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In spite of the rapid economic growth of the post-war era, there has not been significant improvement in the incidence of poverty, nor in the inequality of income distribution around the world, and particularly in the developing countries. A reason for the apparent failure of the poor to benefit from the effects of the post-war economic growth, as a number of development economists have hypothesized, lies in the structure of the economy. They argued that when it comes to alleviating poverty or improving the distribution of income, the type of growth is as important or more important than the rate of growth.

The purpose of this study was to test the hypothesis on the relationship among economic structure, poverty incidence, and income inequality, by determining whether the changes in the structure of the U.S. economy during 1969-1979 have had any impacts on the changes in poverty incidence and income inequality in the states over the decade. More specifically, the study sought to determine whether the changes in the labor demand in a number of selected industries, could explain the interstate variation in (1) changes in the poverty incidence of different demographic groups, or (2) changes in the

share of income received by different family groups ranked by income. Other factors such as transfer payments, migration, and unemployment rate, were included in the models as control variables. A linear multiple regression technique was applied in analyzing data from the 50 states and District of Columbia, published by the Bureaus of Census and of Economic Analysis.

The results from the estimation of the model indicated that, in general, the models better explain the interstate variation in changes in poverty incidence than they explain the changes in income inequality. Changes in employment in agriculture sector were found to be positively and significantly associated with changes in poverty incidence for the nonelderly (negatively for the elderly) householders. The reverse relationships were found to be true for tourism and convention sector. Also found to be significant were the non-income dependent transfer payments which are comprised of the social security and other entitlement programs not dependent on income.

As far as changes in the shares of income to different family groups are concerned, only the changes in labor demand in the agricultural sector and changes in population used as proxy for migration were found to be significant explanatory variables.

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ANALYSIS OF U.S. INTERSTATE VARIATION IN CHANGES IN POVERTY INCIDENCE AND INCOME INEQUALITY (1969-1979)

CHAPTER I

INTRODUCTION

For a book published in 1962, Michael Harrington is credited for awakening the nation's interest in the problems of the poor. In this book, Harrington documented and supported a hypothesis postulated by Galbraith in 1958 that there existed in the United States a new form of poverty which was immune to economic growth. Several studies followed the Harrington findings to analyze the "new form of poverty," to identify who the "new poor" are, and determine the factors contributing to their poverty conditions.

Economic Growth, Income Distribution, and Poverty Incidence

The Harrington findings led to renewed debates among scholars, on the assumptions of the neoclassical economic theory. Researchers sought to determine whether, under the U.S. market system, the effects of economic growth were spreading to all demographic groups. The result from most studies[1/] indicated that not all demographic groups were benefitting from economic growth, that some groups seem to be "immune" to the growth process.[2/] There was, however, little agreement on why such groups do not share the fruit of growth, what

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1/ A review of these studies is presented in the next chapters.

2/ Locke Anderson (1964) found that the chronically poor families are those headed by nonwhite, aged (over 65).

the size of the group was and what must be done about it, if anything.

In 1964, the President of the United States, in his address on the "State of the Union," called for a "war on poverty." Later, the federal government was mandated to take an active role in setting up programs to eliminate the incidence of poverty and thereby improve distribution of income across the nation. Almost 20 years after such mandate, the war on poverty is far from being won. Furthermore, there is an increased skepticism on the wisdom of the federal government's approach to income inequality and poverty issues. In fact some of the programs put in place to fight the war are being eliminated or scaled down. It is the strong belief of some public officials that only economic growth can bring salvation to the poor and low income recipients; thus policies to improve income distribution and to eliminate poverty incidence should proceed by stimulating the growth of the economy.

Actually, very few would question such a premise; economic growth is indeed necessary to fight a war on poverty. However, it is far from being a sufficient condition. The evidence from the Less Developed Countries (LDC's) for example indicates that economic growth policies over the last two decades have not resulted in a reduction of poverty in those countries. There is an increased impatience with such policies, and a growing demand for alternative development strategies, capable of allowing for both growth and equity concerns.

Economic Structure, Income Distribution and Poverty Incidence

To respond to the increased need for a combined policy of growth and equity that could help alleviate the pervasive incidence of poverty and income inequality in the LDC's, many economic development scholars are turning their attention to the structure of the countries' economies in search of significant relationships among the latter, poverty incidence and the distribution of income. Most preliminary indications from these scholars are that poverty and income inequality problems may have more to do with the structure of the economy than its rate of growth as originally assumed. Ul Haq (1971) argued that if production is organized in a way that excludes a large number of the population, it will be wrong to assume that growth will result in redistribution of income to those who are not participating in the production stream. Adelman and Morris in a study on social equity and economic development (1973), concluded that:

> "... economic structure, not the level of income or the rate of growth, is the basic determinant of patterns of income distribution."

In studying Asian Economic Development, Griffin (1978) found that the initial distribution of wealth and income has a decisive influence on the rate of amelioration or deterioration in the standard of living of the lowest income group. He concluded that for economic growth to be effective in alleviating poverty incidence, "it is necessary first to get the structure right."

In earlier studies, Kuznets (1955), Kravis (1960), and Oshima (1962), also hypothesized that the intercountry inequality they observed in a sample of Less and Most Developed Countries would be attributed partly to the difference in structure of the countries' economies. Particularly, the weight of agricultural (or rural) sector in the economy was assumed to be a determining factor. According to Loehr and Powelson (1981)

> "... Kuznets believed his findings (of an inverted U relationship, in which inequality first increases then declines with growth) were caused by a greater concentration of property and 'participation' income among the upper groups in LDC's."[3/]

The same argument was later emphasized by Oshima, who, more than five years after Kuznets, wrote:

> "... the major determinant of dispersion of the quintile shares between countries is the weight of farm or rural sector in the economy."

Other studies on economic structure[4/] have indicated that the weight of the farm sector in the economy declines with growth while the weight of the other sectors rise. If it is true that a relationship exists between a country's economic structure, poverty incidence, and income inequality, then an appropriate way of fighting a war on poverty would be to gear the structure of the economy in the right direction. Given the records of economic growth policies with

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3/ Property income refers to income from interest and rent. Participation income refers to the distribution of product or income among industries (Agriculture, Manufacturing).

4/ Chenery and his Associates published several studies on the issue. See bibliography for references.

regard to income inequality and poverty in the third world particularly, a proposition that economic structure, not just growth, needs to be considered to deal effectively with those issues becomes very appealing. However, the concept may not be quite as operational as one might wish. For one thing, there is no concensus on the meaning of economic structure.[5/] Also, there is not yet any body of theory on just what constitutes a "right structure," and how the structure of a country's economy (and its change thereafter), can affect the incidence of poverty and the size distribution of income in that country.

The purpose of this research is to explore various hypotheses relative to economic structure, poverty incidence, and income inequality, and to apply some of them in analyzing the interstate data in the United States.

Problem Statement

The choice of the United States over the 1969-79 decade as the basis for the study is based upon the rich and uniform data the states offer on income distribution, poverty incidence, and the structure of their respective economies. Furthermore, 1969-79 decade corresponds to the period when two comparable sets of poverty data from the "War on Poverty" era became available. From these data, as indicated in the 1970 and 1980 statistics of the U.S. Census of Population, there is evidence of convergence in the

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5/ In reviewing the various usages of the words "structure" and "structural change" in economics, Machlup (1967) found that in two out of three cases the concepts are used with either vague or "crypto-apologetic" meanings.

incidence of poverty and income inequality among the states. Out of the 50 states and District of Columbia, 38 (75 percent) have experienced a reduction in their poverty rate, and the largest drops occurred in states with high poverty rates in 1969 (see Table A-1).

In an early "Interstate Analysis of the Size Distribution of Family Income Between 1950 and 1970" by Tom Sale III (1974), it was also evident that although the southern states rank consistently high in state income inequality (measured by Gini Coefficient), the inequality gap between the southern and other states is closing down. Over the 1950 and 1960 decades, the southern states have consistently shown a greater than average improvement in the size distribution of their total personal income (Table A-2).

Other studies have shown that, parallel to the improvement in income distribution and poverty incidence among the states, important structural changes have also taken place in the states' economies. In analyzing "Regional Growth and Decline in the United States," Weinstein and Firestine (1978) found that differences in interstate development are narrowing down as:

> "... employment and per capita personal income are rising faster in the South and West than in the Northeast and North Central regions."

In Garnick and Friedenbergs' (1983) estimations, over the past 50 years (1929-79);

> "Per capita increased from 64 to 91 percent of national average in the low income regions (South and part of the West), and declined from 127 percent to 107 percent of the national average in the high income regions (Northeast and Far West)."

They have also identified five regional factors — (1) industrial mixes of employment, (2) property income per capita, (3) transfer payments per capita, (4) percent working-age population employed, (5) wage differentials — that they believe contributed to the narrowing of the regional differences and that:

> "... factors which are directly related to employment income (1, 4, 5) together accounted for about three quarters of the narrowing."

The authors noticed that the early stage toward uniform regional industrial mixes of employment was characterized by a reallocation of the farm "labor surplus." The out-migration from the low income regions was followed by a rapid growth of nonfarm employment opportunities in the low income regions in the 1960s and 1970s. This led to a reverse migration (in-migration) and rapid population growth now being observed in the low income regions. These various observations raise a lot of interesting questions. Economists with interest in factor price analysis might inquire about the role the price mechanism (wage differentials) played in the narrowing of the regional differences. Others might wonder if in-migration was a stimulus to growth as Muth suggested, or a response to the growth process. Others might still ponder on the impacts, if any, all these structural changes in the states' economy have on the incidence of poverty and income inequality in those states. It is this latter avenue that is proposed for the present study.

There are a number of ways in which the change in structure of the states' economies can have positive or adverse effects on the incidence of poverty and income inequality. For instance, a

structural change toward labor intensive rather than capital intensive industries could have beneficial effects on poverty incidence. This would be the case any time the change in the economy results in an increased demand for labor supplied by the poor. It is equally possible that an increase in effective demand for this labor could actually result in an increase rather than decrease in poverty incidence. In fact, a prospect of employment in a state or region could trigger a flow of in-migration. This would lead to an excess supply of labor which would later depress the wages at which the poor are employed.

In addition to its potential contribution to increasing the incidence of poverty and depressing the wage rate, in-migration of poor people to states with good job prospects could also result in an increase in inequality in those states. This would be the case when the in-migration is not accompanied by proportional increases in income share of the low income groups. Whether sectoral changes in the state's economy actually results in beneficial or adverse effects vis a vis poverty incidence and income inequality will depend on the rate of growth in jobs and in-migration.

There also are factors related to government policies regarding social justice and factors related to female labor force participation that can have some bearings on inequality and poverty incidences. As part of the "War on Poverty," the federal government in collaboration with the state and local governments has made a major effort to eliminate poverty and reduce what was seen as social injustice in this country. Several programs have been put in place to help the poor improve their living conditions. In implementing these programs,

every state also has its own laws with regard to the financing and the eligibility requirements. A legitimate hypothesis may be that the states with less strigent eligibility requirements and better financial support for those programs will achieve better improvement in the poverty incidence. As in the case of structural change, favorable conditions to the poor could lead to increased poverty incidence if there is migration of poor from states with "unfavorable" conditions. Also, the effort to provide good financial support for the poverty programs could lead to higher taxes, less growth, and higher unemployment rates which in turn could have adverse effects on the incidence of poverty.

Besides transfer payments, poor families can increase their income above the poverty line if there is one or more income earner in the family. A noticeable change in the labor market over the last decades has been an increase in female labor force participation. In 1982, as reported by the Bureau of Labor Statistics, 53 percent of women were working or looking for work while 35 percent were homemakers. In the 1960s, these statistics were exactly the reverse. A possible consequence of this increased participation of women in the labor force, at least for married couples, and to some extent single parents, is a greater family income. In states where women have made large contributions to the labor force, one can expect greater than average decrease in poverty.

Purpose and Objectives

Previous studies have shown that poverty and income inequality are affected not only by factors such as growth and unemployment,

but also by human related parameters such as education, age, and racial characteristics of the population. To explain the different degrees of success experienced by the states with respect to the reduction of the poverty population within their boundaries, it is proposed in this research to focus on the relationships between the change in poverty incidence and the change in economic structure (growth in employment in selected industries) and policy measures to eliminate poverty (transfer payments). More specifically, to determine the impacts the changes in (1) migration, (2) unemployment rate, (3) income from transfer payments, (4) employment in broad and specific industrial classifications, have on the change in poverty incidence and income inequality across the 50 states and District of Columbia between 1969 and 1979. Note that both years coincide with the peak of the business cycle such that they should be fairly comparable.

This selection of the explanatory variables for the model is certainly not exhaustive. Most of the classical factors such as education, racial characteristics, sex, age, found in previous studies to be significantly related to poverty and inequality in the U.S., appear missing. While the last two are dealt with partially by stratifying the dependent variables into subgroups,[6/] the former two factors have not been dealt with simply because of data limitations.[7/] Not including these two variables in the model could affect

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6/ Eight different poverty groups are considered in the study. A detailed discussion of these groups will be presented in Chapter IV.

7/ When data for the study were collected in Fall 1982 and Winter 1983, the Bureau of Census preliminary releases did not have sufficient statistics on these two variables.

the latter's explanatory power. It should not, however, affect the impacts the changes in structure of the economy have on the incidence of poverty and income inequality.[8/]

It is important to note at this stage, that the type of study proposed here should be viewed more as an exploration. Consequently, any result achieved in the process should be evaluated with caution for two reasons. Firstly, an interstate analysis using cross-sectional data to make inferences about secular trends (such as change in poverty and inequality), is subject to conceptual problems. According to Ahluwalia (1976), the relationship identified from cross-section studies are only associational. He argued that such relationships may be estimated by a multiple regression analysis but,

> "... they do not necessarily establish the nature of the underlying causal mechanism at work, for the simple reason that quite different causal mechanisms might generate the same observed relations between the selected variables."[9/]

As far as specific "stylized facts" are concerned, the study is expected to achieve three objectives:

1. Analyze the extent to which interstate variation in economic structure is associated with variation in aggregate poverty incidence and poverty among different demographic groups over 1969-1979 decade and across the 50 states and D.C.

[8/] It should be recognized that education factors do determine the orientation of the structure of the economy. Since the purpose of the study is not to explain the structure of the economy, omission of education variable should not detract from the meanings of the results.

[9/] For similar argument on the interpretation of a cross-section results, see Loehr and Powelson [1981, p. 130].

2. Evaluate the impacts of interstate variation in transfer payment, migration, and unemployment rates on the variation in poverty incidence at the aggregate and subgroup levels.

3. Estimate the impacts of interstate variation in economic structure, public policies, unemployment, and migration on the variation in family income concentration over the 1969-1979 decade and across the 50 states and D.C.

Definitions of Poverty, Income Inequality and Economic Structure

Up to now, the concepts of poverty incidence and income inequality have been used without really defining what they mean. Before discussing the methods of analysis in the study, it is essential to clarify the meanings of these various concepts.

Concepts of Poverty and Income Inequality

Poverty and income inequality are very subjective and ambiguous concepts that lead to emotional debates. It is customary in the literature to find the two concepts used interchangeably although they are not identical. In this study, an effort will be made to distinguish poverty incidence from income inequality, and to evaluate their relationships with the explanatory variables.

Definitions of Measures of Poverty. Precisely what is poverty? When is someone in poverty, and how can the extent of the problem be measured? There are many answers to these and many other poverty related questions. The ways the concepts have been defined in the

literature from the Victorian time[10/] to date can be broadly classified into three groups. (1) There are definitions that expressed philanthropic or religious beliefs; (2) others are essentially a description of the presumed causes of the problem; and (3) there are those definitions which one might call operational because they lent themselves to empirical evaluation.

Philanthropic Definition of Poverty. According to a report to the U.S. Congress on the measures of poverty by the United States Department of Health, Education, and Welfare (USHEW, 1974):

> "... many people believe that the poor are people who deserve something, sympathy only perhaps, but possibly some kind of assistance. Thus, when it is said that persons of a given type are not poor, what may be meant is that they do not deserve help or sympathy."

This concept of the poor is, not only very subjective, but it also tends to confuse the state of poverty and measures to help alleviate the problem. Whether a society decides to provide assistance to its poor is an ethical and economic issue which should not be used as criteria to determine if a person is poor in the first place. Besides, with this type of definition, it will be hard (if not impossible) for society to agree on who deserves assistance and who does not; and any agreement is likely to fluctuate with the "state of the economy." Thus, there will be no appropriate basis for evaluating progress against the incidence of poverty.

10/ Victorian time dates back to the 16th century in Britian when the first poverty laws were enacted.

Poverty as a Moral Weakness. In her book, *The Politics of Poverty*, Susanne McGregor (1982) reported another popular conception of poverty which prevails in the literature, from the Victorian Era to present days. In this concept, the poor are defined not as needy, but rather as "unfit," "lazy," "morally degenerate." The following rather clearly illustrates the point:

> "... if people were poor, this was because they were extravagant in their spending. Professor Levi for example, took the view that 'poverty proper in the Tower Hamlets was more frequently produced by vice, extravagance, and waste, or by unfitness for work, the result in many cases of immoral habits, than by real want of employment or low wages' [Simey and Simey, 1960:184]. In the 1870s and early 1880s, the poor were commonly viewed as unregenerate, as those who had turned their back on progress or had been rejected by it. They were 'the residuum.' The eminent and influential economist Marshall, for example, saw them as 'those who have poor physique and a weak character — those who are limp in body and mind,' [Stedman, 1971:11). ... The problem was not structural but moral. The evil to be combatted was not poverty, but pauperism: pauperism with its attendant vices, drunkenness, improvidence, mendicancy, bad language, filthy habits, gambling, low amusement, and ignorance' [ibid.]."

There is no doubt that some of the unflattering characteristics mentioned here will fit the profile of some of the poor, but such correlation does not imply causal relationship. It could well be that poverty does not result from the individual's behavior, but that the roots are cultural and/or socioeconomic. In other words, the poor are not poor because of their vices, but that their vices are the result of their being poor. Furthermore, these vices are not necessarily confined to the poor. They can also be found (maybe not at the same degree) among the nonpoor.

Operational Definitions of Poverty. There are essentially two ways in which poverty is operationally defined: subsistence or absolute poverty and relative poverty.[11/]

Absolute Poverty. Originated in Britain in the 19th century, the concept of absolute poverty is used to define those whose income falls below a predetermined level known as the 'poverty line.' According to Holman (1978) the first use of a poverty line can be traced back to a british businessman, Charles Booth (1889),

> ",,, who was ... moved to mount a scientific investigation into poverty in order to disprove the claim made in a series of articles in the Pall Mall Gazette, that one in four (or a million) Londoners were in poverty."

Using the expenditure of 30 East London families on food, rent, and clothes, he estimated that a "moderate family who lived a frugal and self-disciplined life with no personal disasters," would need 18s to 21s per week to satisfy the basic needs of life. Those whose income fell below such level of "18s per week" are then considered to be in poverty. In Booth's terminology, among those in poverty, one can distinguish between the "poor" who may be described as living under a struggle to obtain the "necessaries of life" and make both ends meet, and the "very poor" who live in a state of chronic want.

In spite of its originality, Booth's definition of the poverty line was criticized among other things, for being based on inappropriate

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11/ Martin Rein (1970) identified a third way in which poverty is seen as an externality. In this case, "there is a problem of poverty to the extent that the low income creates problems to those who are not poor."

notion of "necessaries of life." To circumvent this problem, Rowntree (1901) selected an income "necessary for the maintenance of physical efficiency," as the dividing line between poverty and non-poverty.[12/] Using an average value from the results of Atwater's work on calories required to keep a man working efficiently,[13/] Rowntree determined a low cost diet capable of providing the appropriate calorie requirement.[14/] He then added to the cost of food an average rent and an allowance for "certain household sundries" to come up with the poverty line. In his words as quoted by Holman:

> "My primary poverty line represented a minimum sum on which physical efficiency could be maintained. It was a standard of bare subsistence rather than living."

The notion of subsistence to describe the standard of life of the poor is often used in the literature to mean the same thing as absolute poverty.[15/]

12/ In Rowntree terminology, there must be distinction between "primary" and "secondary" poverty. The former includes those "whose earnings are [really] insufficient to obtain the minimum necessaries for the maintenance of merely physical efficiency. The secondary poverty on the other hand comprises those whose total earnings would be sufficient were it not ... [for] other expenditure, either useful or wasteful."

13/ Atwater's estimates were based on a study of convicts. His figures consist of 2700 calories for a man with little physical exercise and 4500 calories for a man with active muscular work.

14/ Rowntree diet would yield 137 protein grams for 3560 calories, which is greater than the 3500 calories he chose as necessary for physical efficiency.

15/ Alternative use of the absolute poverty concept, although no longer prevalent in the literature, is to reflect the universality of the poverty line throughout time and space. According to Holman, it is assumed that people require to subsist, to be physically able to work, will be the same in any age and country. This conception is no longer prevalent in the literature.

Following Rowntree a number of researchers, among which Mollie Orshansky (1965), have applied the principle of "physical efficiency" and necessary food basket to compute the poverty line. Today the Orshansky measures form the basis of the U.S. federal government poverty index, as used by the Bureau of Census and other federal agencies that count the poor. As distinct from that of Rowntree, Orshansky applied the Engels' Law to derive the poverty line. In 1857, Engels had observed that there was an inverse relationship between income and the percentage of total expenditure spent for food. From a survey of household expenditure, an Engels' coefficient can be estimated using the following equation:

$$(TC) = \alpha(FE) + \mu \qquad (1)$$

where:

TC = total household consumption.

FE = household food expenditure.

α = Engels coefficient to be estimated.

μ = random error term.

To arrive at the minimum budget (poverty line) to keep a family out of poverty, Mollie Orshansky substituted the cost of the USDA low cost food plan into the equation (1).

Weakness of the Poverty Line Measures. There are several criticisms that are often levied against the computation of the poverty line that underlines the concept of subsistence or absolute poverty. One group of critics believe that the income base of the poverty line underestimates the true family or individual

income and therefore leads to an overestimation of the poor. It is generally argued that by relying only on the family cash income as the available means for consumption, the absolute poverty measures fail to account for other resources like income-in-kind, gift and accumulated wealth, flow of consumption not purchased, such as public goods, which also contribute to families' welfare. Moreover, it is argued that there are people who simply do not subscribe to society's norms and may be satisfied with living at low income levels. Counting them as poor, just because they have income below the poverty line, would certainly result in an overestimation, and any effort to upgrade their income level will result in a failure.

Another group of critics argue that the poverty line is based on too stringent and inflexible assumptions, and that they underestimate the poor. The disputed assumptions in this case are essentially related to the expenditure, rather than income side of the estimated "minimum budget to keep a family out of poverty." The arguments run along three lines:

1. The flood plan used in computing the minimum cost budget assumes a nutritional knowledge that the poor do not possess. In Holman's comments:

> "To survive on minimum income ... required parents to select the most nutritious foods (ignoring likes and dislikes) at the lowest prices. Even a highly trained expert might have difficulty in doing so."

2. By using an average low cost budget, the poverty line fails to recognize those with special needs (diet and/or medical attention). According to Townsend,

> "There is little doubt that some families above the ... poverty line do not have sufficient income for ... decent life."

3. By emphasizing food[16/] and physical efficiency, the substinence poverty line ignores that individuals have needs also for cultural, social, and psychological fulfillment.

While the previous critics of the absolute poverty are quite concerned with either the income or expenditure assumptions that underly the poverty line, they do not call for a rejection of the concept itself. There is another group of critics who does just that. It is argued that in the stead of a:

> "... comparison between people and what is seen as an objective yardstick (poverty line), a yardstick which can differentiate between subsistence and an ability to carry on working in a proper manner" [Holman, 1978, p. 8],

a poverty measure must be based on comparison between people. It must take into consideration the community's prevailing living standards.

Relative Poverty. Contrary to the subsistence or absolute poverty, the concept of relative poverty does not make assumptions about a minimum requirement of essentials of life. Instead, it seeks to evaluate the gap or inequality[17/] between different groups in a contemporary social environment. It focuses on the

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17/ While poverty is seen as a consequence of inequality, the latter does not necessarily imply the former, even though they are often used interchangeably in the literature. For instance, there may be inequality between the incomes of university professors and top corporate executives, but yet, one can hardly argue that the professors are in poverty.

difference between the share of total income accruing to the low income groups and the rest of the community. It is argued that the poor are not only those who fall below a subsistence level, but also, those whose incomes are considered too far removed from the rest of the society in which they live. As Runciman (1972) puts it:

> "People evaluate themselves and others in terms of what happens around them.... Furthermore argued Holman,[18] there are social pressures on families to comply with established norms[19] of a contemporary environment."

Therefore, a measure of poverty that relies only on a concept of subsistence will fail to ascertain the real extent of poverty being experienced in the community.

By virtue of the notion that poverty should be evaluated with respect to a community income and standard of living rather than a "yardstick," the relative poverty concept relies more on value judgment in the definition of the poor than does the absolute poverty. For instance, according to Laffite, relative poverty occurred when the gap between the lowest and others created "hardship." Holman added that there is a belief of hardship whenever a style of life is judged not to be "acceptable" or "decent," or if it is "unfair" or "unnecessary" when compared with the rest of the population. To decide on when those highly subjective conditions exist, Runciman proposed the following criteria: A relative poverty occurs when

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[18] *Ibid.*, p. 16.

[19] In a study of low income mothers, Marsden (1973) reported that "... they felt social pressures to maintain their homes to something like ... the standards set by the rest of the community even if this entitled cutting down on physical essentials."

(i) person 'A' does not have income X; (ii) 'A' sees other persons having X; (iii) 'A' wants X; (iv) 'A' sees it as feasible that he should have X. With this set of criteria, it becomes obvious that counting the poor will conceptually lead to what Hazlitt (1973) called an endless difficulty. He wrote:

> "... if poverty means being worse off than somebody else, then all but one of us is poor. An enormous number of us are in fact subjectively deprived."

In practice, the percent of families with income less than one-half of the median income is considered poor under the relative poverty criteria.[20/] Even with such measures there are problems, since a proportional increase in income for all groups will not affect the relative poverty incidence. This observation prompted Hazlitt to suggest that: "... our definition (of poverty) ... should not be such as to make our problem perpetual and insoluable." Despite its conceptual shortcomings, the relative poverty is a useful concept that provides additional insights into the poverty issues.

The U.S. Bureau of Census Poverty Data. As previously indicated, it is the absolute poverty concept that is applied by the U.S. Census Bureau in computing the U.S. poverty statistics. The "poverty line" used to delineate the poor and the nonpoor is the Social Security Agency (SSA) index determined by Mollie Orshansky.

20/ A review of the relative poverty measure is provided by Plotnick (1979).

The index produces a range of income cutoffs adjusted for family size, age, and sex of family head, number of children under 18 years old, and the residential factors such as farm-nonfarm residence (Table I-1). Families and unrelated individuals' incomes are then compared against these cutoffs to determine the poverty incidence, i.e., the percent of a given group (all families for instance) that has income lower than the poverty line.

The poverty lines are regularly adjusted for the cost of living using the consumer price index (CPI). However, they are not adjusted for regional cost of living. Such failure would bias the poverty incidence upward in regions where the cost of living is lower than average, and downward in regions with higher than average cost of living. Beside the misleading results that may arise from using inappropriate adjustment factors, the poverty statistics published by the Census Bureau possess other shortcomings: (1) the data is based only on one year's information of cash income flow, (2) it weighs equally anybody with income below the poverty line regardless of how far removed that income is from the threshold. It seem obvious that a family with income close to the poverty line will not experience the same hardship as a family with income say 30 or 40 percent below the minimum. This is particularly important for policy purposes. By targeting a policy toward those just below the poverty line, it is possible with a small budget to significantly reduce the poverty incidence, while alternative programs with a larger budget for those at the very bottom may not lead to a similar result. Although the latter program may actually have greater

Table I-1. Weighted Average Poverty Line.

Size of Family Unit	Poverty Line	
	1969	1979
1 person less than 65 years old	$ 1,888	$ 3,774
1 person 65 years and over	$ 1,749	$ 3,474
2 persons		
head less than 65 years old	$ 2,441	$ 4,876
head 65 years old and over	$ 2,194	$ 4,389
3 persons	$ 2,905	$ 5,787
4 persons	$ 3,721	$ 7,412
5 persons	$ 4,386	$ 8,776
6 persons	$ 4,921	$ 9,915
7 persons	$ 6,034	$11,237
8 persons	$ 6,034	$12,484
9 persons or more	$ 6,034	$14,812

a/ The $ values represent an annual income expressed in current prices.

impact in reducing human anguish, the poverty statistics may not support the fact.[21/]

In spite of all its shortcomings, the census poverty statistics provide a consistent and quite relevant indication of the poverty incidence across the states and over time. They will form the basis of the poverty data employed in this study. Altogether, eight poverty groups will be considered in the study. Beside (1) the aggregate poverty incidence (all persons), the incidence of poverty among (2) married couples, (3) single female householders, (4) single female householders with dependent children (under 6 years of age), (5) elderly householders (65 years and over), (6) nonelderly householders, (7) elderly unrelated individuals, and (8) nonelderly related individuals will be examined.

In the Census definitions, "a household includes all persons who occupy a group of rooms or a single room which constitutes a housing unit." A family is a household in which all persons are related either by blood, marriage, or adoption. An unrelated individual is (1) a householder living alone or with relatives only, (2) a household member who is not related to the householder, or (3) a person living in a group quarter who is not an inmate of an institution. The term "householder" introduced in the 1980 Census is used to refer to the "head of the household," who is the person in whose name the home is owned or rented. It must be noticed that when the census documents refer to the poverty incidence of a house-

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21/ A measure based on ordinal approach is suggested by Amartya Sen (1974) to remedy this problem of the povery incidence measure. With this measure, a greater weight is attached to the gain by the very poor.

holder (say elderly householder), it is not the incidence of the individual head of the households that is measured, but rather the incidence of the household units which include all related members.

Concept and Measure of Inequality. The concept of inequality holds different connotations for different people. According to Budd (1967), society may not be able to agree on what constitutes an inequality, but there may be more of a consensus on the direction of movement toward less inequality than on the ultimate goal of complete equality which remains an utopian alternative. According to Aigner and Heins (1967), economists' use of the term "equality" in reference to a distribution of income had historically been in the sense of a consensus for some statistical characteristic(s) of the distribution rather than a firm concept of equality. To provide an acceptable definition of income inequality requires that appropriate welfare assumptions about income and its distribution be clearly spelled out. Unfortunately, to quote Aigner and Heins,

> "... in discussions on income inequality in the literature, those assumptions, for the most part, are left implicit (and unknown)."

It is important in discussing income inequality to make a distinction between (1) the size distribution of income and the functional distribution on one hand, and (2) relative poverty on the other. Relative poverty is derived from the analysis of a size distribution of income. Functional distribution is concerned about the share of income and that accrues to different factors of production (Labor, Capital, and Land). It is in fact to the functional distribution of income that economists have devoted most theoretical

efforts. This does not imply by any means, that the size distribution is deemed less important in economic analyses. Besides its use as indicator of social justice or in the search for optimum social welfare,[22/] a change in income size distribution is significant for the impact it may have on the level of aggregate demand, and the full employment of resources. According to Keynes, a redistribution of income toward the lower income groups (with higher propensity to consume) could lead to higher aggregate demand and full employment of resources. According to Dusenberry, on the other hand, consumption is not only a function of absolute income, but also of the relative income positions as consumers tend to desire and imitate the consumption patterns of those with higher income. The implication here is that a reduction of inequality in size income distribution could lead to a reduction rather than an increase in aggregate demand. Which of the two hypotheses is actually right is an empirical problem outside the range of this research program.

Measure of Income Inequality. There are several measures of income inequality in the literature. According to Loehr and Powelson (1981), the existing measures (about a dozen of them) can be grouped into three main categories:

22/ "By postulating the existence of a community social welfare function, welfare econmists assume that aggregate welfare can be increased through the transfer from higher to lower income groups; that social welfare will be maximized when it is no longer possible to increase the welfare level in the community with such transfer. Also implicit in this analysis is the existence of a diminishing marginal utility of income" [Al Samarrie, 1967].

(a) The measures not based on probability distributions or welfare functions (coefficient of variation, the variance of income);

(b) The measures based on probability distributions (lognormal distribution, percent share of income, Gini Index); and

(c) The measures based on welfare functions (Atkinson's or Champernowne's index).

By far the most popular measure remains the Gini Index of concentration based on the Lorenz curve (Figure I-1) which is a depiction of the cumulative income distribution against similar distribution of the population.

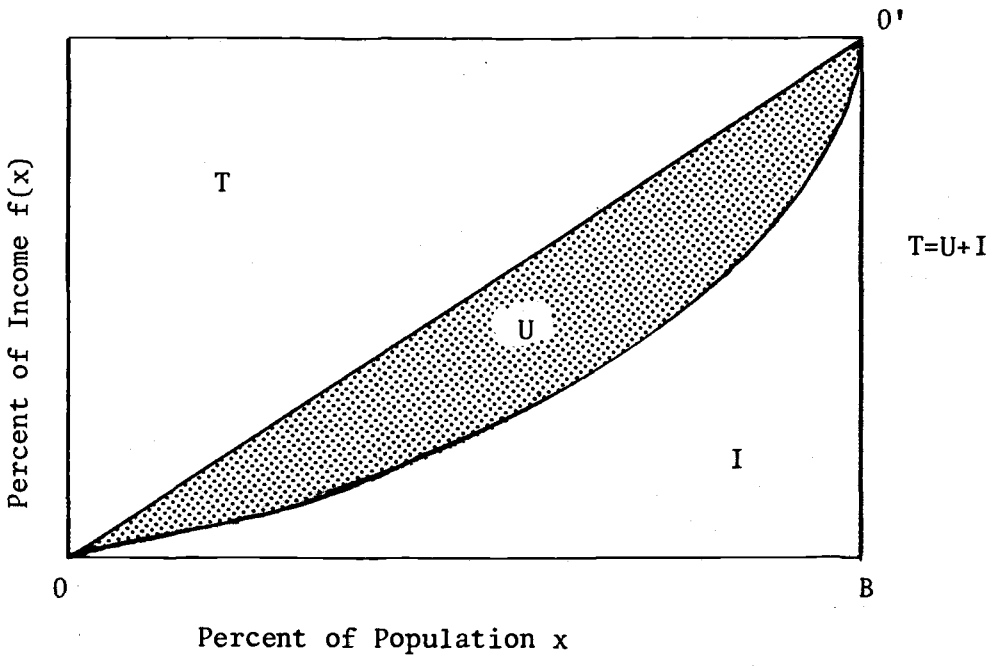

Figure I-1. Cumulative Income Distribution
Source: Yotopoulos and Nugent (1976), p. 242.

Implicit in the notion on Gini Index is a comparison of the actual cumulative distribution of income (f(x) = 00') to a rectangular distribution of that income (straight line 00') in which every group receives the same share of the total income. In mathematical terms,

$$G = \frac{U}{T} = \frac{T-I}{T} = 1 - \frac{I}{T} \tag{2}$$

or in more general terms,

$$G = \frac{\int_0^{100} (X - f(x))\, dx}{\frac{1}{2}(100)^2} \tag{3}$$

The Gini coefficient ranges between 0 and 1. When income is equally distributed, (G = 0), and when one person receives all the income (G = 1). In practice, the coefficient does not reach the extreme values.

In spite of its popularity as inequality measure, the Gini Index possesses a number of conceptual flaws. First, there is no precise mathematical formula for computing the index such that serious approximation errors can be committed in deriving the index. Second, the Gini Index is not sensitive to change in distribution that is not pareto optimum. In comparing any two or more distributions of income, the Gini Index will be an appropriate measure only if the Lorenz curve from the distributions do not cross. Third, according to Loehr and Powelson (1981):

> "The Gini does not give any indication of where the inequality lies, nor, when a distribution changes, where the changes have taken place."

A percentile share measure of inequality which describes the percent of total income received by different income groups presents the advantage of palliating some of the flaws inherent in the Gini measure. Not only is it fairly easy to compute, it is quite informative and flexible by allowing the researcher to focus on separate income groups. Its main disadvantage is that it is clumsy to present. For the purpose of this study, the percentile share will be used as the measure of inequality. Specifically, the change in income share of the bottom 20 percent, middle 60 percent, top 20 percent, top 5 percent of family ranked by income will be examined.

Definitions and Measures of Economic Structure

According to the Webster Dictionary, a "structure is a manner of organization; a mode in which different organs or parts are arranged." Kuznets (1965) identified six different ways in which the parts of a nation's economy can be arranged into structure. The national aggregate output or income can be distinguished in terms of:

1. the industrial sectors in which the products originate;

2. the origin of income in economic entities with different forms of organization such as individual firms, public utilities, governments, etc.;

3. the distinction between products originating and retained at home, and the inflows and outflows across the nation's boundaries;

4. the allocation of income payments among recipients grouped

either by size of income or according to some institutionally distinguishable social group;

5. the distribution of national income, viewed as categories of final products, between flow into consumption and capital formation; and

6. the income streams ... that flow to the several productive factors engaged in the production process such as labor, property and enterprise.

Each of these six modes of organization emphasizes different functions in, or aspects of, a nation's economy. The first three structures deal with the generation of income and the last three, the allocations of that income. Among the latter, structures (5) and (6) have the benefit of over a century of theoretical development while structure (4) has yet to receive any consensus among economists. Another characteristic of Kuznet's definitions of economic structure is that they are broad enough to cover all the major fields of specialization in the economic profession such as production, consumption, investment, trade, and income distribution. However, they are not exhaustive in terms of definitions of structure as found in the economic literature.[23/] In development economics, for instance, the industrial sectors in which the products originate are often grouped into primary, secondary, and tertiary [Chenery, 1975] or modern and traditional [Oberai, 1979] sectors. In regional economics,

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23/ For a good review of the use of the concepts of "structure" and "Structural change" is economics, see Machlup (1967).

other modes of organization such as "fast versus slow growth" [Howland, 1975], "growing versus declining" [Ford, 1971], or "basic versus non-basic" [Tiebout, 1962], industries are often distinguished. In fact there are virtually unlimited numbers of ways one can select to organize the components of a nation's economy into structure. Any choice made can only be justified by the objectives of the study.

Most often, it is not so much the knowledge of (economic) structure that is of interest to researchers, instead how such structure changes over time and/or across countries. According to Yotopoulos and Nugent [1976, p. 286]:

> "... common to many growth theories in different disciplines, ranging from biology and chemistry to economics and sociology, is the notion that the relation of parts to the whole (and between) parts is likely to change in the process of growth. Moreover, the character and magnitude of these changes are thought to be predictable and fundamental to the understanding of growth."

As far as selecting a unit for measuring the change in economic structure is concerned, Kuznets (1962) wrote:

> "The changes ... in structure of economies can be studied through the distinction of the labor force, capital, and income originating; [however, it is the labor force that is mostly used]. It has the richest stock of data and raises the least formidable conceptual difficulties."

In this study, it is the changes in structure of the state economies and their subsequent impacts on the incidence of poverty and income distribution in the states that is of interest. In measuring the structure of the states' economy, the study will focus on the level of employment in broad industrial groups such as primary

(Agriculture and Mining), secondary (Construction and Manufacturing), and Tertiary sectors, and in some specific industrial classifications. Among the possible choices, the (1) Low Wage Labor Intensive Manufacturing Enterprises,[24] (2) High Technology Manufacturing,[25] (3) Tourism/Convention[26] Industries, (4) Agricultural, and (5) Government sectors will be examined. The choice of these industries is determined either by their growing importance in the U.S. economy and the competition among the states to get their shares of those industries (2 and 3), or by previous assumptions regarding their impacts on the dependent variables.

Data Source

The data to be used in the study are secondary data. The poverty incidence and size income distribution statistics are provided by the 1970 and 1980 Census of Population. Statistics relative to functional income distribution (Labor and Proprietor, Property Income) and employment by industrial type are supplied by the Bureau of

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[24] The Low Wage Labor Intensive Manufacturing Enterprises are defined by Bluestone and Williams (1982) to comprise the Textile Mill Products (SIC 22), Apparel and other Textile Products (SIC 23), Lumber and Wood Products (SIC 24), Rubber and Plastic Products (SIC 30), Leather and Leather Products (SIC 31).

[25] The definition of High-Tech Manufacturing used in this study is provided by the Joint Committee of Congress [Shaffer, 1982]. Under this definition, the High-Tech Manufacturing industry consists of (a) Chemical and Allied Products (SIC 28), Machinery except Electrical (SIC 35), Electrical Equipment (SIC 36), Transportation Equipment (SIC 37), Instruments and Related Products (SIC 38). Likely, this classification overstates the High-Tech industry which is more of a science-based industry. Due to lack of more detailed data source, however, this definition will be adopted for the study.

[26] The Tourism industry is defined as the (a) Eating and Drinking Places (SIC 58), (b) Hotels and Lodging Places (SIC 70), and Amusement and Recreation Places (SIC 79).

Economic Analysis (BEA). Several limitations are inherent to the two data sets. The census data are only decennial[27/] by place of residence, and are grouped by Family, household, and unrelated individuals. The BEA data only relate to individuals, and are generally by place of work, particularly the employment statistics. Personal income data by functional type are adjusted for the place of residence. These deviations between the two data sets would not, however, greatly impair the results of the analysis.

Organization of the Study

The dissertation resulting from the study, will be organized into five chapters. After the introduction, the next two chapters will review the theoretical framework of the study, followed by an empirical analysis, and the summary and conclusions chapters. The theoretical framework will be comprised of a discussion of the various schools of thought relative to the determinants of poverty and income inequality, and a review of the empirical methods used in previous research on poverty and income inequality. The empirical analysis chapter will present the proposed methods of analysis in the study, and the results of the estimated models. The implications and limitations of the study will be discussed in the fifth and last chapter.

27/ 1970 is actually the first year the Bureau of Census conducted a survey on the poverty in evidence in the states. Because of this a time-series analysis will not be possible.

CHAPTER II

REVIEW OF THE DETERMINANTS OF POVERTY AND INCOME INEQUALITY

As can be expected from the definitions of the concepts, there is no concensus in the literature on what constitutes the determinants of poverty and income inequality. Several schools of thought exist on the issue, however, and a review of some of them is presented in the following sections.

Determinants of Poverty

Genetic and Psychological Determinants

In the most technologically advanced societies, there is a deeply rooted belief that individuals are self-determining being able to control their own enviornments and destinies.[28/] Consequently, it is sometimes believed a failure of achievement resulting in poverty, for instance, can only be blamed on the individuals themselves. In fact, a number of explanations of poverty stemming from this belief are offered in the literature. To show the individuals' responsibility in their plights, these explanations rely on genetic endowment and/or psychological qualities which are believed to determine mankind's destiny. In other words, it is believed that if an individual is poor it must be because (s)he is destined to be.

28/ This belief is in contrast with the case in the less technologically advanced societies where the individual and his environment are perceived more or less as resulting from the interplay of natural forces.

Genetic Origin of Poverty. The tenets of the theory are that (1) intelligence which can be measured empirically by IQ tests is largely determined (80 to 87 percent) by biological inheritence (through the genes); and that (2) individuals' level of educational attainment, occupation and social class position are in turn determined by their intelligence. Those who are successful in terms of prestige and earnings owe it to inherited high IQ's, while those who receive low pay, or are unemployed and poor must be endowed with low intelligence or inferior genes.

According to Herrnstein (1973), the generalization of education and welfare services in the technologically advanced countries have created opportunities of upward movement on the social scale for children of low "IQ" parents who have some potential to succeed. But the consequence of this upward movement is a depletion of the "gene pool" of the lower classes. With a "shrinking gene pool," these lower classes are left to reproduce offsprings of inferior genetical endowment, hence doomed to failure, low income and poverty. In his words:

> "... the tendency to be unemployed may run in the genes of a family about as certainly as the IQ does now."

There are several criticisms against the argument of "genetic origin" of poverty. While the critics do not refute the importance of intelligence and educational achievements in today's societies, they reject the allegations that "high intelligence" necessarily leads to educational success, best paid occupation, high social class, and absence of poverty.

Psychological Origin of Poverty. The explanations of poverty that fall under this category are the results of a rationalization from three premises. Originated in the U.K. in the 1950s, the psychological explanation of poverty is based on the notions that:

1. Poverty is not necessary in a welfare state.[29/]

2. Those who are poor tend to be individuals or families with a multiciplicity of problems; that is they are "problem families."

3. The origin of their problems tend to be psychological.

According to Elizabeth Irvin (1954) for instance, the roots of poverty can be traced to emotional immaturity:

> "As children, the problem parents had experienced defective relationships within their own family. They had not progressed along normal developmental lines, had not matured. When adults, they still behave like young children who lack the ability to control their impluses, to plan, to save, to take care of property. Consequently, they could not manage money, housing, or employment."

As with the "genetic origin of poverty," a number of criticisms have been put forward to disprove the presumed causal relationship between psychological qualities and poverty. Most of these criticisms, as Rutter and Madge (1976) observed, essentially tried to point out that:

29/ A welfare state is a country in which society, through its representative government, provides for the needs of those who cannot provide for themselves. Often, the term welfare state is used with a pejorative connotation.

> "The poor are not always only those with multitude and overlapping personal problems ..., problems of delinquency, child (mis)behavior, drunkenness, marital disharmony can also be found among the affluent."

Besides the genetic and psychological approaches to poverty which attempt to explain the poverty problem through personal inadequacy (biological or psychological), other popular explanations are often encountered in the literature. These explanations are either based on presumed "Laws of Nature" as in Malthus' population doctrine, on class exploitation as proposed by Karl Marx, or on "Laws of Economics" as described by Ricardo, Marshall, Keynes, and other economists. The remainder of this section will be devoted to the review of some of these evaluations of the poverty problem, and to the remedies proposed to deal with it.

Economic Theory and Determinants of Poverty

In the course of the development of economic thought, different philosophical currents have been determinant in setting the course of the profession. In the late 18th and early 19th centuries, when economics came to be known as the "dismal science," a wave of pessimism in mankind's ability to survive and prosper led several authors to focus their attention on factors that contribute to human misery (such as poverty). The most prominant writers to influence the thinking on the issue were Thomas Malthus, David Ricardo, and later, Karl Marx, and Engels. To both Malthus and Ricardo, the seed for mankind's misery lies in the population growth thought to operate under inescapable laws of nature of economics. To Marx and

Engels, who also saw a problem with population growth, it is the greed of the capitalists, however, the accounts for poverty and unnecessary human sufferings.

Population Growth as Determinant of Poverty. According to Malthus' well known population doctrine, there exists a natural imbalance between the growth rates (geometric and arithmetic respectively) of population and food production necessary to sustain life. The result of such imbalanced natural laws is an ever increasing population with lower per capita food intake leading to poverty and starvation. In Malthus' views as reported by Serrón (1980), poverty exists because of overpopulation and such prospect is real particularly among the lower classes; that is those who owned nothing but the labor of their hands. Because they have a right only to what they can produce with that labor, they will cheapen that right by overproducing.

As far as the owners of the earth and its goods are concerned, Malthus believed they have an unquestionable right to consume all that was produced. Karl Marx and Engels later criticized the notion of an unquestionable right of the owners of the earth and its goods (capitalists) to consume all that was produced. In fact, they (Marx and Engels) consider the capitalists rather than overpopulation to be responsible for the poverty of the mass.[30/]

Another proponent of population growth as a determinant of poverty is Ricardo. Influenced by Malthus' (population) doctrine,

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30/ Their arguments are presented in the section Class Exploitation as Determinant of Poverty.

and the concept of "stationary state"[31/] of the classical economic theory, Ricardo developed a "subsistence theory of wages" to account for the relationships between total population and standard of living. According to Kenneth Boulding (1966), Ricardo's wage theory was built around two main assumptions:

1. There exists a relationship between the standard of life of mankind and population growth.

2. There exists a minimum standard of life — subsistence level[32/] at which the population (particularly the working class) will just maintain itself.

The first assumption stems again from the classical economists' believe that the supply of natural resources (land) is fixed. A population growth means a larger quantity of labor must be applied to the fixed land in production, and eventually per capita output will decline (law of diminishing returns).

31/ According to Boulding (1966), the stationary state is a condition where population is constant in number, age composition, and skill, and where stocks of capital goods are likewise constant in size and composition.

32/ Ricardo argued that the "subsistence level" may be purely conventional and depends on the degree to which the low income prevents the successful rearing of children. He wrote:

> "We assume, then, that there is some standard of life below which the people will raise so few children that the population will decline, and above which the people will raise so many children that the population will rise" [Boulding, 1966, p. 81].

The relationship between population and standard of life (measured by per capita income), is illustrated by the cuve (AA) in Figure II-1. The population (ON) at which the standard of life is maximum (NB) represents the optimum population. By virtue of the second assumption, the optimum population does not, however, constitute an equilibrium point. As can be noticed in Figure II-1, at the optimum population (ON), the standard of life (NB) is greater than the subsistence level (OS). With a better standard of life, death rate will decline relative to birth rate. Consequently, the population will grow until an equilibrium population ST (= OM) is reached where the standard is exactly equal to the subsistence level. Were population greater than ST, it will decline until standard of life OS is reached again. Notice that in the Ricardo model, population growth responds to the standard of life particuarly the subsistence level, rather than the "natural laws" as in the Malthus model. Furthermore, in Richardo's views, the subsistence level is a long-run equilibrium level of the standard of life such

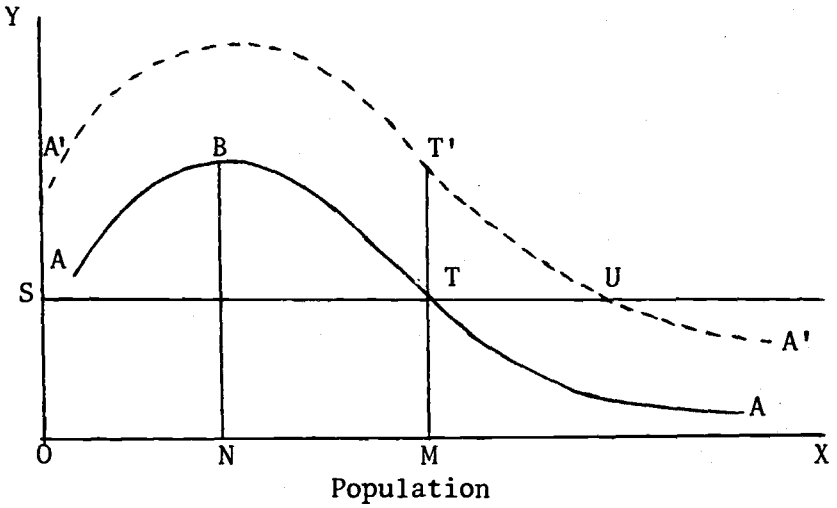


Figure II-1. The Subsistence Theory.
Source: Kenneth Boulding, 1966, p. 80.

that:

> "Any improvement in the techniques of production will have the ultimate effect of increasing the total sum of human misery, for it will merely enable a larger population to exist in misery and starvation."

This situation is illustrated in Figure II-1 by the curve (A'A') which results from an upward shift in the curve (AA). At the equilibrium population level (ST = OM), the new standard of life (MT') is greater than the subsistence level (MT). However, wrote Boulding:

> "This blessing would be merely temporary ... [for], the population would set itself to breeding, children would cease to expire at untimely ages, and the population would grow ... until finally ... the standard of life had sunk once more to the subsistence level."

Many people believe that this phenomena which Boulding described as the "utterly dismal theorem" of population, is descriptive of the situation in the LDC's,[33/] where economic growth appears to be accompanied by increased absolute poverty.

To break the population trap and reduce poverty incidence, both Malthus and Ricardo have only one prescription: "moral restraint" to limit the population growth. The modern thinking is that the population trap can be broken through rapid economic growth, family planning, and above all, through proper economic incentive to women in reproductive age.

33/ According to Adelman and Morris (1973), development is accompanied by absolute as well as relative decline in average income of the very poor in LDCs.

The arguments to provide economic incentives to child-bearing women as a means to reduce poverty and control population growth is elaborated in the "economic theory of fertility." According to Todaro (1981), children within the framework of this theory are considered as argument of the household demand function, and parents' decision of having children is guided by cost-benefit criteria. A family will opt for many children whenever the perceived benefits (expected income from child labor, expected support from the child in one's old age) outweigh the costs (opportunity cost of the mother's time, actual cost) of rearing the children. By providing educational and employment opportunities to potential mothers, the opportunity cost of child rearing will increase to make it less attractive to have many children. With a reduction in family size, average family income would subsequently increase, and poverty incidence would decline.

Class Exploitation as Determinant of Poverty.[34/] For Karl Marx and Engels, and contrary to Malthus and Ricardo,

> "The fundamental problem which lays at the source of poverty is not population growth, but private control of the means of production (capitalism)."[35/]

[34/] The term "exploitation" is used here in the context proposed by Marx. According to Serrón [1980, p. 25],

> "To Marx, 'exploitation' meant that within historically given systems, such as feudalism and capitalism, the institutionalized method of appropriating the products of labor, namely, private ownership of means of production, permitted the appropriation of the surplus produced over and above subsistence needs (in the forms of rent and profit) for purpose other than its use by the laboring class."

[35/] Serron, 1980, p. 21.

They argued that poverty does not arise from overpopulation, instead it is the consequence of an exploitative economic system which does not seek human fulfillment. The capitalist economic structure is such that unemployment and/or starvation do not result from lack of food or absence of work, but rather from the fact that:

> "... profit stands like a ghost between the unemployed and the means of production (necessary to satisfy their needs)."

The existence of an unemployed working class which Marx refers to as "industrial reserve army of unemployed and underemployed" is believed to be an essential part of the capitalist economic structure. It is essential because:

> "... during the prosperity phase of the business cycle, it provides a readily available pool of labor power which can be easily put to work; and during the crisis of depression phase, it serves to keep in check the aspirations of the employed sector of the labor force" [Serrón, 1981].36/

Marx and Engels also argued that with technological progress, there is a disproportionate share of capital (fixed production factors) and labor necessary to produce more and more output. With fewer and fewer laborers required for equivalent increase in capital to produce through more efficient technology, an improvement in labor productivity ultimately renders a portion of the labor force relatively superflous. The point is that were it not for the increased share of output (in relative terms) received by the capitalists, growth in output through greater labor productivity should lead to an improvement in the standard of living of the working class:

36/ *Ibid.*, p. 20.

> "Because capitalist production is production for profit rather than for use, as laborer revolutionizes its own productivity and efficiency through every improvement in the technology and scale of production, it also creates the mans by which it becomes relatively superfluous itself. ... What might otherwise be viewed as accumulated productive power becomes accumulated destitution, want, poverty, and misery. ... The emphasis placed on overpopulation is simply a diversion born out of the effort to avoid coming to terms with the fundamental issue ... that is the contradictory nature of the capitalist production (system)."[37/]

In Marx' views, the obvious and only solution to the poverty problem under the capitalist system would be a structural change through which the working class would gain control of the means of production. In other words, his recommendations for alleviating poverty and creating the conditions for "human self-development and self fulfillment" would be a class struggle which ends in socialism. Unless such class struggle takes place, Marx predicted that the working class would suffer from increased misery and destitution and that ultimately the capitalist system will collapse under the weight of its own contradictions.

Whether it is overpopulation or capitalist exploitation that cause poverty, the kind of poverty and misery prediced by either Malthus, Ricardo, and Karl Marx seemed to have dissipated in Europe and North America with the Industrial Revolution. As David Hamilton (1965) observed:

37/ *Ibid.*, p. 18.

> "Neither the dire predictions by Ricardo, nor those of Marx had validity today when the general rise in living standard [in the developed countries] is taken into consideration. Mankind did not seem to be threatened either by the stationary state or by increasing misery."[38/]

Other Determinants of Poverty. By the turn of the 20th century, the rapid industrialization and the expansion of the western economies had led many economists to believe that the "lot of all" can be improved with greater affluence. Poverty became less of an issue (at least until the great depression), and attention was turned to the mechanism for achieving an affluent society. The emphasis was put on stimulating production by increasing productivity,[39/] and on reducing inefficiency in resource allocation by promoting the free market system.

In spite of the general progress in standard of living associated with the affluent society, poverty did continue to exist, even in the developed countries. To understand how this could be, it is important to realize that in the free market system, an individual's (or family's) income is determined by the value of the productive service (s)he can supply in the market place. For the low income working class, labor generally comprises the sole income-yielding

[38/] This nightmare does persist, however, in most of the Less Developed Countries.

[39/] Alfred Marshall (1920) argued that the general lot of the low income receivers could be improved by a more efficient organization of work, and by continuing improvements in the industrial arts. He suggested (1) to reduce the number of hours worked to increase workers' efficiency and wages; (2) to increase the use of machinery to three eight-hour shifts in order to lower fixed costs; and (3) to adopt new technology of production that could increase labor productivity and hence their wages.

asset possessed. A failure of this asset to generate adequate income could result in poverty.

There are a number of factors affecting the labor market that can explain an inadequate income generation and hence poverty incidence of the working class. On the demand side, the structure of the economy, the level of aggregate demand, and prevalence of discrimination in the economy are factors worth noting. On the supply side, the quality of labor force generally measured by the level of education,[40/] the mobility of the individual or the family, and other constraints such as old age, child rearing, and/or physical disability can enhance or limit the income generating capacity of the laborers.

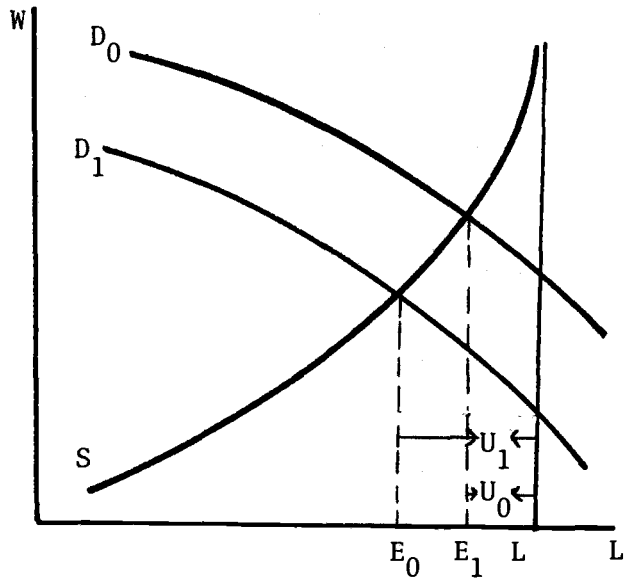
Aggregate Demand, Economic Structure, and Poverty. The level of aggregate demand would affect poverty incidence through the overall demand of labor in the economy, while the structure of the economy would affect it through the type of jobs (or industries in which jobs are) created. The aggregate demand tends to fluctuate with the business cycle. During the expansion phase of the cycle, there is an increase in resource utilization throughout the economy such that the poor may see their labor resources employed. During the decline phase, however, there is a general drop in activity resulting in unemployment or underemployment of resources. For the poor in particular, since it is assumed that the labor is their sole income-generating asset, an increase in unemployment or labor

40/ Note that formal education is not an appropriate measure of the quality of the force. It does not account for other forms of experience through learning by doing, or on the job training.

resources could mean substantial decline in income generating capacity and hence increased risk of poverty.

In addition to the effects of change in aggregate demand on the overall demand of labor in the economy as depicted by Figure II-2, the structure of the economy contributes to how severely the poor will actually be affected by sluggish demand or growth in the economy. The aggregate demand of labor in the economy is made up with demands from different industries. When there is growth or sluggish aggregate demand, not all industries or sectors of the economy are equally affected. Moreover, at any one time, some industries might experience rapid growth, while others are declining. The consequence of the intersectoral differences in growth rate is that during recession, some sectors may be more affected than others, and regions with a greater than average share of one or another type of industry will show similar symptoms.

As far as the relationship between poverty and economic structure is concerned, the implications from this analysis will be straightforward, if one is willing to make some simplifying assumptions. Let us suppose that there exists a dual labor market in the economy. One market (say low skill-low wage) predominantly employs the labor supplied by the poor, while the other (say high skill-high wage) hardly employs any. In graphical representation, the supply of labor by the poor can be illustrated by a perfectly (or near perfectly) elastic supply curve (S_p in Figure II-3). The demand for low skill albor can be represented by D_1 in time period t_1. If a change in aggregate demand between periods t_1 and t_2 results in increased demand in low skill labor, there will be more demand for the



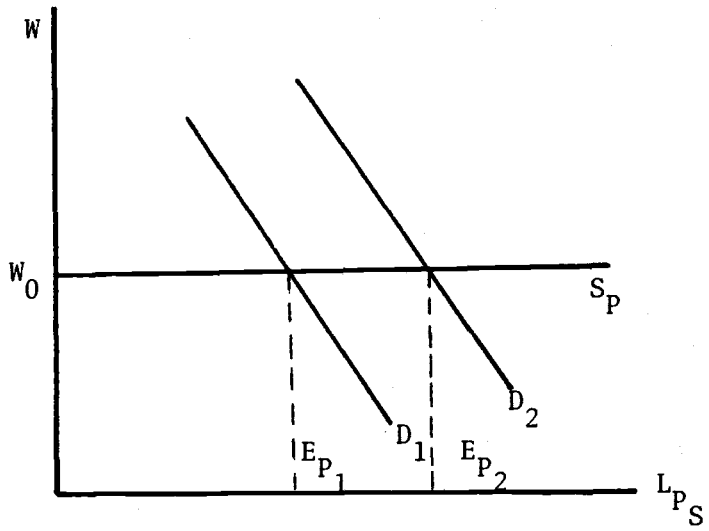
L = Level of full employment of labor

E_0 = Equilibrium level of employment

$U_0 = L - E_0$
= Level of unemployment of labor

$E_1 < E_0 \rightarrow U_1 > U_0$

Figure II-2. Equilibrium in the Market for Workers.



Market for Low Skill Low-Wage Employment

S_P = Labor supplied by the poor

L_W = Low skill-low wage labor

D_1 = Low skill-low wage labor demand

W_1 = Market wage rate

Figure II-3: Economic Structure and Employment of the Poor.

labor supplied by the poor (demand curve shift rightward). Hence, better impacts of growth on poverty incidence. However, if economic growth results in demand for high skill labor, there will be very little, if any, impacts on the poor.

A major criticism of the foregoing arguments could be that there is no guarantee that a supply of employment to the poor would necessarily lead to a reduction in poverty incidence. In fact, not all poor people are unemployed or are without work. Indeed, there is known to be poverty incidence among the self-employed, the underemployed, or even among those holding full-time jobs, at very low wages. For structural changes to actually lead to a decline in poverty incidence, not only is it necessary to match jobs and poor people, but the wage rates must be such that enough income can be made to stay out of poverty.

Discrimination as Source of Poverty. In addition to the factors relative to the performance of the economy that reduce the income generating capacity of the working class' productive assets, discrimination against hiring those assets can represent a major source of poverty. In almost every modern society, cultural and historical circumstances[41/] prevent certain demographic groups equal access to well paid jobs. Besides limiting the value of the services they can supply from their current productive assets,

41/ Because of slavery, blacks have been subject to racial discrimination in the American society. Although they have a full American citizen status, it is only since the 1960s that the law has guaranteed them full civil rights. Also, because of the role women have played in the past (mother and housewife), sexual discrimination continues to shield them from high paid jobs.

discrimination has the effect of reducing expectations and ambitions of those discriminated against, to realize their full economic potential. A number of studies by Anderson (1963) and Thurow (1969) have found that in the U.S., racial discrimination against the colored represents a major source of poverty among the minority demographic groups.

If society is concerned about the problem of poverty, and based on the previous discussions, two alternative solutions clearly suggest themselves. Either society should take measures in eliminating the factors that cause the inadequate income generation for the poor, or recognize the injustice created in the system and compensate those who suffer from it. To this regard, Johnson suggested that:

> "... one line of solution [to the problem of poverty] is to eliminate the various kinds of discrimination that create and persevere it; or else to recognize that the discrimination is based on social philosophy which penalizes unjustly those who are discriminated against, and to award adequate compensation for this discrimination."[42/]

In the U.S., and most European countries, not only are there measures to combat the sources of poverty, there are also compensations[43/] to mitigate the effects of the problem on those being affected.

42/ *Ibid.*, p. 228.

43/ The European societies and particularly the Scandinavians with their "cradle to gave" social policies are well known for their generosities toward the poor.

Constraints on Labor Supply as Source of Poverty. In a technologically advanced economy, a lack of skill can be damaging to one's ability to compete in the market place for nonpoverty income generating employment. With the rapid expansion of the high technology in every sector of the modern industrial economy, there is more and more concern that society may be faced with increased poverty unless measures are taken to train or retrain the labor force.

Even if the labor force possesses the appropriate skills in demand in the economy, interregional or occupational immobility can prevent the individual or family from getting the nonpoverty income that (s)he can command otherwise. The effects of a lack of interregional mobility to a family's productive factors can be particularly severe in regions with declining industries, where pockets of high poverty incidence will persist in spite of increasing general prosperity (as in the case of the Appalachia).

Finally, institutional factors such as mandatory retirement or the need of rearing children can reduce the elderly and female (particularly single mothers with dependent children) to a chronic state of poverty. It need not be the case that these groups be reduced to poverty, if society is willing to see to it. For instance, if society considers raising children as an activity in social interest, it could take responsibility in providing for the needs of the child and the mother. According to a congressional quarterly report (1978), such a system is widely used in Europe:

> "In Sweden, (for instance) parents receive about $1100 at the birth of each child and further allowance during the first 16 years of the child's life. For the youngster who continues in school

> beyond 16, cash allowances and combinations of grants and study loans are available."[44/]

Such measures would obviously have the affect of protecting the mother and child against the risk of poverty. However, as its opponents argued, besides its direct impact on taxes,[45/] such general social insurance would limit the poor's incentive to be self supportive, and endanger their personal freedom. Note that most of the criticism comes from the United States which has the least social budget among the industrialized countries.[46/]

Conclusion

It has been shown so far in this chapter that it is not any easier to ascertain the determinants of poverty than it is to define the concept. Several determinants have been proposed, ranging from Malthus' population laws to the genetic and psychological inadequacy of the poor. Although some of the commonly heard explanations hold the individuals responsible for their poverty conditions, most developed societies have been more willing to consider other possible explanations and design measures on the basis of these explanations to address the problem. These measures range from a radical redistribution of the factors of production as suggested by Marx and

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44/ Editorial Research Report on Jobs for Americans [1978, p. 47].

45/ "A Swedish worker earning about $12,000 a year, for example, pays 70 percent of his income in taxes" [*Ibid.*, p. 48].

46/ In America, welfare and social spending account for less than 15 percent of the annual GNP. In Scandinavian countries, it accounts for at least 40 percent.

Engels (Socialist countries) to gradual reallocation of resources such as human capital (by facilitating access to education), or to guaranteed annual income through direct transfer payments to the poor. The war on poverty in the U.S., an example of a society's effort to confront the poverty problem, combined some of these measures. During this period, and particularly from 1969 to 1979, social spending has expanded[47/] and poverty incidence has declined.

Before determining in the following chapter whether there is any relationship between these changes, the remainder of this chapter will be devoted to the discussion of the determinants of income inequality in a society.

Determinants of Income Inequality

As it may be remembered from the definitions of income inequality, there are two aspects to the concept of income distribution. There is a functional distribution in which one is concerned about the share of income accruing to different factors of production (Labor, Land, and Capital) and there is a size (or personal) distribution in which the focus is the share of income received by different income groups (for example, quintiles of family ranked by income).

Traditionally, it is the functional distribution approach that has been the point of focus for economists, as they sought to determine ways of achieving efficient allocation and utilization of resources. However, the personal distribution had not been totally ignored, either. In fact, there are a number of paradigms in the

47/ On the average, transfer payments as percent of total personal income increased from 8.73 percent to 13.03 percent (see Tables A-5 and A-8 for details).

literature to account for the determinants of inequality in the size distribution of aggregate income. In the remainder of the chapter, some of these paradigms and the related measures proposed to cure the problem, if society wishes to do so, will be discussed.

In a survey of the literature on income distribution, Cline (1975) observed that there are several alternative ways in which income inequality has been accounted for. Among these are the (1) random chance approach, (2) risk attitude approach, (3) human capital, and (4) composition of job opportunities approach.

Income Inequality as Random Process

This explanation of income distribution holds that any observed inequality is simply a result of a random process. According to Cline, the argument was originally developed by Gibrat (1931), who demonstrated that given some initial income distribution, if individual incomes are subjected to random changes regardless of income level, the distribution that results from the process over time will be log normal. Note that the log normal distribution is consistent with the frequently observed distribution of income. In a later study, Champernowne (1953) proved mathematically that, by submitting individual incomes to specific probabilities, it is also possible to derive over time the Pareto distribution of income, which happens to be the observed distribution of income (particularly at the upper end). What these arguments would imply is that any effort on the part of society to change the distribution of income would fail. It would also imply that an individual cannot expect to change his/her income status (relative to others) through hard work, which

is contrary to a fundamental philosophy in many non-socialist societies.

Risk Preference as Source of Income Inequality

According to Friedman (1953), the observed inequality in personal income distribution results from the differential attitude toward risk among people. This paradigm implies that income levels are determined by the extent of risks involved in the economic choices made by families and individuals. A society made up of risk averse individuals will generate less risky economic choice, hence less ex-post inequality than a society of risk taking individuals. According to Cline,[48] if this explanation is true, we should observe more equal distribution in the LDC's than the MDC's. However, as Kuznets and many others observed, it is the reverse pattern that holds.

Human Capital as Determinant of Inequality

The human capital approach, like Friedman's risk aversion model, tries to explain income distribution as the result of "rational individual choice." According to the model formulated by Mincer (1958), individuals' income or rather earning depends on the length of time spent in training. A higher earning reflects a compensation for the income foregone during training, and the expected length of employment. The implication of this model, as Cline observed,[49] would be that:

[48] *Ibid.*, p. 365.

[49] *Ibid.*, p. 366.

> "... all incomes are in reality equal. Observed differences are merely statistical illusions stemming from the fact that the high income individual has been on the job a shorter time than his low income cohor.... Any redistribution of income toward the measured poor would have a perverse welfare effect by making the nominally higher income individual now poorer in real terms (present value) than the beneficiary of the distribution."

Several empirical studies have indeed found strong correlations between income distribution and level of education (taken as a measure of human capital formulation). Adelman and Morris (1973) observed a positive relationship between the shares of the lowest income groups and basic (grade school) education, and Ahluwalia (1976) estimated similar relationships between middle class income and secondary education in the developing countries. These and many other findings have led to the generally accepted belief that:

> "... the upgrading of skills, combined with economic growth that is labor and skill intensive, will likely lead to greater equity (less inequality)."[50/]

However, there are a number of limitations inherent in the model that limit its effectiveness. The model does not account for (1) the impact that income level has in determining the size of an individual's human capital investment; (2) the role of the state of the economy regarding the supply of high and low paying jobs; and (3) the effects of the educational system in screening out a limited number of candidates to be placed in a limited number of high paying jobs.

50/ Loehr and Powelson, 1981, p. 140.

Economic Structure as Source of Inequality

Under this category are a number of empirical as well as analytical models that try to explain income distribution through the composition of job opportunities in the economy. The most significant publication on the issue remains that of Kuznets (1955), in which he discussed the famous "inverted U hypothesis." This and other subsequent studies[51/] proceeded from cross-country analysis of income data to make inferences about the determinants of income distribution.

Generally, the weight of agricultural (or rural) sector of the economy was considered as the major determinant factor of inequality. The argument is that there exists different distributions of income associated with each sector of the economy. In the dualistic economy of the LDC's in particular, the agricultural (rural) sector tends to have more equal distribution than the nonagricultural (urban) counterparts. Also, the percent of the total population in the rural sector is far greater than that in the nonrural sector such that the weight of the agricultural sector will be determinant in the overall distribution of income. As the growth process takes place and the share of the nonrural (industrial) sector increases, the inequality in income distribution will also increase. This will be due to the decline in the weight of the more equal sector of agriculture, and increase in the weight of the less equal industrial or urban sector. However, as growth proceeds to the point where the agricultural

51/ Kravis (1960), Oshima (1963), Adelman and Morris (1973), and Ahluwalia (1976), for example.

sector becomes less dominant, the inequality in income distribution will decline to reflect the distribution of the industrial or non-rural sector.

As reported by Loehr and Powelson (1981), besides the effect of unequal intrasectoral distributions, an intersectoral difference in the distribution of income can also affect the overall level of income inequality. In other words, even if the distribution of income (measured by the Gini coefficient) were to be equal between the rural (G_r) and urban (G_u) sectors, the overall Gini (G_t) can still be higher than the sectoral Gini ($G_r = G_u < G_t$), if there is significant difference between the average income of the two sectors. In most of the LDC's, actually, not only is there unequal intrasectoral distribution ($G_r < G_u$), but there also exists substantial intersectoral difference in average income. Hence, the process of the dualistic growth of the (LDC's) economy could fairly account for the increased inequality observed in those countries.

In another formulation, Thurow (1972), has recently proposed a "job competition" model[52/] to account for the distribution of income in a society. In this model, Thurow assumed that:

> "Wages are paid based on the characteristics of the jobs in question (not on the level of training as in the human capital model), and that workers are distributed across job opportunities based on their relative position in the labor queue."

52/ The "Job Competition" model is in opposition to the neoclassical "Wage Composition" model. As Cline argued, the latter's view lies behind the notion that equalizing educational supply will equalize income distribution (by lowering the relative wage of high education requirements skills).

The major implication to be drawn from this model is that increased education of the labor force (characterized by greater numbers of college graduates) will not lead to more equity unless there is concomittant changes in the job opportunities. One can say that the Thurow model is a job supply (or labor demand) side model while the human capital model is the reverse. Thurow also argued that the marginal product of the laborer is not set by his/her education acquired skill, but by the skills (s)he learns on the job after successfully passing through the queue. This analysis is particularly insightful when considered in the framework of the LDC's. As Cline[53/] noted:

> "... the strengths (of the model) apply a priori to the developing economy, in which it is the structure of the economy which generates the profile of job openings characteristically associated with vastly differing wage levels: organized industrial jobs paying high wages; relatively high wages for the civil service; and very low income for the large portion of the labor queue of workers left to fend for themselves in the unorganized urban services sector or rural wage and tenant labor sector."

As far as this study is concerned, the Thurow model is equally significant for (1) its implication that formal training and human characteristics provide the information on ordinal ranking of job seekers, and (2) its emphasis on the expansion of job opportunities to change income distribution. One may recall that the purpose of this study is to determine the impacts of changes in job opportunities on the change in income inequality.

53/ *Ibid.*, p. 368.

Conclusion

Although this review of the determinants of income distribution was limited to only a few paradigms, it is important to remind the reader that most of the arguments previously developed regarding poverty equally apply to income inequality. It is true that conceptually speaking, poverty and inequality concerns

> "... reflect different philosophies of good society and indicate different types of social policies to move towards such a society."54/

In actuality, discussions on both concepts in the literature tend to focus more on the low income groups.

54/ Johnson, 1973, p. 222.

CHAPTER III

EMPIRICAL METHODS IN POVERTY AND INEQUALITY STUDIES

In Chapter II some of the theoretical arguments on the determinants of poverty and income inequality have been reviewed. In this chapter, the discussion will turn to the review of selected empirical methods used in the past studies of poverty and income inequality. There will be three sections in the chapter. The first two sections will present, respectively, the discussion of the empirical methods in previous poverty and inequality research. The third section will be devoted to a discussion of cross-section analysis and the concepts of a change variable.

Poverty Research

Most of the existing empirical works relative to poverty incidence, particularly in the U.S., have been done during the 1960s. Locke Anderson's research on the "trickle-down" hypothesis[55/] remains one of the best known works of that era. In this study, Anderson set out to test whether economic growth benefitted also the poor segments of the population, or whether Galbraith and Harrington were correct in assuming that "the poor live outside the mainstream of the American life." Using family income data from 1947 to 1960,

55/ W.H. Locke Anderson (1964) "Trickle Down: The Relationship Between Economic Growth and the Extent of Poverty Among American Families."

Anderson regressed the median income on the incidence of pvoerty of different family types. His conclusions, based on the statistical evidence, are that certain family groups[56/] were subject to "case poverty," that they "inhabited the other America" where the beneficial effects of economic growth did not reach them. He concluded that a redistribution program designed to increased the productivity of the group could alleviate the problem.

The functional forms Anderson used to estimate the relationships were of recursive types such as:

$$M_{it} = f(M_t) \tag{4}$$

$$P_{it} = f(M_{it}) \tag{5}$$

where

M_t = National income in time t

M_{it} = Median income of subgroup i in time t

P_{it} = Poverty incidence of subgroup i in time t

t = Time period from 1947 to 1960

i = Type of family.

The incidence of poverty was measured as the percent of family (or subgroup of family) with "total money income (from all sources) less than $3,000 in 1959 prices."

56/ The group comprised families headed by females, persons 65 years of age and over, or living on a farm.

There were several challenges to Anderson's conclusions. Other researchers using different models[57/] have reached different conclusions. Particularly interesting with regard to this study are Gallaway's conclusions. As reported by Weber (1973), Gallaway did agree with Anderson on the existence of a poverty population that was immune to the effect of growth. But he disagreed with the size of what he called the "backwash" population and particularly, what to do about it. He argued that the level of poverty incidence (six percent as he determined it to be) might be approaching the

> "... minimum below which the value of the percent incidence of poverty cannot be pushed short of direct subsidy programs."

In other words, poverty programs designed to raise the productivity of the "backwash" population was suggested by Anderson were bound to be ineffective, and that only through direct subsidy programs gains against poverty could be achieved. Although the poverty incidence now is about twice the level Gallaway used as the basis for his argument, direct subsidy programs are now regular policy measures in use against poverty.

The model that Gallaway used in arriving at his conclusions was a single equation of the form:

$$P_t = f(\underline{M}_t, \underline{U}_t) \qquad (6)$$

57/ A good review of the various models suggested to evaluate the trickle down hypothesis can be found in Madden (1968).

where

P_t = National incidence of poverty in year t,

$\underline{M}_t$ = National family median income,

$\underline{U}_t$ = National unemployment during year t.

The poverty incidence was defined in the same way as in Anderson's study, and the data was a time-series from 1947 to 1963.

Another approach to testing the "trickle-down" hypothesis, particularly in the developing countries, was proposed by Fields (1981). He argued that, in the dualistic economy of the developing countries, the overall growth in the economy (ΔY) can be separated into four effects:[58/]

α) The enlargement of the modern sector to include a greater percentage of the economically active population;

β) The enrichment of the modern sector as a result of increase in average income for those engaged

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58/ In mathematical terms:

$$\Delta Y = \alpha + \beta + \gamma + \delta \qquad (7)$$

a) $\alpha = (f_2^m - f_1^m)\ (W_2^m - W_1^t)$; b) $\beta = (W_2^m - W_1^m) f_1^m$

c) $\gamma = (f_2^m - f_1^m)\ (W_2^m - W_1^m)$ d) $\delta = (W_2^t - W_1^t) f_2^t$

Where f = percent of population; W = appropriate welfare measure (e.g., income); m = modern sector; t = traditional sector; 1, 2 = time periods.

in that sector;

γ) The interaction between enlargement and enrichment in the modern sector;

δ) The enrichment of the traditional sector as a result of increase in average income for those who remain in the traditional sector.

Assuming that the incidence of poverty is essentially associated with the traditional sector in the LDC's, Fields argued that a proper way of testing the "trickle down" hypothesis in those countries would be to determine whether economic growth resulted in (1) "enlargement of the modern sector" and/or in (2) "enrichment of the traditional sector." A positive sum of these two coefficients (Equation 8)[59/] would indicate that the economic growth benefits the poor (those originally and still dependent on the traditional sector), and a negative sum would indicate the opposite.

In analyzing the economic growth in Brazil between 1960 and 1970, Fields applied a version of this model to arrive at the conclusion, contrary to other studies, that the poor also benefitted from the economic growth in Brazil.[59a/] As far as research on poverty in America is concerned, Fields' model appears to be of limited or no use, since the economic sectors cannot be readily divided between

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59/ $$\Delta Y_p = \alpha + \delta \qquad (8)$$

where α and δ are as previously defined.

59a/ For details of this study see Fields (1977).

modern and traditional sectors.

In addition to the "trickle-down" hypothesis, empirical research relative to the incidence of poverty has also explored hypotheses related to racial discrimination [Thurow, 1969], labor force participation [Mooney, 1967], location factors such as urban and rural residency [Gonish and Kau, 1976], and human capital formation [Martin, 1980], just to name a few.

In a study of the labor force participation for example, Mooney estimated

> "... the direction and magnitude of the relation between the overall state of the economy (as approximated by the unemployment rate), and the labor force participation rate of the urban poor."

The reason for the study was to test two alternative hypotheses of labor force behavior; these are the "additional worker" hypothesis and "discouraged worker" hypothesis.[60/]

Starting with the argument that the acquisition of a job by a secondary worker in a family can help lift the family out of poverty, the author hypothesized that married women[61/] in poor households will be drawn into the labor market, during periods of low unemployment when jobs become plentiful in the economy. In other words, the behavior of these women, as far as the supply of labor is concerned,

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60/ The "additional worker" hypothesis postulates that labor force participation increases with the rate of unemployment. That is, as the primary wage earners become unemployed, secondary workers enter the labor force to supplement the household income. The "discouraged worker" hypothesis postulates that labor force participation falls as unemployment rises. Prolonged unemployment causes large scale withdrawal from the labor force.

61/ It was assumed that husbands were the primary wage earners.

can be accounted for by the "additional worker" hypothesis.

To test this hypothesis, Mooney analyzed a cross-section poverty data from the 52 largest SMSA's divided into 1400 poverty tests. A simple regression model of the form:

$$Y_i = \beta_0 + \beta_1 X_i + \mu_i \qquad (9)$$

where

Y = labor force participation rate

X = unemployment rate

β_0, β_1 = unknown coefficients to be estimated

μ = random error term

i = unit of observation

was fitted to the data.

The results of the analysis indicated that the labor force participation of the low income married woman was inversely related to the rate of unemployment. That means the low income female worker is more likely to be a "discouraged worker" than an "additional worker" when the unemployment rate rises. The relationship was found to be particularly strong for the nonwhite married women with husband present. In Mooney's words:

> "... although there may be some nonwhite females who enter the labor force when unemployment rises, on balance they are more than offset by the discouraged females who withdraw from the labor force when the unemployment rises."

Research on Income Inequality

The major empirical effort to analyze the effects of economic

growth on income inequality must be credited to Kuznets [1955, 1963]. From a cross-country data from developed and developing countries, the author observed that in the process of growth the distribution of income tends to follow an "inverted U-shape." That means income inequality tends to increase in the early stage of growth, then decrease in the later stage. In mathematical terms, the Kuznets findings implied that the relationships between income inequality and growth is of quadratic form. In the development literature, semi-logarithm models (such as in Equation 10) are often used to test the (Kuznets) hypothesis:

$$G = \beta_0 + \beta_1 \text{ Log } Y + \beta_2 (\text{Log } Y_i)^2 + \mu_i \qquad (10)$$

where

G = measure of inequality such as Gini Coefficient or percent of share of income.

Y = Per Capita GNP.

$\beta_1 > 0$ and $\beta_2 < 0$.

In an analysis of income inequality data generated by Jain (1975), Ahluwalia (1976) proposed an expanded version of the model 10. In his model Ahluwalia included, in addition to per capita GNP, factors related to the structure of the economy, the degree of urbanization and the education attainment of the population. The full equation that he estimated is of the form:

$$\text{Income Share} = \beta_0 + \beta_1(\text{Log GNP}) + \beta_2 (\text{Log GNP})^2 + \beta_3 (\text{Share of Agriculture in GDP}) + \beta_4 (\text{Share of Urban Population in Total}) + \beta_5 (\text{Literacy Rate}) + \beta_6 (\text{Secondary School Enrollment}) + \beta_7 (\text{Population Growth Rate}) + \beta_8 (\text{Socialist Dummy}) + \mu \quad (11)$$

The income share of five different family income groups (Top 20 percent, Middle 40 percent, lowest 60, 40, and 20 percent) were examined.[62/] The evidence from the model estimation indicated that three aspects of the development process were systematically related to the degree of inequality. These are:

1) Intersectoral shifts involving a relative decline in traditional agricultural sector and a parallel shift of population to the urban sector.

2) Expansion in the educational and skill characteristics of the population.

3) The 'demographic transition' involving a reduction in the rate of growth of population.

Al Samarrie (1967), Then Sale III (1974), suggested other models in their studies of the interstate differential in income inequality in the U.S. In these studies, neither author attempted to test the "inverted U-hypothesis." Instead, they rely on a number of socio-economic factors (Table III-1) to explain the state differential in

62/ To justify the use of income share as a measure of inequality, Ahluwalia argued that: "This permits ... to focus on the impacts of the development process on different ranges of income distribution."

Table III-1. Variables Used in Al Samarrie and Sale III Models.

1. Al Samarrie Model

X_1 = Property income/personal income.

X_2 = Per labor income in agriculture/per labor income in nonagriculture

X_3 = Labor earnings in agriculture/labor earning in all industries

X_4 = Per labor income adjusted for state industry structure.

X_5 = Percent of labor force employed as clerical, sales, craftsmen, foremen, and kindred workers

X_6 = Median school year completed by person 25+ years

X_7 = Percent share of age group (35-64) in the labor force

X_8 = Percent of total families headed by females

X_9 = Percent of nonwhite population

X_{10} = Civilian employment/total civilian population

2. Sale III Model

X_1 = Size of property income

X_2 = Percent of rural population

X_3 = Manufacturing employment

X_4 = Percent of labor force employed in clerical, craftsmen, and operative occupation

X_5 = Median school year completed

X_6 = Elderly population

X_7 = Nonwhite population

X_8 = Female labor force participation

X_9 = Median family income.

income inequality in 1949 and 1959 (Al Samarrie), and 1949, 1959, and 1969 (Sale III). The data for the study were cross-sectional, and the method of investigation was multiple regression analysis. Contrary to Ahluwalia, both authors used the Gini Index of concentration as a measure of income inequality.

The model proposed for this study[63/] possesses some common features with the forementioned models. It is a multiple regression analysis[64/] and the data is cross-sectional from two time periods. Rather than fitting the data for each time period, however, the model will be fitted to a change data computed from the two time periods. Income shares of family income groups will be used as a measure of income inequality, and factors related to the structure of the economy, direct subsidy programs, unemployment, and population growth will all be considered as explanatory variables.

Before actually discussing, in the next chapter, the details of the proposed model, the remainder of this chapter will be devoted to a discussion about cross-section analysis and various ways of measuring a change variable.

Analysis of Cross-Section Data

In 1966, Kuznets made a case against the use of cross-section data in economic studies, particularly for making inferences from past long-term trends. He argued that:

63/ The discussion of the proposed model is presented in Chapter IV.

64/ A discussion of multiple regression analysis is presented in Appendix E.

> "... because of the difficulties of measurement on the basis of data for a single point in time, the cross-section analysis does not take account of technological innovations and changes in tastes ... Unless innovational changes can somehow be taken into account in the use of cross-section data proper, its use may lead to erroneous inferences concerning past (or future) changes in structure in the process of growth."

In spite of this warning, cross-section data is widely used in economic analysis, both for inferring past and projecting future trends. This is done either because the Kuznets arguments do not apply to the problem being analyzed, or simply because the limitation of data does not permit otherwise.[65/] As Thurow (1969) observed, with regard to the use of econometric technique in social studies:

> "... the desire for precise mathematical representation may lead to overslimplifcation at the expense of reality ... Factors that are important but difficult to quantify may be ignored. The absence or limitation of the data may lead to compromises between what is desired and what is possible."

The model in this research will not escape the difficulty of compromising between what is desired and what is possible. The ideal way to answer a question of how growth affects poverty and income inequality for instance, would be to follow a set of individuals over time and measure their income status. However, because of a lack of longitudinal or panel data necessary for this approach, a study on such a subject must make use of alternative and not necessarily

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65/ In a study of "Development Patterns Among Countries and Over Time," Chenery and Taylor (1975) found that cross-section analysis in some cases yields similar results when compared with time-series analysis.

infallible methods. As Thurow would put it:

> "The methods developed for answering (social) questions are not infallible, but they are better than ignoring the questions."[66/]

Analysis of Cross-Section Data at Two Points in Time

To account for the variation in changes in poverty incidence and income inequality in the U.S. between 1969 and 1979, a multiple regression model will be fitted to a change data sample from the 50 states and the District of Columbia.

The use of this type of data is quite prevalent in social sciences such as sociology and psychology,[67/] but not very common in economics.[68/] Researchers in economics tend to rely more on separate estimates from cross-section data at different points in time (as in Sale III) to make inferences about changes. It is true that the existence (or absence) of a stable relationship between dependent and independent variables in two periods could indeed give an indication of changes over the period considered. However, to be able to determine whether a significant relationship exists between changes in the independent variables and the changes in the dependent variables, it would seem rather appropriate to analyze the data in terms of changes over the period of study. Besides, as Bohrnstedt (1969) had observed:

[66/] *Ibid.*, p. 6.

[67/] For discussions on the use of change variables in psychology, see Harris (1963), Bohrnstedt (1969), and Rummel (1970).

[68/] There are a few cases in which they are also used in economic models. (See Al Samarrie (1958), Loehr and Powelson (1981), and Stevens and Owen (1982)).

> "... when proceeding to evaluate change [as in this study], an intuitively appealing approach is to create a change variable or gain score ... and to correlate [that score] with some variables which are assumed to [explain] the change."

This indeed would be the approach adopted in this study.

Measures of Change

According to Rummel (1970), there are four ways in which one can compute a change variable. These are (a) the incremental change (ΔX_j); (b) the relative change ($R(X_j)$); (c) the positional change ($P(X_j)$); and (d) the deviational change ($D(X_j)$).

Given a variable measured at two time periods, an incremental change (also known as an absolute change) would be defined as the difference between X_1 and X_2. That is

$$\Delta X_j = X_2 - X_1 \tag{12}$$

The relative change would be the ratio between the incremental change and the initial observation such that:

$$R(X_j) = \frac{\Delta X_j}{X_1} = \frac{X_2 - X_1}{X_1} = \frac{X_2}{X_1} - 1 \tag{13}$$

By multiplying $R(X_j)$ by 100, one gets the popular measure of the percent of change.

The positional change is an incremental change from standardized variables. That is:

$$P(X_1) = Z_2 - Z_1 \tag{14}$$

Where Z_j is the standard variable of X_j. Finally, the deviational

change is defined as the deviation of X_2 around the best fit regression line between X_2 and X_1 such that:

$$D(X_j) = X_2 - \hat{X}_2 \tag{15}$$

$\hat{X}_2$ in this case represents the regression estimate of X_2.

Limitations of Change Measures. There are a number of conceptual problems inherent in the computation of the change measures that may place limitations on their usages. These problems relate to what is known as ceiling, zero boundary, and regression effects, or reliability of the change measure.

The ceiling and boundary effects exist, respectively, when variable X_j has an upper and lower limit. In such cases, the change measure would tend to become smaller as X_1 approaches the limits. According to Rummel, a consequence of this phenomena is that an inclusion of both ΔX_j and X_1 in the same analysis could lead to an artificial negative relationship between the two variables. The regression effect which is used to express the fact that large numbers (X_j) have greater tendency to large negative and small positive change than do small numbers, also leads to artificial negative relationships when both ΔX_j and X_1 are used in the same analysis. Because there is no plan to include both ΔX_j and X_1 in the same analysis in the course of this study, there is no need to worry about these problems.

As for the reliability problem, Rummel argued that it plagues some classes of data only (questionnaire, opinion poll, and voting type data). The problem may be particularly important in psychology. While trying to measure the change in individual mental attitude through a set of questionnaires in two time periods, it could well

be that the change finally observed is not that in mental attitude. Instead, it could be that of other factors such as the mode of administering the questionnaires themselves. Although the census data (used in the study) are collected through questionnaires, the reliability problem does not pose a threat to the study, because the socioeconomic factors measured in the census are less volatile than psychological factors.

Choice of Change Measure. In Rummel's estimations, the deviational change is the best measure of change because it is not subject to any of the problems previously mentioned. Nevertheless, the relative change measure will be used in this study for a couple of reasons. Firstly, the percent rate of change is the most commonly utilized concept in economics when talking about change. Secondly, it is a fairly easy measure to understand, to compute, and to interpret. Given the resource constraints of the study, these latter properties become very deciding factors.

Conclusion

This chapter has been devoted to the review of some of the past empirical research on poverty and income inequality. The discussion was essentially limited to models that dealt with the "trickle-down" hypothesis or tried to relate poverty incidence and income inequality to some market conditions.

In addition to the discussion of specific models, the chapter covered some issues related to the use of cross-section data for economic analysis, and gave a brief indication of the empirical method proposed for this study. The detailed discussion of the models

and the analysis of the estimated results are the subjects of the next chapter.

CHAPTER IV

MODEL SPECIFICATION AND EMPIRICAL RESULTS

This chapter is comprised of two parts. The first part presents a discussion of the empirical model of the study. The second part reports the estimated results, and presents a discussion on the meanings and implications of those results.

Model Specification

The proposed model for the study is a multiple regression model in which changes in poverty and income inequality are postulated as dependent variables, and changes in structure of the economy, population growth, unemployment, and transfer payments are the independent variables. Although it is quite possible for the structure of the economy to also depend on the incidence of poverty,[69] it is argued that the former dependence relationship is much stronger than the latter, such that a regression analysis can be applied with confidence. It is important to point out that the concept of dependence relationship embedded in the use of regression analysis does not, in any way, imply the existence of a causal relationship. As Kendall and Stuart argued:[70]

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[69] This would be the case when business moves to poor depressed areas to take advantage of cheap labor as the theory predicts. However, business decision to move is not solely based on labor wages, but rather among other things, on the wage adjusted productivity. Poor areas may not necessarily hold an edge on the basis of this criterium.

[70] Quoted from Gujarati, 1978, page 16.

> "... a statistical relationship, however strong and however suggestive, can never establish causal connection: Our ideas of causation must come from outside statistics, ultimately from some theory or other."

The relationships to be estimated from this study, as previously indicated, are only 'stylized facts' which do not necessarily establish the nature of the causal mechanism between economic structure and poverty incidence or income inequality. Therefore, the model proposed for the study will not be used for making causal inferences.

The Variables

As indicated in the first chapter, there are several definitions for the concepts of poverty, income inequality, and economic structure. As such, the choice of variables for the study cannot be inclusive. In order for the variables selected for the study to reflect the diversity embodied in the concepts, different aspects of economic structure and poverty incidence will be explored.

Dependent Variables. All together, 12 different dependent variables will be examined in the study. These variables will be comprised of the change in poverty incidence (%ΔPov) for eight demographic groups and the change in share of total family income accruing to four family income classes. The selected poverty incidence variables are:

1) percent change in poverty incidence for all pesons (aggregate poverty);

2) percent change in poverty incidence for two parent families;[71]

3) percent change in poverty incidence for single female householders;[72]

4) percent change in poverty incidence for single female householders with dependent children (less than six years old);

5) percent change in poverty incidence for elderly householders (over 65 years of age);

6) percent change in poverty incidence for nonelderly householders (between 16 and 65 years of age);

7) percent change in poverty incidence for elderly unrelated individuals; and

8) percent change in poverty incidence for nonelderly unrelated individuals.[73]

The income distribution variables are:

1) percent change in the share of income received by the lower 20 percent of families ranked by income (% Δ YL 20)

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[71] The data on two parent families also include single male parents. The latter still represents quite a small portion of American families.

[72] It may be recalled that the term "householder" is introduced in the 1980 census to refer to the head of household. The poverty incidence of a householder is not defined with respect to the individual head of the household, but with respect to the household as a unit.

[73] Due to data limitations, the eight demographic groups selected for the study are not all mutually exclusive. The elderly and nonelderly householders are mutually exclusive. Also the married couple and single female householders, or householders and unrelated individuals are mutually exclusive.

2) percent change in the share of income received by the middle 60 percent of families ranked by income (%ΔYM60);

3) percent change in the share of income received by the top 20 percent of families ranked by income (%ΔYT20);

4) percent change in the share of income received by the top five percent of families ranked by income (%ΔYT5).

Independent Variables. The explanatory variables in the study can be classified into three main categories. They are (a) variables related to the structure of the economy, (b) variables related to government social policies, and (c) unemployment and migration.

The economic structure variables to be analyzed are:[74/]

1) percent change in employment in primary sector (%ΔEPS);

2) percent change in employment in secondary sector (%ΔESS);

3) percent change in employment in tertiary sector (%ΔETS);

4) percent change in employment in agriculture sector (%ΔEAS)

5) percent change in employment in high tech. industry (%ΔEHT);

6) percent change in employment in low wage intensive manufacturing industries (%ΔELWLI);

7) percent change in employment in tourism and convention industries (%ΔETC); and

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74/ The definitions of the structure variables are discussed in "Definitions and Measures of Economic Structure" of the first chapter.

8) percent change in employment in government sector (%ΔEGS).

Government transfer pyaments to individuals were used as proxy for social policy. These payments are further divided into two groups:

1) percent change in income dependent transfer payments (%ΔIDTP); and

2) percent change in nonincome dependent transfer payments (%ΔNIDTP).

The first group includes all the income maintenance programs (such as aid for family with dependent children, food stamps, for instance) and the second group, all the entitlement programs nondependent on income (such as social security, health and other retirement insurance, for example). A percent change in population (%ΔPOP) is used as proxy for the migration variable, and the rate of unemployment (%ΔUR) is for unemployment variable.

The Equations

Each of the dependent variables will be evaluated by three different equations. Each equation will examine the impacts of different types of economic structure. In the first equation, the structure of the economy will be defined in terms of a broad standard industrial classification (SIC), primary, secondary and tertiary sectors. The structure in the other two equations will be represented by the two digit SIC industries (such as Ag. High Tech.) previously identified as independent variables. The only difference between the second and third equations will be that in the former, the manufacturing sector is represented by the low wage labor

intensive manufacturing establishments, while high technology manufacturing establishments are used in the latter. The reason for estimating three separate equations rather than a single one that includes all the structure variables is to migitate the effects of multicollinearity in the model.[75/] In mathematical terms, the poverty equations to be estimated can be expressed as follows:

$$\%\Delta Pov_{ij} = \beta_0 + \beta_1(\%\Delta EPS)_j + \beta_2(\%\Delta ESS)_j + \beta_3(\%\Delta ETS)_j + \beta_4(\%\Delta NIDTP)_j + \beta_5(\%\Delta IDTP)_j + \beta_6(\%\Delta UR)_j + \beta_7(\%\Delta POP)_j + \mu_j \quad (16)$$

$$\%\Delta Pov_{ij} = \beta_0 + \beta_1(\%\Delta EAS)_j + \beta_2(\%\Delta EGS)_j + \beta_3(\%\Delta ELWLI)_j + \beta_4(\%\Delta ETC)_j + \beta_5(\%\Delta NIDTP)_j + \beta_6(\%\Delta IDTP)_j + \beta_7(\%\Delta UR)_j + \beta_8(\%\Delta POP)_j + \mu_j \quad (17)$$

$$\%\Delta Pov_{ij} = \beta_0 + \beta_1(\%\Delta EAS)_j + \beta_2(\%\Delta EGS)_j + \beta_3(\%\Delta EHT)_j + \beta_4(\%\Delta ETC)_j + \beta_5(\%\Delta NIDTP)_j + \beta_6(\%\Delta IDTP)_j + \beta_7(\%\Delta UR)_j + \beta_8(\%\Delta POP)_j + \mu_j \quad (18)$$

where (i) stands for the demographic groups previously defined, and (j) for the 50 states and the District of Columbia.

The income inequality equations will be identical to the poverty equations except for two characteristics. 1) The dependent variable will be a measure of income inequality, and 2) the expanded equations

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75/ The correlation coefficients are reported in Table D.

will include an additional variable such as the percent change in property income (%ΔPI).

This variable is added to the inequality model because it is assumed that there exists an inequality in the distribution of this type of income. If that is the case, a rapid growth in property income in the economy would benefit the group (upper quintile) with a greater share of property since more than it would benefit the others.

The models will be estimated by the ordinary least squares (OLS) method,[76/] then a number of fairly standard tests of hypothesis will be conducted on the estimated equations. For instance, the adjusted R square ($\bar{R}^2$) will be used to compare the performance of the different models. The $\bar{R}^2$ is related to R^2 (a measure of goodness of fit to the multiple regression model) by the formula:

$$\bar{R}^2 = 1 - (1 - R^2) \frac{n-k}{n-1} \qquad (19)$$

where n = number of observations

k = number of parameter.

Contrary to R^2, an addition of new variables to a regression model does not necessarily lead to an increase in $\bar{R}^2$. The latter can actually rise or fall or even be negative. This property makes the $\bar{R}^2$ a more desirable goodness of fit measure for comparing different models.

[76/] A discussion of the estimation procedure and related assumptions is presented in Appendix E.

In addition to comparing the models, a t-statistic[77/] will be relied upon to test the significance of the estimated coefficients. Although it is a standard practice in economic analysis to use five percent as the acceptable cutoff level of significance, the criterion of significance adopted in this study is for the t-value to be at least equal to one ($t \geq 1$).[78/] The choice of such criterion can be justified by the fact that given the exploratory nature of the study, it does not seem necessary to impose stringent significance requirements on the models. Those requirements are better suited for experimental or tightly controlled studies. It should be noticed that with the available degrees of freedom (at least 40), a significance criterion of $t \geq 1$ corresponds to over 85 percent level of confidence for no Type I error.

Empirical Results

The results of the statistical analysis of the relationship between economic structure, government social policies, and poverty incidence on one hand, and income inequality on the other are reported in Tables B and C. Table B-1 reports the estimated equations describing the relationships between poverty incidence in

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77/ The formula for the t-statistic is given by:

$$t_{b_i} = \frac{b_i}{s_i} \qquad (20)$$

where b_i equals the i^{th} estimated coefficient; s_i equals standard error of the i^{th} estimated coefficient.

78/ Similar criterion has been used by Stevens and Owen in their study on migration and employment change (1982).

eight demographic groups and broadly defined economic structure (Model I). Tables B-2 and B-3 report the estimated poverty equations based on two-digit SIC definitions of economic structure (Model II and III). The only difference between the equations in Table B-2 and B-3 is that the manufacturing industries are grouped differently. The equations in Table B-2 include the change in employment in the low wage labor intensive manufacturing establishments as explanatory variable, while those in Table B-3 include the change in employment in the high technology manufacturing establishments. The impacts of these two variables have been evaluated with two separate models rather than one, in order to reduce the effects of multicollinearity on the estimated coefficients. The results reported in Tables C-1 through C-3 (Model IV through VI) are those corresponding to the analysis of the interstate variation in changes in income inequality, or more specifically the changes in income shares accruing to four percentile groups (lower 20 percent, middle 60 percent, top 20 percent, and top 5 percent) of family ranked by income.

In the remainder of the chapter, some of the results reported in the two sets of tables will be discussed, and the implications suggested by those results will be analyzed.

Changes in Poverty Incidence

The discussion of the estimated results on the interstate changes in poverty incidence between 1969 and 1979 will consist of a number of comparisons. In the first step, the explanatory power of the three models will be compared (using adjusted R-square), to ascertain the relevance of the different definitions of economic

structure adopted. Then the discussion will proceed by focusing on the meanings and implications of the estimated coefficients for the different demographic groups.

Comparison of the Three Poverty Models. By looking at the adjusted R-square ($\bar{R}^2$) associated with the estimated equations of the three poverty models (Table IV-1), a number of general conclusions can be drawn. The estimated results from Models II and III appear to be generally superior (except in three cases: equations #2, #5, and #7) increases from Model I to Model II or III. The increase is relatively large for the aggregate, nonelderly householders, and unrelated individuals equations. It is not so large for female single householder equations. For the two parent family and elderly (householders and unrelated individuals 65 years and over) equations, the $\bar{R}^2$ actually declined indicating a greater explanatory power in the case of Model I than Model II and III. The decline in explanatory power for the elderly equations suggests that the two digit SIC industries examined in the Model II and III do not affect the change in poverty incidence of the elderly. The decline in $\bar{R}^2$ for the elderly equations parallel with an increase in $\bar{R}^2$ for the nonelderly equations seems consistent with expectations. Since defining the structure of the economy in terms of two-digit SIC consists of identifying specific industries that are more or less likely to employ the poor, a model that includes such specific industries (Model II and III) should account for more of the variation in poverty incidence. Of course, this would be the case only if a dependence relationship exists between change in economic structure and change

Table IV-1. Comparison of Explanatory Powers of the Poverty Equations.[a/]

Equation Numbers	Model I (based on broad Ind. classification)	Model II (Based on two digit SIC industries)	Model III (Based on two digit SIC industries)
#1. Agg. Poverty	.295	.508	.497
#2. Two parent Fam.	.014	.011	.011
#3. Single Fem. H.H.	.358	.406	.406
#4. Single Fem. H.H. with Depend. Child	.313	.342	.343
#5. Elderly H.H.	.231	.174	.171
#6. Nonelderly H.H.	.347	.496	.500
#7. Elderly Unr. Ind.	.328	.156	.155
#8. Nonelderly Unr. H.H.	.102	.393	.396

[a/] The explanatory power is measured by the adjusted R square ($\bar{R}^2$).

in poverty incidence as assumed in this study. Similarly, since the elderly, those 65 years of age and over, do not generally participate in the labor market, it seems quite normal for the explanatory power (of the corresponding equations) to decline with Model II or Model III. The two parent family equation is not significant in any of the models.

A comparison of the equations estimated with Model II and III also reveals some interesting information. There seems to be no significant difference in the explanatory power of the two models. Usually 'High Tech' manufacturing implies high skill requirements as opposed to low skill requirements in the 'LWLI' manufacturing. Since the poor are assumed to lack the qualifications for high skill jobs, one would normally expect changes in employment in 'High Tech' to have less impact on (or explain less of the variation in) poverty incidence than would changes in 'LWLI' manufacturing. The fact that there is no difference in the explanatory power of the Models II and III could mean a number of things. It could, for example, be that the two industrial groups of 'LWLI' and 'High Tech' are not really different as usually assumed, or that they are different but their impacts during the period of the study just happened to be not significantly different from zero.

Regarding the first possible explanation, the evidence on earnings in the two industrial groups (Table IV-2) seem to indicate that 'High Tech' industries are relatively higher (mostly above average) wage industries than the 'LWLI' manufacturing establishments are. This wage differential between the two groups of industries would suggest that they are indeed different in their labor demand.

Table IV-2. Employment and Average Hourly Wage in Selected Industries in 1969 and 1979 in the U.S.

Industries	1969		1979	
	Total Employment (000)	Average Hourly Wage ($)[1/]	Total Employment (000)	Average Hourly Wage ($)[1/]
Low Wage Labor Intensive Manufacturing Establishment	3931		3971	
Textile Mill Products	987	2.34	892	4.66
Appareil and Other Textile Products	1418	2.31	1313	4.24
Lumber and Wood Products	600	2.73	768	6.08
Rubber and Plastic Products	681	3.07	752	5.96
Leather and Leather Products	345	2.36	244	4.23
High Technology Manufacturing Establishment	7599		8423	
Chemical and Allied Products	1049	3.47	1113	7.59
Machinery except Electrical	2007	3.58	2463	7.33
Electrical Equipments	2038	3.09	2109	6.31
Transportation Equipments	2035	3.90	2048	8.53
Instruments and Related Products	470	3.16	690	6.17
Tourism and Convention Industry	3140[2/]		5569[2/]	
Eating and Drinking Places	2410	1.73	4535	3.45
Hotels and Other Lodging Places	730	NA	1034	3.97
Amusement and Recreation Places	NA	NA	NA	NA
United States (All Industries)		3.19		6.69

[1/] The wage is in nominal price.

[2/] Does not include all sectors.

SOURCE: Statistical Abstract of the U.S. 1970 (Table #329) and 1980 (Table #692), U.S. Department of Commerce, Bureau of Census.

In other words, the demand of labor by the 'High Tech' industries is essentially of high skill/high wage type; as such it does not meet the labor supplied by the poor. The demand of labor by the 'LWLI' industries is in the low skill/low wage labor market where it has the potential of meeting the labor supplied by the poor.

If the foregoing scenario is true, then the fact that there is no difference in explanatory power between Models II and III could be explained by the second alternative previously suggested. That means during the period of the study (1969-1979), the change in employment in the two industrial groups has a zero or near zero impact on the change in poverty incidence. This latter explanation is in fact consistent with the estimated coefficients for the 'High Tech' and 'LWLI' variables. Neither one is significantly different from zero ($t < 1$).

For all practical purposes, Models II and III can be considered as equivalent, and further discussions of the estimated results can be limited to either one of them. The discussion of the two-digit SIC model, to be undertaken in the next section, will be based on Model II reported in Table B-2.

Meanings and Implications of the Estimated Coefficients. Although the results from Model II are found to be superior to those from Model I in terms of their explanatory power, the discussion of results will cover both models. It is believed that each model provides a different type of information that is worth noting. The discussion will proceed by pointing out the meanings and implications of a number of estimated coefficients (particularly those that are significantly different from zero).

In looking at the results from the estimation of Model I as reported in Table B-1, it is striking to notice the consistency of the secondary sector variable in terms of the sign and level of significance of the estimated coefficients. The changes in labor demand in the secondary sector (Construction and Manufacturing) seem to be clearly associated with a decline in poverty for all demographic groups except the elderly. Considering that there is a limited supply of labor from the elderly demographic group because of mandatory retirement, the results appear quite consistent with expectations.

Another notable result relates to the impact of the change in demand in primary sector on the incidence of poverty among the elderly. The estimated coefficients in both elderly equations (households and unrelated individuals) are negative, and significant (at the one percent level for the unrelated individuals). This means that a decline in labor demand in the primary sector (Agriculture and Mining) is associated with an increase in poverty incidence among the elderly. A possible explanation of this relationship could be that a decrease in labor demand in agriculture and mining (the primary sectors) results into reduced rental incomes to retired farmers or mine owners.

Another notable fact from the results is that the two elderly equations suggest different patterns of response by elderly householders and unrelated individuals. Although the signs of the coefficients are the same in both equations (except for one variable as shown in Table IV-3), the magnitude and level of significance of the coefficients are substantially different. In general, the model

Table IV-3. Comparison of the Elderly Equations from Model I.

	%ΔEPS	%ΔESS	%ΔETS	%ΔNIDTP	%ΔIDTP	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst
Percent change in poverty incidence among elderly householders	-.084 (-1.29)	.145 (1.66)	-.059 (-.34)	.118 (2.60)	.209 (1.78)	-.705 (-2.68)	-.078 (-.97)	-88.32 (-7.78)	.231	3.15
Percent change in poverty incidence among elderly unrelated individuals	-.140 (-3.11)	.123 (2.04)	-.370 (-3.05)	.046 (1.49)	.003 (.26)	.081 (.43)	-.023 (-.42)	-42.40 (-5.44)	.328	4.50

Values in parentheses are the t-statistic.

better explains the change in poverty incidence for the elderly unrelated individuals than it does for that of elderly householders.

Finally, there are differences between the elderly and nonelderly equations. The sign of the coefficients in the elderly equations are in most cases, the reverse of that of the coefficients of the nonelderly equations. The same characteristics appear to be reflected in the results estimated from the detailed Model II (Table B-2), as summarized in the following two equations.[79/]

$$\begin{aligned}\text{Elderly HH:}\quad \%\Delta Pov = {} & -88.57 - .130(\%\Delta EGS) - .177(\%\Delta EAS) \\ & (-7.87) \quad (-.57) \qquad\quad (-1.40) \\ & - .01(\%\Delta LWLI) + .098(\%\Delta ETC) + .102(\%\Delta NIDTP) \\ & \quad (-.36) \qquad\quad (1.73) \qquad\quad (2.28) \\ & + .014(\%\Delta IDTP) - .448(\%\Delta POP) - .072(\%\Delta UR) \\ & \quad (.88) \qquad\quad (-1.55) \qquad\quad (-.96)\end{aligned} \tag{21}$$

$$\bar{R}^2 = .174 \qquad F = 2.29$$

$$\begin{aligned}\text{Nonelderly HH:}\quad \%\Delta Pov = {} & 47.13 + .061(\%\Delta EGS) + .727(\%\Delta EAS) \\ & (2.95) \quad (.20) \qquad\quad (4.05) \\ & + .013(\%\Delta ELWLI) - .267(\%\Delta ETC) - .135(\%\Delta NIDTP) \\ & \quad (.34) \qquad\quad (-3.29) \qquad\quad (-2.11) \\ & + .044(\%\Delta IDTP) + .160(\%\Delta POP) + .153(\%\Delta UR) \\ & \quad (1.85) \qquad\quad (.39) \qquad\quad (1.43)\end{aligned} \tag{22}$$

$$\bar{R}^2 = .50 \qquad F = 7.04$$

Given the characteristics of elderly and nonelderly householders, it seems consistent that opposite results be achieved from an analysis

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79/ The numbers in parentheses are t-values.

of the poverty incidence among the two demographic groups. However, for the same model specification (Model II), the performance of the elderly equation (21), as measured by the $\bar{R}^2$ and the F-statistic,[80] is so marginal relative to the nonelderly equation (22) that one becomes uncertain about drawing any conclusion from the estimated coefficients. In the light of the results from the two equations, one can only argue with some degree of confidence that as specified, the detailed model (Model II) is not appropriate to account for the variation in the incidence of poverty of the elderly. To be able to draw any significant conclusion, it would be necessary to explore other alternative formulations.

As far as the nonelderly householder equation is concerned, not only is the F-statistic substantially greater than the critical value (7.04 vs. 2.99 at the one percent level), the model accounted for half of the variation in the poverty incidence of the group, and all the estimated coefficients except one (income dependent transfer payments) appear to have the right sign.[81] Consider for example the estimated coefficients for the agriculture and tourism and convention industries. The signs are respectively positive (+) and negative (-) for the two coefficients which are also significant at the one percent level of significance.

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[80] At five percent and one percent level of significance respectively, the critical $F_{(8,41)}$ values are 2.17 and 2.99. In other words, the estimated coefficients in the elderly equation are together not significantly different from zero at one percent level, and barely significant at the five percent level.

[81] The coefficients in the aggregate, single female householder, and nonelderly unrelated individuals' equations all have the same signs as those of the nonelderly householders coefficients.

The positive sign of the coefficient of the agriculture variable says that a drop in agricultural employment of nonelderly is associated with a decline in poverty incidence of the subgroup. This is consistent with the labor surplus hypothesis found in the development literature [Lewis, 1955]. It basically says that the displacement of surplus labor from agriculture to low wage urban sector activities (say tourism and convention), would lead to productivity increase hence higher average income to farmers and farm workers. The displaced labor which productivity on the farm was zero or near zero would also enjoy higher productivity and higher average income in the low wage urban activities.[82/]

A comparison of the size of the coefficients in the Model II equations reveals that the coefficients of the agriculture and tourism and convention variables are generally greater than those of the transfer payments variables. This suggests that a one percent change in employment in agriculture or tourism and convention industries would have a greater impact on poverty incidence than would a similar change in transfer payments. That would be the case for the nonelderly householder, the nonelderly unrelated individuals, and the aggregate equations. For the female single householder equations (#3 and #4), the differences between the tourism and convention and the 'NIDTP' coefficients are quite small, however.

It is important to caution the reader at this point about policy inferences. The greater impacts that appear to be associated with

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82/ Even without surplus labor, if there is a gap in the average income in rural and urban sectors, an out-migration from agriculture to urban activities would produce the same results.

the economic structure variables relative to transfer payments variables, do not imply that policy measures for increasing employment in tourism and convention sectors, for example, are necessarily preferable to those involving transfer payments to the poor. Such conclusions cannot be drawn without considerations of the costs for implementing the anti-poverty measures. It could well be that the cost-benefit ratio of a one percent change in transfer payments is greater than that of a one percent change in employment in tourism and convention industries. In that case, the former policy measure might be preferable from an economic point of view. There is nothing in this study that could support one or the other measure as a preferred policy.

The migration and unemployment rate variables are generally not significant. Nevertheless, whenever the t-statistics associated with their coefficients happens to be greater than one ($t > 1$),[83/] the sign of the coefficient is generally positive (except for migration in the elderly household equation). A positive sign for the unemployment variable is consistent with expectations, as unemployment tends to reduce the income generating capacity of the poor. Population growth which is used as a proxy for migration variable in this study has the effect of increasing the supply of labor. If this increase is not met with an appropriate increase in demand, it would also have a depressing effect on the income generating capacity of the poor. As such, a positive sign would also be consistent with expectations.

83/ Aggregate (e.g., #1), female single householder (e.g., #4), elderly householder (e.g., #5), nonelderly householder and unrelated individuals (e.g., #6 and #8) equations in Model I and II.

Conclusion. This section has discussed some of the results from the poverty model estimations. The discussion proceeded by comparing a number of estimated equations for their explanatory power, and by pointing out the implications of some of the estimated coefficients. In the following section, the discussion will turn to the explanation of the results from the inequality models, followed by some general conclusions.

Change in Income Inequality

The results from the estimation of the income inequality models are reported in Table C. The models are specified in the same way as those used in the evaluation of change in poverty incidence except for two things. The explanatory variables in the inequality models include one additional variable (percent change in property income)[84/] and the dependent variables are, of course, inequality measures.[85/] The property income variable was included in this model to account for the fact that property income is characterized by unequal distributions, biased toward the upper classes. It is expected that a rapid increase in property income in the economy would benefit the upper class more than it would benefit the other income classes.

Unlike the poverty models, the estimated equations reported in Tables C-1 through C-3 (Model IV, V, and VI) generally have very

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84/ Property income is defined as income from dividends, interest, rent and royalties.

85/ The share of income to the lower 20 percent, middle 60 percent, top 20 percent, and top five percent are examined.

poor explanatory power. For example, not more than one-third of the variation in change in inequality has been explained by any of the three models.[86/] Particularly disappointing are the results of the 'top five percent' equation for which the $\bar{R}^2$ is zero throughout all three models. These weak results, particularly when compared with those achieved with the poverty models, would lead one to believe that maybe there is no relationship between changes in economic structure as defined in this study and income inequality. This impression is reinforced when the explanatory power of the three models are compared. Contrary to the poverty equations and as shown in Table IV-4, the estimation of the second and third models (V and VI) does not result in an increase of explanatory power. Besides the 'lower 20 percent' equation for which the $\bar{R}^2$ actually drops from Model IV to V or VI, the evidence generally seems to indicate that the choice of model, and maybe the very motion of economic structure, is irrelevant in explaining interstate variation in change in income share received by families ranked by income. However, to draw this conclusion solely on the evidence from $\bar{R}^2$ could be quite premature and erroneous.[87/] It is essential to also examine the magnitude and level of significance of the estimated coefficients associated with the economic structure variables.

[86/] The lower 20 percent equation reported in Table C-1 (Model IV) is the only exception to this observation. In this equation, the model accounts for 40 percent ($\bar{R}^2$ = .40) of the variation in changes in the share of income received by the lower quintile of family ranked by income.

[87/] The low $\bar{R}^2$'s only indicate that the model fails to account for other important correlates of income inequality. This is the case, in part, because it is not the design of this study to fully account for income inequality.

Table IV-4. Comparison of Explanatory Power of the Inequality Equations.

Equation Numbers	Model IV (Based on broad definition of economic structure)	Model V (Based on two digit SIC industries)	Model VI (Based on two digit SIC industries)
#1. "Lower 20%"	.399	.139	.185
#2. "Middle 60%"	.293	.235	.235
#3. "Top 20%"	.267	.240	.251
#4. "Top 5%"	0	0	0

As Kuznets (1955) and others after him argued, structural changes (or intersectoral shift in demand) would affect income inequality, any time there are sectors of the economy which are characterized by unequal (intersectoral) distribution of income. More specifically, if for example the distribution of income in the primary sector is skewed toward the lower end (say the bottom 20 percent), and the distribution in the secondary sector is more concentrated in the middle class (middle 60 percent), an increase in demand in the primary sector of the economy would result in an increase of income share of the lower classes. On the other hand, an increase in demand in the secondary sector would increase the share of the middle class. If the U.S. economy was characterized by unequal intrasectoral distribution over the period of our study (1969 to 1979), one should observe some significant relationships between changes in economic structure and income inequality in the estimated models, in spite of the low explanatory powers. There are, in fact, a number of significant coefficients associated with the economic structure variables in some of the estimated equations. In the aggregate model (IV), the secondary and tertiary sectors are both significant. The former at ten to fifteen percent level of significance ($1 < t < 2$) and the latter at one percent level ($t > 3$). In the detailed model, however, only the agriculture variable happens to have significant coefficients.

Since as previously observed, there is no significant difference between the three inequality models as far as explanatory power is concerned, the discussion of the results will be limited to only one model (say the Model V reported in Table C-2).

Meanings and Implications of the Estimated Coefficients. The discussion of the inequality results will proceed in a similar way as the discussion on the poverty results. The meanings of a number of estimated coefficients will be pointed out. Whenever possible, the sign of the coefficients will be related to prior expectations.

The results reported in Table C-2, the agriculture variable, is the only structure variable with significant coefficients. For the lower and upper quintile equations, the (agriculture) coefficients have a negative sign. It is positive for the middle class equation. All three coefficients are highly significant (one percent for middle and upper quintiles, and five percent for the lower quintile). The sum of the coefficient approximately adds up to zero suggesting that gain in the middle class was at the expense of both the upper and lower classes. Besides agriculture, the other variables with significant coefficients in all three equations are the migration and property income variables. The signs of the migration variable are the same as those of the agriculture variable. The signs of the property variable are the opposite. Finally, the magnitude of the coefficients of the agriculture variable is mostly greater than the coefficients of the other two significant variables.

Under some specific assumptions — (1) the income in agriculture are distributed more equally than those in other sectors; (2) the per capita income is higher in nonagricultural than agricultural sectors; and (3) these relationships do not change in the process or transformation — Kuznets (1955) had hypothesized that the decline in agriculture's share in GDP would have different impacts on the share of each quintile. The lower quintile is expected to decline

continuously (positive coefficient). The share of the upper quintile will follow an inverted U-shape, and that of the middle class will increase on the average (negative coefficient). When compared with the Kuznets hypotheses, the results achieved in this study are contrary to expectations. The sign of the agriculture coefficients are the reverse of those postulated on the Kuznets hypotheses. Because the agriculture variable as defined in this study is not strictly comparable with that of Kuznets,[88/] no implication can be drawn from the observed difference in the results. In fact, all one can say is to point out that the 'stylized facts' revealed in this study are different from those in Kuznets' hypothesis; then to propose an explanation for those facts.

Given the weakness of the inequality models and their insensitivity vis a vis the economic structure variables as previously indicated, one cannot help to question the validity of the estimated coefficients. However, assuming that the results are valid, the coefficients of the agriculture variable could mean a number of things. For example, the drop in the share of income of the lower quintile that is associated with a rise in employment in agriculture, could be due to the fact that farm laborers earn less than their counterpart in other sectors. The increase in the share of the middle 60 percent could be due to the fact that increased activity in agriculture resulted in increased returns to farm owners who belong to the middle class. Finally the decline in the share of

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88/ Kuznets' variable measures the share of agriculture in GDP while the agriculture variable used in this study measures a percent change in total employment in agriculture.

the top quintile could result from the fact that increased activities in agriculture lead to diversion of resources from productive activities which benefit the upper class. A number of other explanations or hypotheses are quite possible. Only through further research can a definite explanation be ascertained.

Conclusion. We have examined in this section the results from estimation of the inequality models. In general, the models are not powerful enough to explain the interstate variation in changes in income share received by the lower, middle three, and upper quintiles. However, the estimated equations contain a number of significant coefficients relative to the economic structure variables. This is particularly interesting because it would indicate that the structural changes that take place in the process of growth do affect the overall distribution of income in the economy. Such findings, if they are accurate, can be valuable for policy decision makers, particularly where there are efforts to reshape the structure of the economy and coordinate the process or growth.

CHAPTER V

SUMMARY AND CONCLUSIONS

In analyzing the relationship between changes in economic structure and changes in poverty incidence on one hand, and changes in income inequality on the other, this study has relied on interstate data from the United States to test hypotheses from the economic development literature.

During the development decade of the 1960s, many countries in the Third World have experienced fairly rapid economic growth. The average per capita income of the Third World as a whole has increased by 50 percent. Parallel to the rise in per capita income, the actual distribution of income has worsened; income inequality has increased, and the poor were getting poorer.

To explain why the poor have not benefitted from the effects of the post-war economic growth, some scholars hypothesized that it might be because the structure of the economy did not make it possible for the poor to participate in the growth process. The basic argument as stated by Ul Haq (1971) is that: "... if a production is organized in a way that excludes a large number of people, it will be wrong to assume that growth will result in redistribution of income to those who are not participating in the production stream." In their study on social equity and economic development, Adelman and Morris (1973) have reached the conclusion that, "... economic structure, not the level of income or the rate of growth is the basic determinant of patterns of income distributions." Griffin (1978) found in a study on Asian economic development, that the root

of the problem lies in the dichotomy between growth and distribution policies of the Third World countries. He argued that most of these countries have adopted a "grow now, redistribute later" strategy of development; but they failed to carry out the redistribution aspect of the strategy. Given such failure, Griffin argued that changes in the structure of the economy would be necessary to involve the poor directly into the growth process.

What this study tried to achieve was to determine whether there are evidence from historical data to support the hypotheses on the relationship between changes in economic structure and changes in poverty incidence. Given the changes in the incidence of poverty, the income distribution, and the economic structure of states in the U.S. over the period of 1969-1979, the interstate data appeared to constitute an appropriate sample for the study and was selected for that matter.

Different concepts of economic structure as well as different categories of poor were examined in the study. All together, eight groups of poor people, eight separate economic sectors, and four family income classes were analyzed. In addition to the economic structure variables, the model for the study also included factors such as transfer payments, population growth used as a proxy for migration variable, and unemployment rate. The transfer payments variable was divided into two components: (1) the income dependent transfer payments variable which included the government income maintenance programs, and (2) the nonincome dependent transfer payments variable which included the social security and other social insurance programs. The technique of analysis consisted of fitting

multiple linear regression models to a percent change data, computed from interstate data between 1969 and 1979. The data for the 50 states and District of Columbia were gathered from statistics published by the U.S. Bureaus of Census and of Economic Analysis.

The results from the analysis indicate that in general, there is some evidence of significant statistical relationships between changes in economic structure and changes in poverty incidence on one hand, and changes in income inequality on the other. The models appeared to better explain the interstate variation in changes in poverty incidence than they explain the variation in changes in income inequality. With the detailed specification of the economic structure variables, the estimated model accounted for 50 percent of the interstate variation in changes in poverty incidence, and less than 30 percent of the variation in income inequality.

There are a couple of economic sectors that have been found to be consistently and significantly associated with changes in the incidence of poverty. These are the agriculture and the tourism and convention sectors. Changes in employment in the former sector were found to be positively and significantly associated with changes in poverty incidence for the nonelderly (negatively for the elderly) householders. The reverse relationships were found to be true for the tourism and convention sector. These results suggest that a decrease in employment in agriculture would be associated with a decrease in poverty incidence for nonelderly householders (an increase for the elderly), and that an increase in employment in tourism and convention sectors would be associated with the same type of effects. It was also found that an increase in nonincome

dependent transfer payments would have the same effects, but not with the same magnitude, as an increase in employment in tourism and convention sector.

There are a number of weaknesses inherent to the definitions and measures of the concepts, and to the methods of analysis of the study that could place some limitations on the results of the analysis.

There are, for example, several definitions and measures of the concepts of poverty, income inequality, and economic structure that the choice of any one definition or measure is likely to overlook other important aspects of the issues. While, for instance, the concept of economic structure used in this study was defined essentially in terms of employment by sectors, it must be recognized that the selected economic sectors are not homogeneous with regard to the occupations they offer, and that not all occupations in a given sector are likely to be accessible to the poor. In other words, a measure of economic structure based on occupation can provide some interesting insights not attainable with the measures used in this study.

About the incidence of poverty, the Bureau of Census data used in the study have the problem of being based on a single year income data. As such, they do not provide any indication to separate the cyclical effects from the long trend phenomena in the povery incidence. Furthermore, the official definition of the concept which compares the individuals' income to a yardstick (poverty line), is far from being comprehensive. It does not give an indication of the extent of poverty being experienced by the individuals. By relying on an

"either-or" type of measure, this measure of poverty would likely fail to account for a situation in which there is a decline in the average income of those with incomes below the poverty line. It seems that such a decline in average income would represent an increase in poverty.

Finally, the technique of single linear equations used to analyze the data in the study, presumes that there is a simple linear dependency among the variables considered. Such presumption could be quite unrealistic if one considers the interdependence among the factors affecting regional economic growth. It could well be that the relationship among economic structure, poverty incidence, and migration are mutually reinforcing. It could be that lack of adequate infrastructure in the poor regions discourages the owners of capital to invest in those regions. Also, a lack of proper investments in the regions could trigger the out-migration of the most productive members of the labor force (those with relatively high levels of education and skills) of the regions, leading to greater erosion in the regions' productive capacity and a risk of greater poverty incidence. If this scenario better reflects the reality, then a set of simultaneous or recursive equations would have been best suited for formulating the models of the study.

As one can imagine, the possibilities for further research are certainly not lacking. While still awaiting a comprehensive theory on regional economic change which can shed light on the causes and effects of structural changes, and how these changes would affect the participants in the economic process, resources can be devoted to finding better measures of the concepts of poverty and income

inequality. Finally, in a recent evaluation study of federally supported poverty research, the National Academy of Sciences called for:

> "A shift of emphasis away from study of the situation and characteristics of people who are in poverty at a particular time, toward study of the social circumstance and systematic social forces that produce and perpetuate poverty itself" [1979, p. 11].

Studies like this one which are concerned with the impact economic structure and its subsequent changes have on the poor, appear to fit well in this agenda, and ought to be developed further by exploring other formulations such as multiple equation models.

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APPENDICES

APPENDIX A

TABLES OF DATA USED IN THE STUDY

Table A-1. Poverty Incidence by States and Demographic Groups.

	Aggregate Poverty Incidence			Poverty Incidence (married couple)			Poverty Incidence (Fem. Single Parent)			Poverty Incidence (Fem. Single Parent with Dependent Child)		
	1969[a/]	1979[b/]	%Δ	1969[a/]	1979[b/]	%Δ	1969[a/]	1979[b/]	%Δ	1969[a/]	1979[b/]	%Δ
ALABAMA	25.40	18.90	-25.59	16.70	10.50	-37.13	49.30	38.90	-21.10	70.20	61.50	-12.39
ALASKA	10.80	10.70	-40.56	7.50	6.50	-13.33	37.10	26.40	-28.84	50.80	41.60	-18.11
ARIZONA	15.30	13.20	-13.73	9.10	7.10	-21.98	34.50	27.70	-19.71	57.40	48.30	-15.85
ARKANSAS	27.00	19.00	-31.65	20.20	11.70	-42.08	47.10	38.10	+19.11	68.40	59.80	-12.57
CALIFORNIA	11.10	11.40	2.70	5.70	5.70	.00	29.90	26.10	-12.71	52.40	53.70	2.48
COLORADO	12.30	10.10	-17.89	6.80	4.90	-27.94	32.00	24.00	-18.75	55.10	48.30	-12.34
CONNECTICUT	7.20	8.00	11.11	3.30	2.90	-12.12	23.00	24.20	13.91	54.30	60.70	11.79
DELAWARE	10.90	11.00	8.26	5.50	5.30	-3.64	31.00	30.00	-3.23	57.40	55.00	6.08
DIST. OF COL.	17.00	18.60	9.41	7.20	7.70	6.94	29.10	28.50	-2.06	47.60	45.10	-5.25
FLORIDA	14.40	13.40	-18.29	9.80	6.70	-31.63	35.90	30.30	-15.60	58.50	55.10	-5.81
GEORGIA	20.70	14.60	-19.81	13.00	8.80	-32.31	42.40	35.40	-16.51	61.10	56.00	-8.35
HAWAII	9.30	9.90	6.45	5.10	4.90	-3.92	32.40	28.00	-13.58	57.10	50.90	-10.86
IDAHO	13.20	12.60	-4.55	8.90	7.30	-17.98	37.80	33.10	-12.43	62.70	56.90	-9.25
ILLINOIS	10.20	11.00	7.84	5.20	3.70	-28.85	28.00	35.80	27.86	54.40	58.50	7.14
INDIANA	9.70	9.70	.00	5.60	4.70	-16.07	26.20	26.80	2.29	47.00	49.80	5.96
IOWA	11.60	10.10	-12.93	7.40	5.70	-22.97	27.50	25.80	-6.18	53.40	51.40	-3.75
KANSAS	12.70	10.10	-20.47	7.00	4.00	-48.72	31.30	38.00	21.41	58.70	49.30	-16.01
KENTUCKY	22.90	17.60	-23.14	14.70	11.60	-30.54	41.50	35.00	-15.66	61.40	60.50	-1.47
LOUISIANA	24.30	18.60	-29.28	17.10	10.00	-41.52	51.10	41.40	-18.98	72.00	62.90	-12.64
MAINE	13.60	13.00	-4.41	8.10	6.90	-14.81	31.20	30.80	-1.28	57.10	58.20	1.93
MARYLAND	10.10	9.80	-2.97	4.90	4.00	-18.37	29.00	25.40	-12.41	50.20	47.20	-5.98
MASSACHUSETTS	8.60	9.60	11.63	4.10	3.90	-4.88	22.10	27.50	24.43	55.70	62.30	11.85
MICHIGAN	9.40	10.40	10.64	5.00	4.40	-12.00	28.80	38.70	6.60	52.50	56.00	6.67
MINNESOTA	10.70	9.50	-11.21	6.90	5.30	-23.19	24.00	22.80	-5.00	47.00	49.30	4.89
MISSISSIPPI	35.40	23.90	-32.49	24.50	13.90	-43.27	50.00	43.50	-25.80	75.20	62.30	-17.15
MISSOURI	14.70	12.20	-17.01	9.40	6.60	-29.79	36.00	27.00	-12.34	53.50	49.50	-7.48
MONTANA	13.60	12.30	-9.56	8.20	6.90	-15.85	35.50	30.40	-14.37	58.70	55.40	-5.62
NEBRASKA	13.10	10.70	-18.32	8.70	6.20	-28.74	27.50	25.20	-8.36	52.10	51.90	-.38
NEVADA	9.10	8.70	-4.40	5.00	4.40	-12.00	25.60	18.60	-27.34	39.40	35.60	-9.64
NEW HAMPSHIRE	9.10	8.50	-6.59	5.00	3.80	-24.00	24.20	24.60	1.65	48.60	54.00	11.11
NEW JERSEY	8.10	9.50	17.28	3.90	3.70	-5.13	24.00	29.20	21.67	58.70	61.20	20.71
NEW MEXICO	22.80	17.60	-22.81	15.00	10.50	-30.00	47.00	37.20	-22.18	68.80	55.60	-19.19
NEW YORK	11.10	13.40	20.72	5.60	5.70	1.79	28.10	34.20	21.71	52.60	64.50	16.01
NORTH CAROLINA	20.30	14.80	-27.09	13.10	8.10	-38.17	41.00	31.60	-22.93	58.60	52.10	-11.09
NORTH DAKOTA	15.70	12.60	-19.75	11.10	8.30	-25.23	30.70	26.60	-13.36	57.90	54.80	-6.74
OHIO	10.00	10.30	3.00	5.30	4.70	-11.32	29.60	29.50	-.34	54.70	56.70	3.66
OKLAHOMA	10.80	13.40	-28.72	12.30	7.70	-37.40	40.30	31.10	-22.83	63.60	52.20	-17.92
OREGON	11.50	10.70	-6.96	6.60	5.10	-22.73	30.80	28.00	-9.09	56.00	53.80	-3.93
PENNSYLVANIA	10.60	10.50	-.94	5.50	4.60	-16.36	26.60	27.40	3.01	55.40	58.60	5.78
RHODE ISLAND	11.00	10.30	-6.36	5.60	3.90	-30.36	30.00	29.30	-2.33	46.40	46.70	.65
SOUTH CAROLINA	23.90	16.60	-30.54	14.80	8.80	-40.54	47.20	35.70	-24.36	65.70	54.90	-16.44
SOUTH DAKOTA	18.70	16.90	-9.63	13.20	10.90	-17.42	33.90	34.40	1.47	60.80	58.50	-3.78
TENNESSEE	21.80	16.40	-24.77	15.20	9.60	-36.84	41.40	33.80	-18.36	60.10	49.90	-16.97
TEXAS	18.80	14.70	-21.81	11.90	8.40	-29.41	39.10	30.70	-21.48	59.30	49.50	-16.53
UTAH	11.40	10.30	-9.65	7.00	5.50	-21.43	34.70	28.00	-19.31	60.00	51.90	-13.50
VERMONT	12.10	12.10	.00	7.50	6.30	-16.00	25.00	28.20	9.30	46.10	57.00	23.64
VIRGINIA	15.50	11.80	-23.87	3.40	5.00	61.11	23.30	29.40	26.18	41.30	53.20	28.81
WASHINGTON	10.20	9.80	-3.92	5.50	4.50	-18.18	29.50	28.20	-4.41	55.10	54.10	-1.81
WEST VIRGINIA	22.20	15.00	-32.43	15.10	9.60	-36.42	42.40	30.30	-28.54	65.20	58.50	-10.28
WISCONSIN	9.80	8.70	-11.22	5.70	4.00	-29.82	26.30	25.10	-4.56	54.40	53.30	-2.02
WYOMING	11.70	7.90	-32.48	7.40	4.40	-40.54	33.70	23.60	-29.97	59.00	40.00	-33.11

Table A-1. Poverty Incidence by States and Demographic Groups (continued).

	Poverty Incidence (Elderly Householder)			Poverty Incidence (Nonelderly Householder)			Poverty Incidence (Elderly Unrelated Ind.)			Poverty Incidence (Nonelderly Unrelated Ind.)		
	1969[a]	1979[b]	Δ	1969[a]	1979[b]	Δ	1969[a]	1979[b]	Δ	1969[a]	1979[b]	Δ
ALABAMA	39.20	20.30	-48.21	17.60	13.80	-21.59	44.00	26.90	-38.86	71.40	50.60	-29.13
ALASKA	20.00	14.10	-32.21	10.70	9.90	-7.48	29.20	18.90	-35.27	47.30	19.00	-59.83
ARIZONA	16.70	7.70	-53.89	10.10	13.90	-27.33	31.60	25.10	-20.57	47.60	26.50	-44.33
ARKANSAS	40.00	19.20	-52.00	8.10	9.30	14.81	44.70	30.90	-30.87	71.90	50.40	-29.90
CALIFORNIA	11.10	5.00	-54.95	8.50	7.50	-11.76	24.70	20.80	-15.79	34.00	15.60	-54.12
COLORADO	14.10	6.00	-57.45	6.90	6.60	14.69	31.60	20.90	-33.44	50.60	37.50	-25.64
CONNECTICUT	8.80	6.10	-53.41	7.30	9.20	26.02	22.60	18.30	-19.02	39.90	20.20	-49.37
DELAWARE	16.20	6.30	-61.11	12.60	16.10	27.78	28.00	25.60	-8.57	49.60	29.90	-39.47
DIST. OF COL.	13.50	10.00	-25.93	11.50	10.60	-7.83	21.00	21.30	-2.74	35.60	32.00	-14.11
FLORIDA	17.10	7.60	-55.56	14.30	12.50	-12.59	10.80	25.70	34.70	40.50	27.50	-43.30
GEORGIA	35.60	10.70	-44.66	6.90	8.10	17.39	35.40	24.20	-25.99	67.00	47.30	-29.40
HAWAII	15.70	5.70	-63.69	9.50	9.70	2.11	26.40	21.50	-18.56	50.00	31.70	-36.60
IDAHO	19.70	8.80	-55.33	6.60	8.80	33.33	34.50	28.50	-17.39	54.10	32.60	-39.74
ILLINOIS	14.40	5.90	-59.03	6.10	7.50	22.95	25.10	21.70	-13.55	48.80	24.50	-49.80
INDIANA	16.20	6.40	-60.49	7.20	7.80	8.33	28.60	22.30	-22.03	51.70	25.90	-49.90
IOWA	17.40	6.00	-65.52	8.10	7.50	-7.41	25.90	33.10	-10.81	41.00	27.90	-34.15
KANSAS	19.90	6.90	-65.33	16.60	14.20	-14.46	34.50	23.60	-31.59	53.10	28.70	-45.95
KENTUCKY	33.90	16.80	-50.44	19.30	14.40	-25.39	42.20	29.40	-30.33	63.40	40.70	-35.80
LOUISIANA	36.00	19.80	-44.20	8.90	10.10	13.48	43.50	28.30	-34.94	68.40	48.40	-29.24
MAINE	18.20	7.80	-57.14	6.80	7.60	11.76	34.00	27.40	-19.41	53.60	34.30	-36.01
MARYLAND	15.00	6.80	-54.67	5.40	8.10	44.44	21.00	20.50	-2.96	38.50	27.60	-28.31
MASSACHUSETTS	9.70	5.00	-48.45	6.30	8.60	36.51	26.10	21.20	-18.77	61.10	10.40	-52.80
MICHIGAN	14.44	6.10	-57.64	6.70	6.90	2.99	28.30	23.40	-17.31	49.60	26.00	-47.58
MINNESOTA	14.70	7.40	-55.69	24.90	17.20	-30.92	20.60	20.70	-27.62	58.20	28.90	-42.43
MISSISSIPPI	49.70	26.10	-47.48	9.70	9.00	-7.22	48.50	32.90	-32.16	74.00	55.70	-26.71
MISSOURI	21.40	9.40	-56.07	9.50	9.40	-1.05	32.10	24.20	-24.61	55.70	33.60	-39.68
MONTANA	16.20	7.40	-54.32	8.60	8.10	-5.81	34.10	26.50	-22.29	58.50	28.70	-48.17
NEBRASKA	17.00	7.70	-54.74	6.30	6.30	.00	32.50	21.00	-32.92	51.20	30.30	-40.82
NEVADA	14.30	5.80	-59.44	5.30	6.30	18.87	22.00	17.10	-22.27	41.20	22.70	-44.90
NEW HAMPSHIRE	15.70	6.90	-60.79	5.50	8.10	47.27	30.90	21.40	-30.74	49.70	28.10	-43.46
NEW JERSEY	10.70	4.80	-55.14	17.10	13.70	-19.88	23.40	19.40	-17.09	44.60	23.40	-47.53
NEW MEXICO	30.60	15.60	-49.02	7.80	11.70	50.00	37.50	28.00	-25.33	57.60	37.00	-35.76
NEW YORK	12.80	6.10	-52.34	14.80	10.80	-22.86	24.00	24.70	2.92	44.80	23.30	-47.99
NORTH CAROLINA	33.00	16.00	-52.66	11.20	9.80	-12.50	38.50	26.40	-31.43	65.00	45.70	-29.69
NORTH DAKOTA	18.80	9.30	-50.53	6.50	8.20	26.15	34.00	22.20	-34.71	50.10	32.10	-35.93
OHIO	15.60	6.30	-59.62	12.80	10.00	-21.88	28.60	22.20	-18.88	51.90	26.50	-48.90
OKLAHOMA	27.40	12.00	-56.20	7.60	8.10	6.58	37.30	24.00	-35.66	63.00	39.80	-37.72
OREGON	14.30	5.20	-63.64	6.70	8.20	22.39	33.00	24.30	-26.36	66.90	25.30	-44.04
PENNSYLVANIA	14.00	5.50	-62.86	7.40	8.40	13.51	32.20	25.40	-21.12	52.60	26.40	-49.81
RHODE ISLAND	15.00	4.50	-70.00	16.50	12.30	-25.45	33.00	24.90	-24.55	52.30	30.20	-42.26
SOUTH CAROLINA	30.50	20.00	-27.27	13.40	13.30	-.75	40.00	26.90	-32.75	68.30	47.60	-30.31
SOUTH DAKOTA	21.10	12.00	-43.13	15.20	12.30	-19.08	40.60	28.10	-30.79	55.50	36.30	-34.59
TENNESSEE	34.60	17.20	-53.01	12.90	10.70	-17.05	38.90	26.00	-33.16	67.70	46.50	-31.31
TEXAS	26.00	14.00	-47.76	8.30	7.90	-4.82	32.50	22.90	-29.54	58.50	39.70	-33.28
UTAH	15.30	5.80	-62.09	7.80	8.40	26.51	40.70	31.10	-23.59	53.50	34.80	-49.91
VERMONT	16.70	6.30	-62.28	10.60	8.80	-16.98	34.00	27.20	-21.84	68.80	29.10	-48.37
VIRGINIA	10.70	11.30	5.61	6.70	7.40	13.43	29.20	21.80	-25.34	54.80	34.20	-38.93
WASHINGTON	13.50	4.60	-65.93	15.40	11.60	-24.68	27.40	21.60	-21.17	46.50	24.90	-46.45
WEST VIRGINIA	31.30	12.20	-61.02	6.10	6.60	8.20	47.10	32.60	-30.79	64.60	36.40	-48.35
WISCONSIN	15.80	4.90	-67.33	8.30	5.70	-31.33	30.00	22.00	-27.27	68.40	28.80	-57.82
WYOMING	15.00	7.30	-53.00				30.40	19.10	-37.17	46.70	27.30	-41.54

[a] 1970 Census of Population and Housing: Detailed characteristics, Table 209. [b] 1980 Census of Population and Housing: Detailed characteristics, Table 209.

Table A-2. Gini Concentration Ratio of Before-Tax Money Income of Families for Continental States, 1949, 1959, and 1969.

State	Concentration Ratio		
	1949	1959	1969
Alabama	.4778	.4390	.3983
Arizona	.4192	.3788	.3645
Arkansas	.4954	.4527	.4057
California	.3619	.3594	.3524
Colorado	.3957	.3625	.3538
Connecticut	.3664	.3488	.3268
Delaware	.4218	.3799	.3430
Florida	.4537	.4173	.3932
Georgia	.4763	.4277	.3873
Idaho	.3783	.3478	.3548
Illinois	.3695	.3604	.3391
Indiana	.3643	.3568	.3288
Iowa	.3814	.3800	.3525
Kansas	.4127	.3786	.3628
Kentucky	.4549	.4400	.3970
Louisiana	.4604	.4363	.4077
Maine	.3843	.3412	.3368
Maryland	.3826	.3612	.3447
Massachusetts	.3566	.3401	.3309
Michigan	.3509	.3483	.3314
Minnesota	.3758	.3717	.3476
Mississippi	.5363	.4775	.4276
Missouri	.4276	.4041	.3710
Montana	.3898	.3527	.3516
Nebraska	.4020	.3818	.3603
Nevada	.3712	.3478	.3353
New Hampshire	.3636	.3301	.3239
New Jersey	.3611	.3423	.3335
New Mexico	.4437	.3945	.3933
New York	.3859	.3667	.3594
North Carolina	.4455	.4288	.3761
North Dakota	.4134	.3750	.3708
Ohio	.3587	.3490	.3311
Oklahoma	.4396	.4161	.3873
Oregon	.3669	.3510	.3468
Pennsylvania	.3554	.3528	.3386
Rhode Island	.3584	.3444	.3407
South Carolina	.4634	.4336	.3795
South Dakota	.4121	.3970	.3844
Tennessee	.4605	.4412	.3915
Texas	.4421	.4203	.3832
Utah	.3406	.3300	.3389
Vermont	.3844	.3579	.3441
Virginia	.4260	.4111	.3756
Washington	.3534	.3408	.3374
West Virginia	.3980	.4072	.3770
Wisconsin	.3645	.3506	.3335
Wyoming	.3674	.3457	.3468

SOURCE: Tom S. Sale [1974], p. 437.

Table V-5. Size Distribution of Family Income by States.

	Share of Total Family Income to Bottom 20%			Share of Total Family Income to Middle 60%			Share of Total Family Income to Top 20%			Share of Total Family Income to Top 5%		
	1969[a]	1979[b]	%Δ	1969[a]	1979[b]	%Δ	1969[a]	1979[b]	%Δ	1969[a]	1979[b]	%Δ
ALABAMA	5.66	4.47	-21.02	52.81	52.76	-.09	41.53	42.77	2.99	21.54	16.25	-24.56
ALASKA	6.32	3.99	-36.87	43.64	49.62	13.70	50.04	46.39	-7.29	18.87	12.13	-35.72
ARIZONA	7.11	5.25	-26.16	50.22	52.73	37.96	54.67	42.02	-23.14	21.94	14.35	-25.55
ARKANSAS	5.69	4.82	-15.29	59.78	51.18	-14.39	34.53	43.99	27.40	22.20	17.52	-21.36
COLORADO	7.23	4.95	-31.54	59.14	51.75	32.22	33.63	43.30	-19.24	21.81	14.95	-31.45
CONNECTICUT	7.71	4.89	-36.58	56.04	53.40	48.72	36.25	41.51	-26.20	22.06	15.05	-31.78
DELAWARE	8.57	5.59	-34.77	58.17	52.15	34.43	33.26	42.25	-20.67	22.27	14.35	-35.68
DIST. OF COL.	5.38	3.29	-38.85	56.03	45.64	46.51	55.75	41.97	-24.72	22.89	15.27	-33.29
FLORIDA	6.21	5.06	-18.52	48.24	50.23	24.83	50.58	51.06	-12.84	25.59	17.05	-33.37
GEORGIA	6.12	4.57	-25.33	44.41	51.88	16.82	49.47	43.55	-11.97	24.53	18.58	-24.26
HAWAII	7.25	5.11	-29.52	41.93	52.12	24.38	50.81	42.77	-15.82	21.98	17.09	-22.25
IDAHO	8.31	6.28	-24.43	27.84	52.66	89.13	63.85	41.06	-35.69	20.06	13.84	-31.91
ILLINOIS	7.07	5.18	-35.20	38.46	53.20	38.33	53.47	41.70	-22.36	19.87	15.54	-21.79
INDIANA	8.97	5.85	-34.78	34.34	54.02	58.05	56.69	39.43	-27.98	21.76	14.19	-33.87
IOWA	7.05	5.58	-29.94	41.73	52.93	26.84	50.42	41.57	-17.55	20.10	14.56	-27.56
KANSAS	7.46	5.42	-24.64	47.48	51.77	21.87	50.04	42.61	-14.88	21.55	15.76	-27.15
KENTUCKY	5.77	4.45	-22.88	51.62	51.29	-.64	42.61	44.26	3.87	22.34	16.53	-25.92
LOUISIANA	5.27	3.92	-25.62	48.68	55.67	14.35	46.13	40.41	-12.40	21.73	16.15	-25.68
MAINE	8.72	6.88	-30.20	52.94	52.24	-1.32	38.34	41.67	8.69	22.82	17.81	-21.95
MARYLAND	7.57	5.23	-30.91	59.58	53.97	34.34	32.85	40.80	-22.80	19.34	15.30	-20.97
MASSACHUSETTS	8.69	5.58	-36.71	57.30	53.41	43.19	34.00	41.09	-23.91	21.34	13.87	-35.00
MICHIGAN	8.20	5.21	-36.46	59.33	53.97	37.22	32.47	40.82	-22.20	21.96	15.08	-31.33
MINNESOTA	7.86	5.23	-33.46	55.15	54.07	53.83	36.99	40.70	-28.38	20.95	14.31	-31.69
MISSISSIPPI	4.80	4.45	-7.29	58.94	50.91	+13.62	36.26	44.54	22.84	22.08	15.37	-30.39
MISSOURI	6.84	5.36	-22.51	46.46	53.18	31.63	52.76	41.52	-21.30	22.85	17.81	-22.06
MONTANA	7.97	5.48	-31.24	46.84	53.53	14.23	45.16	40.99	-9.23	22.10	16.06	-27.33
NEBRASKA	7.58	5.57	-26.52	44.59	53.05	18.97	47.83	41.38	-13.49	21.19	15.69	-25.96
NEVADA	8.31	5.76	-30.69	54.45	53.96	44.77	53.04	41.18	-22.36	21.42	16.16	-24.56
NEW HAMPSHIRE	9.59	6.34	-33.89	38.92	53.91	38.51	51.49	39.75	-22.80	21.23	14.99	-29.39
NEW JERSEY	8.18	5.22	-36.19	39.24	52.90	34.74	52.56	41.88	-20.32	20.40	14.93	-26.81
NEW MEXICO	5.88	4.79	-20.07	45.90	52.08	13.46	48.22	43.22	+10.37	21.35	14.16	-33.68
NEW YORK	7.02	4.66	-33.90	38.11	51.98	36.39	54.87	43.38	-20.94	21.37	16.57	-22.44
NORTH CAROLINA	6.64	5.29	-20.33	51.47	52.91	2.80	41.89	41.80	-.21	23.04	15.97	-30.57
NORTH DAKOTA	7.26	4.89	-32.64	48.41	53.79	10.66	44.13	41.32	-6.37	21.72	16.19	-25.46
OHIO	8.55	5.65	-33.92	36.27	54.76	50.98	55.18	39.59	-28.25	21.89	15.83	-27.68
OKLAHOMA	6.44	5.11	-20.65	48.62	47.95	-.15	45.54	42.84	-5.93	20.98	14.76	-29.65
OREGON	7.98	5.52	-30.83	38.59	53.68	38.90	53.43	40.88	-23.49	21.99	16.77	-23.74
PENNSYLVANIA	8.38	5.71	-31.85	38.89	55.39	45.42	53.33	38.90	-27.06	21.65	15.91	-26.51
RHODE ISLAND	8.33	5.68	-31.81	36.72	53.74	46.35	54.75	40.58	-25.88	21.45	15.36	-28.39
SOUTH CAROLINA	6.33	5.01	-20.85	53.27	53.26	-.06	40.40	41.75	3.34	21.77	16.41	-24.62
SOUTH DAKOTA	6.50	4.90	-25.53	51.01	52.74	3.39	42.41	42.36	-.12	20.76	16.03	-22.78
TENNESSEE	6.04	4.80	-20.53	51.62	52.32	1.36	42.34	42.88	1.28	22.51	16.90	-25.37
TEXAS	6.38	4.71	-26.18	41.47	52.12	25.68	52.15	43.16	-17.24	21.87	16.73	-23.50
UTAH	8.44	6.06	-28.37	41.04	54.09	31.80	50.50	39.35	-22.08	22.76	16.41	-27.90
VERMONT	8.42	5.99	-28.86	42.83	53.17	24.14	48.75	40.84	-16.23	20.32	14.87	-26.82
VIRGINIA	6.63	5.01	-24.43	34.41	52.18	52.31	56.74	42.89	-24.44	21.15	15.54	-26.52
WASHINGTON	8.18	5.52	-32.52	37.12	53.85	45.07	54.70	40.63	-25.72	22.82	15.83	-30.63
WEST VIRGINIA	6.44	5.19	-19.57	57.36	53.64	-6.49	36.00	41.18	14.39	21.21	14.77	-30.36
WISCONSIN	8.59	6.32	-26.43	35.16	53.97	53.50	56.25	39.71	-29.40	20.24	15.48	-23.52
WYOMING	8.15	6.12	-24.91	43.90	54.68	27.14	48.05	39.20	-19.75	21.24	15.21	-28.39
										21.90	14.15	-32.67

a/ 1970 Census of Population: General Social and Economic Characteristics, Table 57. b/ 1980 Census of Population: Summary Tape File 3c, Tables 73, 74, 77PI.

Table A-4. Employment by Broad Industrial Classification and by States.

	Percent of Total Employment in the Primary Sector		% Change in Total Employment in Primary Sector	Percent of Total Employment in Secondary Sector		% Change in Total Employment in Secondary Sector	Percent of Total Employment in Tertiary Sector		% Change in Total Employment in Tertiary Sector	Percent of Total Employment in Government Sector		% Change in Total Employment in Government Sector
	1969	1979		1969	1979		1969	1979		1969	1979	
ALABAMA	9.67	7.15	-10.31	27.48	26.95	19.00	32.03	35.52	31.26	20.26	20.27	21.37
ALASKA	3.62	3.17	34.43	10.00	10.73	64.64	72.44	32.00	124.92	51.73	37.94	42.56
ARIZONA	7.42	4.78	9.66	19.46	20.13	75.84	39.03	44.55	98.12	22.36	19.78	50.40
ARKANSAS	14.43	10.66	-19.10	25.79	26.53	30.44	30.44	34.20	41.77	15.50	16.46	34.92
CALIFORNIA	3.08	3.93	37.72	23.37	21.59	25.52	39.74	44.81	53.19	21.50	17.90	13.14
COLORADO	7.42	5.55	15.54	16.60	17.09	44.37	38.47	43.78	75.45	24.01	19.54	21.57
CONNECTICUT	1.28	1.26	13.66	39.05	31.15	-8.09	38.16	44.87	35.46	13.34	13.58	17.34
DELAWARE	3.13	2.51	-7.59	34.27	29.44	-1.08	35.01	40.63	33.61	18.26	18.59	17.29
DIST. OF COL.	-.29	.03	-110.96	5.88	4.28	-25.16	42.31	42.82	4.20	44.47	44.55	7.27
FLORIDA	4.78	4.43	40.34	18.60	16.84	37.15	44.62	48.38	64.29	19.20	17.61	38.37
GEORGIA	6.05	4.86	.86	27.45	24.70	12.98	34.89	39.61	42.56	21.29	19.74	16.41
HAWAII	6.40	3.52	-25.65	12.91	9.38	-2.59	38.15	45.70	62.01	32.18	30.26	27.49
IDAHO	17.71	12.41	3.26	17.89	17.68	52.53	31.79	37.87	71.93	19.23	18.97	41.71
ILLINOIS	4.00	3.79	3.33	32.12	27.81	-8.49	38.69	43.72	22.98	14.83	15.36	12.31
INDIANA	6.43	5.47	-2.61	37.78	32.67	-.93	32.34	37.83	33.97	13.61	13.85	14.61
IOWA	16.12	12.87	-4.25	22.22	21.75	17.38	34.28	39.40	37.37	15.38	14.66	14.80
KANSAS	13.24	10.02	-6.35	18.94	20.40	34.76	32.93	37.81	42.89	21.42	18.30	5.89
KENTUCKY	15.04	13.00	5.14	23.89	23.35	18.87	30.42	35.66	39.94	19.89	17.18	9.45
LOUISIANA	10.38	8.31	2.84	18.75	19.19	36.91	37.61	41.73	42.54	20.75	18.45	14.24
MAINE	4.60	3.94	3.56	31.16	26.39	1.82	31.92	38.24	44.01	19.65	18.96	15.99
MARYLAND	2.28	2.02	8.45	22.95	18.11	-3.31	38.98	44.81	41.12	25.98	25.47	20.44
MASSACHUSETTS	1.00	.91	2.00	30.77	26.20	-4.52	44.50	48.73	22.78	14.96	15.21	13.99
MICHIGAN	3.88	3.18	-5.93	37.50	32.38	-1.13	34.31	39.00	33.12	14.75	15.31	19.12
MINNESOTA	10.90	8.42	.51	24.65	22.07	16.47	37.11	43.98	54.14	15.78	14.46	19.20
MISSISSIPPI	15.30	10.14	-19.42	24.41	26.11	30.11	38.84	33.69	33.95	20.94	20.47	18.83
MISSOURI	9.26	7.20	-11.69	25.57	23.17	2.99	37.17	42.84	28.56	15.83	15.11	8.45
MONTANA	16.53	11.95	-4.03	12.43	11.39	21.53	33.35	39.51	57.21	21.85	20.45	24.18
NEBRASKA	14.65	11.81	.48	17.85	15.87	15.49	36.60	40.31	34.66	18.41	18.18	22.55
NEVADA	3.72	2.45	21.97	8.52	10.93	137.38	55.21	49.20	101.69	21.23	15.78	37.45
NEW HAMPSHIRE	2.32	1.79	5.86	35.89	31.64	21.21	35.56	41.39	60.85	15.78	14.67	27.80
NEW JERSEY	1.08	.97	3.86	34.82	27.30	-10.32	37.21	44.22	35.90	15.93	16.61	19.07
NEW MEXICO	11.18	9.75	27.11	18.24	12.75	81.49	36.82	40.69	61.08	29.98	25.44	23.68
NEW YORK	1.37	1.54	18.72	26.58	21.44	-20.14	45.11	49.53	8.40	14.33	17.15	3.52
NORTH CAROLINA	10.02	6.71	-18.69	34.49	32.64	14.94	28.69	33.25	40.70	17.26	17.42	22.82
NORTH DAKOTA	24.09	18.14	-4.19	6.64	10.52	181.36	32.19	39.19	54.87	24.48	19.64	3.99
OHIO	3.93	3.71	3.47	37.02	31.34	-4.53	35.30	40.99	27.91	13.63	13.82	11.97
OKLAHOMA	14.60	12.40	9.68	16.20	17.69	41.80	32.43	37.42	49.80	23.70	19.84	8.68
OREGON	7.27	6.05	18.95	24.48	22.43	31.64	34.74	41.18	60.24	17.88	16.82	34.31
PENNSYLVANIA	2.98	3.00	7.90	35.79	29.78	-10.99	36.28	42.22	24.75	14.64	14.66	7.02
RHODE ISLAND	.45	.87	110.49	34.39	32.36	2.62	40.48	49.80	34.42	21.45	15.87	-19.33
SOUTH CAROLINA	7.75	5.22	-13.58	34.66	32.33	19.60	27.82	32.14	48.27	21.42	21.14	24.65
SOUTH DAKOTA	23.97	16.91	-10.90	8.76	11.75	59.83	32.57	39.07	62.73	22.12	19.22	3.48
TENNESSEE	9.86	7.11	-9.72	31.41	28.50	13.98	33.07	37.38	41.52	15.99	14.82	31.71
TEXAS	9.43	8.04	19.60	20.92	21.46	44.02	38.35	41.55	52.08	19.26	17.05	24.32
UTAH	8.71	6.24	7.37	16.48	19.39	78.24	36.81	40.39	68.10	27.11	21.85	20.84
VERMONT	7.25	5.74	-3.86	28.33	25.52	9.36	36.57	40.54	34.60	16.13	16.11	21.26
VIRGINIA	4.56	4.72	-9.18	22.94	21.51	18.31	32.78	38.42	47.85	20.87	25.65	15.23
WASHINGTON	5.85	5.41	21.02	23.26	21.53	22.30	35.33	41.53	54.86	23.96	19.67	8.17
WEST VIRGINIA	13.54	12.58	10.98	25.63	22.45	4.53	31.27	35.24	34.48	17.07	17.71	20.86
WISCONSIN	8.57	7.17	4.47	31.91	28.94	13.25	34.71	39.91	43.57	24.29	13.99	22.34
WYOMING	10.38	19.92	77.94	9.31	12.35	117.02	31.56	33.45	74.53	25.11	19.17	28.34

SOURCE: U.S. Bureau of Economic Analysis: State Employment Statistics.

Table A-5. Employment by Selected Industry Groups and by State.

	Percent of Total Employment in Agriculture		% Change in Total Employment in Agriculture	Percent of Total Employment in LMLI Manu. Estab.		% Change in Total Employment in LMLI Manu. Estab.	Percent of Total Employment in High Tech. Manu. Ind.		% Change in Total Employment in High Tech.	Percent of Total Employment in Tourism & Convention Industries		% Change in Total Employment in Tourism and Convention Industries
	1969	1979		1969	1979		1969	1979		1969	1979	
ALABAMA	8.81	5.79	-20.31	13.59	12.54	16.74	5.78	5.85	35.02	6.18	6.36	83.90
ALASKA	.36	.31	37.49	2.02	1.90	33.41	.53	.73	176.47	7.46	10.43	178.16
ARIZONA	3.82	1.74	-22.62	2.90	2.43	77.28	10.43	8.45	49.70	10.21	11.09	112.49
ARKANSAS	13.24	9.44	-21.33	11.76	8.67	.63	5.68	7.73	79.41	6.23	8.17	86.43
CALIFORNIA	2.89	2.32	10.94	3.10	3.36	49.49	11.70	10.17	29.61	8.09	10.11	73.32
COLORADO	5.42	2.98	-10.12	2.92	2.05	20.61	6.48	5.50	159.35	9.92	13.50	113.54
CONNECTICUT	.95	.85	3.06	4.21	3.08	-16.41	20.63	16.91	-4.92	6.50	8.57	70.95
DELAWARE	3.13	2.09	-23.11	3.24	2.00	-27.50	18.13	15.49	5.91	5.71	2.09	-90.11
DIST. OF COL.	.00	.00	.00	.00	.00	.00	.38	.19	-45.32	9.21	.50	-99.91
FLORIDA	3.61	2.72	13.99	2.45	2.77	76.63	5.82	5.56	51.93	10.45	12.48	84.15
GEORGIA	5.34	4.17	-1.92	16.57	13.74	7.69	5.68	4.15	-2.31	5.14	7.75	96.83
HAWAII	6.48	3.85	-35.62	1.78	1.16	-5.68	.57	.28	-24.19	15.68	19.95	84.49
IDAHO	15.58	10.41	-1.48	8.16	7.61	31.76	2.94	3.39	88.64	8.42	10.28	98.77
ILLINOIS	3.36	3.98	-2.66	2.88	2.24	-15.87	13.90	11.91	-7.13	6.71	8.28	47.20
INDIANA	5.97	4.84	-7.05	3.69	3.88	18.51	15.95	13.50	-.36	5.83	8.39	64.54
IOWA	15.37	12.37	-3.49	2.29	2.37	32.84	11.38	11.07	25.85	7.05	9.33	69.59
KANSAS	11.55	8.58	-7.98	1.81	1.96	48.26	11.55	11.71	48.71	7.09	8.52	63.08
KENTUCKY	12.88	9.19	-12.73	6.96	5.75	9.63	9.59	9.45	31.42	6.88	7.91	74.07
LOUISIANA	6.33	3.66	-25.74	2.76	2.53	26.62	5.47	6.11	55.42	5.58	7.49	88.88
MAINE	4.68	3.52	-8.03	20.84	15.17	-7.34	6.89	5.64	45.88	5.54	8.86	79.23
MARYLAND	1.83	1.56	4.44	3.58	2.61	-8.78	6.38	5.81	13.42	6.61	8.86	51.05
MASSACHUSETTS	.65	.53	-8.34	8.41	5.67	-24.92	10.44	11.42	27.81	7.58	10.46	47.89
MICHIGAN	3.36	2.58	-11.75	2.59	2.62	16.42	10.63	9.18	-.41	5.91	8.32	64.16
MINNESOTA	9.88	7.24	-3.89	2.35	2.45	43.54	10.86	8.43	20.76	8.36	11.06	88.52
MISSISSIPPI	14.19	8.88	-24.51	14.84	11.86	6.34	7.38	9.77	74.57	4.63	6.10	88.81
MISSOURI	8.63	6.55	-13.75	5.48	4.49	-3.68	10.16	9.34	8.17	6.31	8.93	78.79
MONTANA	13.76	9.36	-9.72	5.99	5.04	21.86	.45	.67	128.99	9.85	12.81	88.62
NEBRASKA	14.13	11.09	-2.62	1.53	1.49	26.76	5.72	5.72	29.41	8.02	10.34	56.58
NEVADA	1.81	1.09	11.17	.18	.48	444.42	.88	1.53	296.55	37.98	39.81	115.54
NEW HAMPSHIRE	2.88	1.42	-2.24	16.53	10.42	-11.89	12.39	12.34	61.63	7.84	11.33	91.61
NEW JERSEY	.72	.68	-4.88	7.84	5.88	-18.36	14.99	11.96	-8.46	6.58	8.28	58.15
NEW MEXICO	6.89	4.29	2.62	1.78	2.18	98.86	2.96	2.62	59.23	9.63	11.31	88.35
NEW YORK	1.89	1.24	12.11	4.78	4.83	-30.48	8.49	7.42	-11.49	7.89	9.83	14.54
NORTH CAROLINA	9.63	6.12	-22.86	24.68	19.87	2.32	6.35	6.88	92.78	6.82	8.63	105.68
NORTH DAKOTA	22.85	16.88	-10.92	.28	.36	266.88	1.26	2.88	278.87	8.78	10.63	96.58
OHIO	3.29	2.82	-5.41	6.68	5.95	-5.38	14.32	11.76	-8.48	6.29	8.26	49.24
OKLAHOMA	10.36	7.68	-4.78	2.86	3.38	67.56	7.56	7.88	38.42	6.68	8.68	83.75
OREGON	6.64	5.18	9.78	13.31	10.36	14.66	5.17	6.84	61.87	7.85	12.39	184.49
PENNSYLVANIA	2.82	1.78	-5.61	8.48	6.24	-21.19	10.85	9.23	-7.24	5.93	8.88	52.68
RHODE ISLAND	.45	.49	17.75	11.21	7.83	-18.58	7.79	8.38	19.83	7.87	8.54	54.38
SOUTH CAROLINA	7.28	4.65	-18.82	28.42	22.38	3.87	8.39	8.84	43.84	6.82	7.12	148.88
SOUTH DAKOTA	22.26	15.69	-14.81	1.58	2.64	84.19	2.31	3.88	134.29	10.10	11.46	61.17
TENNESSEE	9.24	6.36	-13.85	13.27	10.85	5.28	11.31	9.91	14.86	6.94	7.63	101.88
TEXAS	6.85	4.31	-11.59	3.34	3.24	46.14	9.17	8.16	34.34	6.55	7.93	84.88
UTAH	5.48	3.14	-13.99	2.79	2.85	71.82	5.71	6.56	114.31	8.34	10.62	95.78
VERMONT	6.47	4.99	-6.36	5.52	5.88	12.52	13.89	13.69	21.41	9.85	11.93	49.22
VIRGINIA	5.99	3.47	-21.48	9.52	7.23	3.68	8.84	6.35	5.94	5.59	8.28	93.54
WASHINGTON	5.27	4.55	13.87	5.74	5.88	22.84	13.51	9.51	2.88	7.87	10.38	98.78
WEST VIRGINIA	5.98	3.85	-22.87	3.28	3.31	22.28	5.81	7.78	9.24	6.62	6.46	66.49
WISCONSIN	8.24	6.76	2.38	6.36	5.83	12.64	14.31	12.86	13.38	7.17	9.84	81.91
WYOMING	10.81	6.28	2.99	1.49	1.19	54.82	1.86	.99	78.21	13.26	12.48	84.72

SOURCE: Bureau of Economic Analysis: State Employment Statistics.

Table A-6. Population and Unemployment Rate by States.

	Population[a]			Rate of Unemployment[b]		
	1969	1979	%Δ	1969	1979	%Δ
ALABAMA	3440000.	3869444.	12.48	4.50	7.50	66.67
ALASKA	296000.	403501.	36.32	9.20	9.70	5.43
ARIZONA	1737000.	2638582.	51.90	4.20	6.20	47.62
ARKANSAS	1913000.	2269115.	18.62	5.70	6.90	21.05
CALIFORNIA	19711000.	23255069.	17.98	6.30	6.50	3.17
COLORADO	2166000.	2849181.	31.54	4.20	5.00	19.05
CONNECTICUT	3000000.	3099907.	3.33	3.40	4.70	38.24
DELAWARE	540000.	598830.	10.89	3.80	6.30	65.79
DIST. OF COL.	762000.	655616.	-13.96	3.70	6.80	83.78
FLORIDA	6641000.	9470585.	42.61	3.80	5.10	34.21
GEORGIA	4551000.	5391265.	18.46	3.20	5.90	84.37
HAWAII	743000.	950050.	27.87	3.00	4.70	56.67
IDAHO	707000.	932636.	31.91	5.20	8.00	53.85
ILLINOIS	11039000.	11422782.	3.48	3.70	7.20	94.59
INDIANA	5143000.	5474909.	6.45	4.10	7.80	90.24
IOWA	2805000.	2916803.	3.99	3.50	5.00	42.86
KANSAS	2236000.	2347370.	4.98	3.90	4.00	2.56
KENTUCKY	3198000.	3643655.	13.94	4.60	8.50	84.78
LOUISIANA	3619000.	4139316.	14.38	5.40	6.00	11.11
MAINE	992000.	1124927.	13.40	4.20	7.60	80.95
MARYLAND	3868000.	4223398.	9.19	3.20	5.80	81.25
MASSACHUSETTS	5650000.	5746188.	1.70	3.80	5.00	31.58
MICHIGAN	8781000.	9248814.	5.33	5.90	11.00	86.44
MINNESOTA	3758000.	4038150.	7.45	4.20	5.40	28.57
MISSISSIPPI	2220000.	2507967.	12.97	5.00	7.10	42.00
MISSOURI	4640000.	4889327.	5.37	4.20	6.90	64.29
MONTANA	694000.	789167.	13.71	6.20	8.30	33.87
NEBRASKA	1474000.	1564356.	6.13	2.70	3.70	37.04
NEVADA	480000.	765121.	59.40	5.40	5.90	9.26
NEW HAMPSHIRE	724000.	911893.	25.95	3.50	4.80	37.14
NEW JERSEY	7095000.	7373048.	3.92	3.80	6.70	76.32
NEW MEXICO	1011000.	1280539.	26.66	5.70	7.10	24.56
NEW YORK	18105000.	17633646.	-2.60	4.00	7.10	77.50
NORTH CAROLINA	5031000.	5801563.	15.32	3.40	5.50	61.76
NORTH DAKOTA	621000.	652152.	5.02	4.60	5.30	15.22
OHIO	10563000.	10798562.	2.23	4.00	8.00	100.00
OKLAHOMA	2535000.	2970080.	17.16	4.20	4.10	-2.38
OREGON	2062000.	2578312.	25.04	7.00	8.30	18.57
PENNSYLVANIA	11741000.	11873563.	1.13	3.70	7.40	100.00
RHODE ISLAND	932000.	956643.	2.64	4.00	7.00	75.00
SOUTH CAROLINA	2570000.	3086885.	20.11	3.80	6.10	60.53
SOUTH DAKOTA	668000.	689018.	3.15	3.70	4.90	32.43
TENNESSEE	3897000.	4533297.	16.33	4.40	7.40	68.18
TEXAS	11045000.	13887312.	25.73	3.60	4.00	11.11
UTAH	1047000.	1416094.	35.25	5.20	5.50	5.77
VERMONT	437000.	505711.	15.72	4.10	6.30	53.66
VIRGINIA	4614000.	5324533.	15.40	3.00	5.00	66.67
WASHINGTON	3343000.	4012831.	20.04	7.90	7.40	-6.33
WEST VIRGINIA	1746000.	1939062.	11.06	5.10	8.40	64.71
WISCONSIN	4378000.	4665911.	6.58	4.00	6.60	65.00
WYOMING	329000.	451850.	37.34	4.80	4.10	-14.58

[a] U.S. Bureau of Economic Analysis: Detailed components of personal income.

[b] 1980 Census of Population and Housing: Advanced estimates of Socioeconomic and Housing Characteristics.

Table A-7. Property and Transfer Payments Income by States.

	Property Income as Percent of Total Personal Income		% Change in Total Property Income	Nonincome Dept Transfer Payments as Percent of Total Personal Income		% Change in Nonincome Dept. Transfer Payment	Income Dpt. Transfer Payment as Percent of Total Personal Income		% Change in Income Dept. Transfer Payment
	1969	1979		1969	1979		1969	1979	
ALABAMA	10.50	11.49	211.75	6.38	10.72	379.65	1.37	1.89	293.29
ALASKA	6.49	9.88	452.92	2.95	5.29	551.07	.71	1.03	431.51
ARIZONA	15.28	16.92	299.96	6.46	9.73	443.86	.57	.76	386.36
ARKANSAS	12.34	14.11	257.87	7.86	11.42	354.71	1.38	1.74	293.12
CALIFORNIA	13.97	16.45	219.92	5.94	8.52	289.22	1.58	1.82	212.54
COLORADO	14.60	15.36	249.71	5.37	7.15	342.32	.92	.79	172.34
CONNECTICUT	16.24	16.96	137.20	4.09	7.97	270.49	.69	1.01	236.88
DELAWARE	17.64	15.57	106.86	4.15	8.23	364.93	.58	1.12	349.81
DIST. OF COL.	15.63	17.13	128.87	8.48	15.20	274.44	.97	2.50	435.92
FLORIDA	18.98	21.61	285.33	7.76	12.46	440.14	.56	1.03	516.93
GEORGIA	10.68	12.07	217.73	4.88	8.29	385.57	1.81	1.43	294.67
HAWAII	13.37	15.18	217.96	4.15	7.48	404.64	.73	2.01	677.90
IDAHO	13.17	15.01	259.59	6.58	9.27	344.28	.62	.87	341.52
ILLINOIS	14.32	16.42	171.45	5.18	8.34	280.86	.70	1.25	322.38
INDIANA	11.89	14.12	192.63	5.41	8.49	286.34	.75	.65	543.92
IOWA	16.77	18.66	184.24	6.28	8.98	265.75	.80	.79	151.93
KANSAS	15.29	17.15	210.17	6.34	8.59	274.57	.68	.64	160.09
KENTUCKY	10.88	12.55	225.26	6.85	10.54	333.69	1.22	1.74	301.93
LOUISIANA	12.46	13.44	222.82	5.68	9.26	333.80	1.80	1.75	189.62
MAINE	13.82	14.43	149.59	7.95	12.27	298.48	.86	1.82	446.26
MARYLAND	11.61	12.23	166.58	4.88	8.68	350.16	.64	1.08	323.53
MASSACHUSETTS	15.08	15.24	126.31	6.47	10.29	259.21	1.73	1.90	273.27
MICHIGAN	11.93	12.59	160.28	5.21	8.52	303.31	.68	1.72	520.41
MINNESOTA	13.81	15.21	189.65	5.95	8.37	269.99	.71	.86	217.35
MISSISSIPPI	10.15	11.03	221.27	6.79	10.33	349.46	1.40	2.40	379.55
MISSOURI	14.07	16.04	183.34	6.40	10.26	298.22	.98	1.84	144.89
MONTANA	15.39	18.40	230.03	7.52	10.60	289.07	.54	.72	266.41
NEBRASKA	17.94	18.67	167.14	6.16	8.59	258.95	.45	.61	252.65
NEVADA	12.61	15.23	334.73	4.70	8.24	531.50	.36	.44	334.78
NEW HAMPSHIRE	13.87	14.91	207.43	6.09	8.88	317.52	.48	.74	344.12
NEW JERSEY	13.11	14.62	157.50	5.52	9.21	285.42	.75	1.28	293.57
NEW MEXICO	12.65	14.19	259.96	5.93	9.26	401.10	1.27	1.57	296.94
NEW YORK	16.54	18.28	124.93	6.30	10.45	237.82	1.50	2.08	182.64
NORTH CAROLINA	10.59	12.02	210.94	4.99	8.63	373.54	.72	1.40	434.44
NORTH DAKOTA	20.03	20.42	175.71	6.73	9.44	279.02	.67	.60	143.39
OHIO	12.74	13.96	156.39	5.68	9.61	295.95	.59	1.12	341.51
OKLAHOMA	14.22	16.05	248.99	6.83	9.33	322.59	1.63	1.19	125.86
OREGON	13.68	15.35	245.39	7.05	9.85	329.96	.66	1.20	456.35
PENNSYLVANIA	13.05	13.97	150.78	4.58	11.05	321.78	.94	1.67	344.46
RHODE ISLAND	13.79	14.90	148.18	7.33	11.08	272.84	.96	1.52	265.79
SOUTH CAROLINA	9.93	11.38	232.48	5.20	8.84	385.30	.59	1.47	695.48
SOUTH DAKOTA	16.33	19.14	208.73	7.14	9.00	261.88	.72	.86	211.67
TENNESSEE	11.05	12.49	220.45	6.33	9.87	357.95	.87	1.55	407.58
TEXAS	13.94	15.61	265.46	5.85	8.87	344.82	.67	.80	289.26
UTAH	12.17	13.46	252.84	6.90	8.68	367.16	.77	.74	289.26
VERMONT	13.89	16.54	197.89	6.76	10.43	286.64	1.94	1.62	288.72
VIRGINIA	11.95	12.37	215.68	5.06	8.74	386.73	.40	.90	534.65
WASHINGTON	13.84	14.59	217.88	6.12	8.89	312.99	.83	1.03	252.11
WEST VIRGINIA	10.83	11.87	193.38	9.02	14.78	378.62	1.26	1.49	240.24
WISCONSIN	13.50	14.32	175.24	6.14	9.31	293.52	.57	1.27	477.85
WYOMING	16.31	15.72	273.43	5.93	6.34	314.70	.46	.35	193.74

SOURCE: U.S. Bureau of Economic Analysis: Detailed components of personal income.

Table A-8. Relative Importance of Transfer Payments, by Component, to Personal Income, United States, 1969 and 1979.*

	Dollars (millions)	Percent of Total
	1969	1969
Total personal income	751,425	100.00
Transfer payments	85,760	11.41
Federal Government	50,330	6.70
Benefits from social insurance	40,049	5.33
OASDI benefits	26,381	3.51
State unemployment insurance benefits	2,302	.31
Unemployment compensation for Federal employees	67	.01
Railroad benefits	1,636	.22
Government life insurance benefits	744	.10
Federal civilian pensions	2,599	.34
Medicare benefits	4,582	.61
Veterans' benefits	8,230	1.10
Veterans' pensions and compensation	5,060	.67
Unemployment insurance benefits for veterans	86	.01
Veterans' readjustment benefits	705	.09
Other 1/	2,387	.32
Black Lung benefits (1970)	-	-
Educational assistance 2/	320	.04
Public assistance	305	.04
Food stamps	237	.03
Supplemental Security Income (1974)	-	-
Basic benefits	-	-
"Hold-harmless"	-	-
Other 3/	68	.01
All other Federal Government transfers 4/	1,426	.19
State and local government*	11,593	1.54
Benefits from social insurance	3,771	.50
State and local government retirement benefits	3,415	.45
Cash sickness benefits	356	.05
Public assistance	6,086	.81
Direct relief	6,003	.80
Aid to families with Dependent Children	5/	5/
General assistance	5/	5/
Supplemental Security Income: State Supplementation (1974)	-	-
State and local Medicare benefits	-	-
All other State and local transfer payments 6/	82	.01
Business 7/	1,737	.19
	3,837	.37

1979

	Dollars (millions)	Percent of Total
Total personal income*	1,597,200	100.00
Transfer payments	208,000	13.04
Government payments to individuals (current)	199,000	12.47
Retirement, disability, and health insurance	159,000	9.96
OASDI	119,000	7.45
Federal employees' retirement	20,000	1.25
State and local government employees' retirement	10,000	.63
Railroad retirement and disability	3,000	.19
Medicare expenditures	7,000	.44
Workmen's compensation benefits (Federal and State administered funds)	4,000	.25
Other government disability insurance and retirement plans*	2,000	.13
Unemployment insurance payments	10,000	.63
State unemployment insurance payments	8,000	.50
Unemployment insurance for Federal civilian employees (UCFE)	1,000	.06
Unemployment insurance for ex-servicemen	1,000	.06
Other unemployment insurance benefits*	1,000	.06
Educational and training assistance payments*	3,000	.19
Veterans' readjustment payments	1,000	.06
Supplemental security income payments*	10,000	.63
Payments to families with dependent children (AFDC)	7,000	.44
General assistance payments	1,000	.06
Food stamp payments	5,000	.31
Other government payments*	4,000	.25
Other payments to individuals*	1,000	.06
Government payments to retired workers, veterans, and their dependents	30,000	1.88
Veterans' pensions and military retirement payments to Federal Government	20,000	1.25
Educational payments to veterans, dependents, and survivors*	2,000	.13
Federal Government GSL education payments	1,000	.06
Other government payments to veterans, dependents, and survivors*	7,000	.44
Payments to nonprofit institutions	3,000	.19
Federal Government	1,000	.06
State and local governments	1,000	.06
Business	1,000	.06
Other business transfer payments	5,000	.31

Footnotes

1969

* Detail may not add to higher level total because of rounding.

1/ Includes military retirement, payments to paraplegics, payments to war orphans, payments to children of disabled veterans, payments for automobile and other conveyances for disabled veterans, and educational assistance to wives and widows of veterans.

2/ Includes Federal fellowship payments, Area Redevelopment Act benefits, Manpower Development and Training Act benefits, Job Corps benefits, interest subsidy payments on higher education loans, Education Exchange (1970), and Basic Education Opportunity Grants (1973).

3/ Includes Bureau of Indian Affairs' payments and refugee assistance payments.

4/ Includes: Panama Canal Construction Annuity Act payments, Alaska Native Claims Settlement Act benefits (1972), Federal payments to nonprofit institutions, Federal auto depreciation payments, and trade adjustment assistance.

5/ Prior to 1972, estimates in combination with other types of public assistance to derive a single estimate of "Direct relief." (See text, p.35.)

6/ Includes veterans' aid, veterans' bonuses, payments to nonprofit institutions, public foster home care payments, and State and local government auto depreciation payments.

7/ Includes consumer bad debts, corporate gifts to nonprofit institutions, cash prizes, unrecovered thefts of cash and capital assets, and personal injury payments from business to other than employees.

1979

* Detail may not add to higher level totals because of rounding.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Local Area Personal Income.

APPENDIX B

TABLES OF RESULTS (Poverty Equations)

Table B-1. Relationship between Economic Structure and Poverty Incidence.

	Independent Variables									
	%ΔEPS	%ΔESS	%ΔETS	%ΔNIDTP	%ΔIDTP	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst
% Δ Pov. (All Pers.)	-.046 (-.62)	-.185 (-1.84)	.190 (.94)	-.171 (-3.28)	-.002 (-.12)	.504 (1.72)	.168 (1.82)	26.23 (2.01)	.295	3.94
% Δ Pov. (2 Par.Fam.)	-.085 (-.82)	-.114 (-.82)	.436 (1.55)	-.038 (-.53)	.019 (.74)	-.266 (-.61)	.088 (.69)	-32.23 (-1.78)	.014	1.10
% Δ Pov. (Sing.Fem.H.H.)	.016 (.21)	-.131 (-1.30)	.157 (.78)	-.128 (-2.48)	.009 (.49)	-.103 (-.33)	.063 (.68)	26.26 (2.02)	.358	4.90
% Δ Pov. (Sin.Fam.HH w/Dept.Child)	.016 (.26)	-.177 (-2.18)	.178 (1.09)	-.082 (-1.96)	-.001 (-.09)	.093 (.37)	.109 (1.47)	13.48 (1.28)	.313	4.25
% Δ Pov. (Eld. H.H.)	-.084 (-1.29)	.145 (1.66)	-.059 (-.34)	.118 (2.60)	.029 (1.78)	-.705 (-2.58)	-.078 (-.97)	-88.32 (-7.78)	.231	3.15
% Δ Pov. (NonEld. H.H.)	.010 (.09)	-.373 (-2.63)	.596 (2.09)	-.198 (-2.69)	-.003 (-.13)	.163 (.37)	.210 (1.62)	38.26 (2.08)	.347	4.79
% Δ Pov. (Eld.Unr.Ind.)	-.140 (-3.11)	.123 (2.04)	-.370 (-3.05)	.046 (1.49)	.003 (.26)	.081 (.43)	-.023 (-.42)	-42.40 (-5.44)	.328	4.58
% Δ Pov. (NonEld.Unr.Ind.)	.021 (.29)	-.176 (-1.85)	-.199 (-1.04)	-.019 (-.40)	.002 (.10)	.641 (2.16)	.036 (.47)	-14.95 (-1.21)	.102	1.81

Values in parentheses are the t-statistic.

Table B-2. Relationship between Economic Structure and Poverty Incidence.

	Independent Variables										
	%ΔEGS	%ΔEAS	%ΔELWLI	%ΔETE	%ΔNIDTP	%ΔIDTP	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst
% Δ Pov. (All Pers.)	.049 (.24)	.337 (2.79)	.036 (1.35)	-.218 (-4.00)	-.141 (-3.28)	.030 (1.92)	.394 (1.43)	.132 (1.84)	30.42 (2.83)	.508	7.32
% Δ Pov. (2 P.Fam.)	-.303 (-.90)	.157 (.79)	.020 (.46)	-.150 (-1.67)	-.008 (-.12)	.049 (1.89)	.163 (.35)	.015 (.13)	-20.60 (-1.16)	.011	1.06
% Δ Pov. (F.S. H.H.)	-.072 (-.30)	.216 (1.53)	.007 (.23)	-.117 (-1.84)	-.106 (-2.11)	.032 (1.73)	-.145 (-.45)	.036 (.43)	29.71 (2.36)	.046	5.21
% Δ Pov. (F.S. H.H. w/Dept.Child)	.018 (.09)	.217 (1.87)	.014 (.55)	-.094 (-1.81)	-.061 (-1.47)	.022 (1.44)	-.092 (-.34)	.100 (1.44)	14.36 (1.39)	.342	4.19
% Δ Pov. (Eld.H.H.)	-.130 (-.61)	-.177 (-1.40)	-.010 (-.36)	.098 (1.73)	.102 (2.28)	.014 (.88)	.448 (-1.55)	-.072 (-.96)	-88.57 (-7.89)	.174	2.29
% Δ Pov. (NE. H.H.)	.061 (.20)	.727 (4.05)	.013 (.34)	-.267 (-3.29)	-.135 (-2.11)	.044 (1.85)	.160 (.39)	.153 (1.43)	47.13 (2.95)	.496	7.04
% Δ Pov. (Eld.Unr.Ind.)	.012 (.08)	-.321 (-3.70)	.004 (.24)	.031 (.80)	.021 (.68)	-.009 (-.78)	-.075 (-.38)	.021 (.24)	-49.70 (-6.43)	.157	2.13
% Δ Pov. (N.E.Unr. Individu.)	.231 (1.22)	.433 (3.90)	-.006 (-.25)	-.205 (-4.09)	-.011 (-.29)	.017 (1.20)	.246 (.97)	.072 (1.08)	-17,92 (-1.81)	.393	4.98

Table B-3. Relationship between Economic Structure and Poverty Incidence.

	Independent Variables										
	%ΔEGS	%ΔEAS	%ΔEHT	%ΔETC	%ΔNIDTP	%ΔIDTP	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst
% Δ Pov. (All Pers.)	.061 (.29)	.356 (2.91)	.295 (.95)	-.230 (-4.06)	-.139 (-3.19)	.029 (1.83)	.437 (1.58)	.136 (1.85)	29.66 (2.73)	.497	7.05
% Δ Pov. (2 P.Fam.)	-.290 (-.85)	.169 (.85)	.023 (.46)	-.160 (-1.72)	-.008 (-.12)	.050 (1.89)	.177 (.39)	.020 (.17)	-21.02 (-1.18)	.011	1.01
% Δ Pov. (F.S. H.H.)	-.077 (-.85)	.217 (1.54)	-.002 (-.05)	-.116 (-1.77)	-.104 (-2.07)	.031 (1.66)	-.126 (-.39)	.033 (.39)	29.56 (2.35)	.406	5.19
% Δ Pov. F.S.H.H. w/Dept.Child)	.028 (.14)	.226 (1.94)	.017 (.58)	-.102 (-1.89)	-.061 (-1.47)	.224 (1.45)	-.082 (-.31)	.104 (1.48)	14.07 (1.36)	.343	4.20
% Δ Pov. (Eld.H.H.)	-.126 (-.58	-.180 (-1.42)	-.00008 (-.002)	.098 (1.67)	.100 (2.22)	.016 (.96)	-.470 (-1.65)	-.069 (-.91)	-88.35 (-1.87)	.171	2.27
% Δ Pov. (NE.H.H.)	.083 (.67)	.739 (4.14)	.030 (.67)	-.280 (-3.37)	-.138 (-2.16)	.046 (1.94)	.150 (.37)	.163 (1.51)	46.85 (2.94)	.500	7.14
% Δ Pov. (Eld.Unr.Ind.)	.009 (.06)	-.320 (-3.69)	-.002 (-.08	.032 (.80)	.022 (.72)	-.010 (-.86)	-.62 (-.31)	.010 (.20)	-49.80 (-6.45)	.155	2.12
% Δ Pov. (NE.Unr.Ind.)	.220 (1.16)	.428 (3.86)	-.014 (-.52)	-.198 (-3.86)	-.010 (-.26)	.016 (1.13)	.252 (1.01)	.067 (1.00)	-17.79 (-1.80)	.396	5.02

APPENDIX C

TABLES OF RESULTS (Inequality Equations)

Table C-1. Relationship between Economic Structure and Income Distribution.

	Independent Variables										
	%ΔEPS	%ΔESS	%ΔETS	%ΔNIDTP	%ΔIDTP	%ΔPI	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst
% Δ Income Share of Bottom Quantile	.016 (.52)	.075 (1.81)	-.524 (-5.66)	-.018 (.76)	.006 (.30)	.103 (3.39)	.191 (1.48)	.034 (-.86)	-36.74 (-6.64)	.399	5.15
% Δ Income Share of Middle 60%	.041 (.39)	-.164 (-1.17)	1.12 (3.58)	-.147 (-1.82)	-.008 (-.32)	-.288 (-2.80)	.608 (1.39)	.208 (1.36)	71.07 (3.79)	.239	3.59
% Δ Income Share of Top 20%	-.054 (-.78)	.112 (1.20)	-.707 (-3.36)	.085 (1.58)	.007 (.38)	.189 (2.75)	-.33 (-1.15)	-.089 (-1.00)	-44.89 (3.58)	.267	3.28
% Δ Income Share of Top 5%	-.002 (-.05)	.024 (.46)	-.094 (-.82)	.007 (.74)	.040 (1.07)	.040 (1.07)	.186 (1.16)	.013 (.26)	-21.72 (-3.16)	0	.61

Table C-2. Relationship between Economic Structure and Income Inequality

	%ΔEGS	%ΔEAS	%ΔELWLI	%ΔETC	%ΔN1DTP	%ΔIDTP	%ΔPI	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst.
% Δ Income Share of Bottom 20%	.131 (1.10)	-.191 (-2.64)	-.001 (-.08)	-.017 (.42)	.016 (.52)	-.005 (-.56)	.043 (1.00)	-.196 (-1.17)	-.011 (-.25)	-42.16 (-6.34)	.139	1.88
% Δ Income Share of Middle 60%	.011 (.031)	.665 (3.03)	.003 (.08)	-.056 (-.44)	-.126 (-1.38)	.011 (.39)	-.165 (-1.28)	.124 (2.46)	.146 (1.08)	81.75 (4.07)	.235	2.67
% Δ Income Share of Top 20%	.175 (.74)	-.432 (-3.01)	.003 (.89)	.032 (.39)	.079 (1.33)	-.008 (-.42)	.123 (1.45)	-.92 (2.78)	-.059 (-.67)	-55.54 (-4.22)	.240	2.72
% Δ Income Share of Top 5%	-.037 (-.29)	-.075 (-.96)	.009 (.57)	.008 (.19)	-.058 (-1.81)	.007 (.70)	.032 (.71)	.145 (.81)	.020 (.43)	-21.91 (-3.07)	0	.52

Table C-3. Relationship between Economic Structure and Income Inequality.

	%ΔEGS	%ΔEAS	%ΔEHT	%ΔETC	%ΔAN1DTP	%ΔIDTP	%ΔP1	%ΔPOP	%ΔUR	Constant	$\bar{R}^2$	Fst.
% Δ Income Share of Bottom 20%	.108 (.92)	-.198 (-2.83)	-.026 (-1.51)	.028 (.69)	.020 (.71)	-.008 (-.91)	.044 (1.07)	-.165 (-1.03)	-.022 (-.50)	-42.19 (-6.52)	.185	2.24
% Δ Income Share of Middle 60%	.102 (.03)	.667 (3.06)	.002 (.04)	-.055 (.44)	-.125 (-1.39)	.011 (.39)	-.167 (-1.32)	1.25 (2.54)	.145 (1.07)	81.77 (4.07)	.235	2.67
% Δ Income Share of Top 20%	.198 (.03)	-.424 (-2.99)	.025 (.74)	.021 (.26)	.076 (1.29)	-.005 (-.27)	.121 (1.46)	-.949 (2.95)	-.497 (-.56)	-55.50 (-4.25)	.251	2.82
% Δ Income Share of Top 5%	-.037 (-.28)	-.069 (-.89)	-.005 (-.25)	.009 (.21)	-.055 (-1.73)	.006 (.61)	.027 (.60)	.166 (.94)	.018 (.38)	-21.85 (-3.05)	0	.49

APPENDIX D

SIMPLE CORRELATION MATRIX

Table D-1. Simple Correlation Matrix

	%ΔEPS	%ΔESS	%ΔETS	%ΔEGS	%ΔEAS	%ΔELWLI	%ΔEHT	%ΔETC	%ΔNIDTP	%ΔIDTP	%ΔPOP	%ΔUR	%ΔPI
% Change in Employment in Primary Sector	1.00	.279	.292	-.223	.670	.127	.086	.067	.059	-.202	.256	-.252	.203
% Change in Employment in Secondary Sector		1.00	.756	.306	.113	.127	.808	.493	.468	-.206	.720	-.681	.694
% Change in Employment in Tertiary Sector			1.00	.454	.272	.553	.647	.671	.712	.133	.856	-.507	.875
% Change of Total Employment in Government Sector				1.00	-.197	.240	.145	.326	.502	.392	.676	-.139	.443
% of Total Employment in Agricultural Sectors					1.00	.178	.122	.129	.020	-.150	.106	-.203	.217
% Change in Employment in Low Wage Labor Intensive Manufacturing Establishments						1.00	.770	.320	.430	-.135	.553	-.442	.469
% Change in Employment in High Tech Industries							1.00	.454	.384	-.191	.492	-.528	.555
% Change in Employment in Tourism & Convention Industries								1.00	.506	.219	.545	-.587	.758
% Change in Non-income Dependent Transfer Payments									1.00	.417	.779	-.161	.767
% Change in Income Dependent Transfer Payments										1.00	.221	.388	.142
% Change in Population											1.00	.472	.813
% Change in Unemployment Rate												1.00	.538
% Change in Poverty Income													1.00

APPENDIX E

MULTIPLE REGRESSION ANALYSIS

APPENDIX E

MULTIPLE REGRESSION ANALYSIS

Broadly speaking, and to quote Damodar Gujarati (1978):

> "Regression analysis is concerned with the study of the dependence one variable [the dependent variable], on one or more other variables [the explanatory variables], with a view to estimating and/or predicting the [population] mean of average value of the former in terms of the known or fixed [in repeated sampling] values of the later."

Running a regression analysis consists of (1) postulating a functional relationship between two sets of variables[a/] and (2) estimating the strength of the relationship. The postulated relationship can be single or multiple equations of the form:

$$Y = X\beta + \mu \qquad \text{(E-1)}$$

where

Y = nx1 matrix of dependent variables;

X = nxk matrix of independent variables;

β = kx1 unknown parameters to be estimated; and

μ = nx1 unknown random error terms.

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a/ A necessary condition for selecting regression technique as a method of analysis is to have a reasonable ground to postulate a dependent relationship between the variables. This is in contrast with correlation analysis for which no such relationship needs to be postulated. In fact, the correlation coefficient between X_1 and X_2 ($r_{1,2}$) is equal to that between X_2 and X_1 ($r_{2,1}$). That is not the case, however, for regression coefficients ($b_{1,2} \neq b_{2,1}$).

The addition of a random term to the equation implies that the specified dependence between the two sets of variables is not a deterministic relationship. It (the random term)[b/] reflects our inability to fully account for the variation in the dependent variables. Generally, there are a number of specific assumptions about the nature of the random term, and the choice of method of estimation to be applied in the estimation stage of the analysis depends on those assumptions. The ordinary least square (OLS) method used in this study is based on the following assumptions:

1) the error term has a normal distribution with zero expectation ($Eu = 0$), constant variance and zero covariance ($Euu' = \sigma^2 I$);

2) the error term and the independent variables are not correlated ($Eu'X = 0$); and

3) the explanatory variables are uncorrelated, such that the matrix of X is of full rank ($r(X) = k$). They are nonrandom and assumed constant in repeated samples.

When all of these conditions are satisfied, the OLS method estimates the line best fitted to the sample data by minimizing the sum of squared errors (SSE) or unexplained variation (μ_j^2) as shown in Figure E-1.

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b/ The random term includes measurement error, and errors arising from model misspecification.

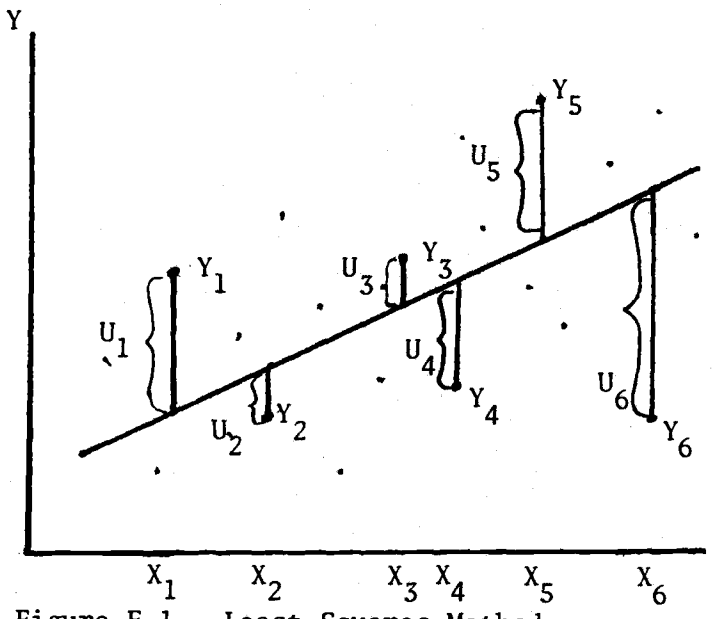

Figure E-1. Least Squares Method.

The slope of the curve (y) is an unbiased ($E\hat{\beta}=\beta$) estimate of the coefficient (β) given by the formula:

$$\beta = (X'X)^{-1}X'Y \qquad \text{(E-2)}$$

Where $(X'X)^{-1}$ is the variance covariance matrix. When any of the previous assumptions is violated, as in the case with most economic phenomena, the OLS method is normally no longer appropriate for estimating the coefficients. However, there are a number of corrective methods discussed in most econometrics textbooks[c/] that can be used to still ensure that the OLS method yields the best estimates.

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c/ See Johnston (1973), Koutsoyiannis (1981), for example.