effect has been confirmed by other authors for a number of countries.¹³ The distribution of income from farmers (which are in lower income brackets) to manufacturers (which are in higher income brackets) will contribute to a deterioration of income distribution.

b. Encouraging capital intensive technique. Since most of the import-substitution projects are relatively capital intensive, the pursuit of this policy encourages the capital intensive technique. Too much emphasis on protection will also discourage the export industries. Conversely, exports from developing countries are relatively labor intensive. So wide resort to import substitution will aggravate the problem of unemployment, and thus intensify the inequality in the distribution of income.

c. Monopoly power. The protection system may also lead to monopoly power for those manufacturers who have obtained the import license for essential inputs of the protected industries. By preventing the competition, the monopolists are able to charge higher prices for the previously imported consumer goods and thus reap monopoly rent at the expense of the consumers.

In general, the main conclusion is that import substitution industrialization has contributed to a deterioration of income distribution. How the distribution of income due to this factor changes over time depends on government policies to provide opportunities for promoting exports and employment.

3.7 - Government Policies and Income Distribution

✓ The pursuit of growth-oriented strategies in most of the developing countries has ignored the ethical standards concerning what is an equitable or just distribution of income. The emphasis on these strategies leads to an environment inefficient to create equal opportunities to acquire income-generating skills. The realization of these facts has led to the conclusion that distribution cannot be left to the free interplay of different forces.

Most governments, in an effort to equalize income distribution, tax the rich, provide public goods, and transfer income to the poor. These are the main instruments by which to change the distribution of income to satisfy the equity objectives of economic growth.

To get precise measurement of the redistributational effects of taxes, two main aspects have to be considered.

✓ First is the structure of the tax system and second, it is necessary that the burden assigned to an individual actually be borne by the individual and not be shifted to others. The first aspect is concerned with the progressivity or regressivity of a tax system. A tax system is defined to

be progressive when the average rate of tax rises with income. On the contrary, a regressive tax system is when the average rate of tax falls with rising income. Personal income tax which is levied on taxable income is progressive in effect as well as in structure. The sales and excise taxes are as a whole regressive. The question of progressivity or regressivity of the property and corporate income taxes are difficult and controversial. The reason for this difficulty is the incidence of these types of taxes. The overall progressive tax system tends to reduce the inequality of income.

In order to determine the redistributive effect of the tax system on the distribution of income, it is also necessary to know how the tax burden is allocated among the individual taxpayers; which is the second aspect of government taxation. Some taxes can be shifted among various parties in the economy. It is, therefore, necessary to locate the final resting place of the major types of taxes.

With regard to the personal income tax, the incidence falls entirely on the individual upon whom the tax is levied. In the case of corporate income tax, Gillespie¹⁴ suggests that two thirds of the corporate profits tax is borne by the owners and one third is shifted forward to consumers.

Sales or excise taxes will generally be shifted to the consumer through higher product prices. The amount of the shift in this case depends on the elasticities of supply and demand for goods and services upon which the tax is

imposed. With regard to the property taxes, it is necessary to distinguish between two kinds of properties. In the case of land and owner-occupied residences, the tax is borne by the owners. On the other hand, taxes on rented property can be shifted wholly or in part from the owner to the tenant in the form of higher rents.

As it has been noted that each country employs a variety of taxes. Some of these taxes are progressive, whereas other are regressive. The structure of the tax system as a whole for distributional policies is very important, because only progressive tax systems will reduce the inequality of income distribution.

✓ In underdeveloped countries, the traditional taxes are excise and sales taxes. Although these types of taxes are regressive in their nature, they are economically and administratively feasible to levy and collect. An income tax, which is progressive, can be administered effectively only if financial records are kept and the economy is predominantly a money economy. Also, political institutions must be such that collection of taxes levied on economically powerful individuals is possible. In the lowest income
✓ countries, the people in higher income groups are too powerful politically to permit even moderate rates of taxation to be levied against them. In these countries, the tax actually collected is likely to be regressive, because it can only be collected from low and middle income salary earners.

In the lowest income countries, the only tax system which is economically and administratively feasible is indirect taxes. Only in the later stages of economic development, as economic complexity produces more financial records, will the newer forms of direct taxes, (corporation and personal income taxes, which are more progressive in their nature) become increasingly important. The ratio of direct to indirect taxes is less than unity in the early stages of economic development, and then will gradually rise again as the country becomes more and more industrial.¹⁵ Government tax policies are only a part of the picture. In order to determine the redistributive effect of the government activities on the distribution of income, the study must take into account the public expenditure side too. Since in most of the developing countries the tax system tends to be roughly regressive, or at most proportional, in its overall effect, the overall progressivity of government policies depends on the overall progressivity of government expenditures.

The very nature of government expenditure makes it difficult to measure precisely the manner in which its benefits are distributed among individuals and institutions in the society. However, transfer income and welfare programs have clear redistributive effects. Transfer payments and welfare programs provide funds to dependent and handicapped and compensation to the unemployed. Gillespie¹⁶ presents an interesting chart in which he shows

how the government expenditures have been allocated among different income brackets. It reveals that government expenditure on education, social security, health and housing are regressive, i.e. allocation of expenditure on each income group decreases as the level of income increases. The regressive nature of government expenditure assures that overall there is some net redistribution effect to decrease the inequality of distribution in income.

Although the provision of welfare programs can change the distribution of income, governments of underdeveloped countries cannot raise the revenue they need through direct taxes on the profit of corporations and personal incomes. In pursuit of welfare programs, these governments have to appeal to indirect taxes; and this is a discouraging fact as far as the distributional objective is concerned.

FOOTNOTES

CHAPTER THREE

FOOTNOTES

¹For a good reference on this matter, see Simon Kuznets, Modern Economic Growth (New Haven and London: Yale University Press, 1976).

²The turning point on the labor supply at L_c is called "commercialization point" by John Fei and G. Ranis, Development of the Labor Surplus Economy (Homewood: Irwin, 1964), p. 22.

³Barry R. Chiswick, "The Average Level of Schooling and the Inter-Regional Inequality of Income: A Clairification," American Economic Review (June 1968) p. 500.

⁴Alan Marin and G. Psacharopoulos, "Schooling and Income Distribution," Review of Economics and Statistics 58 (August 1976), pp. 332-337.

⁵Ability and motivation can be a source of income differential, besides the level of education, but these factors have a very small effect on earnings. For a detailed study see Z. Griliches and W.M. Mason, "Education, Income and Ability," Journal of Political Economy, Part II (May-June, 1972).

⁶For the original work on expansion of this equation, see Leo A. Goodman, "On the Exact Variance of Products," American Statistical Association Journal (December 1960), pp. 708-713.

⁷G. Psacharopoulos, Return to Education: An International Comparison, (San Francisco and Washington: Josser-Bass Inc., 1973).

⁸For instance, see Frederick H. Harbison and C.A. Megers, Education, Manpower and Economic Growth (New York: McGraw Hill, 1964).

⁹For a good discussion on the relationship between concentration of wealth and income see especially chapter two in James Meade, Efficiency, Equality, and the Ownership of Property (Cambridge, Mass.: Harvard University Press, 1965).

¹⁰This point is shown by the use of a simple regression model in Luiz Kogut and Carlos Geraldo Langoni, "Population Growth, Income Distribution and Economic Development," International Labor Review 111 (April 1975) p. 327.

¹¹Simon Kuznets, "Demographic Aspects of the Size Distribution of Income: An Exploratory Essay," Economic Development and Cultural Change 25 (October 1976) pp. 1-94.

¹²J.P. Lewis, Pakistan: Industrialization and Trade Policies (London: Oxford University Press for O.E.C.D., 1970), p. 148.

¹³See for instance, Ian M.D. Little, Tibor Scitovsky, and Maurice Scott, Industry and Trade in Developing Countries (Paris: Oxford University Press for O.E.C.D., 1970), p. 43.

¹⁴W. Irwin Gillespie, "Effect of Public Expenditures on the Distribution of Income," in Essays in Fiscal Federalism, ed. Richard A. Musgrave, (Washington, D.C.: The Brookings Institution, 1965).

¹⁵For the empirical finding on the percentage of direct and indirect taxes in total taxation in the process of economic development, see Harley H. Hinrichs, A General Theory of Tax Structure Change During Economic Development, (Cambridge, Mass.: Harvard Law School, 1966).

¹⁶W. Gillespie, "Effect of Public...", p. 139.

CHAPTER FOUR

EMPIRICAL EXPLORATION OF THE IMPACT OF ECONOMIC GROWTH ON INCOME DISTRIBUTION

4.1 - Introduction

In order to empirically investigate the relationship between the distribution of income and the process of economic growth, one needs to have information on long-term trends on different socio-economic characteristics of the individual countries. But there is a paucity of time series data on distribution of income and other important aspects of economic performance, even for developed countries. The lack of time series data on these important variables is a serious constraint in empirical investigation. The lack of data on long-term trends makes it essential to look for other sources of data; namely, the application of cross-sectional data. In estimating the relationship from this type of data, one makes an implicit assumption that i th country's socio-economic characteristics would be exactly the same as the j th country after a certain time lag.

This assumption implies a basic homogeneity among countries. The homogeneity among countries is an invalid assumption, simply because socio-economic characteristics of the underdeveloped countries are totally different from

those of developed countries at the beginning of their industrialization. These differences can be summarized as follows:

a. There exists a lower agricultural land per capita and a higher man/land ratio in developing countries today than existed in the presently advanced countries. Statistical evidence on the ratio of agricultural land to the male workers in agriculture shows the ratios of 1.2 workers per land unit for the United States, 3.0 for the Soviet Union, 31.0 in India, and 73.0 in Egypt.¹

b. Agricultural productivity in developing countries today is lower than it was in the advanced countries in their pre-industrialization stage. This is probably largely due to the higher density of population settlement and the greater pressure of population on land. The lower agricultural productivity in turn leads to lower per capita income in the agricultural sector of the developing countries.

c. There is a much higher population growth in the underdeveloped countries today relative to that in the pre-industrialization phase of the now developed countries. One implication of high population growth is that the proportion of children under age of 15 is almost one-half of the total population in these countries. The higher dependency ratio in turn implies that a greater amount of resources is required to feed, clothe and educate the young, therefore reducing saving and the availability of

resources for productive investment.

d. Most of the now-advanced countries began industrialization after a long period of political independence, whereas most of the underdeveloped countries are beginning development after decades of political inferiority and colonial status. This factor leads to a political environment which is insufficient to promote political participation for the majority of the population. The lack of interest in political participation leads to weakness in the social and political structure of underdeveloped countries.

e. In underdeveloped countries today, there is a greater degree of dualism and a higher degree of inequality than there were in the presently advanced countries in their pre-industrialization stage.

The above comments very briefly highlight some of the important economic and political characteristics of the underdeveloped economies today in comparison with the developed countries in their pre-industrial phase. Therefore, these differences hinder the comparability of cross-sectional data for drawing a stable relationship between income distribution and economic growth for a single country when cross-sectional data are used. A country committed to a policy of more equitable distribution of income and wealth favors laws to regulate economic activities and ownership of physical and human capital and consequently has a more equal distribution of income across different stages of economic

growth, whereas a country whose government is unwilling to take redistributive measures has a higher degree of inequality regardless of the level of economic growth.

✓ It is again emphasized that in interpreting the results obtained from cross-sectional data, one has to be aware of the danger of drawing inferences from cross-sectional comparisons and applying these results to long-term growth processes for an individual country.

By keeping in mind the shortcomings of the cross-sectional data, this chapter proceeds as follows: in section 2, a brief introduction to the method of estimation is presented. In section 3, the impact of different variables on the Gini coefficient is estimated by using the spline function. One equation is estimated for each variable to explore the impact of that particular variable on the distribution of income. Section 4, on the other hand, presents estimates for a more general equation, relating the Gini coefficient to all the variables in a single equation.

4.2 - Method of Estimation

The conventional wisdom of the relationship between income distribution and the process of economic growth, as measured by per capita product, has been the inverted U-shaped hypothesis, originated by Kuznets. This hypothesis states that the inequality in the distribution of income first increases in the early stages of economic growth and

then in the later stages it improves. In other words, any measure of income inequality follows a particular trend within a certain range of per capita products, but follows a different trend beyond that range.

To test the inverted U-shaped hypothesis by using the regression model, the potential specification which reflects the change in patterns of income inequality could be the piecewise technique. The regression equation can be specified as:

$$G_i = \alpha + (\beta + \gamma D_i) Y_i + \epsilon_i ,$$

where i is various countries and α, β and γ are coefficients to be estimated, G_i is the Gini coefficient measuring the inequality of income distribution and furthermore $0 < G < 1$. Y is per capita gross domestic product, D_i is a dummy variable whose value is 1 for all observations such that $Y_{i-1} \leq Y \leq Y_i$ and is zero, otherwise. ϵ is the disturbance term.

For the inverted U-shaped pattern the above regression can be simplified and illustrated as shown in Figure 4.1. But the piecewise technique reflects a linear relationship with a constant slope in some range of Y and a different constant slope elsewhere. The constancy in slopes is a serious disadvantage in showing the pattern of income distribution in the process of economic growth. The alternative is to fit a piecewise polynomial relationship between these two variables. The piecewise polynomial

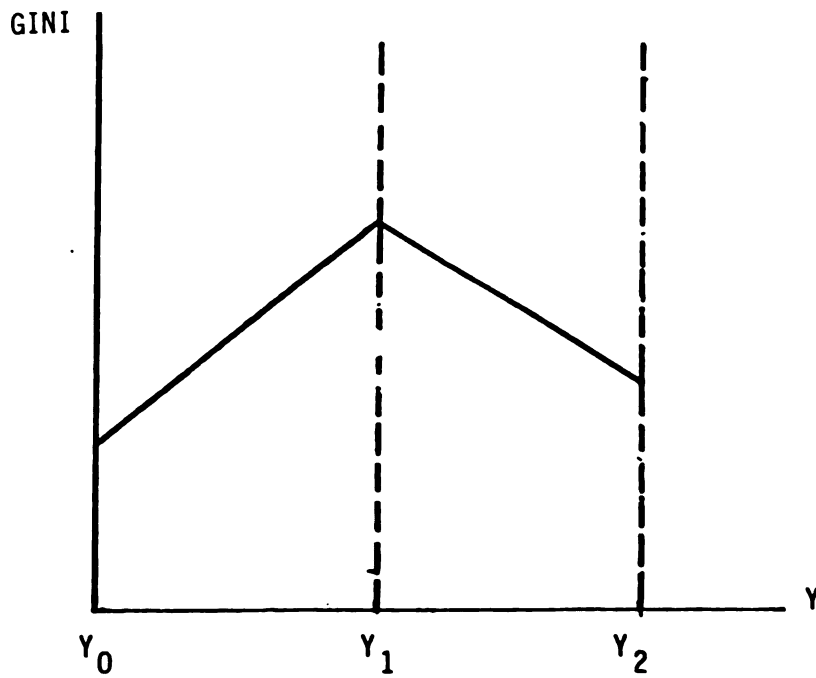


Figure 4.1

PIECE-WISE LINEAR RELATIONSHIP BETWEEN
GINI COEFFICIENT AND PER-CAPITA INCOME

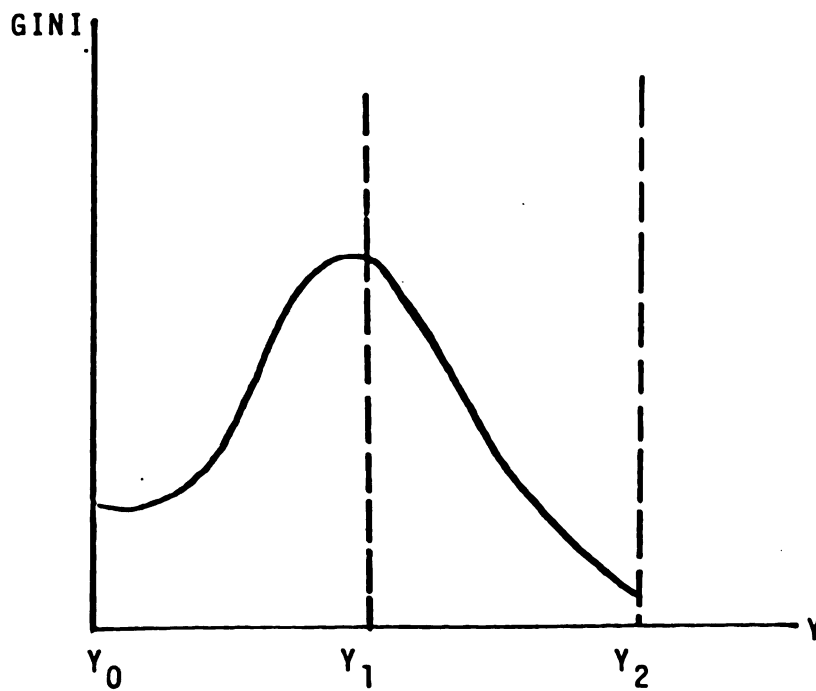


Figure 4.2

PIECE-WISE POLYNOMIAL RELATIONSHIP BETWEEN
GINI COEFFICIENT AND PER-CAPITA INCOME

technique is called spline function.² Any degree of polynomial could be employed, but in this chapter only the cubic polynomial is used. The general form for the regression model for the cubic polynomial is:

$$G = b_0 + b_1 Y + b_2 Y^2 + b_3 Y^3 + \sum_{i=1}^k k_i (Y - Y_i)^3 D_i + \epsilon_i$$

where all the variables are defined as before and k is the number of knots.

The graphical representation of the spline function is shown in Figure 4.2. The points corresponding to Y_1 and Y_2 are called "knots". The use of spline function gives more flexibility to the estimated regression model for variation in the rate of change in the slope of the curve within an interval; the property which the linear piecewise technique did not have. So the spline function is superior to the other form of specification in a sense which allows the curve to twist in order to fit the data more closely.

4.3 - The Estimation Results

4.3.a - Per capita GDP and the Distribution Income

The object of this part is to test the empirical basis for Kuznet's hypothesis; that inequality tends to increase in the early stage of economic growth and improves in the later stages. An index of income inequality which is used in this chapter is the Gini coefficient and it is estimated for the households with the national coverage. Gini coefficient has been obtained from a compilation of

available cross-country data undertaken by the World Bank's Development Research Center and reported in Jain (1975).³

One summary measure of the level of economic growth has been per capital GNP of each country. The use of cross-sectional data requires international comparisons among these countries. The method used to compare per capita GNP has been to take the per capita GNP estimate for each country in its own currency and to convert them all to a common currency by means of the exchange rate between currencies. However, the use of exchange rates to compare the per capita GNP of two countries at different income levels systematically understates the per capita GNP of the lower income countries.⁴

To have a better measure for international comparisons of gross products, purchasing-power parities of currencies provides a better way of making international comparisons. The data on per capita gross product, based on purchasing-power parities, is taken from a recent study sponsored by the statistical office of the United Nations.⁵

After establishing a consistent set of data, the relationship between income distribution and level of economic growth can be explored by fitting a spline function. Since it is expected that there is a turning point in inequality somewhere in the middle range of per capita income, four knots are used at $Y = \$400$, $Y = \$800$, $Y = \$1200$, and $Y = \$1600$ (expressed in 1970 U.S. dollars). The estimated equation is as follows: (the numbers in the parenthesis are

T-statistics)*

$$\begin{aligned}
 G = & .11 + .004Y_* - .14(10)^{-4}Y_*^2 + .14(10)^{-7}Y_*^3 \\
 & (.46) (1.71) (-1.96) \quad (2.16) \\
 & - .18(10)^{-7}(Y-400)^3D_{1*} + .66(10)^{-8}(Y-800)^3D_{2*} \\
 & (-2.41) \quad (2.98) \\
 & - .26(10)^{-8}(Y-1200)^3D_{3*} + .46(10)^{-9}(Y-1600)^3D_4 \\
 & (-1.19)* \quad (1.17) \\
 (R^2 = .37, F_{(7,59)} = 5.13)
 \end{aligned}$$

This estimated equation confirms the inverted U-shaped hypothesis at the level of per capita GDP of \$1000 and Gini coefficient of .583. If the maximum inequality corresponds to $Y = \$1000$, then the numbers of knots can be reduced to two; at $Y = \$800$ and $Y = \$1200$. The new estimated equation with smaller numbers of knots is:

$$\begin{aligned}
 G = & .58 - .12(10)^{-2}Y + .26(10)^{-5}Y_*^2 - .14(10)^{-8}Y_*^3 \\
 & (4.4) (-1.6) \quad (2.1) \quad (2.37) \\
 & + .23(10)^{-8}(Y-800)^3D_{1*} - .82(10)^{-9}(Y-1200)^3D_{2*} \\
 & (2.6) \quad (2.8) \\
 (R^2 = .31, F_{(5,61)} = 5.66)
 \end{aligned}$$

The estimated equation is illustrated in Figure 4.3. As it is seen, the graph confirms the inverted U-shaped

*coefficients with asterisk are significant at .05 level or better.

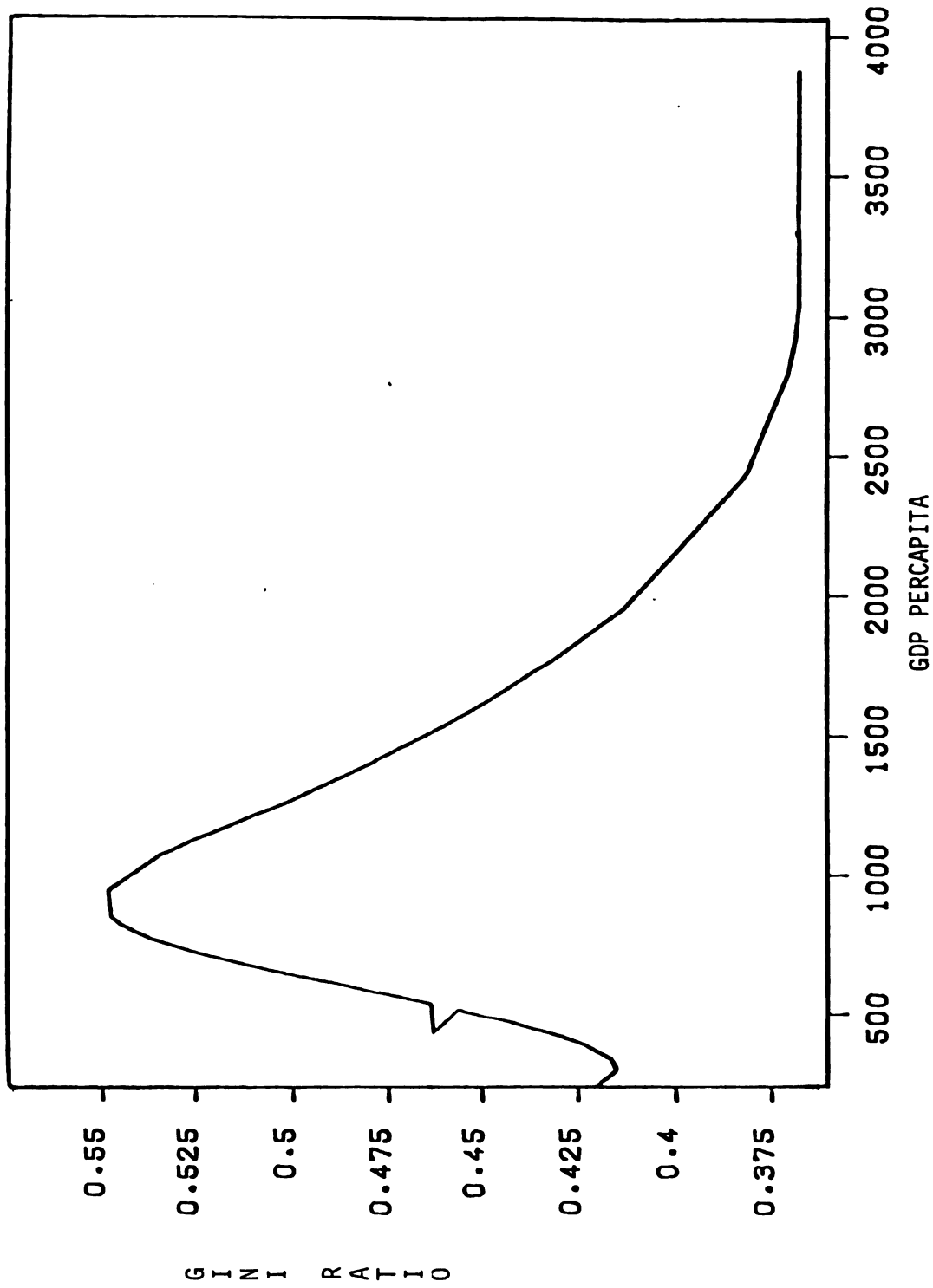


Figure 4.3

ESTIMATED GINI AT DIFFERENT PER CAPITA INCOME

hypothesis. As the level of per capital GDP rises, the inequality in the distribution of income worsens; it reaches to its highest degree at per capita GDP of 1000 dollars. After this level of GDP, the Gini ratio declines rapidly and reaches to its minimum of .365 and stays the same as GDP per capita increases.

4.3b - Rate of Growth of GDP and Income Inequality

The relationship between income distribution and economic growth is essentially a long-term relationship. It may be useful to explore how the degree of inequality is affected by the rate of growth of output. The developing countries have shown a respectable average growth rate of approximately 6.1 percent between 1960 and 1977. The average annual growth rate among all developed countries during this same period was approximately 4.9 percent. So one can expect that the rapid economic growth in the developing countries leads to rapid capital formation and through its accelerator effect causes expansion of income and employment. On the other hand, a stagnant level of per capita income which is reflected in a slow process of innovation leads to a gradual increase in unemployment and a steady decrease in income share among the lower income levels.

So a rapid rate of economic growth, it is expected, leads to a better distribution of income while slow rate leads to a deterioration of distribution of income. To investigate this relationship empirically, a spline regression model is estimated. The dependent variable is

the rate of growth of GDP over the six year period. The estimated equation is as follows:

$$G = .68 - .28 RG + .082 (RG)^2 - .006 (RG)^3 + .0088 (RG - 5)^3 D_1$$

(1.5) (-.78) (.98) (-1.1) (1.19)

$$(R^2 = .30, F_{4,47} = 5.15)$$

The estimated equation is shown in Figure 4.4. The graph shows an inverted U-shaped relationship between the Gini coefficient and the rate of growth of GDP. The maximum level of inequality is reached where the rate of growth of GDP is 5.9 percent. Beyond this rate of growth, the distribution of income starts improving.

One probable reason for the deterioration of the distribution of income can be found in the existence of lags in factor mobility across sectors. High rate of growth may lead to the over-utilization of labor and capital in some sectors, causing a bottleneck or skill shortage in these sectors. The skill shortage in turn leads to significant income differentials for the owners of these highly demanded skills.

When rate of growth of GDP is considered as an explanatory variable, the regression equation does not take into account the rapid population growth in developing countries. Although developing countries have a high rate of growth of GDP, these countries also have a high rate of population growth, the average rate of population growth is about 2.1 percent per year in developing countries compared

with population growth rates of 0.7 percent per year in the industrialized world. To consider this factor, another spline function is estimated. The explanatory variable is per capita rate of growth. The estimated equation is:

$$\begin{aligned}
 G = & .07 + .94 (\text{PRG}) - .51 (\text{PRG})^2 + .88 (\text{PRG})^3 \\
 & (-.19)(1.36) \quad (-1.26) \quad (1.19) \\
 & - .092 (\text{PRG} - 2.0)^3 D_1 + .0045 (\text{PRG} - 4)^3 D_2 \\
 & (-1.1) \quad (.233) \\
 & + .0024 (\text{PRG} - 6.0)^3 D_3 \\
 & (.195)
 \end{aligned}$$

$$F_{(4,53)} = 5.02 \quad R^2 = .27$$

Figure 4.4 shows the estimated equation. When the per capita growth rate is regressed on Gini coefficient, Gini coefficient increases and reaches to its peak level at per capita rate of growth of 1.6. Beyond this rate, it continuously declines. The very small range of worsening income inequality again can be contributed to the factor market disequilibria.

By looking at the estimated coefficients in both equations, it is apparent that none of them is significant. But R^2 s are significantly different from zero at 0.01 level. This case often occurs in spline function when there is only one explanatory variable. The problem is that though the explanatory variables as a group can explain the dependent variable well, the effect of each variable separately cannot be estimated with any reasonable degree of

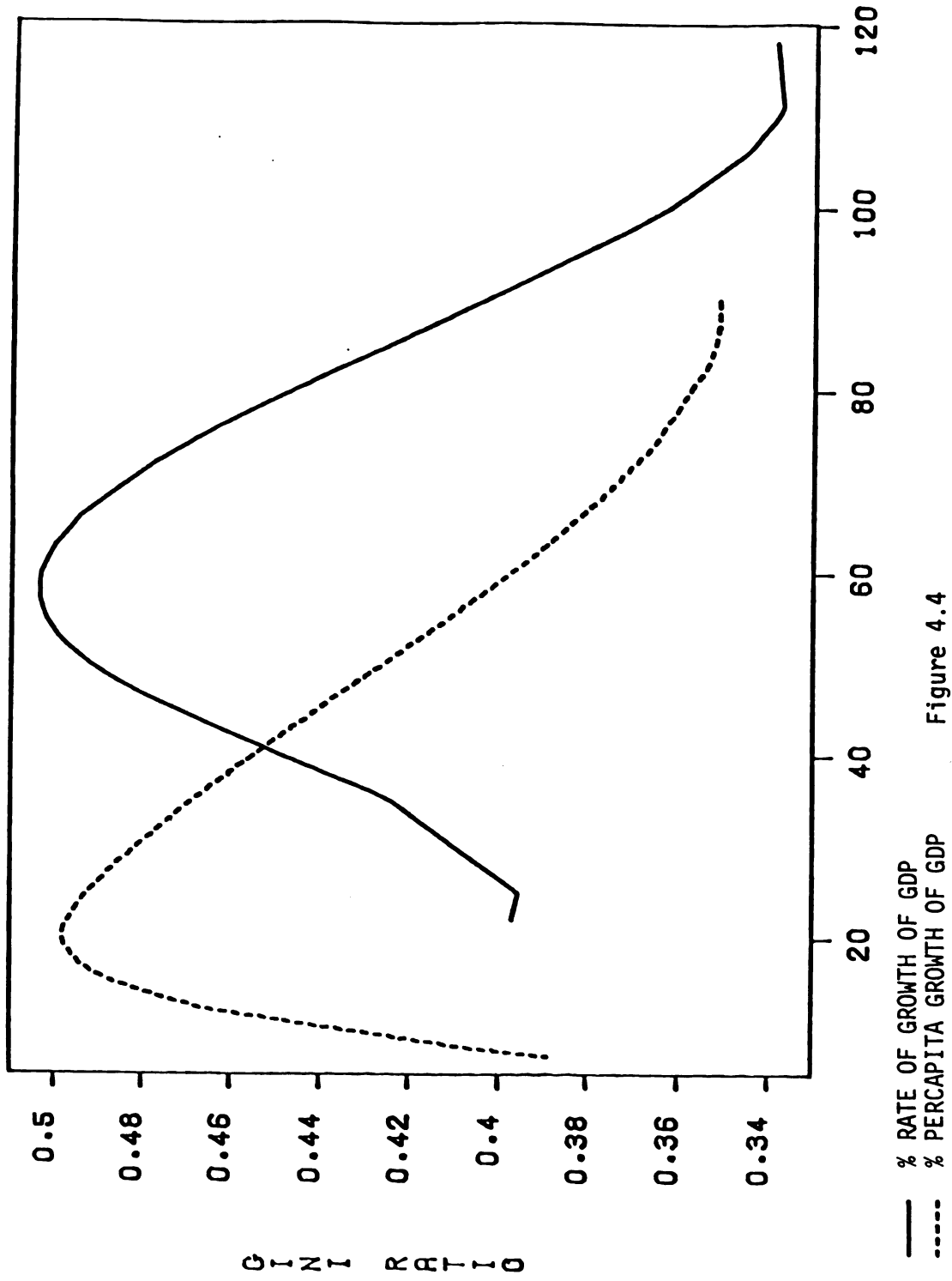


Figure 4.4

GINI COEFFICIENT AND PERCENTAGE RATE OF GROWTH OF OUTPUT

precision. This problem occurs usually in cases where the explanatory variables are highly intercorrelated; which is the case in the spline function. The right hand side variables all are different forms of a single variable. It should be emphasized that the problem in this case is essentially a sample phenomenon. Lack of sufficient information in the sample does not permit accurate estimation of the individual parameters. One solution to this problem is to get more data if it becomes available.

4.3c - Dualistic Economic Development and Income Distribution

In the process of economic growth, it has been observed that output per capita in the industrial sector increases at a rate much higher than the output per capita in the agricultural sector. This unequal development slowly draws people from the low income agricultural sector to the industrial sector. This process creates a mechanism which leads to an increase in relative inequality in the early stages of urbanization and improvement in the distribution of income in the later stages.

For the empirical inquiry on the association between overall inequality and rural-urban migration, one needs information on inequality within each sector and percentage of population in each sector. The lack of data on these variables makes it essential to use some other proxy variables which somehow capture some aspects of this process. The explanatory variable which is used here is the share of

the urban population in relation to the total population. The measure of overall inequality is the Gini coefficient.

The estimated spline equation is:

$$\begin{aligned} \text{Gini} = & .4 + .0048 \text{ UPOP} - .21 (10)^{-3} \text{ UPOP}^2 + .41 (10)^{-5} \text{ UPOP}^3 \\ & (3.35) \quad (.25) \quad (-.23) \quad \quad \quad (.34) \\ & - .11 (10)^{-4} (\text{UPOP} - 30)^3 D_1 + .3 (10)^{-4} (\text{UPOP} - 60)^3 D_2 \\ & \quad \quad \quad (-.68) \quad \quad \quad (1.1) \\ R^2 = & .27 \quad F_{5,46} = 3.43 \end{aligned}$$

where UPOP is share of urban population in total population.

It is evident that, as it was for the GDP growth rate, although the explanatory variables as a group can explain the dependent variable, which is reflected in significant R^2 at .01, the effect of each variable separately cannot be estimated with any reasonable degree of precision. Again the solution to this problem is to obtain more data on urbanization and Gini.

The estimated equation is shown in Figure 4.5. The graph shows an inverted U-shaped association between urbanization and overall inequality. The maximum overall inequality is reached when the share of urban population equals 51 percent. Beyond this point, the overall inequality improves.

The perverse effect of migration on overall inequality can be explained by the differences in the inequality of income distribution between these two sectors. As Ahluwalia⁶ has shown, the inequality of income in the rural sector is

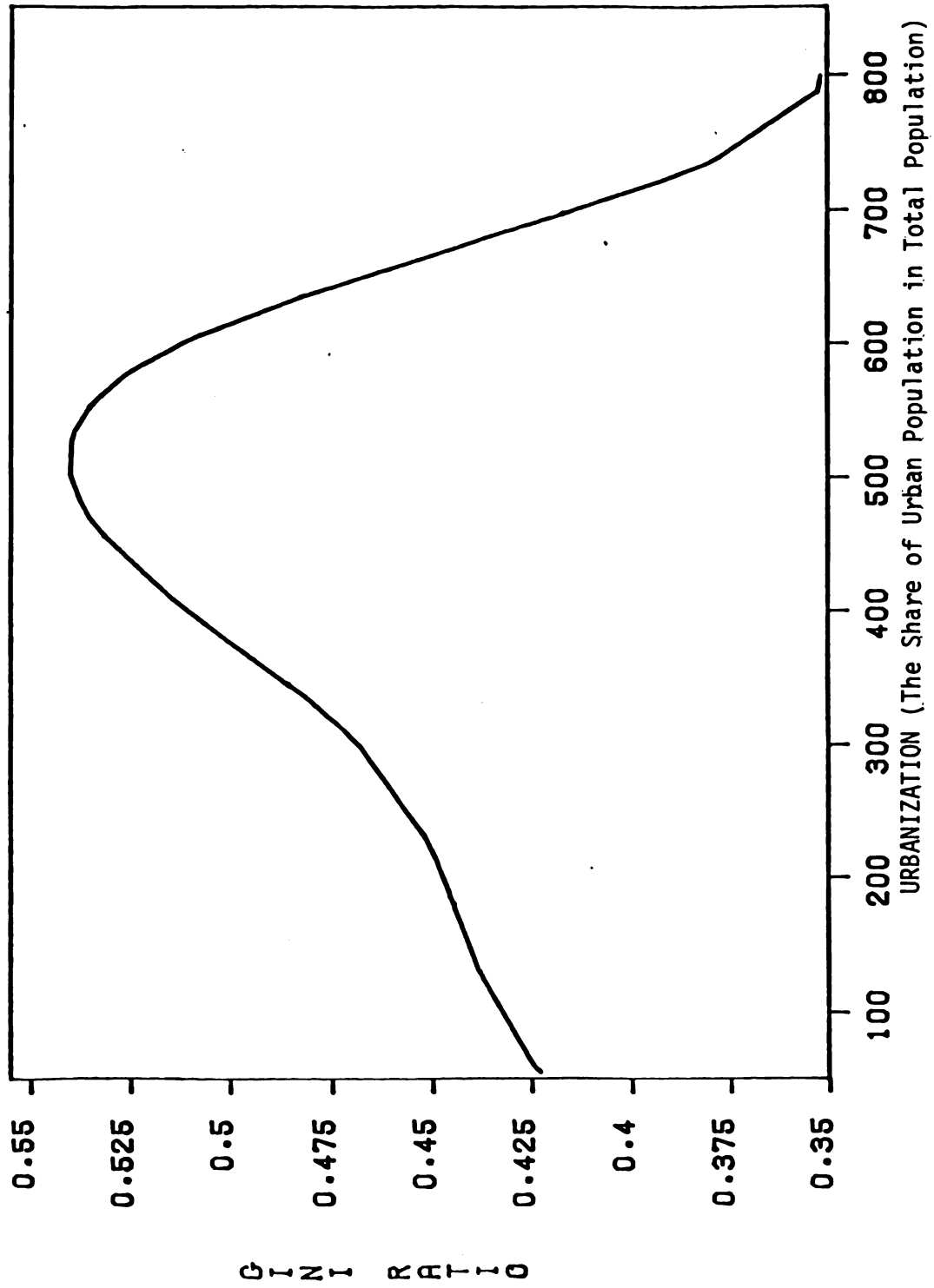


Figure 4.5

URBANIZATION AND GINI COEFFICIENT

much less than the inequality in the urban sector. The increase in relative weight of the more unequal sector in total population will lead to a higher overall inequality in distribution of income.

A plausible reason for the improvement in the overall inequality at the higher urbanization can be explained by increase in political participation and political power of the urban low income groups. The political power will lead to legislation aimed toward the provision of equal opportunities and educational institutions. These steps tend to improve the distribution of income in favor of the urban migrants and low income residents.

4.3d - Labor Share and Capital Formation

The labor-surplus, dual-economy model of development, discussed in the first section of Chapter Three, implies that a high rate of growth in the modern sector would create a high rate of demand for relatively unskilled labor. The engine of the rapid growth in the modern sector is the continuous reinvestment of surplus output. The rapid capital accumulation, in turn, absorbs increasingly large numbers of workers and ultimately increases the share of labor in total output. Since the wage receivers are in the lower income brackets, any factor which increases labor share will change the distribution of income.

Therefore, in order to investigate the pattern of the distribution of income under the dualistic model, two explanatory variables are used. These are the labor share

and capital formation as a percentage of GDP. Two spline regression equations are estimated. The explanatory variable in the first equation is the labor share and in the second equation, the explanatory variable is the capital formation. Gini coefficient is the dependent variable in both equations.

When the labor share is regressed on Gini coefficient, the estimated equation is:

$$\begin{aligned}
 G = & -1.84 + .18 LS_{*} - .0048 (LS)^2_{*} + .38 (10)^{-4} (LS)^3_{*} \\
 & (-1.97)(2.43) \quad (-2.31) \quad (2.13) \\
 & - .13 (10)^{-3} (LS-50)^3 D_1 \\
 & (-.75)
 \end{aligned}$$

$$R^2 = .34 \quad F_{4,49} = 6.38$$

where LS is the labor share.

Figure 4.6 shows the estimated equation. As it is observed, there is an inverted U-shaped association between labor share and the overall inequality. The maximum inequality occurs when the labor share is equal to 32.5 percent. Beyond this point, as the labor share increases, overall inequality decreases continuously. Although it is expected that the distribution of income improves as the labor share increases, a plausible explanation cannot be offered for the worsening distribution of income at the lower labor share. It can be speculated that the lower labor share is associated with a smaller percentage of the labor force in the industrial sector versus the agricultural and

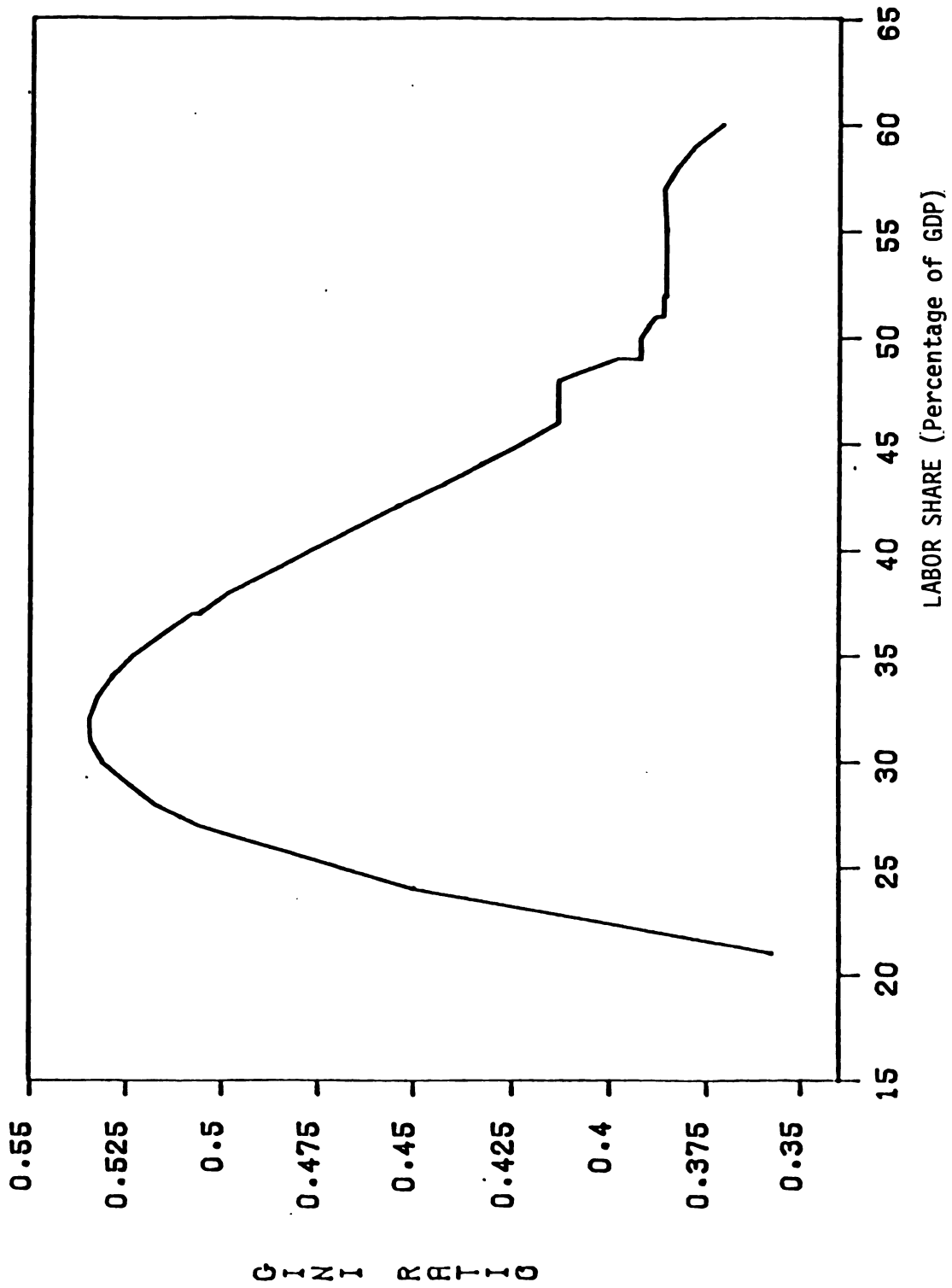


Figure 4.6

LABOR SHARE AND GINI RATIO

informal sectors. The smaller percentage of labor force in industrial sector of the urban area, in turn, is associated with lower political power to demand for better work conditions, higher wages and at the extreme, for more equal distribution of existing assets.

For the second spline regression, capital formation is used as the explanatory variable. The estimated equation is:

$$\begin{aligned}
 G &= 2.6 - .38KF + .022 (KF)^2 - .42 (10)^{-3} (KF)^3 \\
 &\quad (1.72)(-1.41) (1.43) \quad (-1.49) \\
 &+ .69 (10)^{-3} (KF - 20)^3 D_1 \\
 &\quad (1.74) \\
 R^2 &= .28 \quad F_{4,49} = 4.95
 \end{aligned}$$

Figure 4.7 shows the association between capital formation and Gini coefficient. The striking feature that this graph shows is the significant impact of capital formation on improving the distribution of income. An increase of 20 percent in capital formation, as percentage of GDP, has caused a significant drop in Gini ratio (from .59 to .31).

In the absence of time series data for a single country, it is very difficult to pinpoint the causes of this association between capital formation and Gini ratio. If capital and labor are complementary inputs, and the capital invested is in labor intensive techniques, then one can easily explain this pattern. The use of cross section

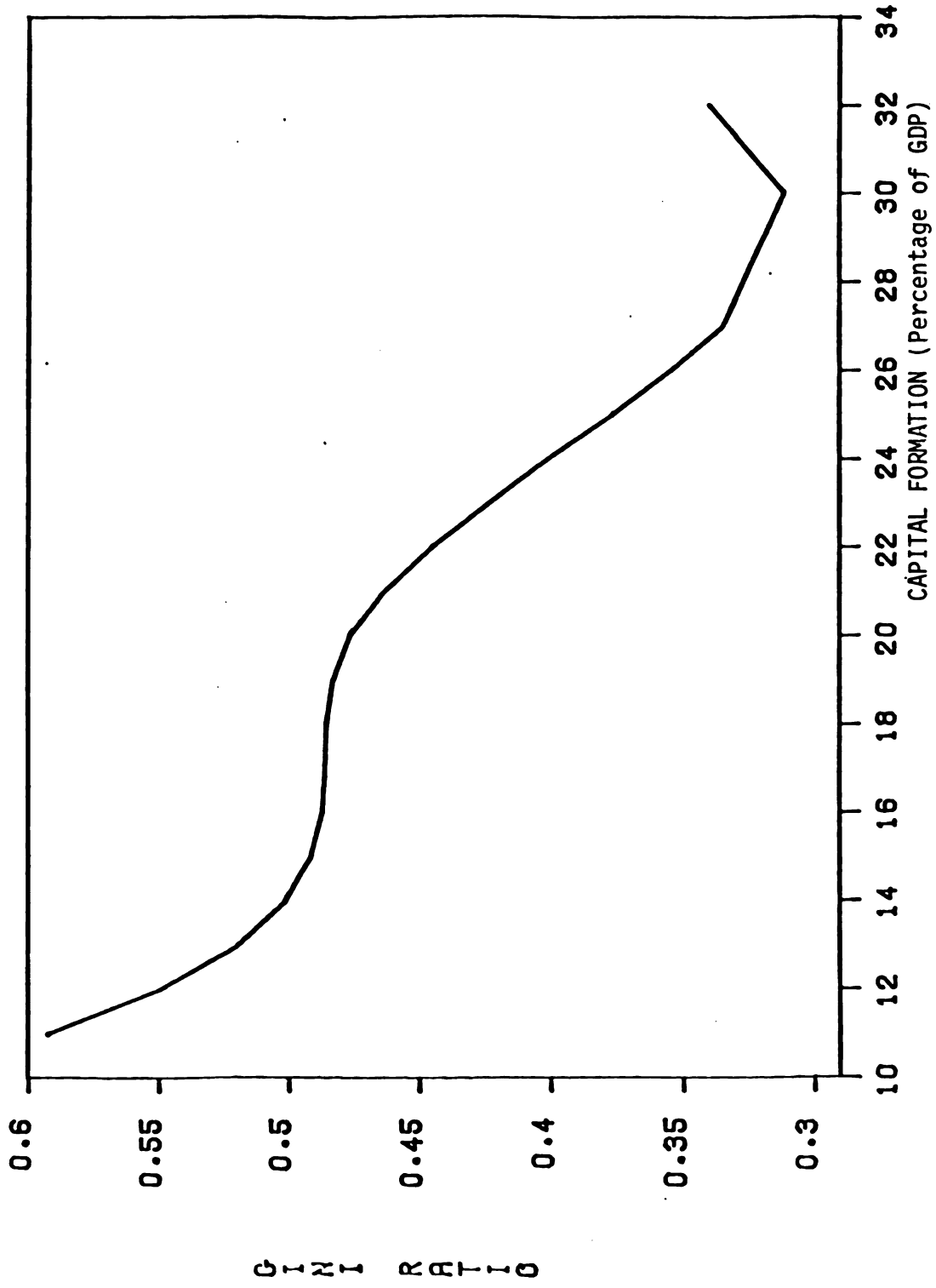


Figure 4.7
CAPITAL FORMATION AND GINI RATIO

data does not shed light on the complementariness between capital and labor if the capital has been invested in more labor intensive techniques. In general, it seems that capital accumulation has served not only as the engine of growth, but also as an equalizer for the distribution of income. Capital accumulation appears to have been invested in the more labor intensive sector and is perhaps the only source of job creation.

4.3e - Education and Income Distribution

In the analysis of education and income distribution, education is considered as a source of productivity and growth and so it influences the individual's earning. However, effect of education on the size distribution of income as an equalizing factor has been a source of controversy. Some authors believe that improvement in the educational characteristic of the population provides a mechanism which operates to promote income equality, while other authors claim that there exists a negative relationship between education and income inequality.⁷

To find the direction of the effect of education on the size distribution of income, the impact of educational level (as measured by school enrollment ratios) on Gini coefficient is examined. Three equations are estimated; the first equation relates Gini coefficient to primary school enrollment ratio. In the second equation, secondary school enrollment is used as the explanatory variable and

total school enrollment is regressed against the Gini coefficient in the third equation.

The estimated spline model relating the primary school enrollment ratio and Gini is as follows:

$$\begin{aligned}
 G = & -71.9 + 7.4 (\text{PSER}) - .25 (\text{PSER})^2 - .0028 (\text{PSER})^3 \\
 & \quad -.04 \quad (.03) \quad \quad (-.019) \quad \quad (.013) \\
 & - .68 (10)^{-7} (\text{PSER} - 20)^3 D_1 - .0029 (\text{PSER} - 80)^3 D_2 \\
 & \quad (-.32(10)^{-6}) \quad \quad \quad (-.19) \\
 & + .11 (10)^{-3} (\text{PSER} - 40)^3 D_3 \\
 & \quad (.198) \\
 R^2 = & .008 \quad F_{(6,54)} = .073
 \end{aligned}$$

where PSER is primary school enrollment ratio.

By looking at the low values of $\underline{t}$ and R^2 it is apparent that neither R^2 nor any estimated coefficient is significant. Based on this result, it is concluded that there is not any association between primary school enrollment ratio and the Gini coefficient. One plausible reason for this lack of association can be contributed to the very low rate of return for the persons with completed primary education compared with persons with no education. Also, universal primary education has become a more feasible goal and more primary education is provided on a universal basis.

On the other hand, when the secondary school enrollment ratio is regressed on G, an inverted U-shaped

pattern is observed. The estimated equation is:

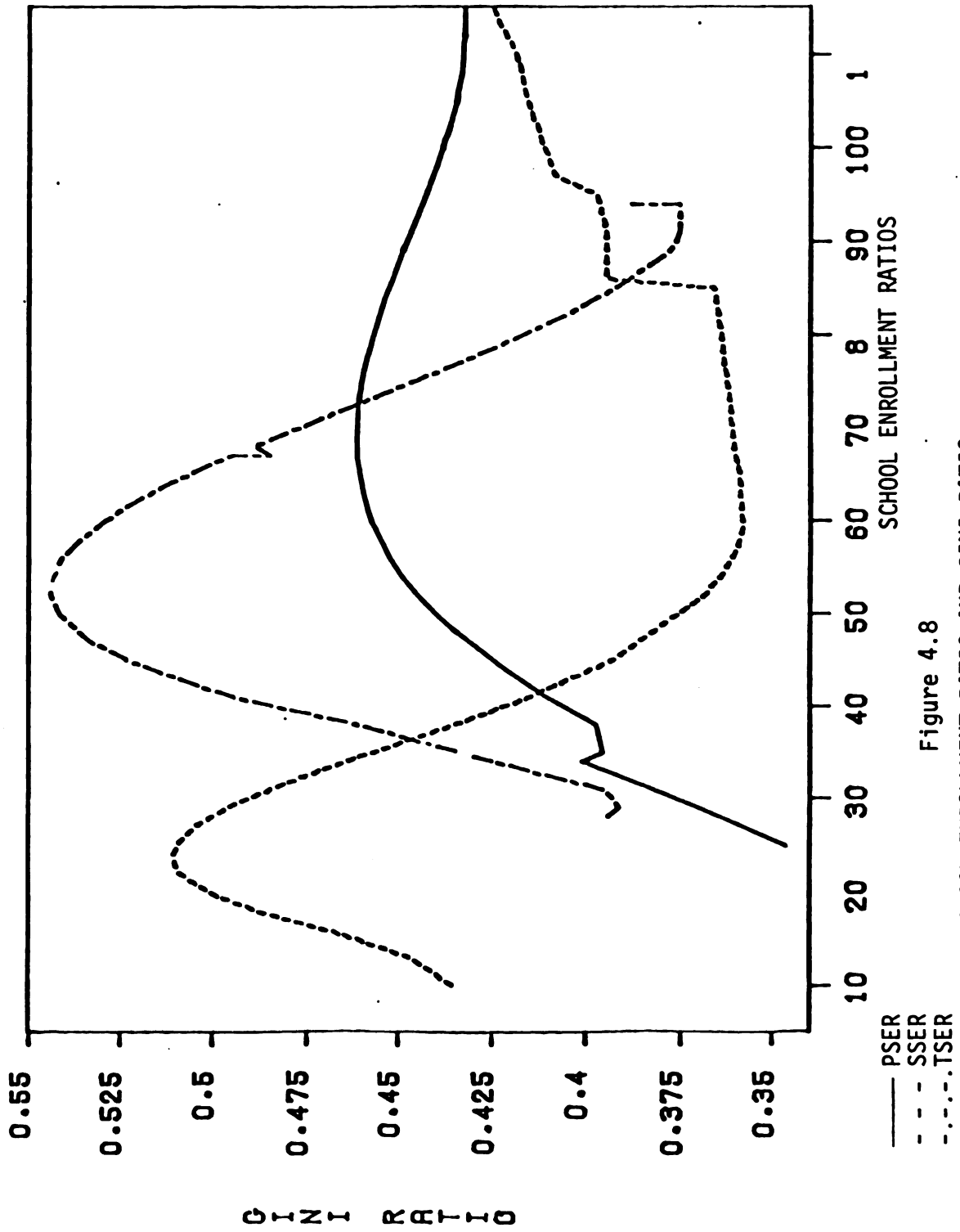
$$\begin{aligned}
 G = & .62 - .044 (\text{SSER})_{*} + .33 (10)^{-2} (\text{SSER})_{*}^2 \\
 & (6.4) \quad (-1.98) \quad (2.21) \\
 & - .68 (10)^{-4} (\text{SSER})_{*}^3 + .85 (10)^{-4} (\text{SSER} - 20)_{*1}^3 D_1 \\
 & (2.36) \quad (2.48) \\
 & - .18 (10)^{-4} (\text{SSER} - 40)_{*}^3 D_2 \\
 & (-2.63)
 \end{aligned}$$

$$R^2 = .31 \quad F_{5,53} = 4.88$$

where SSER is secondary school enrollment ratio.

The estimated equation is shown in Figure 4.8. As it is seen, distribution of income worsens when there is low level of enrollment. The basic reason for this perverse effect of formal education in income distribution is the significant income differentials between those who are able to complete secondary education over others who have only completed part or all of their primary education. The income differential can be as high as 300 to 800 percent.⁸ As the enrollment ratio increases, the income differential as a quasi-rent for an elite group will decline. There exists a negative relationship between income differential and educational level, reflected by the enrollment ratio. The lower income differential between high school graduates and others with no education or primary education might contribute to the decline in the Gini coefficient.

In the third equation, the explanatory variable is



the total primary and secondary school enrollment ratio. The estimated equation is:

$$\begin{aligned}
 G = & 3.2 - .25 \text{ TSER}_{*} + .69 (10)^{-2} (\text{TSER})_{*}^2 \\
 & (2.51)(-2.28) \quad (2.41) \\
 & - .62 (10)^{-4} (\text{TSER})_{*}^3 + .67 (10)^{-4} (\text{TSER} - 40)_{*}^3 D_1 \\
 & (-2.48) \quad (2.57)
 \end{aligned}$$

$$R^2 = .31 \quad F_{4,56} = 6.21$$

where TSER is total school enrollment ratio.

The estimated equation is illustrated in Figure 4.8. As it is observed, there exists a U-shaped pattern between Gini ratio and TSER. The reason for this pattern is the same as mentioned for the secondary school enrollment ratio and Gini coefficient. The difference between TSER and SSER with respect to the Gini coefficient is that the maximum level of inequality corresponds to the TSER to 54 percent compared with SSER of only 23 percent. Also, the maximum points on these two curves differ, i.e. the maximum point on SSER is .51, but it is .545 on the TSER. Beyond the TSER of 54, the Gini ratio falls continuously, a feature which is not present for the SSER.

In brief, it can be concluded that the very low level of enrollment ratios leads to the significant income differential for an elite group and causes more inequality in the distribution of income. As the primary and secondary education are provided on a universal basis (as

reflected by increasing school enrollment ratio), the income differential will decline and consequently the distribution of income improves.

4.3f - Import-Export and Income Distribution

As it was discussed in Chapter Three, the foreign trade policies affect the distribution of income. One of the most widely used trade policies is the import substitution strategies. This policy has a very detrimental effect on traditional primary exports and income distribution. In order to encourage local manufacturing through the importation of cheap capital and intermediate goods, foreign exchange rate has to be artificially overvalued. Overvaluation has the effect of raising the price of exports and lowering the price of imports in terms of the local currency.

The net effect of import substitution policy is to encourage capital-intensive techniques of production and penalizing the traditional primary exports. In terms of its income distribution effects, the outcome of import substitution policy is to penalize the small farmer and the self-employed at the expense of improving the profits of the owners of capital. So import substitution has the effect of taxing agricultural goods in the home market and discouraging agricultural exports. This in turn worsens the distribution of income by favoring the urban sector and the higher-income groups while discriminating against the rural sector and the lower income groups.

An empirical exploration of the impact of trade

policies, namely import substitution strategies, on the distribution of income requires elaborate data on the change in the structure of imports and exports due to these strategies. In the absence of this data, the explanatory variables are the percentage of import in GDP (which is called the degree of openness) and the percentage of export in GDP. In the first equation, the amount of imports as a percentage of GDP is regressed on Gini coefficient. The estimated result is:

$$\begin{aligned}
 G = & 9.39 - 2.8 M_{*} + .30 M_{*}^2 - .01 M_{*}^3 + .01 (M-10)_{*}^3 D_1 \\
 & (2.48) \quad (-2.38) \quad (2.41) \quad (-2.43) \quad (2.46) \\
 & - .56 (10)^{-3} (M-20)_{*}^3 D_2 \\
 & (-2.64)
 \end{aligned}$$

$$R^2 = .23 \quad F_{5,47} = 2.89$$

where M is the percentage of import in GDP.

The estimated equation is shown in Figure 4.9. Figure 4.9 demonstrates that there is not any specific pattern between Gini coefficient and the increase in import as a percentage of GDP. The curve is characterized with the recurrent ups and downs for the estimated values of Gini ratio. Gini ratio falls dramatically between the 7.0 to 7.5 percentage range and it rises sharply and then falls again. Its lowest point corresponds to 22.5 percentage of import in GDP. Beyond this range, rises again and reaches its peak and falls for the third time. Based on this behavior, it is difficult to draw any inferences on the

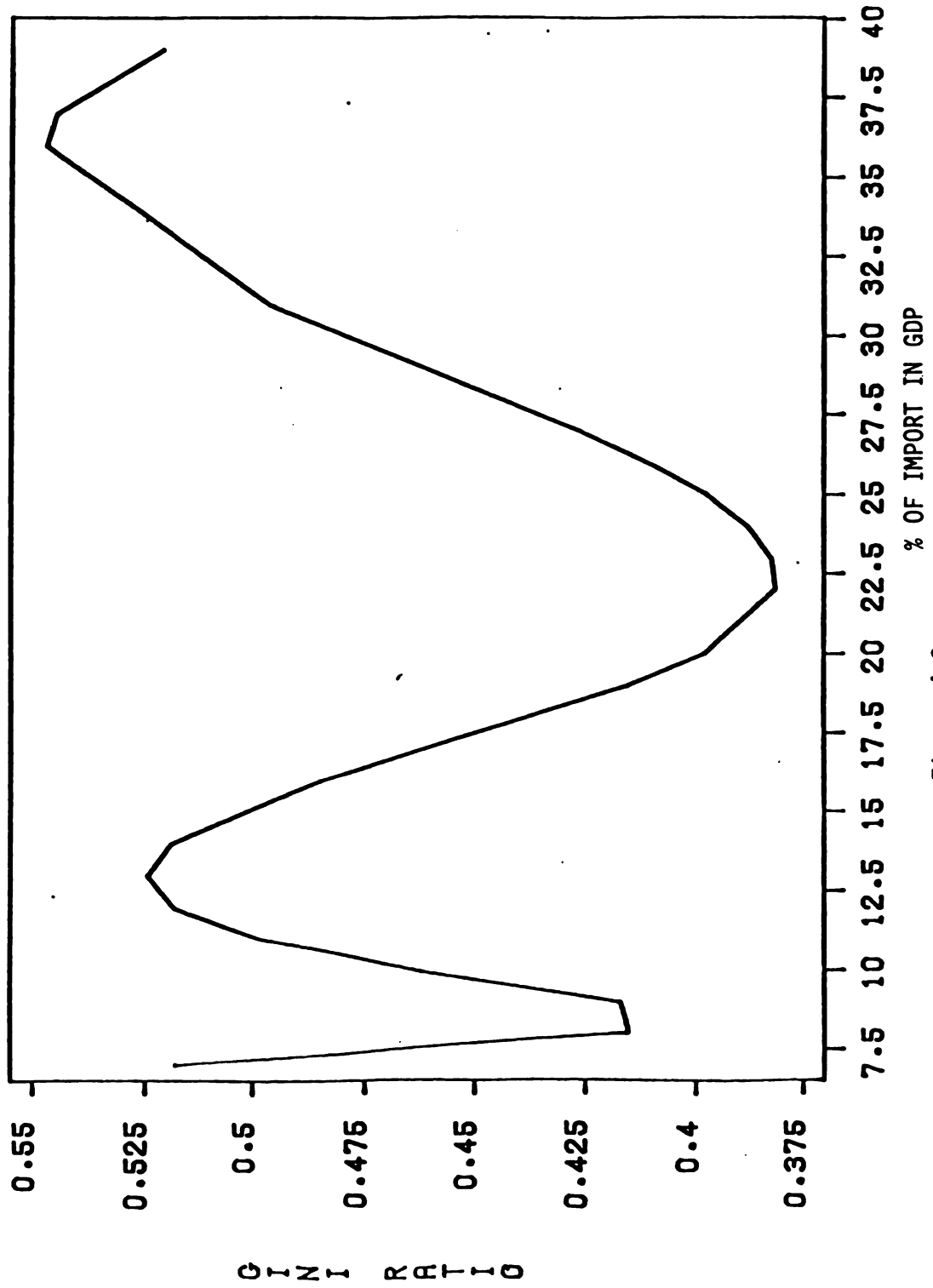


Figure 4.9
IMPORT AND ESTIMATED GINI RATIO

association between the degree of openness and the Gini coefficient.

For the second equation, export (as the percentage of total GDP) is used as the explanatory variable. The estimated spline regression is:

$$\begin{aligned}
 G = & .31 - .047 X - .41 (10)^{-2} X^2 + 10 (10)^{-3} X^3 \\
 & (1.8) \quad (-1.11) \quad (-1.35) \qquad (1.51) \\
 & - .21 (10)^{-3} (X-20)^3 D_1 + .16 (10)^{-3} (X-30)^3 D_2 \\
 & (-1.62) \qquad (1.41)
 \end{aligned}$$

$$R^2 = .12 \quad F = 1.41$$

where X is percentage of export in GDP.

It is evident that neither R^2 nor any of the estimated coefficients are significant at any reasonable level. So it can be concluded that statistically there is not any association between Gini ratio and increase in the export as the percentage of GDP. The behavior of estimated Gini ratio when it is graphed against export is illustrated in Figure 4.10. It is characterized with recurrent ups and downs. It has to be kept in mind that, in this case, neither R^2 nor any estimated coefficient are significant, while in the case of import both R^2 and estimated coefficient are significantly different from zero.

4.3g - Indirect Taxes and the Gini Coefficients

Each county employs a variety of taxes for the mobilization of resources to finance public expenditures.

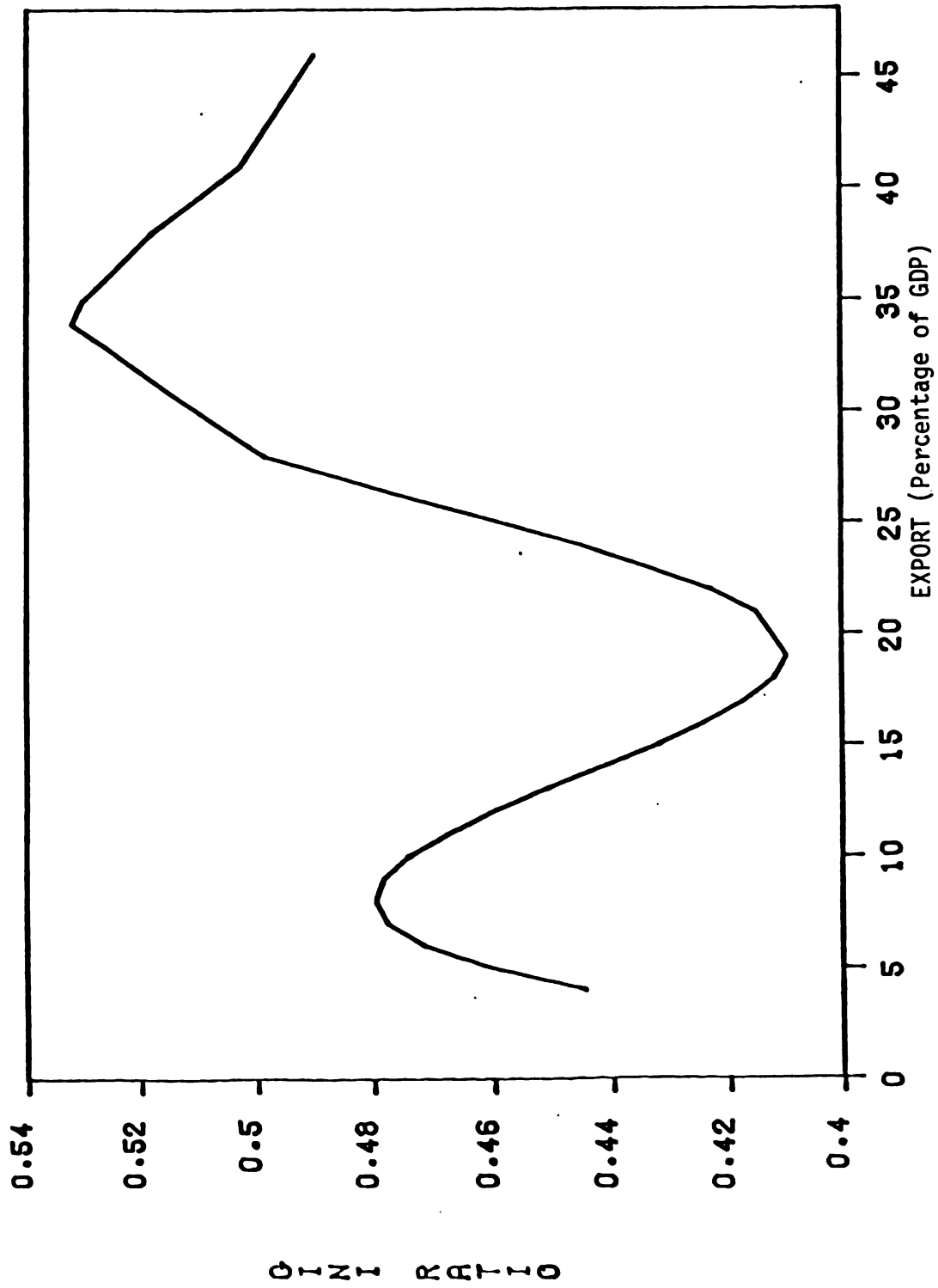


Figure 4.10
IMPACT OF EXPORT ON GINI RATIO

Some of these taxes are progressive, whereas others are regressive. For instance, personal income and property taxes are progressive and excise and sales taxes are considered to be regressive. The structure of the tax system as a whole for distributional policy is very important. Only progressive tax system will lead to a more equal distribution of income.

In the underdeveloped countries, lack of administrative capability and the absence of well-organized money economy make it extremely difficult to collect personal and especially property taxes. These countries have to rely on the more traditional taxes, i.e. sales and excise taxes. Although these types of taxes are regressive in their nature, they are economically and administratively feasible to levy and collect. In order to explore the impact of these taxes on income distribution, a spline regression equation is estimated. The explanatory variable is the indirect taxes as a percentage of GDP. The Gini coefficient is the dependent variable in this equation. The estimated result is:

$$G = 1.96 - .51T + .057 T^2 - .21 (10)^{-2} T^3$$

$$(2.16) \quad (-1.56) \quad (1.48) \quad (-1.43)$$

$$- .3 (10)^{-2} (T-10)^3 D_1$$

$$(1.48)$$

$$R^2 = .10 \quad F_{4,49} = 1.81$$

where T is the indirect tax as the percentate of GDP.

Figure 4.11 shows the above estimated equation. It is observed that there is not any specific pattern between Gini coefficient and increase in indirect taxes. Gini ratio falls sharply and almost stays the same within 8.0 and 14.0. Beyond this range, it rises continuously. Considering the T statistics and R^2 , it is found that there exists no statistical association between Gini ratio and indirect taxes based on the cross sectional data used in estimating the above equation.

4.4 - General Equation

So far, the estimated equations have related the Gini coefficient to one single variable as the explanatory variable. In this section, a more general econometric equation is presented. In this equation, the impact of all the variables on Gini coefficient is estimated. The general form of the equation is as follows:

$$G = f\{Y, Y^2, RPG, PRG, AGAC, TSER, UPOP, GOV, KF, LS, X, M, T\}$$

where G, the dependent variable, is the Gini coefficient. The level of development is measured by per capita income Y and its square form Y^2 . RPG represents the annual average rate of population growth for the six year period. PRG is the per capita rate of income growth of GDP. AGAC represents the share of agricultural output in total output and UPOP is the urban population as the percentage of total population. These two variables demonstrate the relative position of the

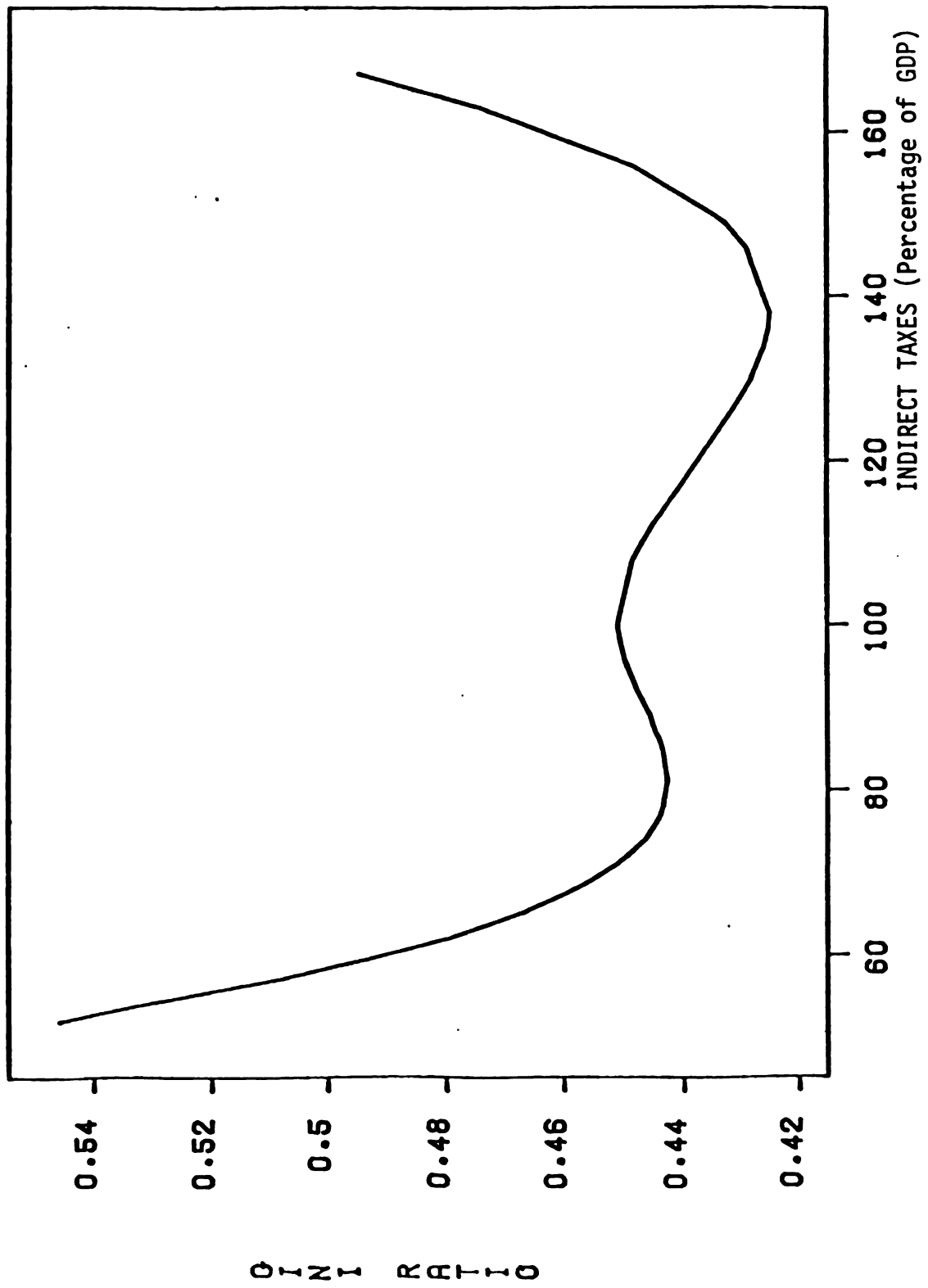


Figure 4.11
INDIRECT TAXES AND GINI RATIO

rural sector. GOV, KF, T respectively, represent the government expenditure, capital formation and indirect taxes as the percentage of GDP. Labor share is shown by LS and X and M are percentage of export and import in GDP.⁹

OLSQ technique is used to estimate the equation. The estimated result is shown below (T ratios are in parentheses).

$$\begin{aligned}
 G = & .39 + .2 (10)^{-3} Y_{*} - .42 (10)^{-7} Y_{*}^2 + .041 \text{ PRG}_{*} \\
 & (1.63) \quad (2.01) \quad \quad (-2.03) \quad \quad (2.06) \\
 & - .022 \text{ PRG}_{*} + .33 (10)^2 \text{ AGAC} - .57 (10)^{-3} \text{ TSER} \\
 & (-3.02) \quad (1.2) \quad \quad (-.67) \\
 & + .81 (10)^{-3} \text{ UPOP} - .13 (10)^{-2} \text{ GOV} + .27 (10)^{-2} \text{ KF} \\
 & (.921) \quad \quad (-.23) \quad \quad (.71) \\
 & + .36 (10)^{-2} X - .14 (10)^{-2} M - .5 (10)^{-3} T \\
 & (1.56) \quad \quad (.66) \quad \quad (-.12) \\
 & - .56 (10)^{-2} \text{ LS} \\
 & (3.3)
 \end{aligned}$$

$$R^2 = .71 \quad F_{13,40} = 7.78$$

The estimated coefficient for Y is positive and for Y² is negative and both are significant. The estimates indicate that inequality first increases and then decreases as per capita income increases. Rate of population growth contributes to more inequality in the distribution of income. This effect is reflected by the significant and

positive estimate for PRG variable. On the other hand, per capita rate of growth has a significant effect on the Gini coefficient. PRG has an equalizing impact on income disparities. Although total enrollment ratio improves the distribution of income, the estimated coefficient is not significantly different from zero (negative sign but very low t ratio). The same result can be observed for the government expenditure. Increase in urban population and share of agricultural output in total output results in more income inequality but neither of these estimates is significant.

The interesting result of this general equation is the estimated coefficient for capital formation. When only KF was regressed on Gini coefficient, it was observed that KF had a significant equalizing effect on the distribution of income. But in the general equation KF has a positive sign and it is not significantly different from zero. Labor share, on the other hand, has a very strong equalizing impact on the distribution of income. This strong effect is indicated by very high t statistics.

The estimated equation also shows that increase in export as percentage of GDP contributes to higher inequality and increase in degree of openness leads to lower inequality, though neither of the estimated coefficients is significant. The negative sign of the estimated coefficient for indirect taxes indicates that increase in indirect taxes results in less inequality; but again t statistics shows that this

estimate is not significantly different from zero.

In brief, it can be said that some of the estimated coefficients in the general equation are consistent with the previous results estimated from single variable equations. For instance, the inverted U-shaped hypothesis is confirmed both in the general equation and spline function. Also, PRG is found to act as an equalizing factor in both general equation and spline function. But there are also inconsistencies between results estimated from the general equation and the spline functions. KF has very strong equalizing effects in the spline function, but in the general equation it has positive sign; meaning more capital formation results in more income inequality.

One important point about the general equation which has to be emphasized is the low t statistics for some of the estimated coefficients. The obvious reason is the existence of the multi-collinearity. In the general equation, there is strong interrelationships among the independent variables, and it becomes difficult to estimate their separate effects on the dependent variable. For instance, there is strong intercorrelation between per capita income and school enrollment ratios. After using Y and Y^2 , adding TSER does not have significant effect on the Gini coefficient. The unexpected wrong signs for the estimated coefficient in the general equation can also be explained by the existence of multicollinearity.

FOOTNOTES

CHAPTER FOUR

FOOTNOTES

¹See Kuznets, Economic Growth and Structure: Selected Essays, (New York: W.W. Norton and Co. Inc., 1968) p. 179

²For further analysis of spline function see Daniel R. Suits, Andrew Mason, and Lou Chan, "Spline Functions Fitted by Standard Regression Method," The Review of Economics and Statistics 60 (February 1978) pp. 132.

³S. Jain, The Size Distribution of Income: A Compilation of Data, (Baltimore: John Hopkins University Press, for the World Bank, 1975). This book offers the richest compilation of data on distribution of income for the largest number of countries.

⁴For the detailed explanation of this matter, see Everett Hagen, The Economics of Development, (Homewood, Illinois: Richard D. Irwin, Inc., Revised Edition, 1976) p. 13.

⁵The data on real domestic product and shares of gross domestic product devoted to private and public consumption and investment for over 100 countries and the method of estimation can be found in Robert Summer, Irving B. Kravis, and Alan Heston, "International Comparisons of Real Product and its Composition, 1950-1977," Review of Income and Wealth (March 1980), pp. 19-67. To the best of my knowledge, no author has used purchasing-power parities in this context.

⁶Montek S. Ahluwalia, "Income Inequality: Some Dimensions of the Problem," in Redistribution with Growth, ed. Hollis Chenery et. al., (London: Oxford University Press, 3rd Printing, 1976) p. 21, Table 1.4.

⁷See Chapter Three of this dissertation.

⁸Michael Todaro, Economic Development in the Third World (New York and London: Longman, Second Edition 1981) p. 312.

⁹The data on per capita rate of growth, percentage of agricultural output in total output, government expenditure, capital formation, labor share, percentage of export and

import in GDP, and indirect taxes as a percentage of GNP have been taken from the Yearbook of National Account Statistics (various years), United Nations. The information on rate of population growth and share of urban population in total population are from The Demographic Yearbook (various years), United Nations. Data on school enrollment ratios are from Unesco, Statistical Yearbook (various years).

CHAPTER FIVE

POLICY IMPLICATIONS TO IMPROVE THE DISTRIBUTION OF INCOME

5.1 - Introduction

The second half of this century has been characterized by unprecedented rates of economic growth in many developing countries. Most developing economies focused their attention on policies which were geared to increase the level of output, and the concept of distribution of the output itself was ignored. However, the skepticism regarding the spillover effects of economic growth to all segments of the population has been raised.

One justification for growth-oriented policies is the so-called "trade-off" between economic growth and egalitarian distribution of incomes. It has been suggested that these two ends are contradictory and that a redistribution of income would lead to lower investment as a portion of income and thus a smaller rate of growth of income. On the other hand, if growth were given primary emphasis, the fruits of this growth would eventually trickle down to all segments of population.

In this chapter it will be shown that there is no need for sacrificing economic growth for an egalitarian

distribution of income. By designing and implementing economic and social policies, a better distribution of income can accompany economic growth from the start.

One important point about redistributive policies, which has to be mentioned, is the reluctance of the economically powerful and the lack of administrative capability to change the status quo. The distribution of income is closely determined by the distribution of political power. Redistributive measures that alter the current distribution of income are against the interests of the politically powerful who are supposed to administer these measures. By this view, it is reasonable to argue that these politically powerful elite are reluctant to take action to correct the distribution of income.

Any redistributive policy necessarily requires the political process that can generate more power for the poor and disadvantaged in the society. In most cases, the political power is more important than scanty command over economic resources.¹ The achievement of political power by the poor is a necessary first step toward a better design and implementation of redistributive policies. As the level of education and political awareness of the lower-income groups increase, they become more conscious of their political rights and easily are mobilized in the defense of these rights. The political conscience of the lower-income group will lead to a variety of protective and supporting legislations which are aimed at improving the

distribution of income in favor of them. Considering the above stated concern regarding lack of political power and its relationship to redistributive policy, the chapter proceeds as follows: Section 2 is concerned with the choice of different measures to promote labor share. In Section 3, investment policies and their relationship with income distribution is introduced. Section 4 explores how changes in capital ownership and changes in pattern of capital accumulation can be used to change the pattern of income distribution. In Section 5, it is argued that educational expansion is considered to be an important factor in improving the distribution of income. Section 6 is concerned with the distributional impact of population policies. Section 7 shows how the tax policies can be used to not only increase revenue but to improve the distribution of income. Finally, Section 8 offers a brief conclusion.

5.2 - Policy Intervention to Increase Labor Share

As it was shown empirically, the increase in labor share improved the overall inequality in the distribution of income. Policy intervention in the labor market aimed at promoting greater absorption of labor is an appropriate policy. The easy policy for the greater absorption of labor is the low-wage approach. This policy attempts to keep the modern sector wages at a low level. Low wages not only encourage rapid absorption of labor in the modern sector, it also leads to a high profit, high saving economy and

consequently to a higher rate of economic growth.

Yet policies directed at lowering the relative price of labor are unsuccessful approaches to income redistribution in developing countries. These policies neither increase labor share nor are they equitable. The impact of lowering real wages on labor share can be illustrated in a two-factor economy with unemployment. The decrease in real wages is expected to produce some increase in employment and an increase in output. But since the elasticity of substitution between labor and capital is less than unity² the share of wages in total income will actually fall. Under these circumstances, the distribution of income has worsened; i.e. capitalists are better off and workers previously employed suffer an absolute decline in income. Against these two changes, there is an increase in income in the previously unemployed group which represents a distributional gain.

As it was argued, the low-wage approach, although increasing employment, does not improve the distribution of income. So some other policies are needed to not only increase the level of output and employment but also to improve the distribution of income. The policy approach has to be related mainly to factors influencing the demand for labor. So the emphasis must be aimed at the use of more labor-intensive production and technology. The high rate of labor utilization can be attained only by choosing a product mix which is labor-intensive in character or by

adopting a technology which permits the substitution of labor for scarce capital and fertile land.

Unfortunately, modern technology adopted by the less-developed countries requires labor and materials similar to those in the developed economies for which it was designed, so that new products and processes are not suited to the demand patterns and factor endowments of the underdeveloped countries. The transplanted technology requires highly skilled workers and efficiency. For the required standards of skill and efficiency, the private and public expenditure must be disproportionately concentrated on the workers of modern industries. This has an important implication for distribution of income. The income distribution problem is worsened by the fact that the adopted technology used often imposes heavy demand not only for physical capital but for human capital for a small portion of the labor force. The requirement for high skills on the part of labor increases intra-labor inequality and creates quasi-rent for a privileged and small group of workers.

The choices of an appropriate technique of production that makes increasing use of the unskilled labor (the most abundant resource) is essential to increase employment and equality in the distribution of income. But since many existing labor-intensive techniques have low productivity, the use of these techniques may create a potential trade-off between growth and income distributional objectives. So

the scope for implementing redistributive and growth strategies depends not only on the use of labor-intensive techniques but on a steady rate of technological improvement and innovation in these techniques and also promotion of products, which are labor-intensive in character.

It is simply a realistic recognition of the fact that research efforts in developing countries are unlikely to be focused on improvement and innovation in labor-intensive techniques. The recognition of this fact necessitates direct actions by the governments to expand the indigenous research capabilities in relevant areas. The indigenous research may place emphasis on production and marketing problems of particular commodities suitable for labor-intensive production or plant breeding programs aimed at the increase and development of crops grown by small farms.

Another policy to discourage the over use of unsuitable imported technology is to eliminate the under-valuation of foreign currency in order to make the imported technology very expensive. Since the manufactured exports are usually more labor-intensive than import substitutions,³ the removal of the bias against export in favor of many import substitution policies can be expected to increase labor demand and gross domestic product in the long run.

Governments also can increase the demand for labor by reducing labor costs to employers without lowering the wages paid to the workers. These policies can be implemented by

provision of labor subsidies or abolition of payroll taxes. But provision of subsidy payments or tax credit involves a cost to the government budget and these costs must be compared with the resulting increase in employment. If there is a large degree of substitutibility between labor and other factors of production, there will be a significant increase in employment and the policy will be successful.

5.3 - Investment Policies and Income Distribution

In the previous chapter, it was shown that investment had a significant effect on the distribution of income. It will be plausible to place a heavy role on investment but the investment must take place in a manner which serves the income distribution objectives very effectively. The investment must be consistent with the resource endowment of the economy.

Almost all developing countries have a variety of policies aimed to encourage investment in the manufacturing sector. In almost all instances, the incentives are in terms of exemptions from company taxes or imposition of explicit or implicit subsidies arising from low interest rates, exchange rate undervaluation or imported capital equipment, and incentive schemes. It is correct to say that in most developing countries all incentive schemes favor the use of capital at the expense of labor. The worse effect of these incentives on employment growth and income distribution is when the choice of techniques and

choice of sectors are affected by these policies. The problem in most underdeveloped countries is capital market fragmentation. Under this condition, the investment incentives cause a difference in the availability of capital between sectors. The capital is underpriced in the modern sector and it is overpriced in the market facing the traditional and agricultural sector. This in fact penalizes employment growth of unskilled workers, discourages the use of domestically produced inputs and discriminates relatively against small-scale manufacturers who use more labor-intensive techniques. In the agricultural sector, too, small farms have unequal access to subsidized inputs. The availability of cheap credit to large farms has encouraged labor-displacing mechanization. The lack of availability of credit for labor-intensive sectors (farmers and urban small producers) demands an appropriate policy action which ensures equal access to credit for these sectors. There is strong evidence that capital-output ratios and capital labor ratios are higher among large firms than small firms. For instance, according to Squire,⁴ the small scale producers use four to ten times more labor per unit of fixed investment than the larger firms. So, removing discrimination against small producers and a more deliberate policy of ensuring access to credit for them can increase employment and improve the earnings of the self-employed.

In addition to the lower capital-labor ratios in small scale manufacturing, there is also higher value added

per unit of capital in this sector. Promoting small scale manufacturing not only serves to improve the distribution of income but also is conducive to growth. In this case, there is no trade-off between growth objectives and distributional objectives.

There are several measures suggested to encourage small manufacturing units. These measures consist of elimination of special incentives, such as cheap foreign exchange and subsidized credit that only favors large firms and the establishment of agencies that advise small firms on technical matters about production and marketing. Measures which improve the credit allocation mechanisms and reform the interest rate structure are very important for promoting the small scale manufacturing units and consequently promotion of employment.⁵

One important point about incentive systems is the impact of tax exemption on the rate of investment. If tax exemption has no effect on the rate of investment, then the government foregoes tax revenues and the investors gain with no change in investment. The foregone government revenue matters if the government supplements the foregone income through other taxes, e.g. payroll taxes, that penalize employment growth. Under the above stated condition, the policy implication is the imposition of a tax on capital and other types of capital-based tax rebates. These policies shift income from high-income groups to the government budget.

To summarize briefly, the investment-incentive packages almost always favor large scale manufacturing in the modern sector. Small scale and indigenous activities that fit the resource endowment of the economy are neglected or discouraged by these policies. This, in turn, decreases the opportunities for income-earning activities that can reach a significant segment of the labor force and contributes to inequality of income. To serve the growth objective and distributional objective, the policy package has to promote investment opportunities and technical advice for small scale indigenous activities.

5.4 - Capital Ownership and Inequality

Resource prices and utilization levels for each type of productive factor (labor and capital) give the functional distribution of income. In some cases, for designing policy packages to improve distribution of income, the knowledge of size distribution of income is very important. In order to translate the functional distribution into size distribution, one needs to examine the distribution of income-earning factors among households.

In most underdeveloped countries, the main cause of the very unequal distribution of personal income is the very unequal and highly concentrated patterns of asset ownership and human skills. It follows that to reduce inequality, the policies must be designed to focus on directly reducing the concentrated control of assets. The

most radical approach to changing the concentrated patterns of physical assets involves the redistribution of directly productive assets to lower income households to raise income levels of these households. In predominantly agricultural countries, land redistribution might be the most effective instrument in reducing inequality in the distribution of income. The impact of land redistribution on productivity and distributive justice deserves emphasis.

Country studies undertaken by the FAO and the World Bank to analyze the relationship among size of holding, concentration of land and productivity, indicate that a smaller average size of holding and a lower concentration of land ownership are associated with an increase in output per hectare.⁶ In a systematic analysis of the differences between large farms and small farms in six Latin American countries, it was found that output per hectare was three to fourteen times greater on the small farms than on the large farms.⁷ The important implication is that reduction in either the size of holdings or the concentration of land ownership need not be associated with a reduction in output per hectare. On the contrary, it is found that output per hectare is likely to be higher. In broad terms, land reform not only eliminates the possibility of trade-offs between growth and distribution, but it serves to improve both objectives.

Land reform also has a significant role in providing employment in rural areas. Evidence exists that the use of

labor per hectare is inversely related to the size of holdings. The studies previously mentioned indicate that manpower per hectare of agricultural land is significantly correlated with the size of the holding, i.e., the larger the holding, the smaller the labor input. The extreme poverty of many who live on the land and the increasing pressure on the land through population growth demands an urgent widespread land reform to raise productivity and income in agriculture and, at the same time, to provide more employment.

Perhaps more intensive use of labor is the main reason why small farms are more productive than the large farms. Inputs other than labor also have to be used intensively on small farms. Therefore, existence of the organizations providing for both the supply of necessary inputs such as credit, fertilizer, seeds and marketing are crucial in a post-reform period. So it is necessary for the government to devise package policies to provide cooperatives, agricultural development banks, special credit institutions and marketing facilities.

One important point on feasibility of land reform which is directly related to political factor is worthy of mention. The concentration of land ownership is usually the most significant determinant of political power in some of the developing countries. A meaningful land reform program will seldom be implemented unless there are shifts in political power. The successful land reform experience

of Kenya, Japan, and the Republic of China indicates that in these countries there was a change in governments that favored drastic changes in political and economic structure.

In brief, land reform can be consistent with all the goals of economic development; it increases productivity, increases employment and provides a better distribution of income. However, sustained increases in output depends on complementary investments and follow up policies. The most important of these policies is organization and provision of the necessary inputs and the marketing of production.

Real land reform is an effective policy to change the concentration of land ownership in the rural areas. In the urban areas, the distribution of real estate and financial assets is more skewed than the distribution of farm land in the rural areas. In countries with a substantial and prosperous industrial urban sector, urban property reform and progressive taxation on urban wealth have to accompany the land reform. Land reform by itself may not decrease the inequality of the distribution of total wealth in these countries as a whole.

Land reform and property reform can be considered as the redistribution of the existing assets. In addition to the redistribution of existing productive assets, governments can change the pattern of accumulation in the economy. If lack of ownership or access to particular types of assets is the main reason for low levels of incomes,

the governments can build up these assets by redirection of the pattern of investment in the economy.⁸ One possible policy to change the pattern of accumulation is to provide equal access to the financial markets for the lower income groups. The fragmented financial market in developing countries discriminates against the people in lower income brackets. The other policy is to subsidize formal and nonformal education by the governments. Accumulation of human capital through formal and nonformal education, in turn, leads to a higher income level.

In brief, some form of asset redistribution, whether the existing assets or dynamic redistribution seems to be a necessary condition for any significant reduction of income inequality in most less developed countries.

5.5 - Policies to Promote Educational Level

Unlike land reform which is a direct attack on patterns of the concentration of land ownership, the extension of education to the poor results in the creation of new human capital. The justification for provision of education on a universal basis is twofold. First, as it was argued in Chapters 3 and 4, concentrated patterns of human skills are as important a cause of income inequality as the concentration of physical assets. The increase in educational level and equal access to educational institutions lead to more equal distribution of income.

The second justification of providing education is

its substantial effect on labor productivity and higher economic growth. For instance, Psacharopoulos has estimated that the contribution of education ranges on the average between 11 percent (for advanced countries) and 15 percent (for less developed countries) of the observed rate of growth. When the contribution of education is disaggregated by educational level, it is found that, on the average, primary education contributes 46 percent of the total educational contribution to the rate of growth, secondary education 40 percent and higher education 14 percent.⁹

Considering the impact of education on income distribution and economic growth, the policy implication is that public policy should aim to promote and develop a more equal pattern of distribution of human capital. It is a popular policy because there is not any trade-off between economic objectives and distributive justice. Furthermore, there is less restrictive political constraints upon implementing educational policies compared with other direct redistributive actions.

It should be pointed out that the provision of education per se will not contribute to a better distribution of income if it is not provided on an equal basis for the whole population within the country. Educational institutions are generally provided in urban areas and educational levels are higher for urban than rural families. This unequal access, in turn, leads to the higher average

income levels of urban families. For instance, in Columbia, which is one of the most advanced of the less developed countries, nearly sixty percent of the rural schools offer no more than the first two grades of primary school; only six percent have facilities to offer a four-year primary sequence.¹⁰ It appears that the productivity and income benefits of formal education and training accrue mainly to persons living in urban areas. So if education is to contribute to more equal distribution of income, it has to be provided on an equal basis.

Up to now, the discussion has been concerned primarily with the equal access to educational opportunities. The other important question on the provision of education is which level of education has to be mostly emphasized in developing countries. As previously stated, primary education makes the greatest contribution to economic growth and it has the highest social rate of return in developing countries.¹¹ On the cost side of providing different levels of education, in the less developed countries the annual per-student expenditures on the secondary and particularly on higher education are proportionately much higher than in the more advanced countries. Thus in the less developed countries students in higher education receive relatively high benefits in the form of public expenditure toward education. The emphasis and consequent subsidizing of higher education can be detrimental to the distribution of income especially if the students in higher education come

from the richer families.

In most developing countries, the private rate of returns to investment in higher education are higher than social rate of returns and little is gained by subsidizing the students from a high income class. Thus, in these countries it might be advantageous to curtail the public financing of higher education and shift greater proportion of its cost to the beneficiaries or their families. At the same time, loans (repayable at a later time by the students from future earnings) can be offered to the students of the poorer families. However, this approach requires an efficient administration to channel the funds only to the needy students.

In brief, it can be concluded that the provision of primary education on a universal basis not only has the largest impact on economic growth but also the public financing of primary education actually redistributes income from the richer families to the poorer families without strong political resistance.

In addition to formal education, nonformal education also can be provided to promote productivity of labor. The nonformal education consists of programs such as provision of basic literacy and numeracy, or agricultural extension services with the purpose of extending knowledge of agricultural processes to farmers. Other programs aimed to promote agricultural productivity are occupational educations designed to develop particular knowledge and skills such as

animal husbandry, adaptation of new technologies and improvement of agricultural output. One kind of nonformal education which is not directly related to production is family and community improvement education. Family improvement education is designed primarily to promote knowledge on subjects such as health and nutrition, child care, home improvement and family planning. Though the family improvement education may not increase the output immediately, it can improve the quality of living of the poor and in the long run raise the life expectancy and mental development of future generations which can be an important factor to the increased productivity of the labor force.

In the absence of any evidence, it is difficult to assess the impact of nonformal education programs on income distribution. If these programs are concentrated on the subsistence farmers and the underemployed, it may be the only means to provide competent people to gain access to higher income and higher level jobs in the economy. One shortcoming of nonformal education is that it does not offer degrees, diplomas, and certificates. The degrees might be considered the essential means of entry to positions of wealth and power. Although it can be argued that nonformal education is not as powerful as formal education in the improving of the distribution of income, it may be the only available learning opportunity for large proportions of the population in many developing countries.

5.6 - Population Policies to Improve the Distribution of Income

As it was estimated in Chapter Four, population growth has a very significant disequalizing effect on the distribution of income. There are several mechanisms through which the rapid growth of population may generate income inequality. The first mechanism is through the effect of population growth in increasing the supply of labor relative to other factors of production. This process, in turn, restrains the growth of real wages and increases underemployment. The other mechanism is the decrease in per person income within families, since there is an inverse relationship between size of family and family income. The per person income in poor families, which are characterized by larger family size, causes a much higher inequality in the size distribution of income.

The rapid rate of population growth also has an adverse effect on economic development. The mechanism through which population growth can affect the economic development can be summarized as follows.

First, the high rate of population growth leads to a higher dependency ratio. In a society characterized with a high rate of growth of population, there is higher demand for resources to feed, clothe, house, educate and equip the increasing numbers of the non working population. The lack of resources for these purposes will impede the improvement of the quality of labor force and consequently lead to a

lower labor productivity. Second, higher growth of population and therefore higher dependency may cause a decline in the savings rate and so lead to less investment and slower growth in total output. The higher the population growth, the more investment will be required to maintain the average capital stock per worker, leading to lower rate of increase in capital per worker and thereby halting the productivity growth.

The adverse effect of population growth on income distribution and economic growth, therefore, suggests that a fertility reduction is a desirable policy. Also, there will not be any sacrifice of economic growth to improve the distribution of income. The important characteristic of any population policy in developing countries has to be a policy which is simultaneously cheap, safe, certain and above all, simple and acceptable to the general public. In general, population policies aimed at reducing fertility can be divided into two basic categories: persuasion and coercion.

a. Persuasion: The government can try to persuade people to have small families. This can be done through communication media or formal and nonformal education to encourage couples to reduce fertility and to promote the ideal of a small family. For this policy to be effective, government has to provide information on different contraceptive methods and costs and benefits of having children. Lack of awareness about the benefits and costs

of children may affect the fertility decisions. Persuasion, through informing couples about the costs and benefits, in this case, is a desirable population policy.

b. Coercive Policies: The government can attempt to force people to have smaller families. This can be done through legislation to raise the minimum legal age for marriage or required abortion for pregnancies after a certain number of children. The coercive population policies are not very popular because they are not only morally and politically unacceptable but also they require administrative power to enforce the imposed legislations. For instance, Todaro argues that the defeat of Indira Gandhi's government in the election of 1977 was largely due to the popular backlash against the government's forced sterilization program and her return to power in 1980 was due to her commitment to ease the coercive birth control policies.¹²

The population policy which influences the demand for children is perhaps the most effective policy. As was mentioned in Chapter Three, the demand for children is categorized as children as productive agents, children as sources of old age security, and to perpetuate the family roots. Establishment of old age social security provisions and minimum age child labor laws can influence the family size, even though these policies are not considered as population policies. Also they can increase the direct and indirect costs of children by the raising of school fees and the elimination of subsidies for secondary and higher

education. Promotion of labor force participation by women will increase the indirect costs of children in terms of foregone income of the mother during the child bearing period. It has to be noted that these policies primarily influence the urban population and have no strong effect in rural areas.

In brief, the governments of developing countries have to formulate and implement population policies that fit the economic, cultural, and religious characteristics of the particular countries. Persuasion of these policies is important because any measure that reduces fertility would substantially increase per capita income. Lower fertility also can affect the total output by increasing capital accumulation and productivity of labor. In addition to its effect on total and per capita output, the lower rate of growth of population also contributes to improvement of the distribution of income.

5.7 - Tax Policies for Mobilizing Resources

Any distributionally oriented development policy must secure sufficient financial resources to be successful. This is implied in the case of wage-subsidy, subsidizing formal or nonformal education, and transfer of investment to the poor. The major source of financing these policies traditionally has been the direct and indirect taxes. In addition to raising resources for the distributional policies, tax systems can be an effective means of improving the

distribution of income. Only direct and progressive taxation of both income and wealth can serve to raise funds and improve the distribution of income. Lack of administrative capability and the absence of a well-organized money economy restrict the scope for expanding the role of direct taxes in developing countries. In addition, in most of these countries, governments offer all sorts of tax exemptions and concessions to commercial corporations. Even in the absence of tax exemptions, lack of administrative power makes it very easy to evade taxes on corporate profits and personal incomes. Under these circumstances, instead of increasingly progressivity, a government should expand the financial records of corporations and individuals because increasing progressivity of direct taxes, without having any financial record, simply leads to tax evasion.

Due to difficulties with regard to direct personal and corporate profit taxes, most of the developing countries rely on indirect taxes. The largest single source of public revenue in these countries is derived from the taxation of import, export and excise taxes on domestic products. These indirect taxes which individuals and corporations pay indirectly through their purchase of commodities are economically and administratively feasible to assess and collect. Under these circumstances, the obvious tax policy is the increase the progressivity in the indirect tax structure, while securing the maximum tax revenue.

In order to maximize the tax revenue, several

economic principles need to be considered. First, the commodity should be imported or produced by a relatively small number of firms so that tax evasion can be controlled. Second, the commodity should have a high income elasticity and low price elasticity so that as income rises, more tax revenue will be collected. For the distributive objectives, progressivity of the indirect tax structure can be increased by the different tax rate among consumer classes. Higher tax rates can be imposed on commodities with higher income and lower price elasticities which represent a larger proportion of the budget in high income classes.

In general, the tax policies should be concerned with a wider implementation of personal and property taxes and reformulation of indirect tax structure to incorporate the distributional objectives.

5.8 - Conclusion

In the previous sections, the primary concern was with the choice and implementation of policy strategies to improve the distribution of income. There are several points which are deserving of some emphasis. First, no single type of policy is likely to succeed in achieving distributional objectives and growth objectives. Many types of policy strategies are complementary and require simultaneous implementation. For instance, land reform requires complementary action on provision of the necessary inputs and the marketing of production. Educational

expansion and training schemes are needed to accompany the labor absorption measures. Second, there may exist no tradeoffs between redistributational strategies and growth-oriented policies. Policies such as population policies, expanding education, search for appropriate technologies, and land reform promote both growth and distributional objectives. Third, any policy which attempts to improve the distribution of income in favor of the poor may prove impossible to implement unless the poor develop sufficient consciousness and organization to provide support for the programs over a period of many years.

FOOTNOTES

CHAPTER FIVE

FOOTNOTES

¹For instance, C. Frank and R. Webb state that in Taiwan the Nationalist Chinese had the political power and the native Taiwanese had economic resources and the former used their political power, through the system of government to increase their income and assets. For further discussion on this matter see Charles R. Frank and Richard C. Webb, "An Overview of Income Distribution in Less Developed Countries: Policy Alternatives and Design," in Income Distribution and Growth in the Less-Developed Countries, ed. by the same authors (Washington, D.C.: The Brookings Institution, 1977), p. 17.

²For the estimated elasticities see Hollis Chenery and William J. Raduchel, "Substitution and Structural Change," in Structural Change and Development Policy, ed. Hollis Chenery (New York: Oxford University Press, 1979) p. 160.

³The difference between labor intensity in manufactured exports and import substitution is fully discussed in Lyn Squire, Employment Policy in Developing Countries: A Survey of Issues and Evidence (New York: Oxford University Press, 1981) Chapter 11.

⁴Lyn Squire, Employment Policies, p. 168.

⁵One of the most frustrating factors for indigenous manufacturers to expand their operation is the lack of access to formal credit institutions. For further discussion on the matter see S. Sethuraman, "The Urban Informal Sector in Africa," International Labor Review, Vol. 116 (November-December, 1977) pp. 742-751.

⁶World Bank, "Land Reform," Sector Policy Paper (Washington, D.C., May 1975). This paper provides a wide variety of estimates on different aspects of land reform.

⁷Ibid., p. 27.

⁸This form of redistribution is called dynamic redistribution of assets by M. Ahluwalia, "The Scope for Policy Intervention," in Redistribution with Growth, ed. Hollis Chenery, et. al., (London: Oxford University Press, 3rd Printing, 1976) p. 80.

⁹For further details on these estimates, see Chapter 7 in G. Psacharopoulos, Return to Education: An International Comparison, (San Francisco and Washington: Josser-Bass Inc., 1973).

¹⁰Frederick H. Harbison, "The Education-Income Connection," in Income Distribution and Growth in the Less-Developed Countries, C. Frank and R. Webb ed. (Washington: The Brookings Institution, 1977), p. 130.

¹¹The rate of return on primary education is estimated to be 27 percent while the rate of return of secondary and higher education are 16 percent and 13 percent, respectively. For the method of estimation see George Psacharopoulos, "Return to Education: An Updated International Comparison," World Bank Staff Working Paper, No. 402 (July 1980) p. 94.

¹²Michael Todaro, Economic Development in the Third World (New York and London: Longman, Second Edition 1981), p. 195. Boulier also points out that the policies to raise the legal minimum age for marriage was faced with the strong opposition and has been defeated. For further analysis of coercive policies see Bryan Boulier, "Population Policy and Income Distribution," in Income Distribution and Growth, p. 178.

APPENDIX

CHAPTER THREE

APPENDIX

The overall inequality of income distribution under the assumption of a dualistic economy with labor-surplus can be determined by analyzing the change in labor share or capital share. The dual-economy model of development implies that there exists a high rate of growth of the modern sector in the process of economic growth. The expansion of the modern sector produces a strong demand for relatively unskilled labor.

In this appendix it is attempted to investigate the impact of industrialization on the labor share under a dual-economy model. The reason for selecting the labor share is the fact that wage earners usually are in the lower income brackets, and any factor which increases the labor share will improve the overall distribution of income.

A dynamic production function is specified for the modern sector as:

$$Q = f(K, L, t) .$$

The production function is homogeneous of degree one, and twice differentiable

$$f_L = \frac{\delta Q}{\delta L} > 0 \quad . \quad f_K = \frac{\delta Q}{\delta K} > 0$$

and

$$f_{LL} < 0 \quad f_{KK} < 0$$

$$f_{KL} = f_{LK} .$$

In the modern sector, labor and capital are purchased in a competitive market, so

$$w = F_L \text{ and } r = f_K .$$

The rate of technological progress is denoted by R and is defined as:

$$R = \frac{Q_t}{Q_0} = \frac{Kf_{Kt} + Lf_{Lt}}{Kf_K + Lf_L} . \quad (A.1)$$

The nature of the bias in technological progress in terms of the Hick's concept of factor saving is represented as:

$$B = \frac{F_{Kt}}{F_K} - \frac{F_{Lt}}{F_L} . \quad (A.2)$$

Since we are only interested in labor share (ϕ_L), we have to define all of our variables in terms of ϕ_L . To do this manipulation we have to first divide R by f_L and multiply B by L/Q ratio. We then have:

$$\frac{R}{f_L} = \frac{Kf_{Kt}}{Qf_L} + \frac{Lf_{Lt}}{Qf_L} . \quad (A.3)$$

$$\frac{LB}{Q} = \frac{Lf_{Kt}}{Qf_K} - \frac{Lf_{Lt}}{Qf_L} \quad (A.4)$$

$$\frac{R}{f_L} + \frac{LB}{Q} = \frac{Kf_{Kt}}{Qf_L} + \frac{Lf_{Lt}}{Qf_L} + \frac{Lf_{Kt}}{Qf_K} - \frac{Lf_{Lt}}{Qf_L} \quad (A.5)$$

$$\frac{QR + Lf_L B}{f_L Q} = \frac{Kf_K f_{Kt} + Lf_K f_{Lt} + Lf_L f_{Kt} - Lf_K f_{Lt}}{Qf_L f_K} \quad (A.6)$$

$$\frac{QR + Lf_L B}{f_L Q} = \frac{f_{Kt}(Kf_K + Lf_L)}{Qf_L f_K} \quad (A.7)$$

From Euler's Theorem $Kf_K + Lf_L = Q$, and $\frac{Lf_L}{Q} = \phi_L$. So the results of (A.7) is to:

$$\frac{f_{Kt}}{f_K} = R + \phi_L B \quad (A.8)$$

Equation (A.8) establishes a relationship between $\frac{f_{Kt}}{f_K}$, R , and B . Dividing (A.1) by f_K and multiplying (A.2) by $\frac{K}{Q}$ and using the same manipulation, we can get

$$\frac{f_{Lt}}{f_L} = R - (1 - \phi_L) B. \quad (A.9)$$

For any production function which is homogeneous of degree one, it is always true that:

$$f_{Kk} = Lf_{KK} \text{ and } f_{Lk} = Lf_{LK}. \quad (A.10)$$

where $k = \frac{K}{L}$ ratio.

And also:

$$-Lf_{LL} \equiv Kf_{LK} \quad (A.11)$$

$$-Kf_{KK} \equiv Lf_{KL}. \quad (A.12)$$

Next, by multiplying f_{Kk} by $\frac{f_K f_L QK}{f_K f_L QK}$ and using (A.10) equalitys, f_{KL} is derived as:

$$\frac{f_{Kk}}{f_K} = \frac{Lf_L}{Q \cdot f_K} \cdot \frac{Q \cdot Kf_{KK}}{Kf_L f_K} \quad (A.13)$$

Using the identity (A.12) in equation (A.13) and arranging terms, one can derive

$$\frac{f_{Kk}}{f_K} = -\phi_L \cdot \frac{L}{K} \cdot \frac{Q f_{LK}}{f_L f_K} \quad (A.14)$$

An expression for the elasticity of substitution for production functions homogeneous of degree one is:

$$\sigma = \frac{d \ln (K/L)}{d \ln \left(\frac{f_L}{f_K} \right)} = \frac{f_L f_K}{Q f_{LK}}$$

Using the above definition in equation (A.14), it results to:

$$\frac{f_{Kk}}{f_K} = - \frac{\phi_L}{\sigma k} \quad (A.15)$$

Dividing (A.10) by f_L and then multiplying the result by $\frac{Q \cdot f_K}{Q \cdot f_K}$ and a similar manipulation process, it is possible to write:

$$\frac{F_{Lk}}{F_L} = \frac{(1 - \phi_L)}{\sigma k} \quad (A.16)$$

The rate of growth of the marginal product of capital can be obtained as:

$$\dot{f}_K = f_{Kt} + f_{KK} \dot{K} + f_{KL} \dot{L} \quad (A.17)$$

and

$$\frac{\dot{f}_K}{f_K} = \frac{f_{Kt}}{f_K} + \frac{f_{KK}}{f_K} \dot{K} + \frac{f_{KL}}{f_K} \dot{L} \quad (A.18)$$

Using (A.11), equation (A.10) yields:

$$\begin{aligned}\frac{\dot{f}_K}{f_K} &= \frac{f_{Kt}}{f_K} - \frac{L f_{KL}}{K f_K} \dot{K} + \frac{f_{KL}}{f_K} \dot{L} = \frac{f_{Kt}}{f_K} - \frac{L f_{KL}}{f_K} (\dot{K} - \dot{L}) \\ \frac{\dot{f}_K}{f_K} &= \frac{f_{Kt}}{f_K} - \frac{L f_{KL}}{f_K} \frac{\dot{k}}{k}\end{aligned}\quad (\text{A.19})$$

Multiplying (A.19) by $\frac{f_L}{f_K}$ and substituting (A.8) for $\frac{f_{Kt}}{f_K}$, (A.19) results to:

$$\frac{\dot{f}_K}{f_K} = R + \phi_L B - \frac{\phi_L}{\sigma} \cdot \frac{\dot{k}}{k} \quad (\text{A.20})$$

By using a similar method and manipulation, it is possible to derive $\frac{\dot{f}_L}{f_L}$ in terms of ϕ_L , R , B and σ . $\frac{\dot{f}_L}{f_L}$ will be:

$$\frac{\dot{f}_L}{f_L} = R - (1 - \phi_L) B + \frac{(1 - \phi_L)}{\sigma} \frac{\dot{k}}{k} \quad (\text{A.21})$$

And finally the rate of growth of real output is:

$$\dot{Q} = Q_t + f_K \dot{K} + f_L \dot{L} \quad (\text{A.22})$$

$$\frac{\dot{Q}}{Q} = \frac{Q_t}{Q} + \frac{f_K}{Q} \dot{K} + \frac{f_L}{Q} \dot{L} \quad (\text{A.23})$$

$$\frac{\dot{Q}}{Q} = R + \frac{f_K}{Q} \cdot \frac{K}{K} \dot{K} + \frac{f_L}{Q} \cdot \frac{L}{L} \dot{L} \quad (\text{A.24})$$

$$\frac{\dot{Q}}{Q} = R + (1 - \phi_L) \frac{\dot{K}}{K} + \phi_L \frac{\dot{L}}{L} \quad (\text{A.25})$$

From Euler's Theorem $\phi_L + \phi_K = 1$. Then (A.25) can be written as:

$$\begin{aligned}\frac{\dot{Q}}{Q} &= R + (1 - \phi_L) \frac{\dot{K}}{K} - (1 - \phi_L) \frac{\dot{L}}{L} + \frac{\dot{L}}{L} \\ \frac{\dot{Q}}{Q} &= R + (1 - \phi_L) \frac{\dot{k}}{k} + \frac{\dot{L}}{L} \quad (\text{A.26})\end{aligned}$$

And finally the rate of growth of labor share is:

$$\left(\frac{\dot{\phi}_L}{\phi_L}\right) = \left(\frac{\dot{w}}{w}\right) + \left(\frac{\dot{L}}{L}\right) - \left(\frac{\dot{Q}}{Q}\right) \quad (\text{A.27})$$

Before the turning point, the wage rate is constant. The constancy of wage rate implies that $\left(\frac{\dot{w}}{w}\right)$ is equal to zero. So before the turning point the rate of growth of labor share will change to:

$$\left(\frac{\dot{\phi}_L}{\phi_L}\right) = \left(\frac{\dot{L}}{L}\right) - \left(\frac{\dot{Q}}{Q}\right) \quad (\text{A.28})$$

Substituting (A.26) in (A.28), one can write $\left(\frac{\dot{\phi}_L}{\phi_L}\right)$ as:

$$\left(\frac{\dot{\phi}_L}{\phi_L}\right) = \left(\frac{\dot{L}}{L}\right) - R - (1 - \phi_L) \frac{\dot{k}}{k} - \frac{\dot{L}}{L} . \quad (\text{A.29})$$

or

$$\left(\frac{\dot{\phi}_L}{\phi_L}\right) = -R - (1 - \phi_L) \frac{\dot{k}}{k} .$$

So, before the turning point, capital accumulation $\left(\frac{\dot{k}}{k}\right)$ and technological improvement, leads to a decrease in the rate of growth of labor share. After the turning point, the supply of labor is no longer perfectly elastic. The rate of growth of labor share will change to:

$$\begin{aligned} \left(\frac{\dot{\phi}_L}{\phi_L}\right) &= R - (1 - \phi_L) B + \frac{(1 - \phi_L)}{\sigma} \frac{\dot{k}}{k} \\ &+ \frac{\dot{L}}{L} - R + (1 - \phi_L) \frac{\dot{k}}{k} - \frac{\dot{L}}{L} , \end{aligned}$$

or

$$\left(\frac{\dot{\phi}_L}{\phi_L}\right) = -(1 - \phi_L) [B - (1 - 1/\sigma) \frac{\dot{k}}{k}]$$

So $\left(\frac{\dot{\phi}_L}{\phi_L}\right)$ increases if the nature of technology is labor-using ($B < 0$) and the elasticity of substitution between labor and capital is less than unity.

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