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ABSTRACT

SOME DIMENSIONS OF RURAL POVERTY IN THE LOWER PENINSULA OF MICHIGAN

By

Ali Abdul Razaque

This study is an exploratory effort to learn some of the dimensions of rural poverty in the Lower Peninsula of Michigan. The main emphasis is to expose some of the aspects of this problem which may help to provide information to those who want to consider this problem in detail. The major considerations are: (a) to measure the differences, if any, in material and services between the areas with lower and higher percentages of poor families; (b) to study the relationship of socio-economic characteristics with the percentage of poor families in the rural area; and (c) to review some of the current and proposed antipoverty policies.

The definition of poverty is a controversial topic but if it is defined in terms of money, then the money a family needs to spend during a given year can be compared to the money actually available. Therefore, the total money income line will be considered (\$3,000 established

by the Social Security Administration) as a reference point in this study because it is the only one for which time series by relevant demographic characteristics are available.

To examine the difference in services and material between the means of two groups of counties, the t test was applied. Out of forty-two variables (socio-economic characteristics), only twenty are significantly different.

The coefficient of localization analysis shows that poverty and some factors of it are evenly distributed as the total population throughout the area under study.

Multiple regression analysis shows eleven independent variables which are significantly associated with the dependent variable (per cent of poor families) at the 5 per cent level of significance. These significant variables explain 92 per cent of the variation in percentage of poor families in fifty-one rural counties. Total population, population sixty-five years and older, general county revenue, and social welfare assistance are positively related whereas medical doctors, total employment, and employment in different industries as mining, construction, manufacturing, utilities, and other services are negatively associated with the dependent variable (percentage of poor families).

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LOWER PENINSULA OF MICHIGAN

By

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CHAPTER I

INTRODUCTION

There has been much said, heard and written in the recent past about the dilemma of poverty but still, relatively, it is difficult to understand the complexity of the problem. Most of the past efforts have been directed toward understanding this problem both nationwide or regional-wide. The nature and the extent of this problem is not a generalized concept because the extent and the characteristics of poverty may differ from time to time and place to place. The recent studies of some rural sociologists and agricultural economists have further revealed that the problem of poverty in cities is actually rooted in the rural areas. Therefore, this study is an attempt to deal with the problem primarily in the rural area and relatively on a smaller scale than the nation as a whole. The United States is a composition of great varieties of socio-economic, cultural and geographic characteristics; therefore, there is a need for this study to expose the local conditions of poverty.

Purpose of the Study

In the last couple of decades numerous studies have been done which extensively document poverty conditions in Appalachia, the Deep South, the Upper Great Lakes cutover region, and among the American Indians. But as yet, not much consideration has been given to other rural areas which have been also left behind and are not the extreme cases like Appalachia and the Deep South. This study is an exploratory effort which may help to provide information about some dimensions of poverty to those who want to consider this problem in detail in such areas. The following three purposes will be given the main consideration for exploring some of the poverty dimensions for future research in this field.

- A. It is commonly assumed that poor have less of everything except poverty itself. This supposition may no longer be true. Therefore, the first purpose of this study is to measure the difference in material and services between the areas with lower and higher percentage of poor families.
- B. The second purpose is to study the relationship of socio-economic characteristics with the income level of the rural population.
- C. The third purpose of this study is to review some of the enforced and proposed anti-poverty

policies and programs in the light of the relationship between socio-economic characteristics and the income level of the rural population.

Definition and Measurement of Poverty

The definition of poverty is a controversial topic and many people do not agree on any one concept. It is also not possible for a complete agreement on a dictionary definition because it refers vaguely to "insufficiency of means" which cannot be translated into money units. If poverty is defined in terms of an amount of money, then it can be compared with the money available to a certain family with the money it needs to spend during a given year. By this way it necessitates, while counting the poor, complete information regarding assets, annual earned and unearned incomes, and cash-expenditure needs of the family. Only earned and unearned cash data is available in a dollar term, therefore, the measurement of poverty is likely to be based on cash-income criterion. There is disagreement on this criteria but it is a more acceptable tool to measure the problem in the absence of any other unanimously accepted approach. The general disagreements which are associated with this criteria are incomes in money and kind, income and assets, size of family, location of family, and age and health. These associated problems should be given a careful consideration

while measuring poverty. The scope of the poverty problem, the time and effort required to reach the goal of eliminating it and, to a lesser extent, the remedies that should be emphasized all depend upon the original definition of the term. Therefore, the definition of poverty deserves careful consideration. Poverty is a discrepancy between needs and resources. In the opinion of the National Advisory Commission on Rural Poverty:

. . . poverty is partly inadequate income, but it goes much deeper than that. Poverty affects the mind and the spirit as well--income is important in escaping from poverty, though not the whole answer to it. Education and jobs are also essentials and they can lead to higher income. Income is obviously needed to buy the food, clothing, housing, schooling and health services required by any one in this money economy if he is to escape from poverty--if he is to preserve some self-esteem.

But poverty is much more:

- A. It is lack of access to respected positions in society, and lack of power to do anything about it.
- B. It is insecurity and unstable homes.
- C. It is a wretched existence that tends to perpetuate itself from one generation to the next.¹

The poverty line of \$3,000 established by the Social Security Administration, is the minimum level of income needed to provide the kind of living which is considered a basic right in the United States and this level of living is changeable as socio-economic development occurs. The poverty index of the Social Security Administration has critics also. Some critics point out

¹U.S., President's National Advisory Commission on Rural Poverty, The People Left Behind (Washington, D.C.: Government Printing Office, 1967), p. 7. Hereinafter referred to as President's Commission on Rural Poverty, People Left Behind.

that the concept refers only to the current income and ignores assets. The main emphasis in this approach is food whereas the housing problem is more critical particularly for negro families. Another argument is that this index has no adjustments for income in kind except for farmers and further adjustment in year-to-year change in income. Some people do not like it because it ignores the other satisfactions of life more than money. All these disagreements are important considerations but to ignore assets is a serious defect and a simple justification for this is non-availability of asset data.

Dorothy Projector and Gertrude Weiss² show that there are very few low income households with any significant assets and similar view has been presented by Arshansky.³ The former writer also thinks that some forms of assets are not negotiable by people who own them. He further concludes that:

All of these criticisms have merit, but let us start from bottom to top. If money alone will not solve poverty, without it, nothing else will work either. It is still a necessary if not sufficient condition. It should also be remembered that in a money economy, housing, food and medical care

²Dorothy S. Projector and Gertrude S. Weiss, Survey of Financial Characteristics of Consumers (Washington: Federal Reserve System, 1966).

³Millie Arshansky, "Who's Who Among the Poor," Social Security Bulletin, July, 1965, p. 55.

received free are not substitutes for things for which people must have care.⁴

Therefore, the total money income line will be considered as a reference point in this study because it is the only one for which time series by relevant demographic characteristics are available. However, other factors like age, location, education, family size, income variability and such other socio-economic characteristics, will be given due consideration where appropriate.

Methods of Study

When we look at Adam Smith's study about the wealth of nations and compare it with the present standards of life, it can easily be said that almost all nations were poor but so far as disparity between them is concerned, it was relatively small. Since then, the different cultural and technological revolutions helped the world to develop a great deal but very unevenly. Some nations have become wealthy whereas others continue to be poor and the disparity has increased not only between the nations but more severely within the nations. This disease is not only directed towards the relationship with human resources but also on other kinds of resources. This world-wide problem is getting worse day by day. In

⁴Ibid.

the decade of the 1960's, extensive inquiry about poverty has been the main concern of some of the economists.

The most affluent society of the world (the United States) is an important example of disparity within the nation. Many efforts and considerable resources have been directed toward escaping from poverty in the last couple of decades. Most of the socio-economic oriented scientists are busy fighting against this national ill from different angles at national, regional, and state levels.

This research work is an effort to explore some of the dimensions of poverty in the State of Michigan. It has been generally accepted that urban poverty is actually rooted in rural areas.⁵ Therefore, the author is basically interested in exploring some of the dimensions of poverty in rural counties of the lower peninsula of this highly industrialized state. In the lower peninsula of this state, there are sixty-eight counties of which seventeen are considered urban counties. These counties are known as standard metropolitan statistical areas (SMSA) and the rest of the fifty-one counties are classified as rural counties. These fifty-one rural counties are under study in this report. The data and

⁵President's Commission on Rural Poverty, People Left Behind, p. ix.

other information is from secondary sources such as of the 1960 census.

The first step in this research work is to know the statistical difference, if any, between the two groups of counties which have low and high percentages of poor families. For this analysis, all fifty-one rural counties are ranked according to percentage of poor families in each county. To reduce the effect of extreme ends, five counties from both ends are discarded because they awkwardly differ from the rest of the counties. The next two groups of counties, No. 6-15 from the upper half of the counties and No. 35-46 from the lower half, are selected for this analysis. To calculate the statistical difference, there are forty-two socio-economic variables which are included. A t. test as a statistical approach has been run on CDC3600 computer to test the means.

The next main approach is to know the relationship between poverty and the different socio-economic characteristics of the poor. For this analysis, all fifty-one rural counties are included. The percentage of poor families is considered as dependent variable and thirty other socio-economic characteristics as independent variables. For this analysis figures are calculated as percentages of the total population of the respective counties. First of all, the data were run on CDC3600

computer to compute simple correlation and regression analysis.⁶ After this, the data were run on the delete routine at 5 per cent level of significance to determine the most significant variables related with the percentage of poor families (dependent variable).⁷ The step-wise, add process is used to rank all of the independent variables according to their respective relationship with the percentage of poor families which is considered as the dependent variable.⁸

To know the distribution of poverty against the total population and employment opportunities in different industries against the total employment, the coefficient of localization approach is used.⁹

⁶Use was made of a standard program published by the Michigan State University Agricultural Experiment Station. Agricultural Experiment Station, STAT Series Description No. 7: Calculation of Least Squares (Regression) Problems on the L. S. Routine (East Lansing: Michigan State University Computer Laboratory, 1969).

⁷Ibid.

⁸Ibid.

⁹The coefficient of localization is a measure of regional concentration of a given industry compared to some total system of regions (e.g., national) magnitude. It may be based on various economic and social indicators such as population, manufacturing employment, or income. This coefficient is essentially a comparison of the percentage distribution by region of the economic or social indicator in the given industry with the regional percentage distribution of the base magnitude.

The third step is to evaluate briefly some of the present anti-poverty policies and their explanation in the light of the results of the above analyses.

Limitations of the Study

As it was decided that this study would be kept small and in the nature of a preliminary investigation, therefore, the state of Michigan is a prime socio-economic unit to conduct this kind of study. The state of Michigan is subdivided into three economic strata: urban counties (SMSA's), the balance of the counties in the Lower Peninsula, and all the counties of the Upper Peninsula. As this study is concerned only with rural poverty, all urban counties are not within the limits of this study. The Upper Peninsula is also not included because this area has been considered in very many research studies. Therefore, this work is limited to the rural counties in the Lower Peninsula.

The second important limitation of this study was to use only secondary data. Therefore, most of the information used in this work is from the 1960 census of population and some estimates made by different departments in state government.

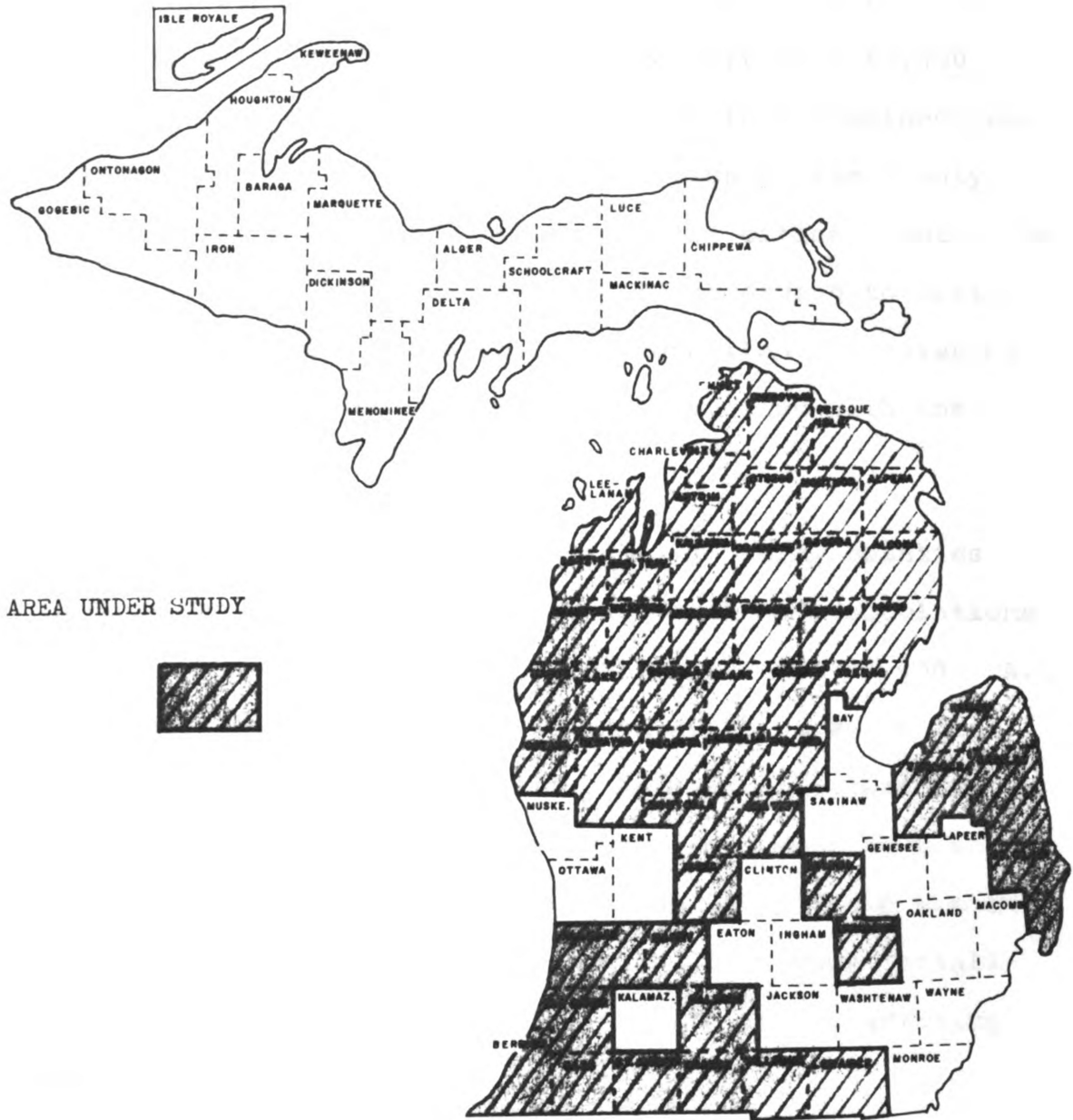


Figure 1.--Area under study.

Definition of TermsStandard Metropolitan Statistical Area (SMSA).¹⁰

This term is defined as a county or a group of contiguous counties which contains at least one city of a 50,000 population or more; or "twin cities" with a combined population of at least 50,000. In addition to the county, or counties, containing such a city, or cities, contiguous counties are included in an SMSA, if according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city.

Rural and Isolated Counties.¹¹ Rural counties

in Michigan are all those counties which have populations of less than 50,000 and no cities larger than 25,000. All isolated rural counties are defined as those which fit the criteria for rural counties, have no more than one-third of the county within a forty-mile commuting distance of any city larger than 25,000 and do not contain within their boundaries any federal government defense installations and/or state supported four-year degree granting institutions.

¹⁰Synopsis of information presented in U.S., Department of Commerce, Bureau of the Census, U.S. Census of Population, 1960 (Washington, D.C.: Government Printing Office, 1960), pp. vi-vii.

¹¹Ibid.

Aggregated Income of the Population.¹² Income is the sum of money received in one year (less losses) from the following sources: wages or salary, net income (or less loss) from self-employment net income (or loss) from rent or receipts from roomers or boarders; royalties; interest, dividends and periodic income from estates and trust funds, social security benefits; pensions, veteran's payments, Armed Forces allotments, insurance, and public assistance or other governmental payments who are not members of the household; alimony, and periodic receipts from insurance policies or annuities. The figures represent the amount of income received before deductions from personal income taxes, social security, bond purchases, union dues, etc.

Families, 1960.¹³ A family consists of two or more persons living in the same household and related to one another by blood, marriage, or adoption; all persons living in one household and related to one another are regarded as one family. Not all households contain families, because a household may be composed of a group of unrelated persons or one per family--for example, two

¹²Ibid.

¹³Ibid.

family groups in the same household with no member of one family related to any member of the other family.

Income of Families, 1960.¹⁴ Families' incomes represent, as a single amount, the combined incomes of the head of the family and all other members fourteen years and over. Although the time period covered by the income statistics is the calendar year 1959, the income figures for families refer to April, 1960. Thus, on the one hand, family income does not include amounts received by persons who were members of the family during all or part of the calendar year 1959, if these persons no longer reside with the family in April, 1960. On the other hand, family income includes amounts reported by related persons who did not reside with the family during 1959 but who were members of the family in April, 1960.

Household.¹⁵ The definition for "household" includes all persons occupying a house, an apartment, a group of rooms, or a single room regarded as a dwelling unit. Therefore, a single person, family, or unrelated person living in a dwelling unit are all taken into account by the term household. It would be noted that

¹⁴Ibid.

¹⁵Ibid.

persons living in group quarters (such as an institution) are not enumerated in the household definition.

Un-related Individuals.¹⁶ The term "unrelated individuals" is used to "refer to persons (other than inmates of institutions) who are not living with any relatives."

Public Welfare Assistance.¹⁷ Public welfare expenditures cover governmental activities related to institutional and non-institutional assistance to the needy. They include cash payments, aid to dependent children, aid to the blind, and aid to the disabled; vendor payments made to private purveyors for medical care, burials, and other services provided under welfare programs; welfare institutions; and any other inter-governmental or other direct expenditures for welfare purposes.

Farm-Nonfarm Residence.¹⁸ The rural population is subdivided into the rural-farm population, which comprises all rural residents living on farm and the

¹⁶Ibid.

¹⁷Michigan Social Welfare Commission, special release.

¹⁸U.S., Department of Commerce, Bureau of the Census, U.S. Census of Population, 1960: Michigan General Social Characteristics (Washington, D.C.: Government Printing Office, 1960), p. viii.

rural-nonfarm population, which comprises of the remaining rural population. In the 1960 Census, the farm population consists of persons living in rural territory on places of ten or more acres from which sales of farm products amounted to \$50 or more in 1959 or on places of less than ten acres from which sales of farm products amounts to \$250 or more in 1959.

Employed Persons.¹⁹ Employed persons comprise all civilians fourteen years old and over who were either: (a) "at work"--those who did any work for pay or profit, or worked without pay for fifteen hours or more on a family farm or in a family business; or (b) were "with a job but not at work"--those who did not work and were not looking for work but had a job or business from which they were temporarily absent because of bad weather, industrial dispute, vacation, illness, or personal reasons.

Unemployed.²⁰ Persons are classified as unemployed if they were fourteen years old and over and not "at work: but looking for work." A person is considered as looking for work not only if he actually tried to find

¹⁹Ibid., p. xix.

²⁰Ibid.

work during the reference week but also if he had made such efforts recently and was awaiting the results of these efforts.

Labor Force.²¹ The labor force includes all persons classified as employed or unemployed, as described above, and also members of the Armed Forces. The "civilian labor force" comprises only of the employed and unemployed who have had previous work experience.

Property Value Per Capita.²² The total value of appraised property in each unit divided by the total 1960 population of that unit.

Property Value Per Acre.²³ The total value of appraised property in each unit divided by the total land area of that unit.

²¹Ibid.

²²Abram P. Snyder and Joseph Lepczyk, 1968 Value of Taxable Property in Michigan (East Lansing: Institute for Community Development and Services, Continuing Education Service, Michigan State University, July, 1969), p. 3.

²³Ibid.

General County Revenue.²⁴ General revenue

includes all revenues except utility, liquor stores, and insurance trust revenue. All tax collections and inter-governmental revenue, even if designated for insurance trust or local utility purposes, are classified as general revenue.

²⁴U.S., Department of Commerce, Bureau of the Census, Census of Government, 1962, Compendium of Government Finances, Vol. IV, No. 4 (Washington, D.C.: Government Printing Office, 1962).

CHAPTER II

REVIEW OF LITERATURE

Poverty has been recognized as a national problem and people oriented sociologists and economists in the government as well as in academic institutions have been concerned to expose the various aspects of this problem. Until now the research work in this field is spotty and needs a lot more efforts to understand this problem thoroughly. The review of the previous studies concerned with this work is presented under the following groups: (1) concept and definition of poverty, (2) importance of poverty in question to economic society, and (3) policy for improvement.

Concept and Definition of Poverty

In 1966, Oscar Lewis mentioned in the introduction of his book that poverty and culture of poverty are two different concepts.¹ He explains that cultures of poverty are patterns of adaptation to common problems which

¹Oscar Lewis, "The Culture of Poverty," Introduction to the author's book, LaVida: A Puerto Rican Family in the Culture of Poverty (New York: Random House, October, 1966).

are culturally transmitted and several factors are held responsible for the emergence of the culture of poverty such as cash economy, unemployment, low wages and low levels of living and organization. The culture of poverty is characterized by specific patterns with regard to the institutions of the larger society, its way of life, its system and individual psychology bred by socialization in cultural surroundings.

Bonnen² argues in the paper he presented in the Third National Extension Workshop in Community Resource Development that poverty is not only a material shortage but it has psychological effects. He says that--when everyone is and has been poor there is no sense of deprivation or failure. When some prosper and develop their human capacities while others do not, a great psychic malaise sets in--when a consciousness of deprivation prevails for years in the same community, individual self-confidence and ego collapse, and an expectation of failure, a self-hatred and general hopelessness becomes endemic. Add racial discrimination and repeatedly broken public and private promises to right social wrongs, and have rising levels of individual and community bitterness, frustration

²J. T. Bonnen, "Progress and Poverty: Community Resource Development," Proceedings of the Third National Extension Workshop in Community Resource Development (East Lansing: Department of Resource Development, Michigan State University, 1968).

and desperation and you will find that violence is an irrational but logical release.

"The People Left Behind," a report by the President's National Advisory Commission on rural poverty, was released in 1967. The Commission was assigned to explore the following aspects of rural life in the United States.

1. To study the present economic conditions and trends.
2. To study the possibilities of coordination of the existing programs, policies and such other activities for economic status and for general welfare of rural population; and to evaluate the directions of such activities so as to reduce unemployment, and improve incomes and standards of social services in rural areas.
3. To develop recommendations so that the local, state, or federal government and private enterprise could take action.

The Commission argues for the concept--and the reality of poverty that--poverty is partly inadequate income but it goes much deeper than that. Poverty affects the mind and spirit as well.

As it has been mentioned earlier, income is important in escaping from poverty though not the whole answer.

Education and jobs are also essential, and they can lead to higher income. Income is obviously needed to buy the food, clothing, housing, schooling and health services required by anyone in this money economy if he is to escape from poverty--if he is to preserve some self-esteem.

The Commission further reveals that poverty is much more than this.

- Poverty is lack of access to respected positions in society, and lack of power to do anything about it.
- Poverty is insecurity and unstable homes.
- Poverty is a wretched existence that tends to perpetuate itself from one generation to the next.³

The nature of poverty as E. W. Jones revealed in his paper presented at the Annual Conference of the Southern Economic Association.

The average American continues to emphasize the physical aspects of poverty . . . the lack of food, clothing, shelter and medical services. The poor are still categorized into two groups . . . the deserving poor and those who deserve to be poor. The deserving poor are those suffering temporary setbacks because of structural changes in the economy or physical infirmities. Those who deserve to be poor are those who are lazy or lacking in achievement aspirations.⁴

³President's Commission on Rural Poverty, People Left Behind, p. 7.

⁴E. W. Jones, "Nature and Extent of Rural Poverty," Papers on Rural Poverty (paper presented at the Annual Conference of the Southern Economic Association, The Agricultural Policy Institute, School of Agriculture and Life Sciences, Raleigh, North Carolina State University, March, 1969), p. 1.

A. J. McKnight testified at a hearing before the National Advisory Commission that:

. . . the culture of poverty in underdeveloped people have developed a culture of poverty--The poor think differently; they have a different sense of values--Take the concept of education: To the middle class it stands for the road to better things for one's children and one's self. To the poor it is an obstacle course to be surmounted until the children can go to work . . .

The poor tend to be fatalistic and pessimistic because for them there is no future; everything is today. They do not postpone satisfaction. When pleasure is available, they tend to take it immediately. They do not save, because for them there is no tomorrow.⁵

Simmel⁶ analyzes the concept of poverty, not in terms of deprivation, but as a social category over time and among different societies. He begins by showing the fundamental dualism that exists in relation to assistance to the poor: the "rights" of the poor versus the "inter-individual genesis of duty," i.e., the right of the poor to get assistance and the obligation of the giver to assist. The right to assistance is as fundamental a human right as is the right to work and the right to live.

Hanna H. Meissner stated:

The American philosophy stressed that in a society where there is work for all, nobody needs to go hungry. Labor and work are values in their own right; anyone who is willing to exert enough effort

⁵President's Commission on Rural Poverty, People Left Behind, p. 8.

⁶George Simmel, "The Poor," Social Problems, XIII, 2 (Fall, 1965).

can acquire a certain level of material well-being. Poverty was an individual matter, and only individuals could overcome it. There was extreme individualistic interpretation of poverty and negates any obligation of society to help the poor.⁷

Moynihan⁸ thinks that poverty today is distinctive as compared with the past because during the settlement in the United States the immigrant suffered from poverty which he thought was a temporary phase and looked forward to the day when he or his children could gain a greater access to opportunity and financial resources. The author further argues that:

. . . the poor of today are more inclined to regard poverty as a permanent way of life with little hope for themselves or their children. This change in the outlook of the poor can be explained by changes in the opportunity structure. The poor of old had aspirations; the poor today do not. The poor of old had culture; the poor today have only culture of poverty. The poor once had political machines that protected them; now they have only social workers who spy on them.⁹

Antonovsky and Lerner¹⁰ conducted a study on "Occupational Aspirations of Low Class Negro and White Youth,"

⁷Hanna H. Meissner, ed., Poverty in the Affluent Society (New York: Harper and Row Publishers, 1966), p. 1.

⁸D. P. Moynihan, ed., On Understanding Poverty (New York: Basic Books, Inc., 1969).

⁹Ibid.

¹⁰Aaron Antonovsky and Melvin J. Lerner, "Occupational Aspirations of Low Class Negro and White Youth," Social Problem, VII (Fall, 1959), 132-38.

in which they concluded that Negroes have a higher level of aspiration than whites of comparable socio-economic statuses. Negroes see achievement via education, have more positive attitudes toward school and expect more of themselves than comparable whites.

Another study was conducted by Richard P. Boyle¹¹ to measure the effect of the high school on students' aspirations. He revealed that attending a high status school affected students' aspirations but all such schools were found in larger metropolitan areas.

There is another study which was also conducted to show the sources of educational aspirations among the working class youth in which the data agrees with previous findings that the educational aspirations of the working class are lower than the middle class. College-oriented working class students who had friends with similar aspirations were more likely to be active in extra-curricular activities and were more likely to be attending a middle-class school.¹²

¹¹Richard P. Boyle, "The Effect of the High School on Students' Aspirations," American Journal of Sociology, LXXI (May, 1966).

¹²Irving Krauss, "Source of Educational Aspirations Among Working-Class Youth," American Sociological Review, XXIX (December, 1964).

Smolensky¹³ comments on the dilemma of past and present poor and he argues that--poverty has a meaning that varies over time and this is reflected in the way poverty is measured--He explains two kinds of yardsticks which are commonly used to measure the poverty in the United States. The first measure is known as "minimum-decency" level which is based on humanitarian precepts and the second measurement depends on equalitarian precepts which gives the idea of the proportion of expenditures of the lowest income groups. He says, while using these definitions, the results show that poverty is declining and seems to be completely eliminated in the present century. But he himself argues that the income of the lower income group (poor) has not increased proportionally in this country and he further thinks that the socio-economic characteristics of the population in poverty have not been changed much in this century. He concludes the following:

. . . having abandoned as irrelevant a biological definition of subsistence as the criteria by which individuals would be classified as poverty-stricken along historical study requires a poverty measure based on a series of different market baskets. These market baskets are very likely to represent a rising level of economic welfare. That poverty is, to some extent, a relative matter is inherent in the rejection of biological subsistence as the definition of poverty.

¹³E. Smolensky, "The Past and the Present Poor," in Chamber of Commerce of the U.S., Task Force on Economic Growth and Opportunity, The Concept of Poverty (Washington, D.C.: Chamber of Commerce, Report No. 1, 1965).

To the extent that statistical measures based on need show a decline in poverty, that decline will have been achieved in the teeth of a rising definition. This being the case, it is foolish to expect the complete elimination of poverty.¹⁴

Dunlop,¹⁵ while describing his definition and way of measuring poverty, quoted Benjamin Franklin's idea and the illustration of the Ad Hoc Committee on the Triple Revolution which are two opposite concepts of poverty.

Benjamin Franklin said:

I am for doing good to the poor, but I think the best way of doing for the poor is not making them easy in poverty, but leading or driving them out of it. In my youth, I traveled much and I observed in different countries, that the more public provisions were made for poor, the less they provided for themselves, and of course, became poorer. And, appeared on the contrary. The less that was done for them, the more they did for themselves and became richer.

Ad Hoc Committee on the Triple Revolution illustrates:

The crux of the proposal is that jobless income would be guaranteed; an office of guaranteed income would stand ready to provide the agreed minimum income without question to any jobless applicant. Incentives to work would have to be revolutionized: the threats of poverty, starvation or even a means test would no longer be available as goods. Employers would have to make work more attractive; the bargaining position of employees--even as individual--would

¹⁴Smolensky, "Past and Present Poor," p. 41.

¹⁵J. T. Dunlop, "Poverty: Definition and Measurement," in Chamber of Commerce of the U.S., Task Force of Economic Growth and Opportunity, The Concept of Poverty (Washington, D.C.: U.S. Chamber of Commerce, Report No. 1, 1965), p. 95.

be much stronger. The economy would have a vast new built-in stabilizer along with considerable disruption of the labor market.

While considering these two opposite concepts Dunlop favors the first one because it has been in terms of the philosophical choice between the two extremes.

1. Driving them out of poverty.
2. Guaranteeing them out of poverty.

He further says concerning the problem in the definition and measurement of poverty that it is not essential to have a defined definition in very many cases; therefore, it is advisable just to consider simply the "bottom end" of the income distribution because there are not many different characteristics among those who are considered bottom fifth, fourth, or third of the income distribution.

V. R. Fuchs¹⁶ says that poverty refers to an insufficiency of material goods and services while considering the poverty on economical bases but there are other kinds of poverties, too, like "spiritually impoverished," "morally bankrupt," or "poor health," but he thinks that this definition needs more classification before it could be practiced. He illustrates that a miser poor may have insufficient food, clothing and shelter but most people do not think him poor. It means,

¹⁶V. R. Fuchs, "Toward a Theory of Poverty," in Chamber of Commerce of the U.S., Task Force of Economic Growth and Opportunity, The Concept of Poverty (Washington, D.C.: U.S. Chamber of Commerce, Report No. 1, 1965).

it is not the possession of material and services, but the ability to command them. Therefore, it is a short jump to saying that income is the test of poverty. He further says that to back up this jump there are some other hurdles to be cleared. First of all, he thinks that there is more satisfaction than money and a second consideration is difference in prices. There are other problems which could be mentioned here but the above mentioned are enough to think that money income can be an imperfect measure. But for the time being, it is the only available approach for our purposes; therefore, it can be used while giving due consideration to the above stated problems.

Harry G. Johnson says that:

. . . poverty in the usual sense may be defined as existing when the resources of families or individuals are inadequate to provide a socially acceptable standard of living. Both the specification of what standard of living should be regarded as socially acceptable (the poverty standard) and the measurement of the resources available to people for comparison with what standard, in order to evaluate the size and shape of the poverty problem, bristle with difficulties. . . .¹⁷

Defined in this way--as inadequacy of financial resources or "income" poverty inevitably has a multiplicity of causes, or, to put the same point another

¹⁷Harry G. Johnson, "Unemployment and Poverty," in Poverty Amid Affluence, ed. by Leo Fishman (New Haven: Yale University Press, 1966).

way, the poor have no unique common characteristics that distinguish them from the non-poor other than their poverty itself.

There is a review of the psychological literature relating to the ego development of children from economically and racially segregated families in which one can draw the conclusion that school problems encountered by Negro children in school are more the result of family, environmental, and subcultural factors than the fault of the educational system.¹⁸

Miller's study of "Low Class Culture as a Generating Milieu of Gang Delinquency," revealed that lower classes are seen as forming a distinctive cultural system in which the main concerns are trouble, toughness, smartness, excitement and autonomy as a substitute concept for values.¹⁹

Becker's article about "Social Class Variation in the Teacher-Pupil Relationship," stated that teachers complained that they derived no sense of reward from teaching Class III (the poor class). They further said

¹⁸David P. Ausubel and Pearl Ausubel, "Ego Development Among Segregated Negro Children," in Education in Depressed Areas, ed. by A. Harry Passow (New York: Bureau of Publication, Columbia University, 1963).

¹⁹Walter B. Miller, "Low Class Culture as a Generating Milieu of Gang Delinquency," Social Survey Review, XIV (1958).

that Class II (moderate economic status) children were the ones that gave them some satisfactions as they were nice but not bright; Class I (upper economic class) children were the ones that gave them the greatest sense of accomplishment. Regarding discipline, they reported that they have more trouble with Class III than with any other.²⁰

Another study revealed that the attitudes towards schools, teachers, programs, and the values of education did not differ significantly by income groups. Differences by income groups were found in attitudes pertaining to social life, being liked by other pupils and personal interest in teachers.²¹

Another study revealed that economic and social factors play an important role in helping to determine which children graduate from high school and enter college. After entering college, the chances of graduating were much more dependent upon ability and much less on family background.²²

²⁰Howard S. Becker, "Social Class Variation in the Teacher-Pupil Relationship," Journal of Educational Sociology, XXV, 8 (April, 1952).

²¹John K. Coster, "Attitudes Toward School of High School Pupils From Three Income Levels," Journal of Educational Psychology, XLIX (1958).

²²Dale Wolf, "Education Opportunity, Measured Intelligence, and Social Background," Education, Economy, and Society, New York, 1961.

The United States Department of Health, Education and Welfare²³ investigated that the poverty is declining during a unique period of sustained economic expansion and because of increased governmental efforts to alleviate the problem. In some groups this decline is remarkable but the past trends suggest that this problem is not likely to disappear in the near future.

Importance of Poverty to the
Economic Study

For the causes of poverty, people generally blame either the poor or the society because in some instances the individual may be lacking in ambition, initiative, or willingness to work while in other cases the society may have failed to provide the proper socio-economic environments for the development of human resources. The cause of this problem is not a simple or a pinpoint phenomenon, but it is a compound interrelationship of different factors. From the society's point of view unemployment, substitution of capital and technology for labor, depletion of natural resources, discrimination in sharing the economic function, and inflationary practices are generally responsible for this problem. On the other hand, lack of education, poor health, high birth rate, age, broken

²³U.S., Department of Health, Education and Welfare, Toward a Social Report (Washington, D.C.: Government Printing Office, January, 1969).

family institutions and occupational and racial differences, are the important factors on the part of individuals, to add to the severeness of the problem. These factors are not independent, they are interrelated; and the cure of poverty needs close cooperation on the part of both the individual and the economic system.

The Council of Economic Advisors concluded that poverty includes ignorance, disease, delinquency, crime, irresponsibility, immorality, and indifference²⁴ which generally is considered as the major threats to a certain economic society. The existence of poverty is associated with the waste of resources and social ills which are the costs not only to the individuals but to the economic society as a whole.

Jerry G. West, looking at the relationship of poverty to the economic society said:

Probably the greatest cost of poverty to society is that represented by the human resources which are wasted. The poor who are unemployed or underemployed are obvious illustrations of such loss to society. Likewise, those whose productivity is low, even though working full-time, because of low levels of education or lack of training, represent waste relative to what the situation might have been-- society must also bear much of the cost of the

²⁴The Annual Report of the Council of Economic Advisors (Washington, D.C.: Government Printing Office, 1964), p. 55.

juvenile delinquency, civil disorders, crime, alcoholism, mental illness, physical defects, and chronic illness often associated with poverty . . . ²⁵

President Johnson's National Advisory Commission on Civil Disorders concluded that:

The culture of poverty that results from unemployment and family breakup generates a system of ruthless, exploitative relationships. . . . Prostitution, dope addiction, and crime create an environmental 'jungle' characterized by growing up under such conditions are likely participants in civil disorder.²⁶

West²⁷ believes that the important factor which is the rapid technological development in agriculture is responsible for rural poverty because this forced the rural population to seek employment in other sectors of the economy. Therefore, human resources suffered from unemployment and underemployment. He further says that there is underinvestment in the human resources; therefore, the quantity and the quality of education and social development approaches have been much inferior as compared with urban areas.

²⁵Jerry G. West, Poverty: Its Meaning and Its Causes With Selected Case Studies (Raleigh: Ag. Policy Institute, School of Agriculture and Life Sciences, North Carolina State University, July, 1968), p. 153.

²⁶Report of the National Advisory Commission on Civil Disorders (New York: Bantam Book, Inc., 1968), p. 14.

²⁷Jerry G. West, "Evaluation of the People Left Behind," Papers on Rural Poverty (Raleigh: Ag. Policy Institute, North Carolina State University, March, 1969).

Stanley Masters²⁸ conducted a study in which he measured the effect of family income on children's education in which he stated that children of little education and low income parents have more than twenty times greater chance of dropping out or falling behind in school than the children whose parents are well-to-do and both parents have high school education and had graduated.

A study was conducted in 1960 in which the author concludes that the majority of Americans are moderately satisfied with their work. Occupational prestige is the best index of satisfaction; aspects such as control over the technical and social environment, integrated work groups, and occupational communities are among the preconditions for job satisfaction in the American economic society.²⁹

An exploratory study was made of the employed population of a poverty area of Washington, D.C. which revealed that marginal families heads' incomes were not higher than incomes of the poor families but the size of the families were slightly larger than the poor

²⁸Stanley H. Masters, "The Effect of Family Income on Children's Education," Journal of Human Resources, IV, 2 (Spring, 1969).

²⁹Robert Blauner, Work Satisfaction and Industrial Trends in Modern Society, Report No. 151 (Berkeley: Institute of Industrial Relations, University of California, 1960).

families. The proportion of Negroes in poor families was higher than in marginal families. The heads of poor families were younger;³⁰ therefore, it can be imagined that if this trend continued, how it will effect the society.

Bernard³¹ discusses the relation between the individual's inner processes and his social environment, in which she describes the importance of comprehensive community mental health projects in an anti-poverty program. She emphasized the "unconscious problem" which may contribute to the distress of the disadvantaged, who are economic failures in an affluent society.

Policies to Alleviate Poverty

It was realized that a national action should be taken since a few decades when the President, Franklin Roosevelt stated, one-third of the nation was ill-housed, ill-clothed and ill-fed. Many of his programs for recovery involved the manipulation of planned economic scarcities. The concept of full employment, universal adequate minimum income which are basic to present-day

³⁰Charles V. Willie and Walter E. Riddick, "The Employed Poor: A Case Study," in Poverty as a Public Issue, ed. by Ben Selligmen (New York: The Free Press, 1965).

³¹Viola W. Bernard, "Some Principles of Dynamic Psychiatry in Relation to Poverty," The American Journal of Psychiatry, XXII (September, 1965).

concept of poverty, was not widely heard until the middle of the present century. As the administration of the social system changed, different programs have been tried against poverty (e.g., social security and insurance programs, area resource development, community resource development and war against poverty).

Most of the early efforts gave importance to the urban poverty but the National Association for Community Development, criticized the existing approaches and drew attention to rural poverty. The Association further exposed the unfair division of prosperity of an affluent economy in the form of ineffective resource development programs in the rural areas.

The President's National Advisory Commission on Rural Poverty unveiled a number of dimensions of rural poverty and criticized the previous anti-poverty efforts. The Commission stated:

Until the past few years, the Nation's major social welfare and labor legislation largely by-passed rural Americans, especially farmers and farm workers. Farm people were excluded from the Social Security Act until the mid-1950's. Farmers, farm workers and workers in agriculturally related occupations are still excluded from other major labor legislations, including the unemployment insurance programs, the Labor Management Relations Act, the Fair Labor Standards Act and most State Workmen's Compensation Acts.³²

³²President's Commission on Rural Poverty, People Left Behind, p. ix.

The Commission further emphasized the need of appropriate measures for solving the problem of rural poverty which is increasing urban poverty. Agricultural price support programs are considered to help the farm population. Learn, Cox and Herder³³ concluded in their study that agricultural price support programs are not effective to improve the income situation of farmers because very many farmers do not have sufficient productive resources to earn an adequate income. They suggested consolidation of farms to make economic units because in the existing situation farm labor is not sufficiently productive.

Jerry West concludes in his evaluation of The People Left Behind that:

. . . Much of the underemployment in rural areas can be traced to inadequate monetary and fiscal policy, imperfection in the labor market, and lack of economic development in rural areas . . .

Another factor which must be considered is the combination of programs developed by the federal government to support prices and incomes of farmers. Although certainly of importance to the commercial sector of agriculture these programs have done little to improve the plight of the rural poor . . . ³⁴

³³Elmer W. Learn, Rex W. Cox, and Richard J. Herder, Upper Midwest Agriculture: Alternatives for the Future, Study Paper No. 6 of Upper Midwest Economic Study (Minneapolis, Minn.: University of Minnesota, 1962).

³⁴West, "Evaluation of People Left Behind," Papers on Rural Poverty, p. 13.

For the regional and community economic development, West also emphasized the coordination of federal programs as Office of Economic Opportunity and Cooperative Extension Service in the U.S.D.A.

E. Walter Jones writes in his article about the concept of adequate income. He says that poverty is a crippling phenomenon and income is a necessary, but totally insufficient, solution to the problem. He further argues that:

The relationship of rural poverty to the income and social system in this country must be taken into account if an effective solution is to be found. The answers to the problems of poverty are not dependent upon a compassionate people and an emotional response to the vagaries that are identified with it. The economic and social system itself must be adjusted so that it is capable of relating effectively to poor people. Therefore, if we are to do something about effecting a permanent solution to the poverty problem, we must bring about changes in the functioning of basic institutions in this country. The patchwork of poverty programs outside the institutional structure will not do the job. . . . The process of economic growth has spun off many of the people who are in poverty and rendered them nonfunctional. The educational and manpower institutions have not been geared to deal with these marginal human resources in developing their capacity to cope with their social and economic environment . . .

In a non-technological age, it was easier for people to pull themselves up by their own bootstraps and overcome environmental handicaps. However, with the explosion of knowledge and the complexities of today's world, the educational deprivation in the home and community. We must not, however, think that we can deal with this problem by setting up a new

set of institutions. The challenge is to adjust the basic institutional structure of this country . . . ³⁵

For the regional development and the rural poverty, Niles M. Hansen evaluates the policy of the President's Advisory Commission on Rural Poverty as:

The regional policy of the President's Advisory Commission on Rural Poverty is based on the assumption that the social costs of bringing industry to relatively poor regions would be less than the social costs involved in the migration of workers and increased congestion and unemployment in industrial areas. However, there is no convincing evidence that government controlled programs can attract enough industry to the countryside to provide people everywhere with jobs in proximity to their places of residence. On the other hand, federal programs to influence the quality of human resources in lagging rural areas benefit the people of these regions and the nation as a whole. Opportunity cost considerations favor federal subsidies for investment in education, health, and training in lagging regions . . . ³⁶

Anti-poverty strategy of adequate minimum income through the various social security and social service measures have often been criticized. Two main objections are often raised to guarantee annual income and President Johnson's policy "war on poverty." The first objection is related to incentive and the second is inflation. Some of the economists think that if the people were guaranteed

³⁵E. Walter Jones, "Nature and Extent of Rural Poverty," in Papers on Rural Poverty presented at the Annual Conference of the Southern Economic Association (North Carolina State University: Agricultural Policy Institute, March, 1969), pp. 7-8.

³⁶Niles M. Hansen, "Regional Development and the Rural Poor," in the Journal of Human Resources, Institute for Research on Poverty (Madison: University of Wisconsin Press, IV, 2, 1969).

annual income they would no longer try to improve themselves. David Hamilton criticizes this concept and argues that:

. . . Undoubtedly some individuals might choose to at the minimum--but that the vast majority possessing such minimum income would lose all incentives to rise above it which is a very doubtful proposition. Can anyone seriously believe that a family of four with approximately \$3,000 in guaranteed income would lack incentive to seek employment to add to this income and to their level of living? The truth is most probable, that a guaranteed income would give new hope to those benefitted and raise new aspirations . . . ³⁷

Inflation, which is the second common objective, has been heard often in the second half of the last decade and the necessity of cutting back the anti-poverty programs particularly war on poverty, because of its inflationary effect in the country. David Hamilton concludes again this idea as:

. . . the expenditures on the war on poverty is no more inflationary than the new net investment on night clubs or baseball stadiums or wars. A dollar spent on poverty has the same effect on the price level as a dollar spent on anything else.
 . . . Expenditures for cigarettes and liquor were an inflationary force several times greater than the war on poverty.
 If, however, a guaranteed annual income were introduced as a means of resolving poverty, the expenditures would be larger and its inflationary effect potentially greater than that of the current war on poverty.³⁸

³⁷David Hamilton, A Primer on the Economics of Poverty (New York: Random House, 1967), p. 114.

³⁸Ibid., pp. 115-16.

Education is another important antipoverty strategy, it is significantly established evidence that the investment in education is important as a means to developing the human resources which are known as human capital. This human capital is essential to increase income.

While evaluating how education can help reduce poverty, Carroll³⁹ says that education is a helpful anti-poverty strategy because it is not only a means of transferring wealth but also helps promote economic growth. Education is wealth which cannot be sold, stolen, or destroyed easily except by death of the possessor or complete deterioration of his or her mental health. Education can increase the ability for better allocation of resources to improve the welfare. Education helps to develop attitudes toward work, social institutions and patterns of consumption and production which can help to reduce the differences between behavior of individuals and the society. An educated society is more likely to be responsible and motivated enough to improve welfare. Benefit-cost analysis is a common process to measure the return of investment in education which has been used by economists.

³⁹ A. B. Carroll, "Education for Reduction of Rural Poverty," Papers on Rural Poverty, presented at the Annual Conference of Southern Economic Association (North Carolina State University: Agricultural Policy Institute, 1969).

The President's National Advisory Commission on Rural Poverty recommends that relocation programs be established in the Department of Labor and provide their relocation assistance to the disadvantaged workers who cannot find proper employment where they now live, but for whom jobs and training opportunities can be located in other labor market areas.⁴⁰

This recommendation of the Commission refers to relocating the worker to an area where employment is available and provides them financial assistance which includes transportation costs of the family and the cost of the removal of household goods, and a starting allowance to support the family until the time that the bread winner gets his first pay check. This recommendation of the Commission that financial assistance be given to the relocaters, Schnitzer comments that:

. . . in order to have a high rate of economic growth, there has to be a high degree of labor mobility; . . . High mobility of labor as well as capital characterizes the purely laissez-fair economy. Yet in the mixed economies of today, government intervention is directed toward the mobility of capital, leaving market sources to determine the mobility of labor. The assumption is that capital needs the inducements to locate a particular area, but labor needs no particular inducement to leave the area.

This reasoning, when applied to the type of person, relocation assistance is designed to help, and is absolutely wrong. The person who has been unemployed over a long period of time, or is making an income of less than \$3,000 a year, usually does not

⁴⁰President's Commission on Rural Poverty, People Left Behind, p. 35.

have the financial resources to support a move to an area where employment is available. He is also not aware of job opportunities elsewhere. Lack of financial resources and knowledge of existing employment opportunities are deterrents to labor mobility.⁴¹

He further argues that the movement of unskilled labor from the rural areas to the industrial areas will complicate the socio-economic problems which already exist in such industrial areas. He also says that there is already labor mobility from rural areas, without any significant effort, which is adding and creating socio-economic problems particularly in big centers. He argues that this move should be stopped and there should be new factories put in the depressed areas and better educational facilities should be provided for rural youth.

Industrialization of the poverty-stricken rural areas is commonly heard as an anti-poverty policy but questions arise about how industry can be shifted economically? Should it be the private sector; factor payment or public sector--transfer and investment? The second question is that, will it help the poor? Bryant concludes this about the strategy based on his micro analysis:

Factor payments to capital and the effects on immigration appear to me to the major private sector

⁴¹Martin Schnitzer, "An Approach to the Amelioration of Rural Poverty: Migration and Relocation," Papers on Rural Poverty (paper presented at the Annual Conference of the Southern Economic Association, The Agricultural Policy Institute, School of Agriculture and Life Sciences, Raleigh, North Carolina State University, March, 1969), p. 45.

leakages diminishing the impact of industrial growth on the poor. Leakages from the public sector effects appear to revolve around the proposition of investment in public overhead capital which constitutes investment in human capital; the higher the proportion, the smaller the leakage. If the efforts to industrialize a poverty-stricken rural area succeeds only in raising the income level, then some fraction of the increase in income goes to the poor. It is likely that the fraction will decline through time as immigration continues for capital labor ration of new capital rises, and as the unemployed as fraction of the total poor in the area increases.⁴²

He further says that there are two dilemmas in the minds of the policymakers to execute the poverty policy, "first it is posed by the Anderson analysis⁴³ which indicates that the effect of the national economic growth on poverty declines as economic growth proceeds. The second dilemma is posed by Phillips'⁴⁴ curbe analysis which indicates that the unemployment rate can be pushed down only at the cost of a higher rate of inflation."

⁴²W. K. Bryant, "Industrialization as a Poverty Policy: Toward a Micro Analysis," Papers on Rural Poverty (paper presented at the Annual Conference of the Southern Economic Association, The Agricultural Policy Institute, School of Agriculture and Life Sciences, Raleigh, North Carolina State University, March, 1969), p. 81.

⁴³W. H. Locke Anderson, "Trickling Down: The Relationship Between Economic Growth and the Extent of Poverty Among American Families," Quarterly Journal of Economics (November, 1964).

⁴⁴G. L. Perry, "The Determinants of Wage Rate Changes and the Inflation--Unemployment--Trade-Off for the United States," Review of Economic Studies, XXXI, 88 (October, 1966).

After reviewing the above literature on poverty, one can conclude that different characteristics of the poor like color or race, age or sex, geographic location, type of employment or lack of job opportunity, should never divert anyone from the one universal characteristic of all the poor: they do not receive enough income in money and other forms to cross the poverty line.

The poor have been widely known to generations of economists who briefly stated in the following, which is still applicable:

This association of poverty with progress is the great enigma of our times. It is the central fact from which spring industrial, social and political difficulties that perplex the world, and with which statesmanship and philanthropy and education grapple in vain.

Prompt action is needed in regard to the large, though it may be hoped, now steadily diminishing residuum of persons who are physically, mentally, or morally incapable of doing a good day's work with which to earn a good day's wages. . . . The children of unskilled workers need to be made capable of earning the wages of skilled workers: and the children of skilled workers need by similar means to be made capable of doing still more responsible work. . . . The most imperative study of this generation is to provide for the young such opportunities as will both develop their higher nature, and make them efficient producers.⁴⁵

⁴⁵ Alfred Marshal, Principles of Economics (London: Macmillan and Co., Limited, 1920), p. 714.

CHAPTER III

IMPERICAL ANALYSIS

This chapter is mainly concerned with the interpretation of the statistical analysis. As mentioned in the first chapter, this study is an exploratory effort to examine some of the aspects of poverty. Therefore, first of all statistical testing approach will be applied to measure the differences of the means of two groups (rich and poor counties). Secondly, to know if there is any concentration of poverty and some of the poverty factors like employment opportunities, coefficient of localization analysis results will be interpreted. Thirdly, the results of correlation analysis will be presented and their further interpretation will be focused on the evaluation of anti-poverty programs which have been in practice and others which have been proposed.

Difference Between Two Groups of Counties
With Low and High Percentage
of Poor Families

For this analysis, two groups of ten counties each were compared according to the percentage of poor families.¹ In the first group, 18.3 to 21.9 per cent of the families were in the poor category, whereas in the second, 33.3 to 35.5 per cent of the families were classified as poor. There were forty-two socio-economic characteristics which were analyzed to measure the difference between the two groups. The t test analysis was used and the results are shown in Table 1. These calculated t values are compared with the table value at 5 per cent level of significance.

Whenever we think of rich and poor, the first impression is that rich have more and poor have less of everything. But it seems that this is not always true. The poor certainly have less but not of everything. In the comparison of rich and poor counties² twenty-two of the forty-two variables indicate no significant difference between rich and poor counties. The means of the remaining twenty variables are significantly different but do

¹For sampling procedure, see Methodology in Chapter I.

²Rich counties are those which have low percentage of poor families and poor counties are the other way around.

TABLE 1

t STATISTICS OF FORTY-FIVE VARIABLES; t VALUE
AT 5 PER CENT LEVEL OF SIGNIFICANCE--2.101

Variables	Calculated t Statistic
Population, 1960	3.769 ^a
Per cent population over 65 years of age	3.022 ^a
Per cent non-white	1.546
Taxable property value, 1968	2.392 ^a
Per cent commercial property	0.853
Per cent industrial property	2.753 ^a
Per cent residential property	1.862
Per cent agricultural property	0.574
County Revenue (General)	3.128 ^a
No. of farms, 1964	1.946
Population 25 years and over	0.491
Per cent of population 25 years and over with four years high school and more education	1.568
Labor force	2.706 ^a
Per cent of unemployed labor force	2.847 ^a
Median income, 1959	2.803 ^a
Median income of farm families, 1959	2.496 ^a
Ratio worker/non-worker	3.641 ^a
No. old-age welfare recipients, 1967	3.776 ^a
Total Payment	3.229 ^a
No. of dependent children on welfare recipients, 1967	1.224
Total Payment	0.971
No. of blind welfare recipients, 1967	0.787
Total Payment	0.765
No. of disabled welfare recipients, 1967	2.161 ^a
Total Payment	2.667 ^a
No. of persons getting direct relief, 1967	0.643
Total Payment	1.344
Hospital beds/1,000	0.994
Nursing homes/1,000	2.099
M.D.'s/1,000	1.854
D.O.'s/1,000	1.896

TABLE 1.--(continued)

Variables	Calculated t Statistic
No. employed in ag. for fish.	1.582
No. employed in mining	2.360 ^a
No. employed in construction	2.700 ^a
No. employed in manufacturing	3.627 ^a
No. employed in utilities	1.274
No. employed in trade	1.581
No. employed in finance ins. real es.	1.175
No. employed in business and personal services	3.399 ^a
No. employed in other services	0.452
No. employed in public administration	2.194 ^a
Population density	5.032 ^a

^aVariables with significant difference

not explain which group (rich or poor) possesses more. The answer to these questions is not in the scope of this statistical test of differences (t test) between the means of the two groups. To examine the relationship and importance of these independent variables with the dependent variable (percentage of poor families) simple correlation and linear regression analysis is used.

Coefficient of Localization

To describe the spatial dimension of poverty, the coefficient of localization approach has been applied. In the first case (Appendix A) poverty (percentage of poor families) has been calculated against the total population of each county. In the second case (Appendix B) employment in different industries like agriculture, construction, the manufacturing, utilities, mining business and personal services has been considered against total employment in each county.

In the case of percentage of poor families and the total population, the coefficient of localization is .001. It means that poverty as a whole (percentage of poor families) is not concentrated in rural counties. Poverty is evenly distributed in rural counties as population. Similarly, employment in agriculture, manufacturing,

construction, utilities, mining, business and personal services, is not concentrated anywhere in rural counties of the Lower Peninsula. The employment in the above mentioned industries is evenly distributed as total employment in the area. The coefficient of localization for agriculture is .0025, construction .0013, manufacturing .0015, utilities .0017, mining .0054, and business and personal services .0009. Employment in construction, manufacturing, utilities and business and personal services is slightly better distributed than the employment in agriculture and mining.

Multiple Regression Analysis

At this point the main concern of this study is to know what characteristics are associated with the percentage of poor families, and the explanation of those variables which are associated at the 5 per cent level of significance. For this analysis, from the previous long list of independent variables, to avoid the complicity of forty-two variables, only twenty-nine variables are included without any specific statistical criteria of selection, except the judgment of the writer about the logical reason for expecting these to be related to the poverty. These twenty-nine variables include most of the

important aspects of the problem.³ All the fifty-one rural counties in the Lower Peninsula of Michigan are included instead of twenty counties which were considered in the previous analysis of t values. The estimating equation including the twenty-nine independent variables is as follows:

Regression Equation:

$$\begin{aligned}
 Y = & 45.693 + 0.098X_1 + 7.118X_2 + 0.060X_3 + 0.048X_4 \\
 & - 0.299X_5 - 2.073X_6 + 0.254X_7 - 0.056X_8 \\
 & + 3.292X_9 + 1.293X_{10} - 0.276X_{11} + 6.094X_{12} \\
 & + 0.102X_{13} - 4.449X_{14} + 2.165X_{15} - 0.158X_{16} \\
 & + 0.065X_{17} - 0.457X_{18} - 0.611X_{19} - 0.569X_{20} \\
 & - 0.717X_{21} - 0.130X_{22} + 1.167X_{23} + 0.223X_{24} \\
 & - 0.199X_{25} - 0.569X_{26} - 0.420X_{27} - 0.062X_{28} \\
 & - 0.016X_{29}
 \end{aligned}$$

Multiple Correlation Coefficient:

$$R_1^2 = 0.9545, R = 0.9770, \bar{R}^2 = 0.8917, \bar{R} = 0.9443$$

³Income of the family is obviously an important factor of poverty which has not been included in the final analysis of correlation. This variable was included in elementary analysis and dominated the analysis. Therefore, it was decided to delete it from the final analysis.

Standard Error of Estimate = 2.4838

Y = Percentage of poor families (dependent variable).

Independent Variables:

- X1 = Population, 1960
- X2 = Population over 65 years of age (per cent)
- X3 = Per cent non-white
- X4 = County revenue (per capita)
- X5 = Per cent population 25 years and over
- X6 = Per cent population 25 years and over with 4 years high school and over education
- X7 = Per cent labor force of the total population
- X8 = Per cent of labor force unemployed
- X9 = Per cent social welfare recipients of the total population
- X10 = Median school years completed
- X11 = Property value per acre
- X12 = Property value per capita
- X13 = Hospital beds/1,000
- X14 = M.D.'s/1,000
- X15 = D.O.'s/1,000
- X16 = Nursing homes/1,000
- X17 = Per cent (of the total employment) employed in agriculture, forestry and fisheries
- X18 = Per cent (of the total employment) employed in mining
- X19 = Per cent (of the total employment) employed in construction

- X20 = Per cent (of the total employment) employed
in manufacturing
- X21 = Per cent (of the total employment) employed
in utilities
- X22 = Per cent (of the total employment) employed
in trade
- X23 = Per cent (of the total employment) employed
in finance, insurance and real estate
- X24 = Per cent (of the total employment) employed
in business, personal services
- X25 = Per cent (of the total employment) employed
in public administration
- X26 = Per cent (of the total employment) employed
in other services
- X27 = Total employed
- X28 = Population density
- X29 = Per cent total employed

When we look at the multiple coefficient of determination which (R^2) is equal to 0.9545, we can conclude that 95 per cent of Y, which is our dependent variable (percentage of poor families) is associated and can be explained by the above twenty-nine independent variables. But when we look at the regression equation, we actually see very few independent variables which have a significant relationship. The rest of the independent variables are not significantly related; therefore, these twenty-nine variables are run on L.S. Delete Routine at 5 per cent level of significance. Eleven independent variables were left at the 5 per cent level of significance.

The regression equation formed by eleven variables which are significant at 5 per cent level.

$$\begin{aligned}
 Y = & 41.243 + 0.137X_1 + 0.524X_2 + 0.047X_4 + 3.229X_9 \\
 & - 4.364X_{14} - 0.394X_{18} - 0.627X_{19} - 0.489X_{21} - 0.064X_{20} \\
 & - 0.396X_{26} - 0.459X_{27}
 \end{aligned}$$

Multiple Correlation Coefficients:

$$R^2 = 0.9282, R = 0.9634, \bar{R}^2 = 0.9080, \bar{R} = 2.9529$$

Y = Dependent variable (percentage of poor families of the total population)

X1 = Population, 1960

X2 = Per cent of population 65 years and over

X4 = Per capita county revenue

X9 = Per cent social welfare recipients (of the total population)

X14 = Medical doctors/1,000

X19 = Per cent employed in construction

X21 = Per cent employed in utilities

X20 = Per cent employed in manufacturing

X26 = Per cent employed in other services⁴

X27 = Total employed

⁴Other services as an independent variable does not include agriculture, forestry, fisheries, mining, construction, manufacturing, utilities, trade, finance, insurance, real estate, business and personal services, and public administration.

Interpretation of Regression Analysis
Results With Relation to the
Anti-Poverty Programs

First of all, to evaluate how close our prediction of poverty is, the residuals (plus and minus differences between observed and calculated values of Y) and observed and calculated values are graphed (Figure 2). This graph shows that estimated Y or explained variance is not far from the observed values. The differences between observed and estimated values range from plus 5.3 to minus 0.03. These plus and minus differences are plotted on Map no. 2 to show which counties are over- and under-predicted. Out of fifty-one rural counties under study, twenty-four counties are over-predicted and twenty-seven counties are under-predicted (Figure 3). Twenty counties are predicted very close to the observed values (Figure 4).

Population and Poverty

The multiple regression coefficient of independent variable X_1 (total population) which is significant at 5 per cent level of significance shows that population and percentage of poor families are positively related. The regression coefficient of these two variables is 0.13667. Therefore, if we increase X_1 (population which is in thousands) 10 per cent, we increase poor families 1.2 per cent. In the case of simple correlation, the

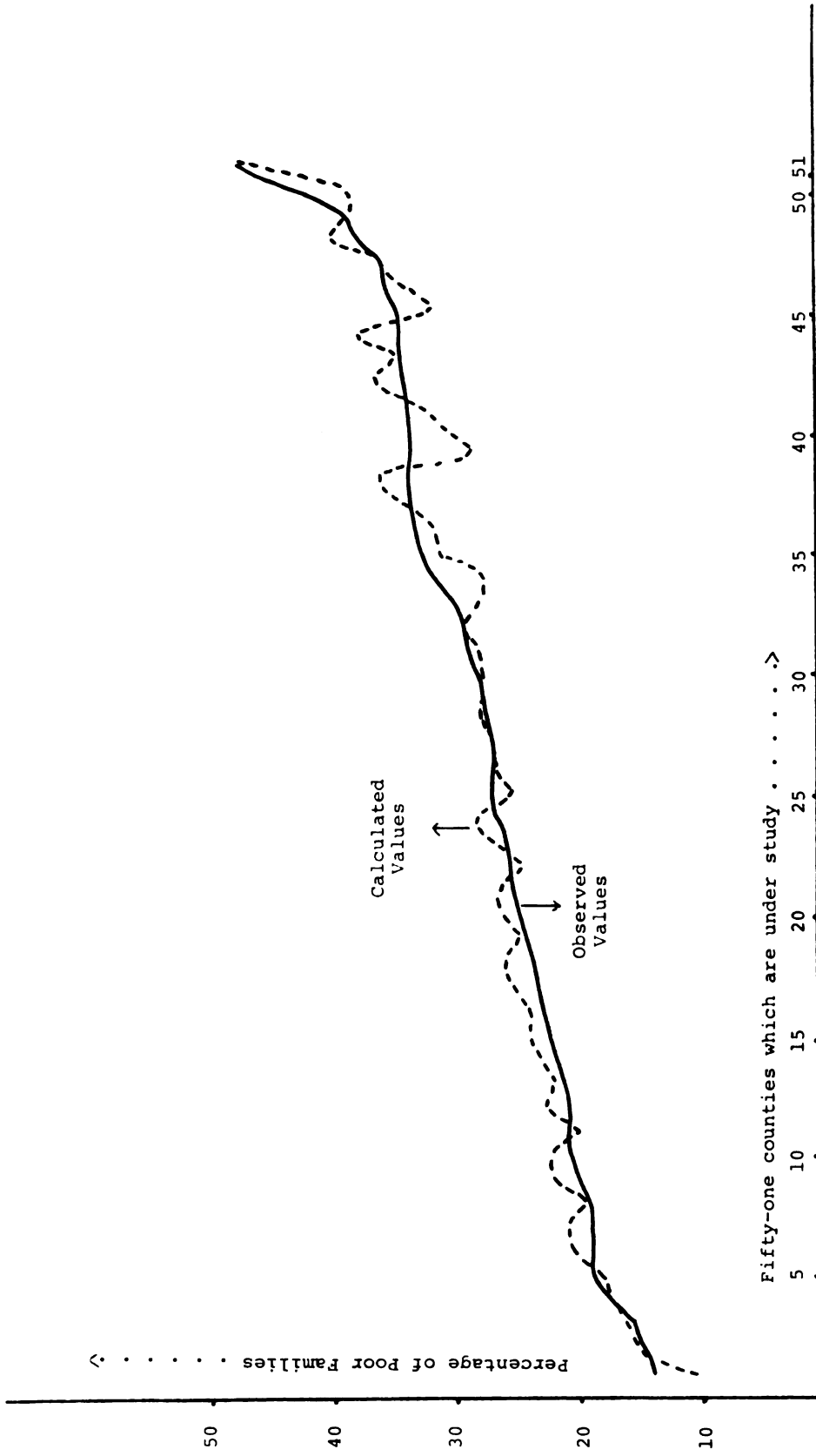


Figure 2.--Observed and calculated values of Y (dependent variable).

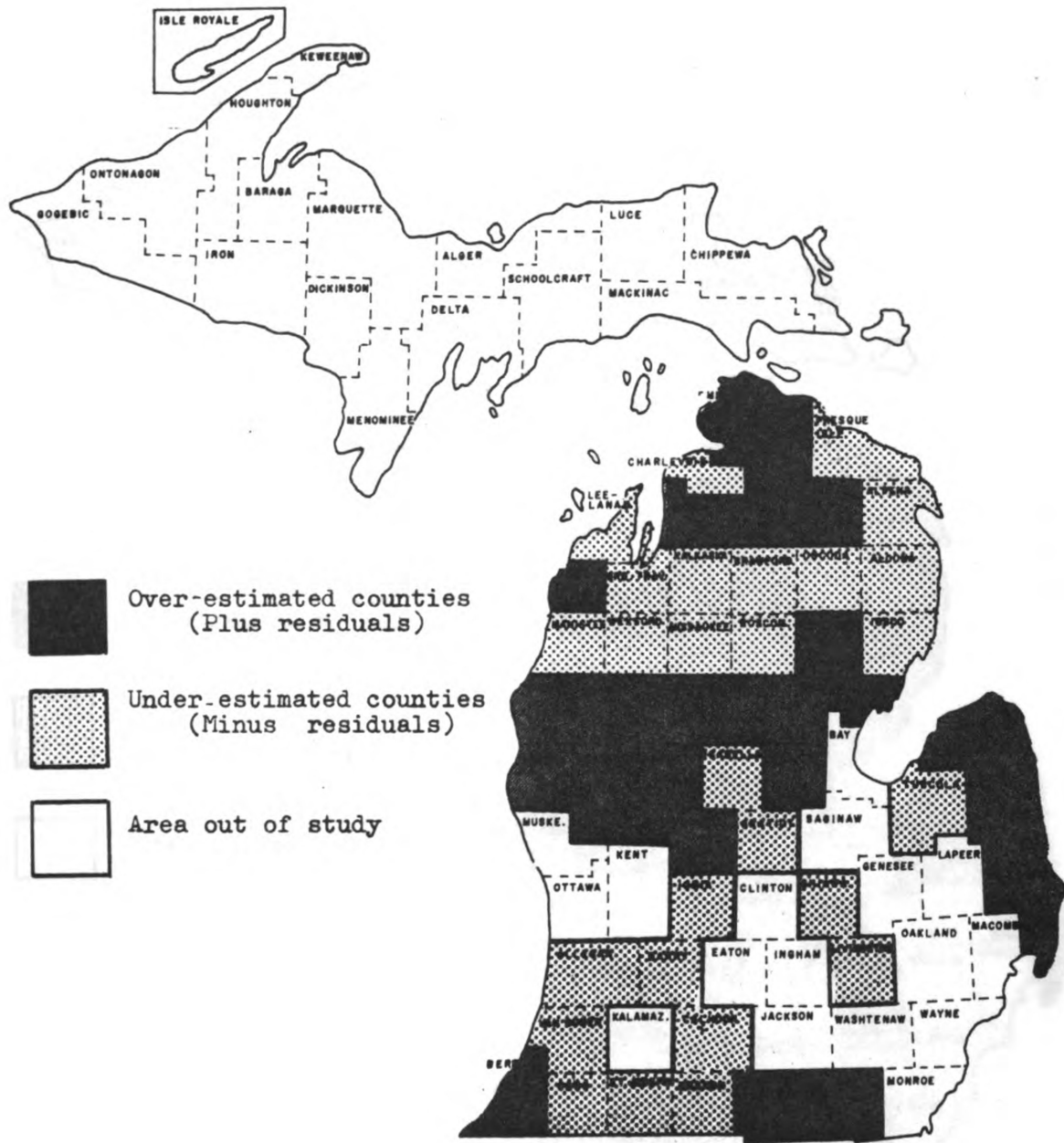


Figure 3.--Level of prediction.

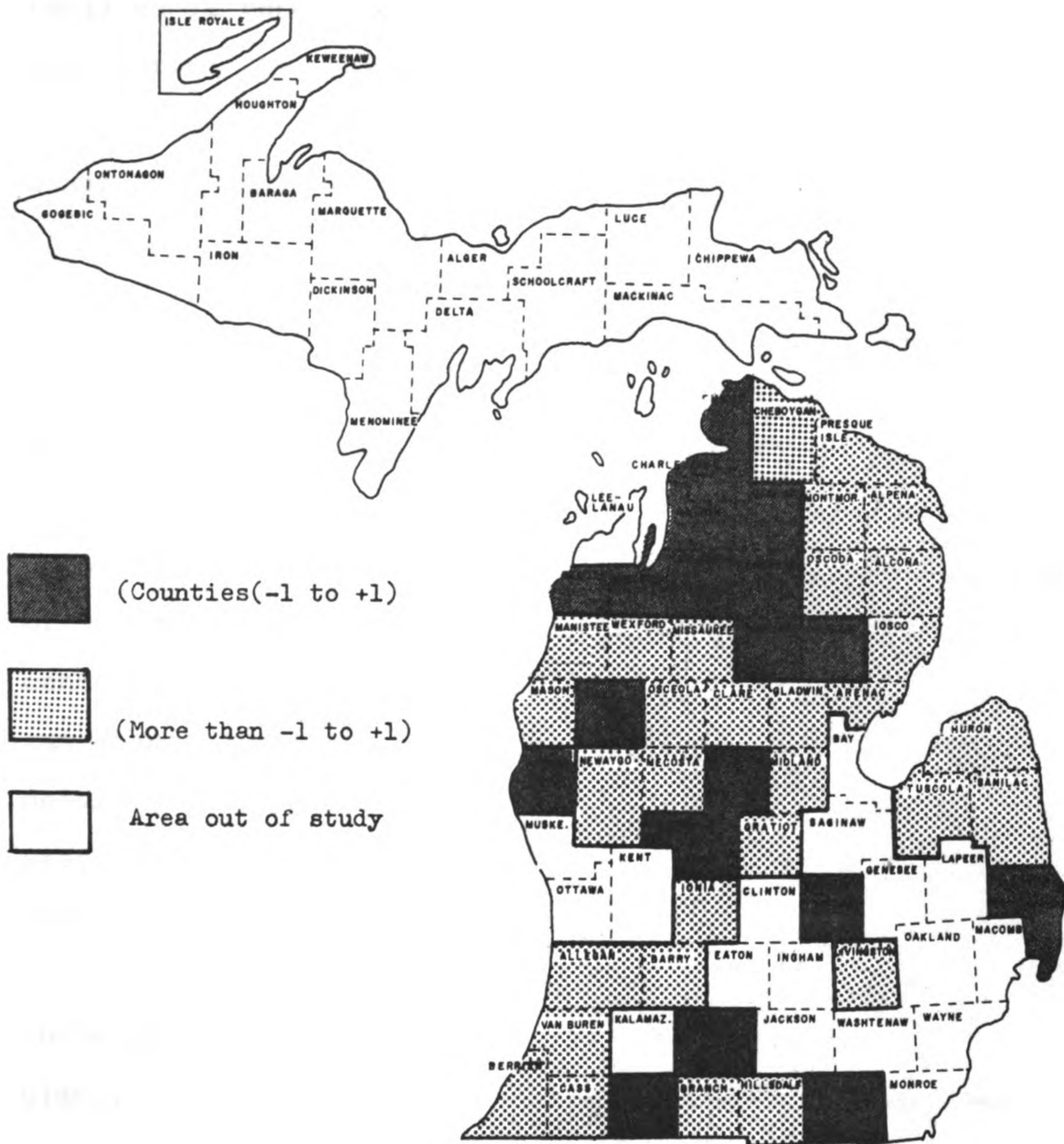


Figure 4.--Difference between the observed values and calculated values of Y by counties.

relationship between population and percentage of poor families is the opposite because this relationship is only between two variables. The multiple regression coefficient is positive because of the entire effect of other independent variable is taken into account

Age and Poverty

The next significant variable is percentage of population which is sixty-five years old or more. This variable is also positively related with the percentage of poor families as indicated by the regression coefficient. The coefficient is + 0.5241. If we change (increase or decrease) 10 per cent of this independent variable (percentage of population sixty-five years old and over) we can change (increase or decrease) 1.7 per cent of our dependent variable while holding all over variables constant at their means. In the case of simple correlation, this relationship is also positive.

In the rural counties of the Lower Peninsula, there are 159,409 people of sixty-five years of age or older, 10.5 per cent of the total population of the area. The minimum and the maximum limits are 5.2 and 19.9 per cent, respectively, in rural counties of the Lower Peninsula. The majority of them live alone or with just one other person. Families headed by aged persons generally have lower incomes than younger households of the same

size because they are less likely to include a steady earner and because the public programs that help many of the aged almost always pay less than the earnings they are intended to replace. Also, aged are less likely to work regularly than the younger persons and they earn less when they do work which is the main reason why poverty is so much more common among the aged.

Employment and Poverty

The total number of employed persons as one of the independent variables is negatively related with the dependent variable both in simple and multiple regression coefficient. This variable is further subdivided into ten categories: The percentage of persons employed in agriculture, forestry and fisheries, mining, construction, manufacturing, utilities, trade, finance, business, public administration, and other services. Out of these ten categories, only five--mining, construction, manufacturing, utilities, and other services--are significantly associated with percentage of poor families. These five independent variables have the same relationship as the total number of employed variable. The b. coefficients were: Total employment -0.4586, mining -0.3938, construction -0.4895, manufacturing -0.6490, utilities -0.3964 and other services -0.4586. This minus relationship of employed persons is quite logical because

when higher percentage of people are employed they increase the income of the families and pull poor families out of the poverty bracket. Figures 5 and 6 show this relationship between the percentage of employed persons of the total population and percentage of poor families in rural counties. Figures 7 and 8 explain the relationship between percentage of poor families and percentage of employed persons of the total labor force. Counties with large percentage of employed persons have generally a low percentage of poor families. The rural counties which are adjacent to the urban counties generally have large percentages of the labor force employed and low percentage of poor families as compared to the rest of the rural counties which are away from the urban counties (SMSA). This is because the labor force can commute easily to the urban areas for job opportunities and obtain higher salaries than in the rural areas.

In the State of Michigan, the average civilian labor force unemployment per county is 7.9 per cent.⁵ Standard metropolitan statistical (SMSA) counties have an average of 5.8 per cent unemployed civilian labor force whereas in rural counties of the Lower Peninsula the average is 7.3 per cent.

⁵U.S., Department of Commerce, Bureau of the Census, U.S. Census of Population (Washington, D.C.: Government Printing Office, 1960).

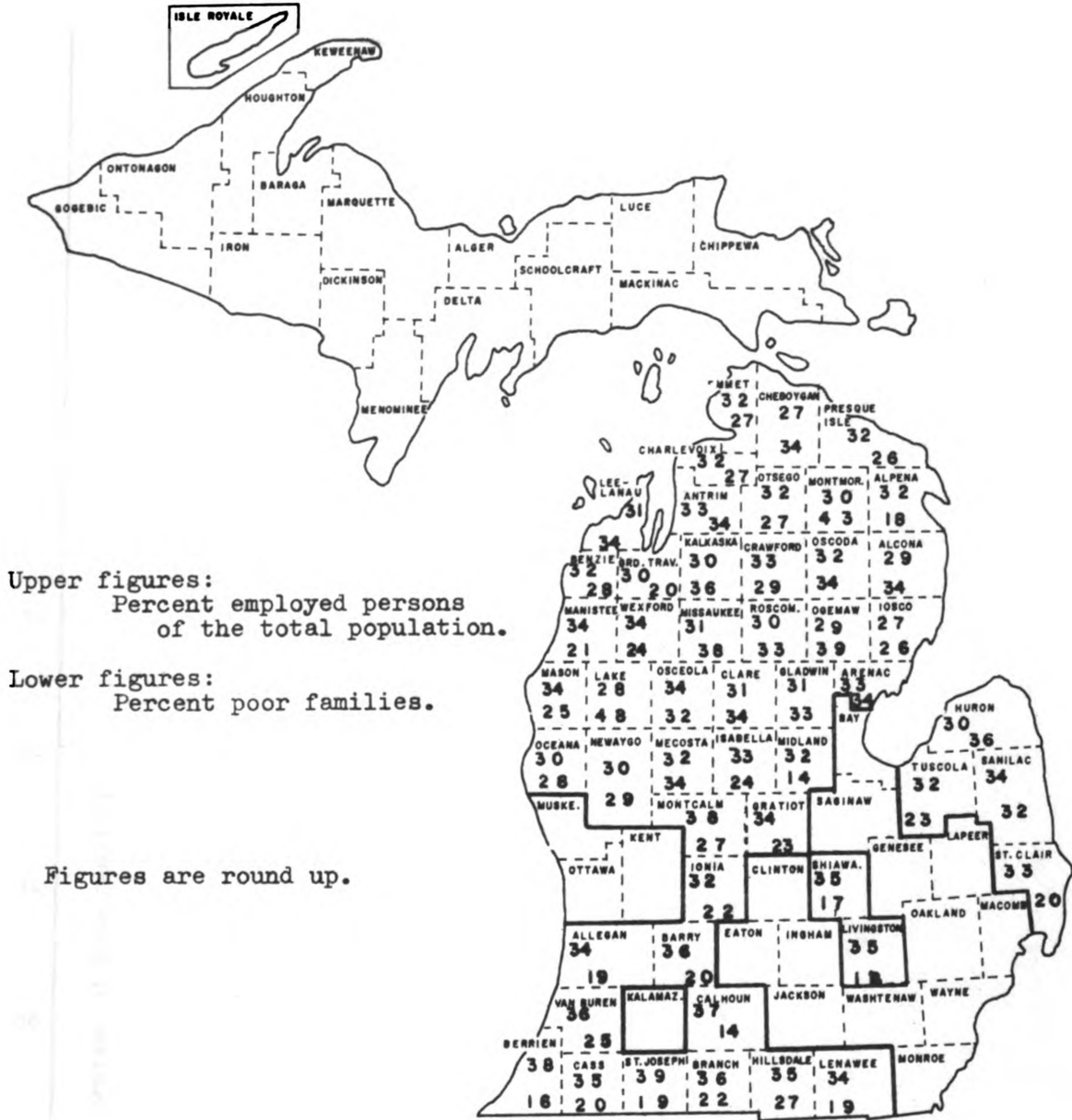


Figure 5.--Percentage of employed persons and poor families.

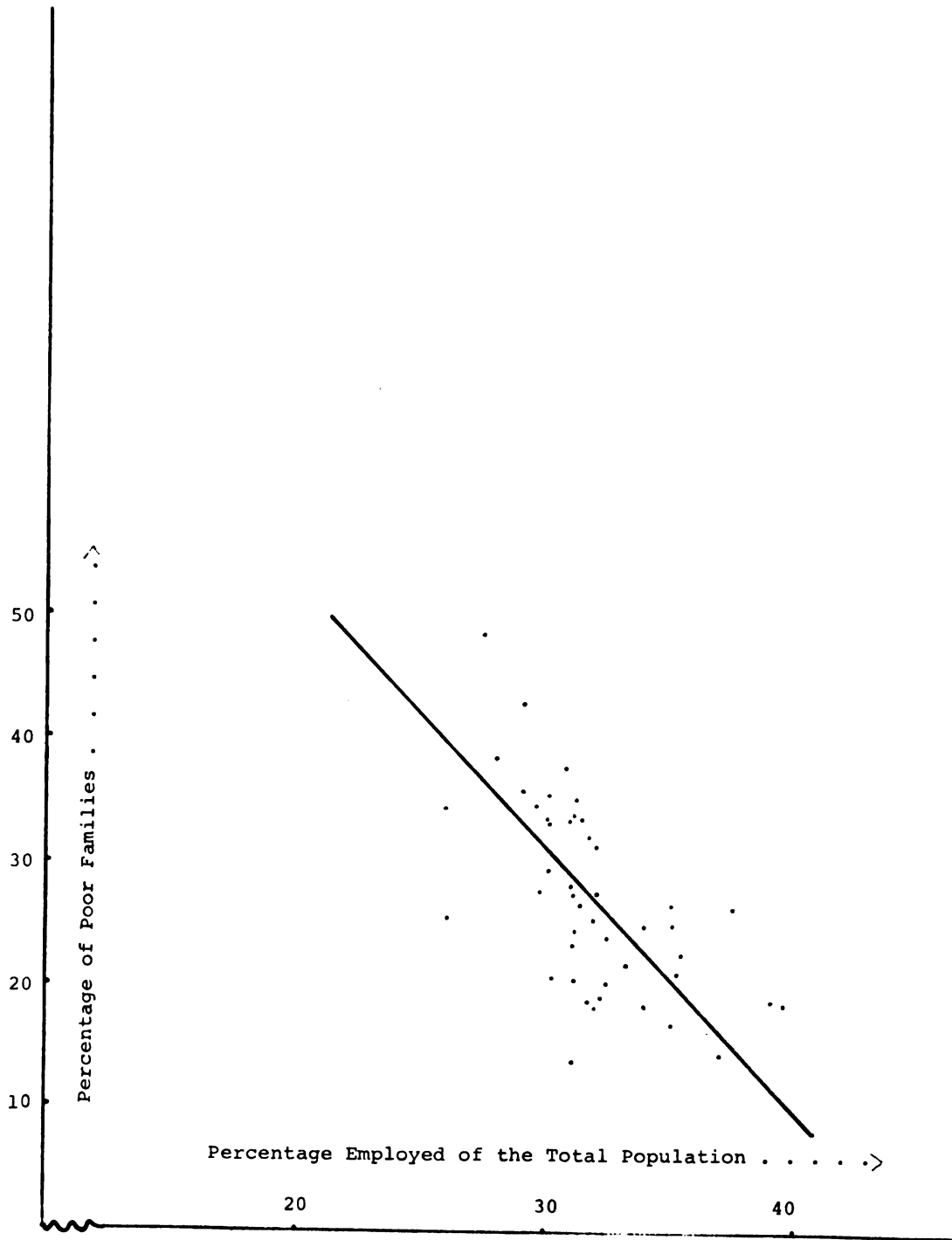


Figure 6.--Relationship of employed population and poverty.

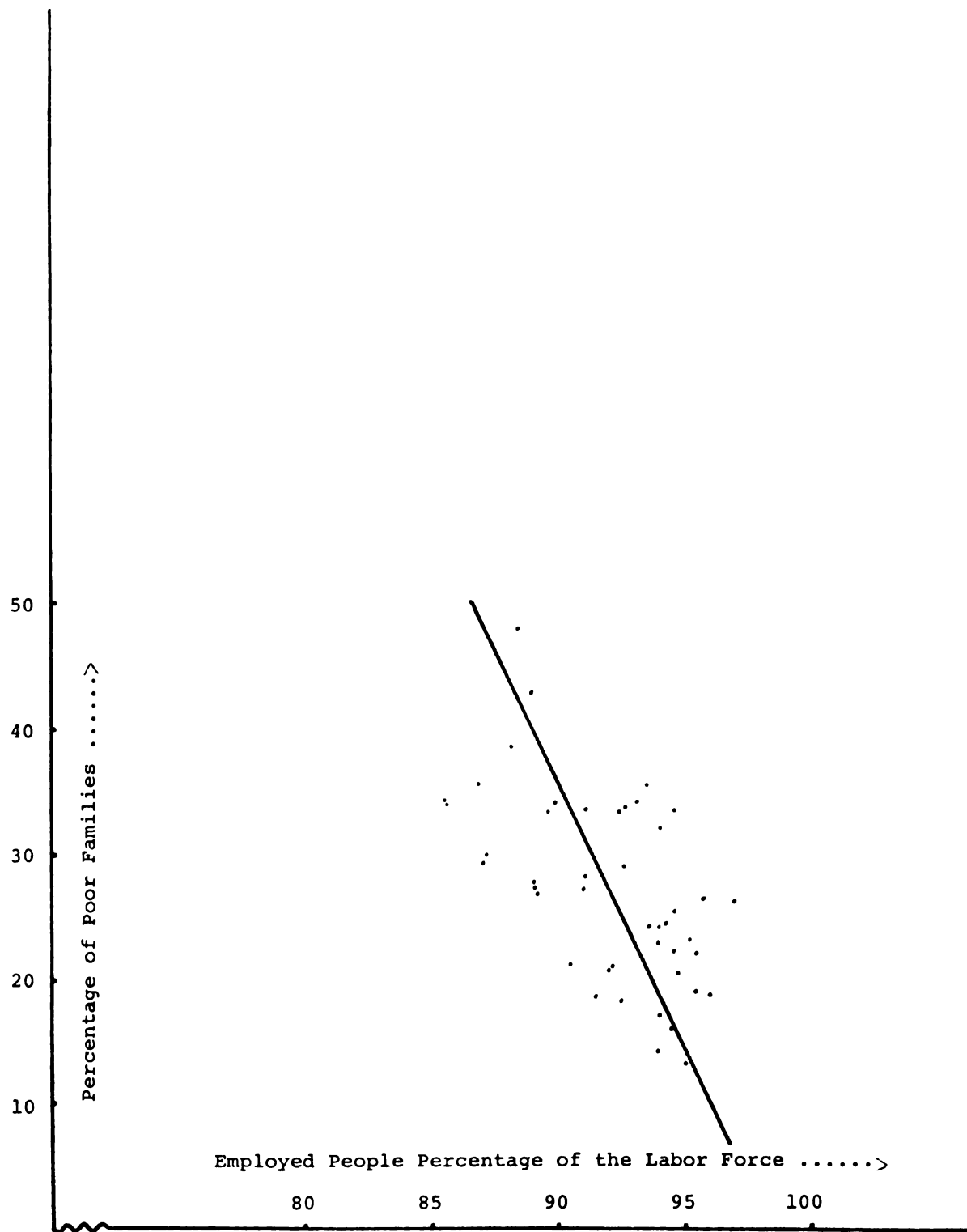


Figure 8.--Percentage of employed persons of the labor force and percentage of poor families.

In any social system, it is a fact that work is the key to economic security of that social system and work opportunities are usually necessary to keep up the economic health. With all the interest in more job opportunities for the poor, it is generally revealed that for many it is not more jobs which are lacking but better job opportunities. Particularly this kind of situation is prevailing in rural areas where mostly low-paying jobs are available. It is just possible that poverty in rural areas may not be the outcome of unemployment only, but also the low-paying jobs. As one would expect, the kind of job held was intimately related to the risk of poverty. The most poverty-prone calling for men is generally farming and unskilled labor and for women workers it is domestic service in rural areas. This is the place where "working poor" work.

Generally, family size is larger in rural areas than the urban, therefore, it is another burden on the family bread-winner. In 1964, reported Mollie Orshansky:

The poverty rate among families rose sharply from 12 percent when there was one child in the home to 49 percent when there were six or more children. And among families with the same total number of persons, those with large numbers of children are more poor than the others because the income tends to go down as the number of children goes up.⁶

⁶Mollie Orshansky, "Who's Who Among the Poor: A Demographic View of Poverty," Social Security Bulletin, XXVIII, 7 (July, 1965), 14.

Unemployment and underemployment which is more common in rural than urban areas affect society's human resources. This was the major point, also, of West's comments cited earlier.⁷

West also mentioned that the important factor responsible for rural poverty is, the rapid growth in agricultural technology because this change forced the labor force to be unemployed and to seek employment in the other sectors of the economy, particularly in urban areas. This migration of unskilled labor created problems in urban areas. When some of this unskilled unemployed labor force could not adjust in urban areas, preferred to return to rural environments they had left. This part of the labor force is probably suffering more because of this back-and-forth shift.

Mostly unemployed labor force in rural areas is suffering from lack of education and lack of training of a certain skill to get jobs. Even the report of the Commission on Rural Poverty places very little emphasis on job retraining aspects of needs in rural education deficiencies, as it concentrated primarily upon educational needs of rural youth but the Commission did emphasize the coordination of all Federal manpower development and training programs under one administration,

⁷See Page 25, Footnote 27.

"That adequate job training opportunities be provided for rural workers to maintain and upgrade their skills and to qualify for better jobs."⁸ The theory of welfare economics states that a perfectly competitive, free enterprise system guarantees the attainment of maximum social welfare. It seems that poverty does exist in this economic system. Schultz⁹ argues that poverty causes discomfort for society and we prefer less poverty to more poverty, which appears that some of the assumptions of a perfectly competitive free enterprise system do not hold in this economic system.

In the last decade many studies have been completed to test the return from education and investment in the human factor of production in this country. Schultz¹⁰ has mentioned that poverty in this country is the result of "long standing chronic disequilibrium rooted in inadequate investment in particular classes of people who are therefore poor," and he further emphasizes more investment in poor people (job training) to correct this disequilibria.

⁸President's Commission on Rural Poverty, People Left Behind.

⁹T. W. Schultz, "Public Approaches to Minimize Poverty," in Poverty Amid Affluence, ed. by Leo Fishman (New Haven: Yale University Press, 1966).

¹⁰Ibid.

Welfare and Poverty¹¹

In the rural counties of the Lower Peninsula, there are a total of 24,420 welfare recipients which are 1.6 per cent of the total population of these counties. The minimum and the maximum number in these counties is 80 (0.8 per cent) and 2,895 (5.5 per cent) recipients, respectively. The mean is 1.8 per cent. These figures have been calculated from monthly average data. The per cent of welfare recipients as an independent variable in regression analysis shows highly significant relationship with the dependent variable. As per cent welfare assistance recipients increases, the percentage of poor people increases and the relationship of simple correlation and multiple regression coefficients is positive which seems logical. It is not only true in these rural counties but even in the nation and the state as a whole. The percentage of people on relief is climbing, no matter what kind of financial assistance is available.

As Charles Schottland, Dean of the Brandies University, School of Social Welfare, says that there are many gaps and the present system of welfare assistance has failed because there are too many people falling into the poverty category. Actually welfare assistance programs

¹¹Data in this section represent the fiscal year ended June, 1967.

are not coping with the problem rather are encouraging the poverty problem. Edmund K. Faltermayer states that:

. . . Yet some of the most deserving poor have received no help at all; the rules work to exclude them. And for those it does cover, the system appears to be counterproductive. It has done almost nothing to rehabilitate people and put them to work, and far from promoting the cohesiveness of families' life, it has tended to encourage the break-up of families . . .¹²

Welfare Programs

The present welfare system is very costly, destructive of pride, self-reliance, incentive of the poor and inefficient. In other words, it is a disease for the healthy economic growth of the nation in the long run. Instead of "welfare," it has been often referred to "illfare."

The most important anti-poverty efforts are direct relief and aid to dependent children and Milton Friedman¹³ explains in the following:

These programs have at least one merit: the people who are assisted for the most part have lower incomes than the people who pay the taxes to finance the programs. This may seem like a trivial or obvious merit. But it is not. Of the great host of so-called welfare programs in the U.S., these are the only programs which unambiguously benefit people with lower incomes than they burden. For some other

¹²Edmund K. Faltermayer, "A Way Out of Welfare Mess," Fortune (July, 1968).

¹³Milton Friedman, "The Case for the Negative Income Tax," in The Republican Papers, ed. by Melvin R. Laird (New York: Doubleday and Company, Inc., 1968).

programs, like Social Security, the redistributive effect is uncertain; for still others, like urban renewal and agricultural price supports, the programs quite clearly benefit with higher incomes than those who pay the cost.

Direct relief and aid to dependent children welfare programs do not have only above-mentioned merit but these are also coupled with some defects. The most important flaw is that there is no incentive because the poor are being taxed 100 per cent as compared with a much lower per cent in the case of the non-poor. If there is any increase in the poor's earned income, his or her relief payment is reduced the same amount.

The second important effect of these kinds of programs is on the personal freedom, dignity and privacy of the poor because they have to expose in detail their private circumstances to qualify for welfare assistance. These programs often are unable to assist people according to their needs and values.

In spite of the above-mentioned welfare programs, there are many others which are also known as public welfare programs. The most important are public housing, old age assistance, unemployment insurance, job training, farm price supports and many others. All of these welfare programs basically support the concept of governmental means.

When we see "the children's allowance" welfare program and the childhood poverty, it can be easily

realized that this is a group of poor which requires the top priority but unfortunately has been most neglected and most shabbily treated by current social welfare policies. Children deserve top priority but unfortunately has been most neglected and most shabbily treated by current social welfare policies. Children deserve top priority in welfare assistance not only because they are dependent and are subject to the risks to adequacy and continuity of income to which all adults are liable but they have also two other reasons. The first one is lost or interrupted income and the second is the size of the families where some of these children are born. The present policies to deal with the childhood poverty which is due to lost or interrupted income of the bread-winner and size of families are inadequate by any criterion. Although children are protected from the loss of a bread-winner through death (old age survivors' disability and health insurance) as far as the bread-winner was a "covered worker") but loss of a bread-winner through separation of parents by divorce, legal separation or the fact that the parents have never been married. About the size of families and the poverty, Mollie Orshansky says;

The poverty rate among families rose sharply from 12 percent when there was one child in the home to 49 percent when there were six or more children. And even among families with the same total number

of children, there are more poor than the others because the income tends to go down as the number of children goes up.¹⁴

Eveline M. Burns¹⁵ mentions three measures to cope with childhood poverty problems: (1) social insurance improvement, (2) public assistance, and (3) negative income tax. He suggests that there is a lot of scope to improve the existing income maintenance system by covering all of the workers with unemployment insurance and temporary disability insurance. He further suggests a liberal policy in case of social insurance coverage, particularly for heavy medical expenses. He supports the argument that at present unemployment insurance covers only four wage earners out of five, while temporary disability insurance is in effect in only four states and nationally for railroad workers only. In the case of public assistance programs, Burns is quite optimistic for the improvements to provide more adequate payments without destroying initiative and self-respect of the recipients.

The third proposal, "Negative Income Tax," amounts to setting the minimum income level for a family of any given size at the sum of deductions and exemptions permitted a family of that size. After the failure of most

¹⁴Orshansky, "Who's Who Among the Poor," Papers on Rural Poverty.

¹⁵Eveline M. Burns, ed., Children's Allowance and the Economic Welfare (Report of a conference, 1968 Citizens' Committee for Children of New York, Inc.).

of the present welfare programs, some other alternatives have been presented. In 1962, Milton Friedman, a conservative economist, spelled out "The Negative Income Tax" approach to cope with the welfare problem. The basic philosophy of this concept is a guaranteed minimum income for everyone through supplement but not replacement. The whole process will be executed through present income tax framework. Milton Friedman explains in the following:

I have termed this device for helping the poor a negative income tax in order to stress its identity in concept and operation with the present income tax by supplementing the income of the poor by a fraction of their unused income tax exemptions and deductions.¹⁶

Friedman explains the advantages of this tax device as:

1. It concentrates public funds on the poor.
2. It treats indigent as responsible individuals, not incompetent wards of the state.
3. It gives indigent an incentive to help themselves.
4. It would cost less than present programs yet help indigent more.
5. It eliminates bureaucracy and political slush fund.

¹⁶Milton Friedman, "The Case for the Negative Income Tax," in The Republican Papers.

Negative income tax proposal as a way of guaranteeing everyone some minimum income is among those currently most fashionable. Many economists and other concerned thinkers are advocating this concept to supplement the income of the poor.

Medical Facilities and Rural Poverty

To examine the relationship between poverty and medical facilities, four independent variables were included in the regression analysis:

- (1) Number of hospital beds
- (2) Number of M.D.'s
- (3) Number of D.O.'s
- (4) Number of nursing homes.

Out of these four variables, only the number of M.D.'s are significantly associated with percentage of poor families.

Lack of medical facilities is an important factor of poverty in rural areas and uneven distribution of medical facilities has been pointed out in the Advisory Commission's Report. Actually, rapid expanding of urban oriented medical technology which needs more complex and expensive equipment and skills is a limiting factor to develop medical resources in rural areas. Because of this complex medical technology development, medical resources are being centralized in urban centers.

What happens when the population is short of personnel and facilities for health care? The shortage of health personnel and medical facilities create very many disadvantages for the rural disadvantaged population in case of high illness rates and an accumulation of physical defects. Research results from a wide range of studies show that the rural population of this nation has a higher incidence of almost all types of illnesses than urban population.

Shortage of medical care results general illness of population which has left so many rural areas exhausted and poor, both economically and culturally. Poverty and illness are often so much interwoven that it is difficult to determine which comes first. Studies have shown the following:

Disease and premature death are startlingly high among the rural poor. Infant mortality, for instance, is far higher among the rural poor than among the least privileged group in the urban areas. Chronic diseases also are common among both young and old. And medical and dental care are conspicuously absent.¹⁷

Similarly other studies reveal disadvantages in health situations of rural areas. For example, prevalence of chronic illness, infant mortality rates, days lost from illness, preventive measures, draft rejection rates, etc.

¹⁷President's Commission on Rural Poverty, People Left Behind, p. x.

Health care needs generally are greater in rural areas and the following factors differentiate the rural population from urban residents. The first factor is the higher percentage of poor families in rural areas. In the rural counties of the Lower Peninsula the minimum and maximum proportion of poor families is 13.6 per cent and 48.0 per cent, respectively. The average percentage of poor families per county is 27.1 whereas in urban (SMSA) counties the minimum and the maximum percentage is only 9.4 and 22.4. The average in this area is 14.3 per cent of families which are below the poverty line. The second factor is age distribution. In rural areas there are more aged persons and children and there are fewer persons of working age as compared to the urban counties. In rural counties which are under study there is 5.2 and 19.1 per cent population minimum and maximum, respectively, which is sixty-five years old and over. The mean is 11.4 per cent. In urban counties, it ranges from 4.3 to 9.4 per cent sixty-five years old and older. The average is 7.7 per cent. The third point which differentiates rural and urban residents in the case of their health care needs is the average level of education. In rural areas, levels of education are much lower than in urban centers. Educated people are more aware about the health care and are more conscious about their health. Urbanites, which are more educated, have better attitudes about health care. Doherty says that:

Even when allowances are made for the greater proportion of older persons living in rural areas, the incidence of such activity-limiting conditions increases with rurality. Farmers, in particular, experience a high rate of chronic illness--use of health services, as distinct from need for such services, is influenced by education. Because of their low level of education, rural people--especially the poor--are less likely than more highly educated people to utilize advice about nutrition, hygiene, immunization, prenatal care, and periodic check-ups and other health aids.¹⁸

Medical services tend to locate in urban areas because of rural environment which discourage whereas urban environments encourage the location of physicians. The low income and sparcity of rural population is another disadvantage to attract the physicians in rural areas.¹⁹ The present situation of health facilities in rural and urban counties in Michigan confirms the statements. In rural counties of the Lower Peninsula the minimum and the maximum number of M.D.'s per thousand of population are 0.00 and 1.970, respectively; and the mean is 0.627 M.D.'s per thousand population. In the case of urban counties (SMSA) the range of numbers of M.D.'s per thousand population is 0.347 to 3.729, and the average number of M.D.'s per thousand people is one.

¹⁸Neville Doherty, Rurality, Poverty, and Health, U.S., Department of Agriculture, Medical Problem in Rural Areas, Agricultural Economics Report No. 172 (Washington, D.C.: Government Printing Office, 1970), p. 2.

¹⁹U.S., Congress, Senate, Hearing before the Subcommittee on Monopoly of the Select Committee on Small Business, "Competitive Problems in Drug Industry," in Income Opportunities and Physician Location in the U.S., by Steele and Rimlinger, 90th Cong., Part 5, December 14, 9, 1967; January 18, 19 and 25, 1968, pp. 2,012-24.

Similarly, in case of general hospital beds, they range from 0.000 to 9.990 beds per thousand people in rural counties, whereas in urban counties, the range is 1.163 to 8.126. The mean is 3.330 and 3.450 in rural and urban counties, respectively. The range for nursing homes is 0.000 to 8.053 and 1.401 and 4.581 per thousand population in rural and urban counties of the Lower Peninsula. The average nursing homes is 2.602 in rural counties and 2.550 in urban counties which is a little better situation as compared to M.D.'s and general hospital beds in rural counties.²⁰ It seems that rural people generally have higher birth rate than the urban residents, therefore they need more nursing homes per thousand population.

General County Revenue and Poverty

In our analysis general (per capita) county revenue²¹ is significantly related to the dependent variable (percentage of poor people). Counties with larger percentage of poor families have more per capita general revenue perhaps because these counties get higher grants for welfare programs from the state and the federal governments (Figure 9), County revenue from

²⁰The data on medical facilities were obtained from the U.S. Department of Agriculture, Economic Research Service, Economic Division, located at Michigan State University, East Lansing, Michigan.

²¹For definition see page 13.

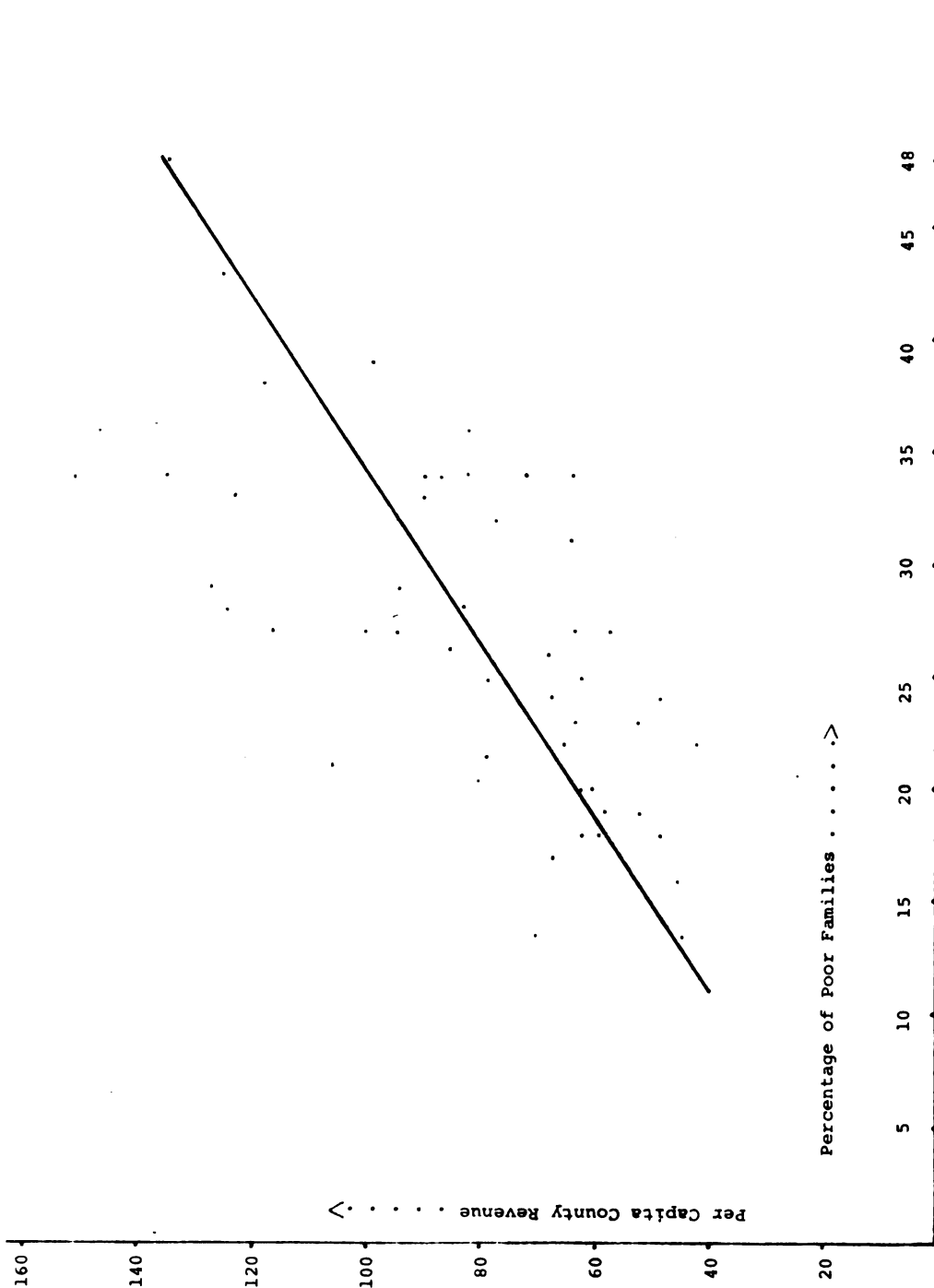


Figure 9.--Per capita county revenue and percentage of poor families.



local sources and taxes which people pay do not show the above significant relationship with percentage of poor families.

CHAPTER IV

SUMMARY AND CONCLUSION

This study is an exploratory effort to know more of the dimensions of the rural poverty in the Lower Peninsula of Michigan. The main emphasis is to expose some of the aspects of this problem which may help to provide information to those who want to consider this problem in detail. The major considerations have been focused on the following three purposes:

- A. The first purpose of this study is to measure the differences if any, in material and services between the areas with lower and higher percentage of poor families.
- B. The second purpose is to study the relationship of socioeconomic characteristics with the percentage of poor families in the rural area.
- C. The third purpose of this work is to review some of the current and proposed anti-poverty policies in the light of the above relationships.

The definition of poverty is a controversial topic and many people do not agree on any one concept. It is also not possible for a complete agreement on a dictionary definition because it refers vaguely to "insufficiency of means" which we cannot translate into money units. If we define poverty in terms of money, then it can be compared with the money available to a family with the money it needs to spend during a given year. By this way it necessitates, while counting the poor, complete information regarding assets, annual earned and unearned incomes, and cash expenditure needs of the family. Only earned and unearned cash data are available in dollar terms, therefore, the measurement of poverty is likely to be based on cash-income criterion. There is disagreement on this criterion but it is a most acceptable tool to measure the problem in the absence of any other unani- mously accepted approach.

Therefore, the total money income line will be considered (\$3,000 established by the Social Security Administration) as a reference point in this study because it is the only one for which time series by relevant demographic characteristics are available.

To examine the difference in services and material between the means of two groups of counties with lower and higher percentage of poor families, t test a statis- tical approach was applied. Forty-two socio-economic

characteristics were included in this test. Out of these forty-two only twenty variables are significantly different while the other twenty-two variables do not have any significant difference between two groups.

The coefficient of localization analysis shows that poverty and some other factors of poverty like employment in different industries is not concentrated in the rural counties of Lower Peninsula. Poverty is almost evenly distributed as the total population throughout the area under study.

To examine the relationship of socio-economic characteristics and poverty (percentage of poor families) multiple regression analysis was conducted. This analysis shows that there are eleven independent variables which are significantly associated with the dependent variable at the 5 per cent level of significance. These are:

1. Total population, 1960
2. Per cent of population 65 years and over
3. Per capita general county revenue
4. Social welfare recipients (per cent of the total population)
5. Medical doctors per 1,000 population
6. Per cent employed in mining (percentage of the total population)
7. Per cent employed in construction

8. Per cent employed in manufacturing
9. Per cent employed in utilities
10. Per cent employed in other services
11. Total employment

The above independent variables explain 92 per cent of the variation in percentage of poor families in fifty-one rural counties in Lower Peninsula in the state of Michigan.

Total population is positively related with poverty. If we increase total population 10 per cent, the percentage of poor families will change 1.2 per cent. A 10 per cent increase in the percentage of population sixty-five years or older would change the percentage of poor families 1.7 per cent.

The total number of employed persons as one of the independent variables negatively related with the dependent variable both in simple correlation and multiple regression coefficient. Employment in mining, construction, manufacturing, utilities, and other services (percentage of the total employment) have the same relationship as the total employment. This negative relationship between dependent variable and the employed population shows that if we increase 10 per cent of the total employment we can decrease 0.8 per cent poverty. This relationship seems to be logical because more job opportunities will increase the level of income. In rural

areas mostly family size is larger, therefore, if there are more employment opportunities in rural areas the children will help more to increase the income of the family bread-winner.

The percentage of welfare recipients as an independent variable in correlation analysis shows highly significant relationship with the dependent variable (poverty). As per cent welfare assistance recipients increase, the percentage of poor people increases. This positive relationship in both simple and multiple regression coefficient was expected.

As Charles Schottland, Dean of the School of Social Welfare, Brandeis University, says that there are very many gaps and the present welfare system has failed because there are too many people failing in the category of welfare recipients. Actually welfare assistance programs are not coping with the problem rather are encouraging the poverty problem. Edmund K. Faltermayer states that:

. . . yet some of the most deserving poor have received no help at all; the rules work to exclude them. And for those it does cover, the system appears to be counter productive. It has done almost nothing to rehabilitate people and put them to work, and far from promoting the cohesiveness of family life, it has tended to encourage the break-up of families.¹

¹Faltermayer, "A Way Out of Welfare Mess."

As Harold Watts² mentioned in his speech, the present public assistance programs are not successful to achieve their objectives. He illustrates the following defects in the present anti-poverty programs.

1. It has led to excluding nearly three-fourths of the poor from assistance.
2. It provides a situation in which a father can best serve his family by deserting it.

Such adverse incentives are a hazard with any categorical approach that is based upon characteristics of the family that can be changed at the option of the family. But on the other hand it is hard to find a set of programs to eliminate poverty that does not include a universal as opposed to a categorical system of income guarantees and supplements.

Employment opportunities, training and retraining, education, medical facilities, and other social services are indispensable parts of an effective anti-poverty program and no one program can eliminate all poverty alone. The most economical program requires a careful blending of many approaches.

. . . A successful antipoverty effort must include a comprehensive income maintenance program which can

²Harold Watts, Director Institute for Research on Poverty, University of Wisconsin, presented his paper before the Senate Sub-committee to Discuss the Welfare System and Proposals for Reform, in Welfare Reform: Problems and Solutions (Madison, N.D.: University of Wisconsin Institute for Research on Poverty), p. 108.

serve all the poor. A universal income maintenance scheme must both support and encourage individual efforts to improve this situation. An income-conditioned cash benefit, usually termed the negative income tax, can accomplish our objectives and seems superior to the principal alternatives that have been suggested.³

To examine the relationship between poverty and medical facilities the regression analysis shows that number of medical doctors and the percentage of poor families are negatively related. It means that if we increase number of doctors 10 per cent we can decrease poverty 0.9 per cent. What happens when the population is short of personnel and facilities for health care? The shortage of health personnel and medical facilities create numerous disadvantages for the rural disadvantaged population in case of high illness rate and an accumulation of physical defects which decrease the income level of the population. Poverty and illness are often so interwoven that it is difficult to determine which comes first.

General county revenue and poverty (percentage of poor families) are positively related in our analysis which does not seem logical because the general county revenue is not only from the local sources. It also includes grants from state and federal governments for different functions. Therefore, general county revenue is not all contribution of the population and that is why

³Ibid., p. 111.

we can argue that the above positive relationship is not meaningful. The only argument which favors this relationship is that counties which have more poor families perhaps get more grants for welfare programs and such other activities.

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APPENDICES

APPENDIX A

DISTRIBUTION OF POVERTY AND POPULATION

APPENDIX A

DISTRIBUTION OF POVERTY AND POPULATION

County	Total Population	$\frac{E_j}{E}$	Total Poor	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$
	(000)		(000)		
Midland	51.4	.03	7,140	.02	-.01
Calhoun	138.8	.09	19,460	.06	-.03
Berrien	149.9	.09	24,160	.07	-.02
Shiawassee	53.4	.03	9,010	.03	0
Lenawee	77.8	.05	14,040	.04	-.01
Livingston	38.2	.02	6,840	.02	0
Alpena	28.6	.02	5,220	.02	0
St. Joseph	42.3	.03	7,980	.02	-.01
Allegan	57.7	.04	11,020	.03	-.01
Cass	36.9	.02	7,400	.02	0
St. Clair	107.2	.03	21,400	.06	-.01
Barry	31.7	.02	6,400	.02	0
Gr. Traverse	33.4	.02	6,930	.02	0
Manistee	19.0	.01	3,990	.06	0
Ionia	43.1	.03	9,460	.02	0
Branch	34.9	.02	7,700	.02	0
Gratiot	37.0	.02	8,510	.02	0
Tuscola	43.3	.03	9,890	.03	0
Isabella	35.3	.02	8,400	.02	0
Van Buren	48.4	.03	11,520	.03	0
Wexford	18.5	.01	4,500	.01	-.01
Mason	21.9	.01	5,500	.02	+.01
Presque Isle	13.1	.01	3,380	.01	0
Iosco	16.5	.01	4,160	.01	0
Hillsdale	34.7	.02	9,450	.03	+.01
Montcalm	35.8	.02	9,720	.03	+.01
Emmet	15.9	.01	4,320	.01	0
Charlevoix	13.8	.01	3,780	.01	0
Otsego	7.5	.01	1,890	.01	0
Oceana	16.5	.01	4,480	.01	0
Benzie	7.8	.01	2,240	.01	0
Crawford	4.9	.00	1,450	.00	0
Newaygo	24.2	.02	6,960	.02	0
Osceola	13.6	.01	4,340	.01	0
Sanilac	32.3	.02	10,240	.03	+.01
Gladwin	10.8	.01	3,630	.01	0
Roscommon	7.2	.01	2,310	.01	0
Leelanau	9.3	.01	3,060	.01	0
Mecosta	21.0	.01	7,140	.02	+.01
Arenac	9.8	.01	3,700	.01	0
Clare	11.6	.01	4,080	.01	0

APPENDIX B

DISTRIBUTION OF DIFFERENT INDUSTRIES
AND TOTAL EMPLOYMENT

APPENDIX B
DISTRIBUTION OF DIFFERENT INDUSTRIES
AND TOTAL EMPLOYMENT

County	Total Employment	$\frac{E_j}{E}$	Agri-culture	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$	Con-struction	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$	Manu-facturing	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$
Midland	16.3	.028	.48	.009	-.019	0.96	.034	+.006	8.5	.047	+.019
Calhoun	51.6	.089	1.87	.036	-.053	2.13	.075	-.014	18.6	.104	+.015
Barrien	56.4	.098	4.16	.080	-.018	2.73	.096	-.002	23.9	.133	+.035
Shiawassee	18.9	.033	1.41	.027	-.006	0.80	.028	-.005	7.7	.043	+.010
Lenawee	26.3	.046	2.34	.045	-.001	0.97	.034	-.012	10.6	.059	+.013
Livingston	13.2	.023	1.27	.024	+.001	0.83	.028	+.005	4.2	.023	0
Alpena	9.2	.016	0.59	.011	-.005	0.51	.018	+.002	3.5	.019	+.003
St. Joseph	16.5	.029	1.32	.026	-.003	0.78	.027	-.002	7.0	.039	+.010
Allegan	19.9	.034	2.46	.048	+.014	1.19	.042	+.008	7.9	.044	+.010
Cass	12.8	.022	1.31	.025	+.003	0.67	.024	+.002	5.2	.029	+.007
St. Clair	35.0	.061	2.13	.041	-.020	1.87	.066	+.005	11.6	.065	+.004
Barry	11.4	.019	1.39	.027	+.009	0.62	.022	+.003	4.5	.023	+.004
Gr. Traverse	10.2	.018	0.71	.014	-.004	0.58	.020	+.002	1.9	.011	-.007
Manistee	6.4	.011	0.44	.008	-.003	0.43	.015	+.004	2.4	.013	+.002
Ionia	13.7	.024	1.67	.032	+.008	0.54	.019	-.005	5.3	.029	+.005
Branch	12.5	.022	1.48	.028	+.006	0.54	.019	-.003	3.7	.021	-.001
Gratiot	12.6	.022	1.65	.032	-.010	0.54	.019	-.003	3.9	.021	-.001
Tuscola	13.9	.022	2.54	.049	+.027	0.67	.024	+.002	4.1	.023	+.001
Isabella	11.6	.020	1.33	.026	+.006	0.67	.024	+.004	2.2	.012	-.008
Van Buren	17.2	.030	2.47	.053	+.023	1.14	.040	+.010	5.8	.032	+.002
Wexford	6.3	.011	0.27	.005	-.006	0.37	.013	+.002	1.9	.011	0
Mason	7.4	.013	0.75	.014	+.001	0.39	.013	0	2.2	.012	-.001
Presque Isle	4.2	.007	0.64	.014	+.007	0.17	.001	-.006	0.5	.002	-.005
Iosco	4.4	.007	0.32	.006	-.001	0.45	.015	+.008	0.8	.004	-.003
Hillsdale	12.3	.022	1.85	.036	+.014	0.60	.021	-.001	3.9	.021	-.001
Montcalm	13.6	.022	1.67	.032	+.010	0.58	.020	-.002	4.8	.023	+.001
Emmet	51.7	.090	0.37	.007	-.083	0.47	.017	-.073	0.7	.003	-.087
Charle-voix	4.3	.007	0.39	.007	0	0.32	.011	+.004	1.2	.006	-.001
Otsego	2.4	.004	0.21	.004	0	0.18	.006	+.002	0.6	.003	-.001
Oceana	4.9	.007	0.97	.019	+.010	0.27	.009	+.002	1.7	.009	+.002
Benzie	2.5	.004	0.27	.005	+.001	0.16	.005	+.001	0.5	.002	-.002
Crawford	1.6	.002	0.03	.002	0	0.11	.002	0	0.4	.002	0
Newaygo	7.4	.013	1.13	.022	+.019	0.39	.013	0	2.6	.014	+.001
Osceola	4.6	.007	0.76	.014	+.007	0.29	.010	+.003	1.4	.008	+.001
Sanilac	10.9	.019	3.27	.063	+.044	0.47	.017	-.002	2.8	.016	-.003
Gladwin	3.3	.005	0.59	.011	+.006	0.29	.010	+.005	0.9	.005	0
Roscommon	2.2	.004	0.06	.002	-.002	0.30	.011	+.006	0.3	.001	-.003
Leelanau	2.9	.004	0.54	.011	+.007	0.25	.009	+.005	0.5	.002	-.002
Mecosta	6.7	.011	0.79	.015	+.004	0.34	.011	0	1.4	.008	-.003
Arenac	3.2	.005	0.48	.009	+.004	0.19	.007	+.002	0.8	.005	0
Clare	3.6	.005	0.32	.006	+.001	0.29	.010	+.005	1.1	.005	+.005
Oscoda	1.1	.001	0.15	.003	+.002	0.15	.001	0	0.2	.001	0
Antrim	3.2	.005	0.48	.009	+.004	0.25	.009	+.004	0.9	.005	0
Alcona	1.9	.004	0.29	.005	+.001	0.23	.008	+.004	0.3	.001	-.003
Cheboygan	3.9	.006	0.33	.006	0	0.47	.017	+.011	0.7	.003	-.003
Huron	10.3	.018	0.30	.006	-.012	0.48	.019	+.001	1.8	.010	-.008
Kalkaska	1.3	.001	0.16	.003	+.002	0.13	.001	0	0.4	.001	0
Missaukee	2.1	.009	0.58	.011	+.017	0.10	.001	-.003	0.4	.001	-.003
Ogemaw	2.8	.005	0.39	.008	+.003	0.21	.007	+.002	0.6	.005	0
Montmorency	1.3	.001	0.19	.004	+.003	0.15	.001	0	0.2	.001	0
Lake	1.5	.001	0.17	.003	+.002	0.18	.007	+.006	0.3	.001	0
TOTAL	575.4		51.76			28.40			179.3		

- .230
+.276

- .133
+.126

- .145
+.150

The Coefficient of Localization = $L_i = .0025$.0013 .0015

Formula:

$(e_{ij} - e_j) > 0$

$j (e_{ij} - e_j) / 100$ for either

$(e_{ij} - e_j) < 0$

County	Utilities	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$	Mining	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$	Business and Personal Services	$\frac{E_{ij}}{E_i}$	$\frac{E_{ij}}{E_i} - \frac{E_j}{E}$
Midland	0.53	.019	-.009	0.06	.020	-.006	1.08	.029	+.001
Calhoun	2.81	.099	+.010	0.15	.050	-.029	3.57	.096	+.007
Berrien	2.79	.099	+.010	0.05	.017	-.080	3.94	.106	+.008
Shiawassee	1.51	.054	+.021	0.03	.010	-.023	1.19	.032	-.001
Lenawee	1.06	.038	-.008	0.03	.010	-.036	1.76	.048	+.002
Livingston	0.57	.020	-.003	0.12	.040	+.017	0.89	.024	+.001
Alpena	0.39	.014	-.002	0.08	.027	+.011	0.58	.016	0
St. Joseph	0.71	.025	-.004	0.01	.003	-.026	1.01	.027	-.002
Allegan	0.75	.026	-.008	0.09	.030	-.004	1.27	.034	0
Cass	0.64	.023	+.001	0.00	.000	-.022	0.85	.023	+.001
St. Clair	3.44	.122	+.061	0.14	.047	-.014	2.58	.069	+.008
Barry	0.43	.015	-.004	0.03	.010	-.009	0.63	.017	-.002
Gr. Traverse	0.72	.026	+.008	0.01	.003	-.015	0.90	.024	+.006
Manistee	0.45	.016	+.005	0.01	.003	-.008	0.39	.010	-.001
Ionia	0.44	.016	-.008	0.00	.000	-.024	0.78	.021	-.003
Branch	0.57	.020	-.002	0.01	.003	-.019	0.93	.025	+.003
Gratiot	0.72	.026	+.004	0.05	.017	-.005	0.91	.024	+.002
Tuscola	0.57	.020	-.002	0.04	.013	-.007	0.78	.021	-.001
Isabella	0.39	.014	-.006	0.33	.110	+.090	0.96	.026	+.006
Van Buren	0.82	.029	-.001	0.02	.007	-.023	1.04	.028	-.002
Wexford	0.41	.014	+.003	0.00	.000	-.011	0.54	.014	+.003
Mason	0.86	.030	+.017	0.00	.000	-.013	0.46	.012	-.001
Presque Isle	0.65	.023	+.016	0.73	.256	+.249	0.19	.005	+.002
Iosco	0.31	.011	+.004	0.08	.026	+.019	0.45	.012	+.005
Hillsdale	0.52	.018	-.004	0.14	.046	+.024	0.79	.021	-.001
Montcalm	0.48	.017	-.005	0.03	.010	-.012	0.69	.020	-.002
Emmet	0.34	.012	-.078	0.00	.000	-.090	0.57	.019	-.071
Charlevoix	0.19	.007	0	0.00	.000	-.007	0.54	.014	+.007
Otsego	0.08	.003	-.001	0.00	.000	-.004	0.31	.008	+.004
Oceana	0.17	.006	+.001	0.06	.020	+.013	0.28	.008	+.001
Benzie	0.41	.014	+.010	0.00	.000	-.004	0.19	.005	+.001
Crawford	0.06	.002	0	0.00	.000	-.002	0.19	.005	+.003
Newaygo	0.39	.014	+.001	0.03	.010	-.003	0.49	.013	0
Osceola	0.25	.008	-.001	0.11	.037	+.030	0.32	.009	-.002
Sanilac	0.44	.016	-.003	0.05	.017	0	0.60	.016	-.003
Gladwin	0.04	.001	-.004	0.05	.017	+.015	0.27	.007	+.002
Roscommon	0.12	.004	0	0.05	.017	+.016	0.22	.006	+.002
Leelanau	0.09	.003	-.001	0.00	.000	-.004	0.27	.007	+.003
Mecosta	0.45	.016	+.005	0.06	.020	+.010	0.57	.019	+.008
Arenac	0.15	.005	0	0.10	.033	+.028	0.23	.006	+.001
Clare	0.18	.006	+.001	0.09	.030	+.025	0.31	.009	+.004
Oscoda	0.06	.002	+.001	0.00	.000	-.001	0.08	.002	+.001
Antrim	0.11	.003	+.002	0.00	.000	-.005	0.30	.008	+.003
Alcona	0.07	.002	-.002	0.00	.000	-.004	0.18	.005	+.001
Cheboygan	0.23	.008	+.002	0.01	.003	-.006	0.48	.013	+.007
Huron	0.45	.016	-.002	0.06	.020	+.002	0.70	.019	-.001
Kalkaska	0.05	.002	+.001	0.00	.000	-.001	0.09	.002	+.001
Missaukee	0.04	.001	-.003	0.02	.006	+.002	0.12	.003	-.001
Ogemaw	0.13	.005	0	0.07	.023	+.018	0.25	.007	+.002
Montgomery	0.03	.001	0	0.00	.000	-.001	0.14	.003	+.002
Lake	0.08	.003	+.002	0.01	.003	+.002	0.25	.007	+.006
TOTAL	28.20			3.00			37.03		

Formula: $(e_{ij} - e_j) > 0$
 $L_i = E_j [e_{ij} - e_j] / 100$ for either or
 $(e_{ij} - e_j) < 0$

-.163	-.518	-.094
+.184	+.570	+.093

The Coefficient of Localization

$L_i = .0017$.0054	.0009
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APPENDIX C

Y VALUE CALCULATIONS

APPENDIX C

Y VALUE CALCULATIONS

$$\begin{aligned} Y &= 41.243 + 0.137 \times 30.473 + 0.524 \times 11.390 + 0.047 \\ &\quad \times 82.863 + 3.229 \times 1.847 - 4.364 \times 0.627 - 0.394 \\ &\quad \times 0.946 - 0.627 \times 6.564 - 0.489 \times 28.144 - 0.065 \\ &\quad \times 5.155 - 0.396 \times 11.599 - 0.459 \times 11.282 = \underline{\underline{33.844}} \end{aligned}$$

$$\begin{aligned} Y_1 &= \Delta X_1 10\% \text{ while } X_2 \rightarrow X_{11} \text{ are constant} = \frac{Y + b_1 \Delta X_1}{Y} \\ &= \frac{33.844 + 0.137 \times 3.047}{33.844} = 1.012 \end{aligned}$$

$$\text{Per cent change} = 1.012 \times 100 - 100 = 1.2\%$$

$$\begin{aligned} Y_2 &= \Delta X_2 10\% \text{ while } X_1, X_3 \rightarrow X_{11} \text{ are constant} = \frac{Y + b_2 \Delta X_2}{Y} \\ &= \frac{33.844 + 0.524 \times 1.139}{33.844} = 1.017 \end{aligned}$$

$$\text{Per cent change} = 1.017 \times 100 - 100 = 1.7\%$$

$$Y_3 = \Delta X_3 10\% \text{ while } X_1, X_2, X_4 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_3 \Delta X_3}{Y}$$

$$= \frac{33.844 + 0.047 \times 8.286}{33.844} = 1.011$$

$$\text{Per cent change} = 1.011 \times 100 - 100 = 1.1\%$$

$$Y_4 = \Delta X_4 10\% \text{ while } X_1 \rightarrow X_3, X_5 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_4 \Delta X_4}{Y}$$

$$= \frac{33.844 + 3.229 \times 0.185}{33.844} = 1.018$$

$$\text{Per cent change} = 1.018 \times 100 - 100 = 1.8\%$$

$$Y_5 = \Delta X_5 10\% \text{ while } X_1 \rightarrow X_4, X_6 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_5 \Delta X_5}{Y}$$

$$= \frac{33.844 - 4.364 \times 0.063}{33.844} = 0.992$$

$$\text{Per cent change} = 0.992 \times 100 - 100 = 0.9\%$$

$$Y_6 = \Delta X_6 10\% \text{ while } X_1 \rightarrow X_5, X_7 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_6 \Delta X_6}{Y}$$

$$= \frac{33.844 - 0.394 \times 0.095}{33.844} = 0.998$$

$$\text{Per cent change} = 0.998 \times 100 - 100 = 0.9\%$$

$$Y_7 = \Delta X_7 10\% \text{ while } X_1 \rightarrow X_6, X_8 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_7 \Delta X_7}{Y}$$

$$= \frac{33.844 - 0.627 \times 0.656}{33.844} = 0.988$$

$$\text{Per cent change} = 0.988 \times 100 - 100 = 0.8\%$$

$$\begin{aligned}
 Y_8 &= \Delta X_8 10\% \text{ while } X_1 \rightarrow X_7, X_9 \rightarrow X_{11} \text{ are constant} = \frac{Y - b_8 \Delta X_8}{Y} \\
 &= \frac{33.844 - 0.489 \times 2.814}{33.844} = 0.959
 \end{aligned}$$

$$\text{Per cent change} = 0.959 \times 100 - 100 = 0.6\%$$

$$\begin{aligned}
 Y_9 &= \Delta X_9 10\% \text{ while } X_1 \rightarrow X_8, X_{10}, X_{11} \text{ are constant} = \frac{Y - b_9 \Delta X_9}{Y} \\
 &= \frac{33.844 - 0.065 \times 0.516}{33.844} = 0.999
 \end{aligned}$$

$$\text{Per cent change} = 0.999 \times 100 - 100 = 0.9\%$$

$$\begin{aligned}
 Y_{10} &= \Delta X_{10} 10\% \text{ while } X_1 \rightarrow X_9, X_{11} \text{ are constant} = \frac{Y - b_{10} \Delta X_{10}}{Y} \\
 &= \frac{33.844 - 0.396 \times 1.159}{33.844} = 0.986
 \end{aligned}$$

$$\text{Per cent change} = 0.986 \times 100 - 100 = 0.8\%$$

$$\begin{aligned}
 Y_{11} &= \Delta X_{11} 10\% \text{ while } X_1 \rightarrow X_{10} \text{ are constant} = \frac{Y - b_{11} \Delta X_{11}}{Y} \\
 &= \frac{33.844 - 0.459 \times 1.128}{33.844} = 0.985
 \end{aligned}$$

$$\text{Per cent change} = 0.985 \times 100 - 100 = 0.8\%$$

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