AN ANALYSIS OF INTER-COMMUNITY INCOME DIFFERENTIALS

IN AGRICULTURE IN THE UNITED STATES

By

Wilfrid Keith Bryant

AN ABSTRACT OF A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
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ABSTRACT

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Data from the 1960 Census of Population were used in a cross-section regression analysis of factors affecting inter-community income differentials in agriculture. The median income of white rural farm families per county was analyzed for each division, region, and for the conterminous United States. Median income of nonwhite rural farm families per county was analyzed only for the South. The median earnings of male farmers and farm managers per county was analyzed for each division and for the nation.

Of the factors studied, the relative prevalence of functional illiterates among rural farm males in a county (those 25 years of age and over who had completed 0-6 years of school) was the most important determinant of the median income of white rural farm families per county for the nation as a whole. It was the second most important determinant of the median earnings of farmers per county for the nation. In both cases the relationship was negative. In equations fitted at the divisional and regional levels, functional illiteracy was a relatively unimportant determinant of earnings and income levels.

For each division (except the Middle Atlantic) and for the nation, the most important determinant of median earnings of farmers

was the average value of land and buildings per farm in a county; the higher the average value, the higher the median earnings. The average value of land per farm in a county was not important in determining income levels of white rural farm families.

For most divisions, each region, and for the nation, the closer was a county to a large city, the higher was the income level of white rural farm families. The same relationship held for income levels of nonwhite rural farm families among Southern communities. Except for the Northeast, city size in conjunction with distance accounted for more variation in income levels among communities than did distance alone.

East of the Mississippi River the closer was a county to large cities, the higher was median earnings of farmers. This relationship did not hold west of the Mississippi or for the nation. Distance accounted for as much of the variance in median earnings as did distance in conjunction with city size. Thus, proximity to large cities was much more important relative to other variables in determining income levels of farm families than it was in determining earnings levels of farmers.

The male unemployment rate was third most important in determining the income level of white rural farm families and earnings levels of farmers for the nation. It was quite important in both equations at the divisional and regional levels. It was less important in the South than elsewhere, and was not a determinant of the income level of nonwhite farm families in Southern communities.

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Other factors studied with respect to either income or earnings levels were the age distribution of rural farm males, farm family size, the relative prevalence of farmers, farm laborers, craftsmen, operatives, employed females, and nonwhite farmers. These were relatively unimportant determinants of income and earnings levels.

In summary, a relative prevalence of functional illiteracy, a relative lack of nonfarm employment opportunities for farm residents, and a low average value of land and buildings per farm in a county all result in low earnings and income levels. With respect to farm families in communities for the nation, and with respect to farmers in communities east of the Mississippi, the remoteness of the community from industrial-urban concentrations is an important cause of low income and earnings levels.

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The responsibility for any errors or omissions remains with the writer.

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CHAPTER I

THE PROBLEM OF INTER-COMMUNITY INCOME DIFFERENTIALS IN AGRICULTURE

The Problem Introduced

Over a decade has passed since T. W. Schultz lamented "the state of ideas held and cherished with regard to poverty within agriculture."[1] The problem posed by Schultz was that of explaining the wide disparities which exist among the incomes of agricultural communities. For, the explanation of poverty, whether of agricultural communities, families, or persons, entails explaining why some communities, families, or persons receive less income than others.

The intervening years have seen significant research carried out on the causes of inter-community income differentials within agriculture. Clearly, the problem of poverty has been and remains most poignant in the southern states. And, not unnaturally, most of the analysis of inter-community income differentials has been for areas in the South. Income variation among agricultural communities is great in any region in the country, however. Little research has been carried out for other areas than the South. At the regional and national level some work of a rather cursory nature has been published. It has

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[1] T. W. Schultz, "Reflections on Poverty within Agriculture," Journal of Political Economy, Vol. 58, No. 1, February, 1950, pp. 1-15.

emphasized the effect of urbanization on income variation among rural communities. No intensive study of the large income variations among rural communities has been conducted except for specific areas in the South.

The reason for the lack of such studies, and a major stumbling block for most of the published studies, has been the lack of appropriate data relating to the relevant geographic units. Either adequate measures of explanatory variables have been absent, or they have been available only in units which were inappropriate to meaningful analysis. For instance, many measures of variables thought to explain income variation have been available at the state level but not below. Or, the measures have been available in such a form that both agricultural and non-agricultural sectors are grouped, thus negating the measure's usefulness in a study of income differentials within agriculture.

This study brings better data to focus on the problem than has been previously available. Indeed, the availability of better data is the study's raison d'etre. As part of the 1960 Census of Population, a 25 per cent sample of households in the United States was drawn. This sample amassed a host of sociological, economic, and demographic characteristics of the population. Most important, the data was available for population groups classified by residence at the county level. With this data an intensive study of the factors which affect income differentials among rural farm communities could be undertaken.

The primary purpose of the study is to investigate some of the factors which were related to income differentials among rural farm communities in the United States in 1960. The study is regional in nature for it studies the factors by Census division, region, and for the conterminous United States as a whole. Its major hypothesis is that previous studies, by concentrating their attention on specific small areas, have failed to uncover important regional differences in the factors and their effects. Further, the regional studies which have been conducted have been concerned with one hypothesized factor, that of urban-industrialization. By considering this factor in addition to others, this study attempts to analyze the effects of several factors and clarify the relations between these factors and the resulting income differentials.

Published studies concerned with income differentials among agricultural communities have investigated two sorts of differentials. Those which have studied specific areas in the South intensively have attempted to explain differentials among communities in gross or net farm income per worker. Those which have studied several regions less intensively have sought to explain income differentials among rural farm communities. Depending upon their location and other characteristics, rural farm communities may differ in their dependence on agriculture even though all members live on places defined as farms by the Census. To investigate the income differentials among those engaged in farming as a major occupation, this study also investigates the factors which were associated with differences among communities in the earnings of farmers and farm managers in 1959. Further, it is hoped that through a comparison of the factors associated with variations in rural farm family income and those associated with variations in the earnings of farmers and farm managers, additional insights into the general problem of income differentials in agriculture can be obtained.

A majority of the variables available and used in the analysis of the two income variables are related to the characteristics of the population in the community. Other variables are related to the location of the community with respect to other communities. One variable is a proxy variable representing the value of capital and land per farm in each community. Thus, variables related to the product, labor, land, and capital markets are employed. However, most of the variables relate to the labor market. Therefore, the analysis concentrates on ascertaining the effects of the labor market on variations in the two income variables among agricultural communities.

The Empirical Nature of the Problem

The problem is that of great disparities in income among rural communities. The purpose is to delineate some of the factors which affect them. How large are the differentials in income among rural communities? Do the differentials vary according to the part of the country which is observed? Before a discussion of the size and location of these differentials is undertaken, a prior set of questions must be touched upon. These questions include the operational definitions of a rural community, its members, and the income of the rural members of the community.

A rural community may be defined in a number of ways. Most relevant for the purposes of this study is one which is oriented toward economics rather than sociology. One can imagine, then, a rural community as being a group of persons living in a limited area, who are engaged to a greater or lesser degree in farming, and who operate in the same product and factor markets. Such a concept as this is almost impossible to quantify or observe. Questions can be raised with respect to the extent to which the persons included are engaged in farming. Questions can be raised also as to the geographic limits and boundaries of the product and factor markets mentioned. Clearly, some markets which farmers face are national in scope while others are restricted to the immediate area in which they live. Nevertheless, two facets of the concept can be approximated more or less by an operational definition. These are that the individuals be engaged more or less in farming and that they live in a limited area.

The Bureau of Census publishes data for various geographical units. Of these the smallest of relevance to the study is the county. The population within a county is classified as to whether they live in an urban place or in a rural area. Those people living in rural areas are classified into rural nonfarm and rural farm residents on the basis of whether they live on a place defined as a farm.[1] Even though these people live on farms their major source of income may not be from farming. Nevertheless, the places on which they live are farmed to a greater or lesser degree. For the purposes of this study the rural farm residents of the county are taken to be the rural community.

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[1]The definition of a farm in the Census of Population is slightly different from that used in the Census of Agriculture for 1959. Two differences are (a) the Census of Agriculture counted farms within urban boundaries whereas the Census of Population did not; (b) the Census of Agriculture classified some places as farms which did not meet the minimum value of sales of farm products set by the Census of Population. See U. S. Bureau of the Census, U. S. Census of Population, 1960, United States Summary, General Social and Economic Characteristics, PC(1) 1C, pp. vii-viii.

Although the similarity of this operational definition to the concept of a rural community may be questioned, it is deemed to be adequate for this analysis.

The incomes of white members of the rural community are analyzed separately from the incomes of nonwhite members. For the South, variations in income among rural communities are analyzed for both white and nonwhite members. Elsewhere, variations in income among rural communities are analyzed only for white members. The neglect of the nonwhites in areas other than in the South does little damage, for the nonwhite rural farm population is very small in these areas. Most nonwhites in the Northeast, North Central, and Western regions are urban residents.[1]

The Census of Population publishes several measures of the income of rural farm residents. These are income of persons by sex and color, income of families by color, income of unrelated individuals by color, and the earnings of persons by occupation by sex. Depending on the purposes for which it is used, any of these measures could be used. An index of welfare was desired for this study. Of the measures available the median income of rural farm families per county comes closest to being an indicator of general welfare of the population considered. One advantage of the measure is that the family is the basic spending unit in society. Consumption decisions are usually based on the collectivity of family needs. Furthermore, family spending resources include the incomes of all the members of the

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[1]In 1960 nonwhite rural farm residents formed .74 per cent of the total rural farm population in the Northeastern region, .58 per cent in the North Central region, 25.02 per cent in the Southern region, and 6.02 per cent in the Western region (including Alaska and Hawaii).

family. Family income as measured by the Census is the sum of the family members' incomes. It also includes transfer payments. The measure excludes the incomes of unrelated individuals. Unrelated individuals form a very small portion of the total rural farm population. In the 1960 Census of Population they formed only 2.69 per cent of the rural farm population. Moreover, an income distribution which is skewed extremely to the right results when the incomes of unrelated individuals are included with those of families. Their exclusion does little violence to the appropriateness of the operational definition of a rural community. Median, rather than average, family income is selected as the measure. It is believed that the median gives a better indication of the over-all income level of rural farm families than does the average because the average is sensitive to extreme values whereas the median is not. One family with an extremely high income in a group of families with little dispersion of incomes may affect the average significantly. For the purposes of the study a measure which has this property is not desired. The median is unaffected by such a phenomenon. Moreover, the average is difficult to compute given a distribution with an open-ended class. The upper income class of the family income distribution as published by the Census is open-ended. An assumption must be made about the distribution of income in the open-ended class in order to compute the average. The median income of rural farm families, by color, therefore, is used as a crude index of the welfare in the rural community.

Table 1.1 shows the distribution of counties by median income of rural farm families for each division, region, and for the conterminous United States in 1959. Counties in which no rural farm families

TABLE 1.1

Distribution of counties by median income of rural farm families, and by division, region, and for the conterminous United States, 1959.

Area	mean of medians	under 1000*	1000 to 1999	2000 to 2999	3000 to 3999	4000 to 4999 (dollars)	5000 to 5999	6000 to 6999	7000 to 7999	8000 to 8999	9000 and over
						- - - White - - -					
Conterminous United States	3386	4	147	800	1048	689	267	60	17	7	10
Northeast Region	4192	0	0	6	49	98	38	9	7	0	1
New England	3732	0	0	4	20	23	11	6	2	0	0
Middle Atlantic	4398	0	0	2	29	75	27	3	5	0	1
North Central Region	3564	1	5	265	453	244	72	11	1	0	0
East North Central	4162	1	0	34	178	161	52	9	0	0	0
West North Central	3144	0	5	231	275	83	20	2	1	0	0
South Region	2852	3	140	521	450	184	63	13	4	2	3
South Atlantic	3264	1	29	184	215	88	24	7	1	1	0
East South Central	2497	0	83	167	89	19	5	1	0	0	0
West South Central	2616	2	28	170	146	77	34	5	3	1	3
West Region	4338	0	2	8	96	163	94	27	5	5	6
Mountain	4257	0	2	8	92	106	42	15	3	2	6
Pacific	4511	0	0	0	4	57	52	12	2	3	0
						- - - Nonwhite - - -					
South Region	1366	219	575	199	62	19	14	8	0	2	1
South Atlantic	1657	70	242	93	33	10	7	6	0	2	0
East South Central	1267	95	156	38	7	4	1	1	0	0	0
West South Central	1080	54	177	68	22	5	6	1	0	0	1

Source: U. S. Bureau of the Census, Census of Population, 1960, unpublished data.
*Counties with no rural farm families are excluded.

resided in 1960 were excluded from the distributions. There were 55 counties in which no white rural farm families resided in 1960. In the South there were 320 counties in which no nonwhite rural farm families resided in 1960. Table 1.1 shows the disparity in median farm family income levels among rural communities within each division and region, and for the conterminous United States as a whole.

Of all counties in the conterminous United States in which white rural farm families resided in 1960, about 31 per cent had median income levels below $3,000 in 1959. The Southern region contained 70 per cent of these counties; the North Central contained 28 per cent; the Western region contained one per cent; the Northeast contained .6 per cent. In 48 per cent of the counties in the Southern region, the median income of white rural farm families was below $3,000. Twenty-six per cent of the rural communities in the North Central region had median income levels for white families of below $3,000. Similar rural communities formed three per cent of all Northeast rural communities and two per cent of all rural communities in the Western region. Clearly, rural communities with low income levels for white rural farm families predominate in the South.

In three per cent of all rural communities in the conterminous United States, in which white rural farm families resided in 1960, median income levels were $6,000 or over in 1959. Forty-six per cent of these rural communities were in the Western region; 23 per cent were in the South; 18 per cent were in the Northeast; and 13 per cent were in the North Central. Rural communities with median income levels of white families of $6,000 or over formed 11 per cent of the rural communities in the West. Such communities formed eight per cent of all communities in the Northeast, two per cent of all rural communities in the South, and one per cent of the communities in the North Central. Rural communities with high income levels of white families are more evenly distributed throughout the country than are those with low income levels. Nevertheless, most rural communities with high median income levels for white farm families are in the West.

Variations in the income levels of nonwhites among rural communities were studied only for the Southern region. Seventy-two per cent of the counties in which nonwhite rural farm families resided in 1960 had median income levels for nonwhites under $2,000. Thirty-nine per cent of these were in the South Atlantic division, 32 per cent were in the East South Central, and 29 per cent were in the West South Central. Sixty-seven per cent of all the South Atlantic communities considered had median income levels under $2,000 for nonwhite farm families in 1959. Similar counties formed 83 per cent of all counties considered in the East South Central and 69 per cent of the counties considered in the West South Central division. In only one per cent of all counties in which nonwhite rural farm families resided in 1960 was the median income level for nonwhite farm families $6,000 or over. Most of these counties were in the South Atlantic division.

While most members of the rural farm labor force are engaged in farming full-time, not all are. For some, farming is a part-time occupation. Some rent the land and accept full-time nonfarm employment, while others merely rent the farm home and someone else farms the land. To obtain further insights into the reasons for income differentials among agricultural communities, the variations in incomes of farm operators among communities were analyzed.

Again, the county is taken to represent the community. Males classified by the Census as farmers and farm managers in the county represent farm operators. Incomes of farmers and farm managers are not available in the Census. However, earnings of male farmers and farm managers are available. The major income items not measured by earnings are net rent, interest, dividends, and transfer payments. The median earnings of male farmers and farm managers per county is used as the index of the level of income of farm operators in the county. Both white and nonwhite farmers and farm managers were included because earnings by occupation is unavailable by color.

Table 1.2 shows the distribution of counties by median earnings of male farmers and farm managers who were rural farm residents, by divisions and for the conterminous United States. There were 76 counties in the conterminous United States in which there were no rural farm males classified as farmers and farm managers in 1960. Thirty-two of these counties were independent cities in Virginia and were classified as counties for convenience only. The 76 counties are excluded from consideration in Table 1.2.

In approximately 12 per cent of the counties considered, the median earnings of farmers and farm managers was under $1,000. Forty-one per cent of these counties were in the South Atlantic and 42 per cent were in the East South Central division. None of these counties were in either the New England or Pacific divisions. Clearly, the counties with very low levels of earnings of farmers and farm managers were in the South.

In only 3.31 per cent of the counties in the conterminous United States was the median earnings of farmers and farm managers

TABLE 1.2

Distribution of counties by median earnings of farmers and farm managers who were rural farm residents, by division and for the conterminous United States, 1959.

Area	mean of medians	under 1000*	1000 to 1999	2000 to 2999	3000 to 3999	4000 to 4999	5000 to 5999	6000 to 6999	7000 to 7999	8000 to 8999	9000 and over
		(dollars)									
Conterminous United States	2038	353	968	1034	432	142	52	23	11	5	9
New England	2316	0	13	38	13	1	0	0	0	0	0
Middle Atlantic	2422	1	13	102	20	2	0	0	0	1	1
East North Central	2191	2	104	255	70	2	1	0	0	0	0
West North Central	2278	2	143	336	106	21	7	1	1	0	0
South Atlantic	1315	146	291	71	19	5	6	1	1	2	0
East South Central	1048	150	179	31	2	1	0	0	0	0	0
West South Central	2155	44	207	91	54	33	18	8	5	0	6
Mountain	3012	8	10	75	104	47	16	7	2	0	2
Pacific	3231	0	8	35	44	30	4	6	2	2	0

Source: U. S. Bureau of the Census, Census of Population, 1960, unpublished data.

*Excluded are those counties in which there were no farmers and farm managers who were rural farm residents in 1960.

over $5,000. All but a very few of these counties were in the West South Central, Mountain, and Pacific divisions.

Within divisions, the great disparities in the levels of earnings of farmers and farm managers among counties occurred in the Mountain, Pacific, West North Central, and West South Central divisions. In the eastern divisions the levels of earnings among counties were less disparate.

For the nation as a whole, however, low levels of earnings of farmers and farm managers occurred most frequently in the Atlantic and East South Central divisions, while the high earnings levels occurred most frequently in the West South Central, Mountain, and Pacific divisions.

The Organization of the Study

The literature pertaining to income differentials is very extensive when inter-person and inter-family differentials are considered. Less has been written about inter-community income differentials in agriculture. Chapter II contains a review and criticism of the empirical and theoretical work concerned with the differentials in incomes which exist among agricultural communities. This work has been concerned, by and large, with T. W. Schultz's industrial-urban development hypothesis. In Chapter III the hypotheses tested in this study are discussed. These hypotheses relate not only to the influence of industrial-urban concentrations, but also to the characteristics of the population in a county, the county labor market, and the value of capital inputs in a county's agriculture. Chapter IV presents the regression analysis which was used to test the hypotheses. The results of the analysis of median incomes of rural farm families are discussed and interpreted in Chapter V. The results of the analysis of median earnings of farmers and farm managers are discussed in Chapter VI. A comparison of the two analyses is contained in Chapter VII. The results of the study are summarized in Chapter VIII. While the major statistical results are included in Chapters V and VI, the more complete statistical results are contained in Appendices I and II.

CHAPTER II

THE INDUSTRIAL-URBAN DEVELOPMENT HYPOTHESIS: A REVIEW OF THE LITERATURE

Introduction

At both the theoretical and empirical levels, the literature of economics and related areas is replete with studies which describe, analyze, and attempt to explain the size distribution of income for various countries. The studies can be grouped loosely into two categories. The first set contains studies which are usually cross-sectional in character. They attempt to explain the size distribution of income in terms of the demographic characteristics of the population. Although closely related to the problems of income variations among rural communities and of farm operators among communities, this literature will not be reviewed in this chapter. A review of income distribution analysis is contained in _Income and Welfare in the United States_, a recent book emanating from the Survey Research Center at Ann Arbor.[1] The book's footnotes, as well as the bibliography contained in _Income of the American People_, constitute a broad bibliography of the analyses of the size distribution of income.[2]

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[1]J. N. Morgan _et al._, _Income and Welfare in the United States_, A Study by the Survey Research Center, Institute for Social Research, University of Michigan (New York: McGraw-Hill Book Company, Inc., 1962), chap. 2.

[2]H. P. Miller, _Income of the American People_, A Volume in the Census Monograph Series (New York: John Wiley & Sons, Inc., 1955), pp. 125-28.

The second set of studies seeks to explain the variations in income of people among communities in terms of economic growth. Again, the literature while relevant is not reviewed in this chapter.[1] Both sets of studies by and large have not been concerned with income differentials among agricultural communities.

What is attempted in this chapter is a review and criticism of some of the work which has been done with respect to agriculture. It concentrates on the recent literature concerning the industrial-urban development hypothesis as stated by T. W. Schultz. It states Schultz's hypothesis and his discussion of it. This is followed by the interpretation of the hypothesis by W. H. Nicholls and A. M. Tang. Some of the criticisms of the hypothesis and the Nicholls-Tang interpretation are noted. Finally, the empirical studies testing the hypothesis are summarized.

The Industrial-Urban Development Hypothesis

Of the several hypotheses which have been advanced to explain income differentials among agricultural communities, none has received more attention than T. W. Schultz's industrial-urban hypothesis. Although it appeared in "Reflections on Poverty in Agriculture," it was not fully developed by Schultz until *The Economic Organization of Agriculture* was published.[2, 3, 4] The hypothesis was meant to

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[1]See *Economic Development and Cultural Change*, Vol. III, 1955, for a number of articles concerned with this approach.

[2]Schultz, *op. cit.*, pp. 1-15.

[3]T. W. Schultz, "A Framework for Land Economics - The Long View," *Journal of Farm Economics*, Vol. 33, No. 2, May, 1951, pp. 204-15.

[4]T. W. Schultz, *The Economic Organization of Agriculture* (New York: McGraw-Hill Book Company, Inc., 1953), chaps. 9, 10, 17, 18.

supplant a number of alternative hypotheses. These have been grouped by Tang in the following way:[1]

1. Those which rest their explanations of geographical farm income disparity on differences in the natural ability of the human agent among communities.

2. Those which rest their explanations of income disparity on differences among communities in their preferences for leisure or for particular ways of life.

3. Those which rest their explanations of income disparity on the ground that communities have not been uniformly affected by the varying pattern of secular drifts in commodity prices.

4. Those which rest their explanations of income disparity on community differences in natural endowments (for instance, that communities are endowed with land of widely different attributes.)

These hypotheses and their implications have been discussed extensively by both Tang and Schultz. There is no need to repeat their discussions here. However, some comments may be made as to the reasons Tang has given for rejecting these hypotheses. Hypotheses (1) through (3) are refuted on empirical grounds. In addition, hypothesis (2) - that inter-community income differentials can be accounted for by cultural differences - is turned into an implication of the industrial-urban hypothesis. In this interpretation, community wants are a function of cultural development which is in turn a function of economic development.[2, 3] The differential endowment argument - hypothesis (4) -

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[1]A. M. Tang, Economic Development in the Southern Piedmont, 1860 - 1950, Its Impact on Agriculture (Chapel Hill: University of North Carolina Press, 1958), pp. 5-6.

[2]Ibid., pp. 7-8.

[3]Schultz, "Reflections on Poverty in Agriculture," pp. 12-15.

is taken more seriously by Tang. First, Tang rejects the hypothesis on empirical grounds. Second, Tang, in analyzing the logic of the argument, considers three cases. The first is that in which two communities are each faced with perfect factor markets, and in which one community has better land. He argues that while the marginal products of capital, land, and labor are equated by product trade and factor migration, per capita income may be greater in the community with the better land. If my interpretation of this case is correct, this is a special case of the different production function argument.

In his second case, Tang considers two communities, one of which possesses better land. Both communities face imperfect factor markets of equal efficiency. He argues that product trade will tend to equalize factor prices as would factor migration even though it is imperfect. The third case considers two communities, one with better land, both of which face imperfect factor markets of unequal efficiency. Tang concedes that factor prices need not be equal in these circumstances. In all three cases, however, he hypothesizes that the effects of differences in natural endowments will be overshadowed by differential rates of economic development. Further he hypothesizes that economic development is a function of market efficiency, which implies that the community with the more efficient markets will develop more quickly regardless of its natural endowments.[1]

Three comments may be made. First, the hypotheses which Tang attempts to reject seek to explain "income" differentials among rural

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[1]Tang, op. cit., p. 10.

communities. One is not sure whether "income" means marginal value products of resources or income, which is a quantity times the marginal value product. As Tang points out, factor returns may be equalized and yet per capita incomes may not. Second, both the appeal to experience and the logical arguments result in the conclusion that the four hypotheses do not state necessary conditions for the existence of income differentials among communities. In all cases, however, the hypotheses pose sufficient conditions. Thus, under specific conditions, in specific areas and at specific times the hypotheses may be confirmed. Third, Tang's arguments against the natural endowment hypothesis are ambiguous. Different market imperfections produce different results. Imperfect knowledge may slow the time rates of adjustment. Monopsonistic practices in the labor market produce monopsony profits for the demanders of labor but need not reduce adjustment rates. Without specifying the kinds and natures of the imperfections, few results can be deduced. This applies also to the hypothesis that economic development is a function of market efficiency. In summary, then, the arguments presented against the four alternative hypotheses reduce to the hypothesis that the industrial-urban development hypothesis is more important empirically.

Schultz stated the industrial-urban development hypothesis in the following way:[1]

> 1. Economic development occurs in a specific locational matrix; there may be one or more such matrices in any economy. This means that the process of economic development does not necessarily occur in the same way, at the same time, or at the same rate in different locations.

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[1]Schultz, The Economic Organization of Agriculture, p. 147.

2. These locational matrices are primarily industrial-urban in composition; as centers in which economic development occurs, they are not mainly out in rural or farming areas although some farming areas are situated more favorably than others in relation to such centers.

3. The existing economic organization works best at or near the center of a particular matrix of economic development and it also works best in those parts of agriculture which are situated favorably in relation to such a center; and it works less satisfactorily in those parts of agriculture which are situated at the periphery of such a matrix.

Schultz identifies three sets of conditions which accompany economic development.[1] These create disparity of incomes between agricultural communities at the center and periphery of a matrix of economic development. It is these statements, to which Schultz presumably refers in statement (3) above, which make the existing economic organization at the center "work better" than at the periphery.

The first set of conditions increases the proportion of the population engaged in productive work. The proportion is hypothesized to be higher at the center of an industrial-urban matrix than at the periphery. Schultz mentions the shift in the age composition of the community which experiences economic development toward a greater per cent of the population in the working ages. He also mentions the specialization of function and the division of labor accompanying economic development as factors contributing to an increase in the proportion of the population engaged in productive activity.

The second set of conditions increases the ability of the population to produce. Here, Schultz concentrates on the amount and effects of capital invested in the human agent.

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[1] Ibid., p. 163.

The final set of conditions which Schultz discusses impedes factor-price equalization between the periphery and the center thus creating an income differential. Cultural impediments, imperfect knowledge, and external and internal capital rationing are the impediments to which he refers.[1]

W. H. Nicholls and A. M. Tang have discussed and investigated the ramifications of the industrial-urban development hypothesis more than other researchers.[2, 3, 4] The following summary of their theoretical discussion comes from various places in their work.

Nicholls and Tang begin with the assumption that agriculture is poorly organized and out of adjustment; i.e., too much labor and too little capital is used in agriculture. The presence of a center of industrial-urban growth ameliorates but does not correct this disequilibrium situation in agriculture near the center. The agriculture further removed from such a center is less affected. The effects of industrial-urban growth on nearby agriculture are reorganization of agriculture, higher farm income, and higher agricultural productivity. Two questions are raised by this statement: 1. Why

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[1] Ibid., chap. 18.

[2] W. H. Nicholls, "A Research Project on Southern Economic Development, with Particular Reference to Agriculture," Economic Development and Cultural Change, Vol. 1, No. 3, October, 1952, pp. 190-95. This note is the project outline of the project on which both Nicholls and Tang worked.

[3] W. H. Nicholls, "Industrialization, Factor Markets, and Agricultural Development," Journal of Political Economy, Vol. 64, No. 4, August, 1961, pp. 319-40. This article is a summary statement of the results of the project. See p. 320 for a list of Nicholls' other articles reporting segments of the project.

[4] Tang, op. cit.

does industrial-urban growth affect local agriculture favorably?

2. Why do these factors not operate, or operate less effectively, in that portion of agriculture further removed from the center of an industrial-urban matrix?

In answer to the first question, Nicholls and Tang say that industrial-urban growth results in greater efficiency in the product and factor markets facing local agriculture.[1] Industrial-urban growth brings an influx of capital and an increase in the availability of nonfarm jobs. The extent of job rationing and capital rationing decreases. Because of the shifts to the right of the labor demand and capital supply curves, local agriculture is provided with an opportunity to reorganize. The increase in the demand for labor increases the opportunity cost of labor in agriculture. Excess labor finds non-agricultural employment. Capital is invested in agriculture. Higher productivity per farm worker and higher farm income per worker remaining in agriculture are the results. Increased demand and the creation of demand for new farm products also favor local agriculture. Finally, the increase in community services associated with industrial-urban growth increases the living levels in local agriculture.

Basic impediments to inter-community factor mobility prevent agriculture at the periphery from experiencing the benefits of industrial-

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[1]Tang also postulates that economic development, and therefore industrial-urban growth, is a function of market efficiency. Paraphrased, his hypothesis runs in the following manner. The long-run income position of an area is a function of the ability of its existing organization to adapt to changing demand and technology. The ability to adapt is a function of market efficiency. Economic development, and therefore industrial-urban growth, is a function of market efficiency. (See Tang, op. cit., pp. 11-12) Thus market efficiency is both a pre-condition and a result of economic development.

urban growth. Distance, imperfect knowledge, job and capital rationing are the impediments mentioned. The lack of adequate off-farm migration puts pressure on the local labor supply. This pressure creates high land values which act as a further barrier to farm reorganization.

Finally, Nicholls and Tang admit to the possibility that different resource endowments at the center and at the periphery could cause income differentials.

In summary, the income differential between two agricultural communities is a function of (a) the differences in the resource endowments of the two communities, (b) the rates of industrial-urban growth in the two communities, and (c) inter-community factor mobility.[1, 2, 3]

Criticism of the industrial-urban hypothesis has been on two levels. One level rejects the notion that differential rates of industrial-urban development are necessary for income differentials to exist between the two communities. This approach takes economic development as a dependent variable and to explain it, D. C. North maintains that growth is dependent upon the demand for a region's exports and the disposition of the returns from exports between

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[1]Nicholls, "A Research Project on Southern Economic Development, with Particular Reference to Agriculture," pp. 190-95.

[2]Nicholls, "Industrialization, Factor Markets, and Agricultural Development," p. 320.

[3]Tang, op. cit., pp. 11-21.

consumption and saving.[1] In North's view agricultural growth could spawn supporting industrial growth as well as the reverse. Vining concentrates on the regional location of "strategic" and "ubiquitous" resources and seeks to explain the location of growth by the combinations of these two types of resources each region possesses. Depending upon the resources, the growth can be agricultural, mining, or industrial in character. In brief, his views are a variant of the natural endowment argument.[2]

Such criticism is valid in the sense that it points out that the industrial-urban development hypothesis may not be valid for parts of the United States or for periods in a country's development. However, as Schultz stated the hypothesis, it does not exclude the type of phenomenon discussed by North and Vining. The hypothesis gives a sufficient condition for income differentials to exist among agricultural communities. The criticism, therefore, does not negate the industrial-urban hypothesis.

The other level of criticism accepts the major hypothesis that differential rates of industrial-urban growth among communities create

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[1]D. C. North, "Agriculture in Regional Economic Growth," Journal of Farm Economics, Vol. 41, No. 5, December, 1959, pp. 943-51. Interesting in this connection is G. H. Borts', "The Equalization of Returns and Regional Economic Growth," American Economic Review, Vol. 50, No. 3, June, 1960, pp. 319-47. Borts develops a model in which either a difference in production functions or a difference in demand for a region's exports causes the region to grow faster than the other region. The data brought to bear on these alternative hypotheses indicate ". . . strong support for a model of regional growth based on the demand for a region's exports." See p. 342.

[2]R. Vining, "On Describing the Structure and Development of a Human Population System," Journal of Farm Economics, Vol. 41, No. 5, December, 1959, pp. 922-42.

income differentials. But, it argues with the emphasis which Nicholls and Tang place on impediments to factor mobility and the market efficiency rationale. These arguments have been expressed by V. W. Ruttan.[1] He argues that, even in the absence of impediments to factor mobility, income differentials among communities can arise as a result of differential rates of industrial-urban growth.

Ruttan suggests three supplements to the market efficiency rationale. Increasing product demand in industrial-urban concentrations allows advantage to be taken of external and internal economies of scale. The process takes place through specialization of function and division of labor. Here, Ruttan actually returns to Schultz's original discussion and enlarges the set of conditions which expand the proportion of the population engaged in productive activity. A second point, which is linked to his first, is Vining's system described previously. Lastly, Ruttan takes note of the asset fixity considerations of G. L. Johnson.[2] A divergence between salvage and acquisition prices of inputs fixes inputs in agriculture. Implied in this suggestion is that the gap between salvage and acquisition prices is smaller in the agriculture close to industrial-urban concentrations than elsewhere.

Such is the hypothesis and the criticisms made of it. Some further comments can be added. They hinge on terms used by Schultz,

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[1]V. W. Ruttan, "Industrialization, Factor Markets, and Agricultural Development: Comment," (Presented at the Conference on the Role of Agriculture in Economic Growth, sponsored by the Social Science Research Council's Committee on Economic Growth, Stanford University, November 11 and 12, 1960.) (Mimeographed.)

[2]G. L. Johnson, "The State of Agricultural Supply Analysis," Journal of Farm Economics, Vol. 42, No. 2, May, 1960, pp. 435-52.

their meanings, and the interpretation research workers have given them.

Two such terms are "locational matrix" and "industrial-urban growth." Schultz used the first, while the second was coined by subsequent writers. Neither have been adequately discussed. The lack of discussion has created a situation in which the operational definition of an industrial-urban matrix varies among workers. More discussion of this point is included in Chapter III.

Another term is "works better." Schultz hypothesized that the economic organization "works better" at the center than at the periphery of an industrial-urban matrix. Schultz, Nicholls, and Tang have all interpreted this to mean that the markets at the center are relatively more "efficient" than at the periphery. Tang has gone further to hypothesize that economic development is positively related to market efficiency, making market efficiency both a pre-condition and a result of industrial-urban growth.

Although the reduction of market imperfections such as job and capital rationing are attributed to industrial-urban growth, increased product demand, the creation of demand for new products, increased social overhead capital, specialization of function, and the division of labor are also mentioned. All of these seem to be implied when increased market efficiency is said to result from industrial-urban growth. In short, all effects which may bring about an increase in factor returns, living levels, and incomes seem to be included in the term, market efficiency. If such was intended, then Ruttan's criticisms are beside the point. Indeed, the hypothesis that industrial-urban growth results in increased market efficiency is merely a restatement of the major hypothesis; that industrial-urban growth increases the income of the industrial-urban center and nearby agriculture. A more restricted meaning for "increased market efficiency" must be meant if the statement is not superfluous.

Efficiency is usually construed as a ratio. Stigler defines it as the ratio of actual to maximum output from given resources; optimum efficiency being reached when the value of the marginal product of each input equals its alternative cost. He emphasizes that optimum efficiency is relative to the distribution of the ownership of resources, tastes, the state of technology, and the use of a single price system.[1] In brief, it is a static concept. When tastes (the indifference curves), the state of technology (the production function), or the distribution of the ownership of resources change, the efficiency of the pre-change position cannot be compared to the efficiency of the post-change position. Nothing can be said as to whether efficiency increased or declined as a result of the changes. Growth involves some or all of these changes.

It appears, then, that the term efficiency as used in the hypothesis may be all inclusive and thus add nothing to the hypothesis, and, from one point of view, should not be used at all when discussing growth. Nevertheless, the hypothesis in which "efficiency" is used still can be expressed with the term omitted. Such a formulation involves a set of hypotheses, each one postulating a result or a set of results of industrial-urban growth. Chapter III includes a discussion of these hypotheses.

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[1]G. J. Stigler, The Theory of Price (rev. ed.; New York: Macmillan Company, 1952), pp. 102-04.

At the empirical level one interpretation of the major hypothesis has been confirmed for the United States as a whole.[1, 2] It has also been tested for various regions in the United States. While the hypothesis was confirmed for most regions in varying degrees, it was disconfirmed for the Plains, Mountain, and for the Pacific states.[3, 4] The Nicholls and Tang studies as well as the Ruttan study concentrated on areas in the Southeast. All three studies strongly confirm the hypothesis.[5, 6, 7] In addition, both Nicholls and Tang conclude that differential resource endowments between communities accounted for the income differentials which existed prior to 1900. Finally, Nicholls, Tang, and Ruttan all conclude that the major impact of industrial-urban growth on local agriculture operated through the labor market by providing nonfarm job opportunities to persons leaving agriculture.

To summarize, the industrial-urban development hypothesis postulates a sufficient condition for inter-community income differentials in agriculture. It has been criticized somewhat unfairly because

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[1] V. W. Ruttan, "The Impact of Urban-Industrial Development on Agriculture in the Tennessee Valley and the Southeast," Journal of Farm Economics, Vol. 37, No. 1, February, 1955, pp. 38-56.

[2] D. G. Sisler, "Regional Differences in the Impact of Urban-Industrial Development on Farm and Nonfarm Income," Journal of Farm Economics, Vol. 41, No. 5, December, 1959, pp. 1100-1112.

[3] Ibid., Table 1, p. 1105.

[4] Ruttan, loc. cit., Table 1, p. 41.

[5] Ruttan, loc. cit., pp. 38-56.

[6] Nicholls, "Industrialization, Factor Markets, and Agricultural Development."

[7] Tang, op. cit.

of the failure of critics to recognize that the hypothesis postulates a sufficient condition and not a necessary condition. It has been surrounded by a certain ambiguity and lack of clarity because of the unfortunate use of terminology. Various interpretations of the hypothesis have been tested, and with the exception of some areas in the United States, it has been confirmed. Most of the empirical work has been done for areas in the South. No intensive analysis has been carried out for other areas of the country or for the nation as a whole.

CHAPTER III

THE CONCEPTUAL FRAMEWORK: A DISCUSSION OF HYPOTHESES

The present chapter outlines the conceptual framework within which the study of inter-community income differentials in agriculture is conducted. The operational variables used to measure the incomes of members of rural communities and of farm operators are discussed more fully. Relationships between the independent variables and the dependent variables are postulated and discussed.

Median Rural Farm Family Income

Chapter I introduced per county median rural farm family income by color as the operational variable used to measure the income level of the members of a rural community. This section discusses the concept of family and of family income as defined by the Census.

According to the Census, a family is a group of two or more persons living in the same household, who are related by blood, adoption, or marriage.[1] The definition regards the individual who resides with relatives as part of the family, whether the individual is financially independent or not. It excludes from the family individuals who live alone or with persons to whom they are not related. These persons are defined as "unrelated individuals." As

[1] U. S. Census of Population, op. cit., p. xxiv.

was noted in Chapter I, these individuals form a very small portion of the rural farm population. Finally, families observed by the Census were those in existence at the time the Census was taken in April, 1960.

Family income is the total money income received in 1959 by all members of the family. It was formed by summing for all family members their answers to the following questions:[1]

1. How much did this person earn in 1959 in wages, salary, commissions, or tips from all jobs?

2. How much did he earn in 1959 in profits or fees from working in his own business, professional practice, partnership or firm?

3. Last year (1959) did this person receive any income from: social security, veteran's payments, rent (minus expenses), interest or dividends, unemployment insurance, welfare payments, other sources?

The income of a family, then, is the total money income from those sources listed above in 1959. It is composed of the earnings of labor, land, and capital, plus transfer payments from public or private sources. Income in kind, such as home grown food, imputed rent from owned housing, and sales of assets are excluded. It also excludes the 1959 incomes of persons who were members of the family in 1959 but not in 1960. It includes, however, the 1959 incomes of family members in 1960 who became members of the family in 1960.

Median Earnings of Farmers and Farm Managers

The measure of the income level of farm operators in a community used in this study is the median earnings of farmers and farm

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[1] Ibid., p. xxxvii.

managers in a county. Farmers and farm managers as defined by the Census include those persons who said that they were owner-operators, tenant farmers, or share croppers when asked to state the occupation in which they were engaged the week before.[1] The week referred to was in 1960, and for a majority of persons was in either March or April. If the persons reported several jobs, the occupation reported was that occupation at which the person worked most during the week in question. Therefore, both full-time farmers and multiple-job holders were included. Persons who were multiple-job holders with farming as their secondary occupation would not be included. While the majority of the individuals classified as farmers and farm managers resided in the rural farm parts of counties, some resided in the rural nonfarm parts, and a few resided in urban parts.

Earnings in 1959 were somewhat different than income as defined by the Census. Earnings comprised wages and salaries, as well as self-employment income. The answers to questions (1) and (2) above were summed for each individual to obtain their earnings in 1959. Excluded, therefore, are all those income sources referred to in question (3). In summary, earnings of farmers and farm managers as used in this study are the 1959 earnings of individuals who classified themselves as farmers or farm managers, in March or April, 1960.

Conceptual Framework

The study is cross-sectional and locational in nature. The data are observations on factors which vary from community to community. The hypotheses postulate that the income levels of rural farm families

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[1] *Ibid.*, pp. xxx-xxxi.

and of farm operators in communities vary from community to community in accordance with inter-community variation in these factors.

The hypotheses tested in this study are not deduced from a formal mathematical model representing the economic relationships presumed to be present among communities in the United States. In its place are three presumptions about the nature of the factors and the relationships among the factors hypothesized to explain inter-community differentials in the income levels of rural farm families and farm operators. The hypotheses tested in the study can be grouped loosely with respect to these presumptions.

(1) Some of the factors which account for differing income levels of rural farm families and farm operators among communities vary from community to community according to the location of the community with respect to other communities and with respect to the size of the population of the other communities. Thus, it is important to classify communities on the basis of these attributes. Three alternative measures of the location of each county with respect to large cities and with respect to the population size of large cities are constructed. An equation with the median income of rural farm families per county as its dependent variable is constructed. An equation with the median earnings per county of farmers and farm managers as its dependent variable also is constructed. The three alternative measures of the spatial influence of large cities are tested by including them individually in the two equations.

(2) The second presumption expresses the hypothesis that while the members of two communities may experience similar influences because of the similar locations of the two communities with respect to

industrial-urban concentrations, the members of one community respond differently than the members of the other community. The varying responses among communities to similar influences of industrial-urban concentrations result in varying income levels among communities. This argument leads to the hypothesis that a number of factors within each community are important in determining the income level of its members. Such factors are the abilities and skills of the rural members of the community, the land and capital assets they own and control, the occupations which constitute relevant nonfarm employment opportunities for farmers, and the general condition of the local labor market. It is not argued that these factors are not influenced by the location of the community with respect to industrial-urban concentrations. It is argued, however, that they vary among communities which experience similar influences of industrial-urban concentrations, and that these variations are important determinants of inter-community differentials in the income levels of rural families and farm operators. Variables measuring these factors are included in the equations noted above.

(3) Inter-community variations in the factors (which result in differences in the income levels of rural people and farmers) have different effects in different regions and divisions of the United States. This applies to the influence of industrial-urban concentrations on communities and to other factors as well. Accordingly, the equations noted above are estimated for the various divisions and regions in the United States, and for the conterminous United States as a whole.

In the following sections the postulated independent variables in the equations are discussed. The expected relationship between these variables and the income levels of rural families and of farm operators among communities is discussed. In addition, the expected relationships among independent variables are noted and discussed. Where the postulated effect of a variable on the median income of rural farm families is different from its effect on the median earnings of farmers and farm managers, it is discussed separately.

The Discussion of the Hypotheses

Urban-Industrialization

Chapter II was devoted to a summary of the rationale behind the industrial-urban development hypothesis and the empirical work surrounding it. While a critique of the hypothesis was attempted, the empirical results were merely reported. Before operational definitions of urban-industrialization and an industrial-urban matrix are given, some discussion of the definitions of other workers seems warranted.

Operational definitions of the concept can be placed in two categories: (a) those definitions which emphasize the urban facet of the concept, and (b) those definitions which emphasize the industrial facet of the concept.

The operational definitions which have emphasized the urban facet of the concept are exemplified in the work of Ruttan and Sisler. Both these workers used the per cent of the total population of the unit area which is nonfarm as the measure of urban-industrialization.[1, 2]

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[1]Ruttan, loc. cit.

[2]Sisler, op. cit.

This measure includes as non-agricultural in character those persons residing in the rural nonfarm parts of the nation. Ruttan justified his use of the definition on the basis that it is a relative measure and better adapted to handling differences in the size of the unit area.

Nicholls and Tang have emphasized the industrial facet of the concept. These researchers used two indices of the industrial development of an area. One was the per capita value added by manufacture. The other was per capita non-agricultural payrolls. The latter measure includes the payrolls of manufacturing, retail and wholesale trade, and selected service industries.[1]

With respect to the problem of inter-community income differentials in agriculture, the writer knows of no study which has made direct use of Schultz's concept of a geographic matrix with an industrial-urban center and an agricultural periphery.[2] Unit areas have been chosen and either of the two types of indices of urban-industrialization have been used. An attempt is made in this study to operationalize the matrix concept. This section briefly discusses three operational definitions which are used in the study. In general, all three definitions sacrifice direct consideration of industrialization and emphasize the spatial and urban aspects of the original concept.

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[1]Nicholls, "Industrialization, Factor Markets, and Agricultural Development," p. 321.

[2]See, however, Roger L. Burford, "An Index of Distance as Related to Internal Migration," Southern Economic Journal, Vol. 29, No. 2, October, 1962, for a discussion of one such related measure and a short bibliography of others in the field of migration.

This is done on the assumption that industrialization is highly and positively correlated with the population size of cities.[1]

A detailed description of the three measures appears in the "Variable Specification" section of Chapter IV. Only their broad outlines are described here. The first measure of an industrial-urban matrix is defined simply to be the distance of each county from the nearest Standard Metropolitan Statistical Area (SMSA).[2] Approximately 70 per cent of the population of the United States were urban residents in 1960. Of these, 76 per cent resided in urbanized areas.[3] This segment of the population clearly forms the major product market in the nation. Moreover, most of the factor markets are located in cities of 50,000 or more. A reasonable hypothesis, then, is that each SMSA in the nation forms the center of an industrial-urban matrix.

For simplicity, the first measure is called the distance variable. Each county is assigned a number corresponding to the distance of the county from the nearest SMSA. The hypotheses underlying the use of this variable are the following: (a) The influence of an SMSA on the incomes in nearby counties is a linear function of the distance of the county from the SMSA. (b) The income levels of

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[1]See Economic Development and Cultural Change, Vol. III, 1955, for a collection of articles on the economics and sociology of urbanization, industrialization, and economic growth. Particularly interesting is the discussion by Wolfgang Stolper, "Spatial Order and the Economic Growth of Cities: A Comment on Eric Lampard's Paper," pp. 137-46.

[2]In general, an SMSA is a county in which a city of 50,000 population or more is located. See U. S. Census of Population, op. cit., p. x, for a complete discussion of the concept.

[3]Ibid., p. ix. Briefly, an urbanized area is a city of 50,000 population or more along with the densely populated urban fringe surrounding it.

farm families and of farm operators do not vary among counties in which cities of 50,000 population or more are located because of varying population size of the city. (c) The effects of a large SMSA on income levels in a community "x" miles distant are the same as the effects of a small SMSA on income levels in a community "x" miles distant.

The other two measures alter the hypotheses expressed by the distance variable. The hypotheses which the other two measures represent are as follows: (a) The influence of any SMSA on income levels in nearby communities is a joint linear function of the distance between the community and the SMSA, and of the population size of the SMSA. Implied here is that the influence of Chicago is greater and extends farther than the influence of Denver. (b) The effects of the presence of a city, 50,000 population or more, in a county is a linear function of the population size of the city up to a population size of two million. It is hypothesized that cities of two million or more have similar influences on the income levels in the county in which they are located and on outlying counties. Thus, Detroit and New York were taken to be centers of similar industrial-urban concentration for the purposes of this study.

The two measures other than the distance variable differ with respect to the maximum area over which they hypothesize a city of given size extends its influence. The size-distance$_1$ variable represents the hypothesis that a city of two or more million population extends its influence up to a maximum of 450 miles. A city of one million is hypothesized to extend its influence up to a maximum of 200 miles. Cities larger or smaller than one million are hypothesized to extend their influences in proportion according to their population size. The size-distance$_2$ variable expresses the hypothesis that a city of two or more million extends its influence up to a maximum of 200 miles, whereas a city of one million extends its influence up to a maximum of 100 miles. Again, cities greater or smaller than one million extend their influence in proportion according to their population size. The procedures for assigning values to counties allow intervening cities to add to or cancel out the influence of any particular city on a specific county.

The three measures, therefore, are alternative hypotheses, each of which is used to test the major hypothesis in the industrial-urban development rationale - that incomes of agricultural communities at the center of a matrix are higher than at the periphery. The rationale for the hypotheses follows closely that portrayed in Chapter II. Each sub-hypothesis is discussed below.

Transportation costs. Because of the concentration of people and industry in SMSA's, it is hypothesized that the prices of farm products and of farm inputs are determined in these centers. Prices in outlying counties, although they reflect local market conditions, are related to the prices in SMSA's by transportation costs. The costs of transporting farm products to the central city and of transporting inputs from the central city increase as the distance between the central city and the county increases. Both of these relationships imply lower incomes at the periphery than at the center of a particular matrix.

More important is the consideration of transportation costs with respect to labor. The rural farm resident or the farmer seeking nonfarm employment is confronted with either commuting to the nonfarm job, if the distance is small enough, or migrating, if the distance is such that it excludes commuting. The former involves the cost of daily travel to and from the job, while the latter involves the cost of relocating the home. Labor returns and income will be lower at the periphery than at the center at least by the amount of these costs.

Costs of acquiring market information. Individuals in the central city of a matrix have better knowledge of the markets in the city than do individuals at the periphery. While the same knowledge is available to individuals throughout the matrix, the knowledge can be acquired only at a cost. Moreover, the cost is directly related to the distance of the individual from the city.

Direct physical contact with the markets is perhaps the method of acquiring market knowledge which is most expensive. Its cost includes the cost of traveling to and from the city as well as the opportunity cost of the time spent obtaining information. The use of the communication devices in the matrix is another way to obtain knowledge. Radios, television, the newspaper, and the telephone can all be used. All are costly. Some, like the radio and television stations of the central city, may not reach the periphery. The costs of others like the newspaper and the telephone rise as the distance from the central city increases. Costs of obtaining knowledge of the markets in the central city of a matrix are assumed to explain part of the differential income between the center and the periphery.

Specialization of function and its results. Most important in explaining the differentials which exist between communities at the center and the periphery, as well as between communities near cities of various sizes, may be the results of firm and industry specialization of function. The theorem that the division of labor is limited by the extent of the market was first stated by Adam Smith.[1] Allyn Young and George Stigler have since elaborated and extended the theorem.[2, 3]

Firms in an industry which faces a small market are relatively unspecialized. Because of the limited market no firm may be at the low point on its long-run average cost curve. Further, the demand curve which faces them dictates that each firm perform all or nearly all the processes in the manufacture and sale of the product. As the market increases, it becomes profitable for firms to specialize in one or a few processes. By specialization of firms, advantage is taken of processes which exhibit increasing or decreasing returns. Within each firm, the low point on the long-run average cost curve can be reached. Productivity and income is thereby increased. Large cities provide markets large enough for this specialization to take place. Transportation costs tend to make industries concentrate in one or a few locations. One would expect, then, that returns to labor and capital are higher at the center than at the periphery of a matrix because of specialization of function. Also, returns to labor and capital will be higher in large SMSA's than in small SMSA's.

Relevant, also, to the hypothesis is the part played by specialization of function and the division of labor in determining

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[1]Adam Smith, The Wealth of Nations, ed. E. Cannan (Modern Library Edition; New York: Random House Inc., 1937), chap. 3.

[2]Allyn Young, "Increasing Returns and Economic Progress," Economic Journal, Vol. 37, December, 1928, pp. 527-42.

[3]G. J. Stigler, "The Division of Labor is Limited by the Extent of the Market," Journal of Political Economy, Vol. 59, June, 1951, pp. 185-93.

the size and character of the labor market. Through specialization the division of labor becomes extreme. Each unit of labor performs only one or a few complementary tasks. Many jobs of different kinds are created. In a large city, then, there exist jobs in which almost any individual, no matter what his skills, can find his comparative advantage. These jobs may not be available at the periphery. This point was implied by Schultz in his set of conditions which increase the proportion of the population engaged in productive activity. It could have been included also in his set of conditions which increase the ability of the population to produce.

The discussion implies further consequences of specialization. The opportunity cost of labor in agriculture is directly related to nonfarm wage rates and the probability of obtaining a nonfarm job. The probability of obtaining a nonfarm job is directly related to the number and kinds of jobs available. Wage rates and job availability in any community are inversely related to the distance between the community and the SMSA, and directly related to the size of the SMSA. Agriculture throughout any matrix is poorly organized in that the marginal value product of labor is low relative to the marginal value product of capital. Because of the higher opportunity cost of labor near the center of a matrix than at the periphery, more labor is drawn from agriculture into nonfarm employment in communities near an SMSA than in more distant communities. The excess labor drawn from agriculture find either full-time or part-time nonfarm employment. Thus, income from agriculture will be higher near the center of a matrix than at the periphery.

The previous paragraph would account for a portion of the income differentials between rural members of a community near the center and at the periphery of a matrix. It also would account for some of the differentials between the earnings of farm operators in communities near the center and at the periphery of a matrix. However, the effects on the income levels of rural families among communities will be greater than those on the income levels of farm operators among communities. This is because the effects include not only the increased income from agriculture; they also include effects on the occupation distribution of the nonfarm labor force of the rural farm community. The discussion in the previous paragraph implies that the proportion of the labor force engaged in farming will be highest in rural communities at the periphery and lowest in rural communities near the center of any matrix. Farmers and farm managers typically occupy the low end of a distribution of income by occupation of a community. The median income of rural farm families can be viewed as a weighted mean of this distribution; the lower the proportion of farmers the higher the income. Thus, median income of rural farm families will be higher near the center of a matrix than at the periphery both because of the increase in farm income and because of the shift in the occupation distribution toward higher income occupations.

Living costs. The measures of income used in the study are measures of money income. Differential living costs between the center and the periphery of a matrix account in part for differential money incomes. Included in the higher costs of living in or near an SMSA are such things as higher property taxes and increased transportation costs as traffic density increases. The measures of the industrial-urban matrix as constructed were expected to pick up these differences in money income between the center and the periphery.

Finally, the expected effects of urban-industrialization on the age, education, and occupation distributions in rural communities at the center and at the periphery of a matrix can be stated. The specialization of function section made clear the implications for the occupation distribution. The per cent of the labor force who are farmers and farm managers will be smaller in rural communities at the center than at the periphery. Conversely, the per cent of the labor force who are professional and technical workers will be higher at the center than at the periphery. A relationship such as described for professional and technical workers is not so obvious for craftsmen and operatives. These two occupation groups, as defined by the Census, included a multitude of job-types.[1] While the types held by craftsmen and operatives in communities near the center of a matrix probably differ greatly from those held by craftsmen and operatives at the periphery, it is not clear that the proportion they form of the rural labor force will differ greatly between the center and the periphery.

Clearly, the per cent of the labor force who are highly educated will be higher in communities near the center than at the periphery because the types of jobs they hold are more prevalent at the center. Whether they are included in the rural farm work force of a community near the center is another question.

The effects of urban-industrialization on the age distributions in rural communities near the center and at the periphery are also in

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[1]U. S. Census of Population, op. cit., pp. xxx-xxxi.

doubt. More people in young age groups migrate than people from older age groups. The job availability argument stated previously implies that the direction of migration will be from the rural farm parts of communities in the periphery to communities in or near the center of a matrix. But, it is expected that these people migrate to and live in urban parts of communities rather than the rural farm parts of communities. Also, it is generally held that birth rates are higher in rural than urban areas. Applying this to a matrix, birth rates will be higher at the periphery than at the center of a matrix. Thus, while the age distribution of an urban community at the center is probably much different from the age distribution of a rural community at the periphery, it is not clear that the age distributions of rural communities at the center and at the periphery of industrial-urban matrices are much different.

In summary, differentials between income levels of rural members of communities at the center and at the periphery of an industrial-urban matrix are to be explained by transportation costs, costs of acquiring market information, specialization of function and the division of labor, and differential living costs. The differentials so created are hypothesized to be greater for rural members than for farm operators among communities. Also, it is hypothesized that the presence of large SMSA's affects income more than the presence of small SMSA's.

The Age Distribution

Distributions of income by age typically reveal that income increases with age until about age 45 and declines thereafter. The relationship makes economic sense. Physical and mental abilities are not fully developed in young entrants to the work force. With increasing age both of these develop to a maximum and then deteriorate. Physical and mental skill affect labor productivity. If wage rates more or less reflect the marginal product of labor, income will rise with age and then decline.

More important, however, is that age measures much of the experience and education that a variable which measures formal education does not. The education variable used in this study measured the years of school completed by males, age 25 and over.[1] It did not measure on-the-job training, experience, and trade school education. Experience and on-the-job training probably enhance productivity more in laborer, craftsmen, and operative occupations than does formal education. The acquisition of experience and on-the-job training is time consuming. Moreover, older workers, simply because they have been working for more years, have more experience than do young members of the labor force. On the basis of experience older workers are paid higher wage rates than are young workers. Thus, young members of the labor force receive lower incomes than do older members.

Further, the very young typically are employed in rather unstable occupations or have not been in the labor force long enough to gain any degree of job security. This group is frequently out of work with the result that annual income is low. Men in their twenties have found more stable employment and, therefore, the incomes of this group are higher than the previous one. At the other end of the age distribution men

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[1]See the next section for the discussion of formal education.

in physically demanding occupations accept less demanding work at lower wage rates. Self-employed men and white collar workers work fewer days per year. Sickness forces some to retire in their fifties. All of these factors lower income for the older age group.

In addition, as age increases, there is some upward mobility through occupations which have higher wage rates. This happens as a result of on-the-job training and greater experience.

The previous discussion, therefore, suggests the following hypotheses: Median income of rural farm families is directly related to the per cent of the labor force in the community which is in the middle age group. It is inversely related to the per cent of the labor force which are in the young and old age groups.

The same relationships are hypothesized between age and median earnings per county of farmers and farm managers. Age distributions for farmers and farm managers are not available. The age distribution for the male rural farm labor force is used instead. Since most farmers and farm managers are rural farm residents, the age distribution of the rural farm labor force clearly measures the effect of age on farm income. Earnings of farmers and farm managers include wages and salaries from nonfarm employment. If younger farmers hold more part-time nonfarm jobs than older farmers, the age distribution might pick up some of the effects of off-farm employment.

The Education Distribution

The facet of education under consideration is that part which is acquired for productive purposes. It is an investment good. People acquire education according to its costs and prospective returns.

Additional education is pursued if the present value of its expected future returns is greater than its costs.

The education measure available for this study measured only elementary, high school, college education, and their equivalents. On-the-job training, trade, or vocational school education were excluded. Thus, much of what might be called informal education was not measured by this variable. As was pointed out in the preceding section, the age variable probably measured this facet of education.

The major way in which education enhances the income potential of an individual probably is to broaden the range of alternative occupations available to the individual. Individuals with elementary education or its equivalent usually are limited to performing jobs which require a minimum of independent intellectual effort. These jobs have low wage rates. With more education, occupations which require more independent intellectual effort become open. As the formal education level of the individual increases, jobs with higher wage rates and, therefore, higher incomes are available.

Age and education are related in other ways than that described in the preceding section. Schultz points out that the school year has lengthened since 1900. Average attendance of enrolled pupils, age 5 to 15, was only 99 days in 1900. It had risen to 159 days in 1957.[1] Persons now in the work force, who completed their education in the 1920's and 30's received less education than new entrants to the work force who completed the same number of years of school. For

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[1]T. W. Schultz, "Education and Growth," Social Forces Influencing American Education, Sixtieth Yearbook of the National Society for the Study of Education, Part II, pp. 46-88.

this reason, persons in the older age groups can be expected to receive less income than more recently educated persons. Further, technical change occurred between generations and tends to make the formal education received by people in the older age groups obsolescent. The proportion of the population educated has risen steadily in past decades. Schultz reports that high school and college students formed 3.5 per cent of the employed labor force in 1900 and 16.5 per cent in 1956.[1] Hence, the proportion of the population who are educated varies with the age distribution. A community with a high median age likely will have a lower median years of school completed than will a community with a low median age.

Finally, the occupation group of employed persons and education are related. High levels of education are required for professional and technical jobs while low levels of education suffice for admittance into laborer and some operative occupations. A community with a high proportion of its labor force in professional and technical occupations will also have a high median years of school completed. Whether some of the effects of education on income will be picked up by the measures of the occupation groups is unknown.

From the preceding considerations it is clear that the education distributions of the populations of rural communities can be expected to affect their income levels. It is hypothesized that the income level of the members of a rural community is positively related to the per cent of the labor force which has completed many years of school. It is postulated as being negatively related to the per cent of the labor force which has completed few or no years of school.

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[1] _Ibid._, Schultz, Table 2, p. 59.

The relationship between education and the earnings of farmers and farm managers in communities is assumed to be similar to that postulated between education and rural community income. The education distribution for farmers and farm managers is not available. The distribution of years of school completed for the male rural farm population over 25 years of age is used as a substitute. The education variables measure the effects of varying levels of education on income from farming. They also may measure more. Low levels of education may prevent farmers from obtaining part-time, off-farm employment. Certainly, most industrial jobs require the ability to read and write. Farmers with little or no education (zero to six years of school completed) may be barred from the nonfarm labor market on this account. Thus, low education levels may reduce the proportion of farmers who hold nonfarm jobs. Such an occurrence simply strengthens an already negative relationship. This may be important in the divisions in the South where illiteracy is most common.

In the discussions of the effects of age and education on median incomes and median earnings per county it was argued that, among other things, labor productivity varies with age and education. In both discussions wage rates paid to labor of equal age and education were assumed to be equal among communities. This, of course, need not be so and, in general, is not. However, it is hypothesized that the factors, which probably cause the most variation in wage rates among communities, are accounted for in the measures of the relative effects of industrial-urban concentration among communities.

Occupation

This section discusses the hypothesized relationships between variations in the occupation distribution of the rural farm labor force and median income of rural farm families among communities. It also discusses the relationships between variations in the occupation distribution of the labor force and the median earnings of farmers and farm managers.

There is a rough mathematical relationship between the median income per county of rural farm families and the occupation distribution of the rural farm labor force. Incomes vary by occupation. Typically, farm laborers, farmers, and laborers are at the bottom of the distribution of income by occupation. Operatives and craftsmen fall somewhere in the middle of the income distribution along with sales and clerical workers. Managers, officials, professional, and technical personnel fall in the upper ranges of the distribution. Average income per person can be calculated as a weighted mean by multiplying the number of persons in an occupation by the average income for the occupation, summing over all occupations, and dividing the result by the total number of employed persons. The more persons who are in professional and technical occupations the higher is average income per person. The more farmers and laborers there are in the labor force the lower is average income per person. A similar, though much less precise, relationship holds between the occupation distribution of a community's rural farm labor force and the median income of its rural farm families.

The variables relating to the occupation distribution which are used in the equation explaining median income per county of rural farm families are the following: (a) the per cent of the employed labor force who were farmers and farm managers, (b) the per cent of the employed male rural farm labor force who were craftsmen and foremen, (c) the per cent of the employed male rural farm labor force who were operatives and kindred workers, (d) the per cent of the employed male rural farm labor force who were farm laborers and farm foremen. Not directly considered in the equation are professional and technical workers, managers, officials and proprietors, clerical and sales workers, service workers, and laborers. Those not considered formed 12.8 per cent of the employed male rural farm labor force of the United States in 1960.[1]

The proportion of farmers and farm managers measures the effect of the relative importance of farming on income levels among rural communities. A negative relationship between this variable and median income per county of rural farm families is expected.

The measures of craftsmen and operatives are chosen on the hypothesis that these two occupations are the relevant alternative occupations for farmers. One would expect that craftsmen and operatives in the rural farm labor force are likely to be ex-farmers from the same community. If this assumption is true, then the agriculture of a community, which has many craftsmen and operatives in the rural farm labor force, probably has a higher ratio of capital to labor than a community with few such workers. Therefore, income from farming in such a community would be higher than in one with few craftsmen and operatives. A positive relationship between both the proportion of craftsmen and the proportion of operatives in the rural farm labor force and the median income per county of rural farm families is expected.

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[1] U. S. Census of Population, op. cit., Table 87, p. 216.

Finally, a variable representing the proportion of farm laborers and farm foremen is included. A very high proportion of farm laborers in the rural farm labor force can be expected to lower the median income of rural farm families per county. Further, it can be argued that communities with a very high proportion of farm laborers in the rural farm labor force are likely to have a distribution of wealth which is skewed to the right. Such a condition prevails where there are a few, very large farms in the county which employ many hired workers. In such counties farm income may be high, but, since there are so few farmers, the median income of rural farm families is dominated by the lower incomes of farm laborers. If such is the case, the phenomenon should show up in the Plains states and in the South West. A high, positive correlation between the average value of land and buildings per farm per county and the per cent of the rural farm labor force who are farm laborers and farm foremen would confirm the relationship.

In the equation for the median earnings of farmers and farm managers per county, the per cent of the employed male labor force in the county who are craftsmen, foremen, and operatives is used. The county is taken as the unit in this case because it is assumed to represent the local labor market. Craftsmen and operatives are chosen because these occupation groups presumably include most of the alternative jobs open to farmers.

The per cent which craftsmen and operatives form of the labor force of the county is regarded as a proxy variable for the relative abundance of nonfarm job alternatives which are available to the farmers in the county. Farmers in a county with a high per cent of its labor force who are craftsmen and operatives can be expected to have more nonfarm jobs, both part- and full-time, available to them than the farmers in a county with a low per cent. In a county with many available nonfarm jobs, farmers can be expected to hold more nonfarm jobs. Also, it indicates that there is probably a higher capital to labor ratio resulting from greater multiple-job holding and from greater off-farm migration. Thus, median earnings of farmers in such a county can be expected to be higher than the median earnings in a county with a lower proportion of craftsmen and operatives. In brief, the relationship between this variable and the median earnings of farmers and farm managers per county is postulated to be positive.

Unemployment

Another variable used in the analysis is the male unemployment rate per county. The county is taken as the unit for the measure because the county labor market was assumed to be the local labor market. The variable is included in the median income analysis and the median earnings analysis.

A high unemployment rate in a county relative to other counties indicates that more rural farm family heads are unemployed, fewer employed family members are multiple-job holders, and fewer work overtime in nonfarm jobs. A negative relationship between the unemployment rate and median income per county of rural farm families is expected.

More important, perhaps, is the effect high unemployment rates in the local labor market has on local agriculture. Bishop has concluded that labor is underemployed in agriculture; i.e., that more labor is prepared to migrate off the farm at prevailing wage rates than there are jobs available.[1] Migration can be job migration or residence migration. Job migration entails that the farmer accept employment in a nonfarm job, while residence migration entails that the farmer physically leave the farm. A high unemployment rate in a county's labor market relative to other counties is hypothesized to impede both job and residence migration from local agriculture. It also is expected to reduce the number of part-time farmers in the county relative to other counties. The reduction in both job and residence migration, as well as multiple-job holding in a county relative to other counties entails a lower capital to labor ratio in counties with high unemployment rates than in counties with low unemployment rates. Thus, income from farming in counties with high unemployment rates is expected to be lower than in counties with low unemployment rates. This facet of the effect of unemployment on differential incomes among communities is expected to be more important in the median earnings of farmers and farm managers analysis than in the median income equation.

The particular measure of unemployment per county is a poor one. It is the measure of the unemployment among males per county in April, 1960. The median income of rural farm families and the median earnings of farmers and farm managers are for 1959. It is assumed that the unemployment rate per county in April, 1960, is an adequate proxy for the average unemployment per county which existed in 1959. Such may not be the case. Nevertheless, the 1960 measure is the only measure of unemployment available.

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[1] C. E. Bishop, "Economic Aspects of Changes in Farm Labor Force," Labor Mobility and Population in Agriculture (Ames: Iowa State University Press, 1961), pp. 36-49.

It is quite possible that the male unemployment rate per county, while not a good measure of unemployment, may be a good measure of local urbanization. The evidence supporting this contention is in Table 3.1, which shows male unemployment rates in April, 1960, by residence classification for each region in the United States. Clearly, the rural nonfarm rate in each region is the highest, the urban rate is the next, and the rural farm rate is the lowest. The county unemployment rate is a function of the three residence classification rates. The urban rate predominates in the county rate because its labor force is the largest of the three. One would expect that a very rural county would have a lower rate than a very urban county. But, rural incomes are hypothesized to be a positive function of the degree of urban-industrialization. Thus, a positive regression coefficient for the

TABLE 3.1

Male unemployment rates by region, and by residence classification: United States, April, 1960.

Region	Urban	Rural Nonfarm	Rural Farm
Northeast	4.9	6.1	2.7
North Central	4.9	5.9	2.0
South	4.7	6.0	2.9
West	5.6	7.2	2.8

Source: U. S. Bureau of the Census, U. S. Census of Population, 1960, United States Summary, General Social and Economic Characteristics, PC(1) 1C, Table 104, p. 246.

unemployment variable may not be unrealistic. It should be pointed out that the three operational definitions of Schultz's industrial-urban matrix measure the effects of SMSA's on income and earnings. No account has been taken for the presence of cities which have populations under 50,000. Thus, it is quite possible that the male unemployment rate per county is a proxy variable which accounts for the presence of these smaller cities.

Value of Farm Land and Buildings per County

The average value of farm land and buildings per farm per county is included as a proxy variable for the capital inputs per farm in the county. The measure includes such items as the value of irrigation, drainage, terracing, and other improvements to land in addition to the value of the buildings. It excludes the value of livestock, machinery, feed inventories, and fencing. The measure varies with both the average farm size per county and the average price per acre per county. Thus, a county near a city with many small farms devoted to intensive agriculture may have the same average value of farm land and buildings per farm as a county in a very rural area with few large farms which are farmed extensively. The average value of farm land in the county near the city reflects the intensive use of the land and its opportunity costs. The value of land per farm in the county in the rural area reflects farm size more than the price per acre.

Finally, it can be argued that the value of farm land and buildings on a farm is a function of income. However, it is more likely to be a function of past income than present income, and that present income is a function of the value of farm land and buildings on a farm. It is the latter relationship which is being measured in this instance.

On the assumption that this measure is a proxy variable for the amount of capital inputs on farms in the county, it is hypothesized that there is a positive relationship between it and median income of rural farm families, and also between it and the median earnings of farmers and farm managers. The higher is the value of land and buildings per farm, the higher the capital to labor ratio per farm is expected to be.

This variable is expected to have more effect on the median earnings of farmers and farm managers per county than on the median income of rural farm families per county. While the median income of rural farm families includes many nonfarm sources of income, income from farming predominates in the earnings of farmers and farm managers.

Family Size

Median income of rural farm families in the county is used as the index of the income level of the rural community. As such, it is a crude index of welfare. Two communities may have the same median rural farm family income; yet, in one community families may be worse off because families on the average are larger. To adjust for differences in family size among communities, therefore, the average size of rural farm families per county is included among the variables which account for variations in income levels among communities. Average family size is not included as a factor explaining the earnings of farmers and farm managers.

As family size increases, one would expect the number of family members who work to increase, and, therefore, family income to increase. The number of family members who work can increase with family size in two ways. So long as the marginal value product of labor in agriculture is positive, the addition of labor on the family farm increases total farm income per farm. Average rural farm family size may pick up the effect of the differing number of unpaid family workers on farms among communities. Average rural farm family size also may pick up the effect of differing numbers of family members who work in nonfarm occupations among communities. In either case a positive relationship between the income level of a rural community and average family size per rural community is expected.

Age of household head, family size, and family income are interrelated. The relationship between income and age was previously discussed. Income increases with age until about age 45 to 54, and then declines. The family, however, usually increases in size through the addition of children as the household head grows older. The family is at its maximum size when the family head is in the 40 to 50 age group. Thereafter, family size declines as children leave home. The family size cycle, therefore, roughly corresponds in timing to the income, age relationship. The intercorrelation between family size and the age of the household head may increase the positive effect of average family size per county on median income per county of rural farm families.

<u>Labor Force Participation Rate of Females</u>

The age, education, and occupation variables which were used in the analysis refer to males only. Females, however, contribute to family income also. A measure of the labor force participation rate of rural farm females per county is included to account for variations in the contributions to income of rural farm females among rural communities.

The relationship between the labor force participation rate of rural farm females and median income per county of rural farm families is expected to be a positive one. Since most rural farm females are members of rural farm families, a high labor force participation rate of females indicates that a high proportion of female family members are employed.

Intercorrelation is expected between average family size per county and the labor force participation rate of rural farm females. As family size increases, one would expect that the probability of the wife or other female member of the family working to increase. Thus, average family size may pick up some of the effects of differing labor force participation rates of rural farm females among communities.

Color

Identical equations to the white equations are estimated for nonwhites in the three divisions in the South and for the Southern region. All the variables refer to the nonwhite population except the operational definitions of industrial-urban matrices and the average value of farm land and buildings per farm per county. This separation is done on the assumption that nonwhites face different labor markets than do whites. Also, through separate analyses, the effects of color could be excluded from the white equations.

Somewhat different results can be expected from the nonwhite analyses. In general, the effects of varying age and education distributions among communities may be less than in the white equations in the South. This statement is made on the hypothesis that the labor market facing nonwhites offers the nonwhite individual much less opportunity to find a job in which he has greatest comparative advantage. Also, the negative effects of low education may be more extreme for nonwhites than for whites because discrimination may force unemployment on such individuals. Although, the opposite could be true if highly educated nonwhites experience more discrimination that do poorly educated nonwhites.

The influence of large industrial-urban concentrations in the South may be less on nonwhite rural communities also. This is so because nonwhites tend to migrate to northern cities, such as, New York, Chicago, and Detroit, rather than to large southern cities. Thus, the measures constructed for the South may be more applicable for the white population that for the nonwhite population.

The average value of farm land and buildings per farm per county may also have less relationship to the median income of nonwhite rural farm families. High values of farm land and buildings may indicate a predominance of Negro hired farm labor or sharecroppers in the county. In this case the income level of nonwhite families would be lower than in counties in which Negroes owned and farmed the land. This suggests that a negative relationship may be expected between this variable and the median income of nonwhite rural farm families per county.

It was noted earlier that nonwhites are included in the analysis of the earnings of farmers and farm managers. In this equation nonwhite farmers and farm managers as a per cent of all farmers and farm managers in the county is included as one of the variables. Outside the South the ratio of nonwhite farmers to all farmers per county is very low and in many counties it is zero. Accordingly it is expected to have a regression coefficient not significantly different from zero in the Northeast, North Central, and West. For the South it is expected that this variable would gain importance in the equation. It is hypothesized that this variable would have a negative regression coefficient. The ratio of nonwhite farmers to all farmers is expected to measure the effects of differential educational levels between nonwhite and white farmers, and discrimination in the nonfarm labor market. This last refers to the unemployment variable, the variable measuring the proportion of the labor force who are craftsmen and operatives, and nonfarm earnings included in the earnings of farmers. Because of discrimination, nonwhite unemployment is expected to be higher than white unemployment, and nonwhite wage rates to be lower than white wage rates. Thus, because of discrimination nonwhite migration to local nonfarm jobs, either part-time or full-time, would be impeded. This would reduce nonfarm earnings included in the nonwhite earnings of farmers and farm managers. Also, this would entail a lower capital to labor ratio on the farms of nonwhites. Thus, a negative relationship between the ratio of nonwhite farmers to all farmers and the median earnings of farmers and farm managers appears reasonable.

Regional Differences

The median rural farm family income equation is fitted for each division, each region, and for the nation as a whole. The equation for median earnings of farmers and farm managers is fitted for each division and for the nation as a whole. Important regional differences in the effects of the variables in the two equations are expected.

In general, the effects of industrial-urban concentration and the effects of the variables relating to the local labor market are expected to be greatest in the Northeastern region, the East North Central division, and the Pacific division. These areas contain the greatest concentration of cities, both large and small. The local nonfarm labor markets and the markets in large cities could be expected to have great impacts both on median income and median earnings per county. The same is true to a lesser degree in the South Atlantic and East South Central divisions. The local labor markets and the markets in large cities could be expected to have less influence on median income and median earnings per county in the West North Central, West South Central, and Mountain devisions. These divisions are oriented more toward agriculture than are other areas in the country. Thus, in the South West, the Great Plains, and Mountain areas variables such as the average value of farm land and buildings per farm per county and farmers as a per cent of the labor force could be expected to assume more importance in the determination of rural community income levels and the income levels of farmers and farm managers.

To summarize, the dependent and independent variables in the two equations have been introduced and discussed. How each variable is expected to influence the median income of rural farm families and the median earnings of farmers and farm managers per county has been postulated. Some of the expected relationships between independent variables have been noted and discussed. Finally, regional differences in the effects of the independent variables on the two income variables have been touched upon. In the chapter to follow the equations are presented formally, the variables specified, and the statistical hypotheses stated.

CHAPTER IV

THE STATISTICAL FRAMEWORK: A DISCUSSION OF THE DATA, ITS SOURCES, AND THE STATISTICAL ANALYSIS

The Data and Its Sources

As part of the 1960 Decennial Census of Population, the Bureau of the Census obtained detailed information on the social and economic characteristics of the population by means of a 25 per cent sample of households and a 25 per cent sample of persons in group quarters. The Census was taken on or about April 1, 1960. From the information obtained from the persons sampled, estimates for the population were made, tabulated, and placed on magnetic computer tape. The tabulations arranged the information in the form of distributions of social and economic characteristics of residents of the rural farm and rural nonfarm residence parts of counties, and of urban places in each county. It was this tape from which Volume C (General Social and Economic Characteristics) of the 1960 Census of Population Reports was produced.[1] A copy of the tape was purchased by Michigan State University with funds granted by the Social Science Research Council. With the exception of the data for four variables, all of the data used in this study was obtained from this tape.

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[1]See U. S. Census of Population, loc. cit., for a discussion of the sample procedures and the methods of estimating the population characteristics used by the Bureau of the Census.

The data for one variable - the average value of farm land and buildings per farm in a county - was obtained from the 1959 Census of Agriculture. This data was supplied by the Bureau of the Census on IBM cards and subsequently was placed on the magnetic tape. Three measures of industrial-urban matrices were constructed and placed on the tape.

The statistical analysis was programmed and run at the Armour Research Foundation of Illinois Institute of Technology in Chicago on a Remington-Rand UNIVAC 1105 computer.

The Equations: Introduction

Least squares techniques are used to estimate twelve equations for various geographic areas in the United States. The equations can be placed in three categories according to the dependent variables they seek to explain.

Each equation in the first category has as its dependent variable the median income of white rural farm families in a county. These equations are called the "white family income" equations. Each "white family income" equation is estimated with county data for each division, each region, and for the conterminous United States as a whole. In all, 42 "white family income" equations are estimated.

Each of the equations in the second category has as its dependent variable the median income of nonwhite rural farm families in a county. These equations are called the "nonwhite family income" equations. Each "nonwhite family income" equation is estimated with county data for each of the three divisions in the Southern region, and for the Southern region as a whole. Twelve "nonwhite family income" equations are estimated.

The equations in the third category have as their dependent variables the median earnings per county of farmers and farm managers. These are called the "earnings of farmers" equations. Three of these equations are fitted with county data for each division, each using one of the measures of proximity to SMSA's. Three are fitted with county data for the conterminous United States as a whole. Thirty "earnings of farmers" equations are estimated.

In this chapter these three sets of equations are presented. Their variables are specified, and the hypotheses discussed in Chapter III are presented as statistical hypotheses.

The "White Family Income" Equations

Three equations are presented in this section. They are identical with the exception of one variable. In Chapter III, three operational definitions of Schultz's industrial-urban matrix were discussed briefly.[1] Equation (1) below includes the distance variable and omits the size-distance$_1$ variable and the size-distance$_2$ variable. Equation (2) below includes the size-distance$_1$ variable and omits the distance and size-distance$_2$ variables. Equation (3) includes the size-distance$_2$ variable and omits the distance and size-distance$_1$ variables.

"White Family Income" Equation (1)

$$Y_i = a + c_1 X_{i1} + \dots + c_{13} X_{i13} + u_i$$

[1]Hereafter, these measures are collectively referred to as the proximity variables.

where:

$i = 1, 2, \ldots, N$

$j = 1, 2, \ldots, 13$

and:

Y_i is the <u>ith</u> observed value of the dependent variable.

X_{ij} is the <u>ith</u> value of the <u>jth</u> independent variable.

u_i is the <u>ith</u> random disturbance term. It is assumed that the u_i are independent and come from a normal distribution with zero mean and σ^2 variance.

a is the constant term.

c_j is the coefficient of the <u>jth</u> independent variable.

<u>Variable Specification</u>

<u>The dependent variable, Y_i.</u> The median income in a county in 1959 of white rural farm families in 1960 is used as the dependent variable. This variable is taken as an index of the income level of the rural community. Sections in Chapter I and Chapter III thoroughly discussed this measure; no more need be said in this section.

<u>The independent variables, X_j.</u>

Value of land and buildings per farm, X_1: The average value of farm land and buildings per farm in a county is used as a measure for the average value of all capital inputs per farm in the rural community. The 1959 Census of Agriculture was the source of this variable.

The unemployment rate, X_2: White unemployed males as a per cent of the male civilian labor force in a county is used as the measure for this variable. The measure refers to the white male unemployment which existed during the week prior to the taking of the Census. For the majority of counties in the United States this was the first or second week of April, 1960. The variable is taken to represent the general demand conditions of the local labor market. As was discussed in Chapter III, it may represent more nearly the level of local industrial-urban concentration.

Age of males, X_3 and X_4: To account for the curvilinear relationship between age and income, two variables are used to measure the effect of age rather than one.

X_3 measures the per cent of white rural farm males, age 15 to 24 years, in the county.

X_4 measures the per cent of white rural farm males, age 25 to 44 years, in the county.

Education of males, X_5 and X_6: To allow for the possibility of a curvilinear relationship between income and education, two variables are used to measure the effect of the education distribution on rural income levels.

X_5 measures the per cent of white rural farm males, age 25 years and over, who had completed zero to six years of school, in a county. The effect of the relative prevalence of functional illiteracy on the variations in income levels of rural farm families among communities is measured by this variable. It is assumed that the majority of males in this group have limited communication skills and factual knowledge of the world and social institutions. The lack of such knowledge and skills is hypothesized to bar these individuals from all but the most menial, low wage jobs.

X_6 measures the per cent of white rural farm males, age 25 years and over, who had completed 12 years of school or more. These individuals are those who at least have completed high school. They are presumed to have accumulated the factual knowledge of the world and of social institutions, and to have attained a level of communication skills which allow them to work in a broad range of high wage jobs. The effects of the relative prevalence of high education on income levels of rural farm families among communities are measured by this variable.

Occupation of males, X_7 - X_{10}: The variables which measure the relative importance of farmers, craftsmen, operatives, and farm laborers are all expressed as percentages of the white rural farm labor force in the county. The occupation of individuals refers to the occupations in which individuals worked most hours during the first or second week in April, 1960. The use of these measures entails the assumption that the net change from occupation group to occupation group from 1959 to 1960 was zero. This appears to be a reasonable assumption. If the assumption was not met, and if the changes were randomly distributed, and if there was no intercorrelation, the estimated regression coefficients are biased downwards. However, intercorrelation is present. In the case of intercorrelation, the direction of the bias becomes unclear. (These remarks apply to all other variables with the exception of the proximity variables.)

X_7 measures the per cent of the white rural farm male employed civilian labor force who were farmers and farm managers in the county.

X_8 measures the per cent of the white rural farm male employed civilian labor force who were craftsmen and foremen in the county.

X_9 measures the per cent of the white rural farm male civilian labor force who were farm laborers and farm foremen in the county.

X_{10} measures the per cent of the white male rural farm employed civilian labor force who were operatives and kindred workers in the county.

Family size, X_{11}: Average family size of white rural farm families in a county in 1960 is the measure used. It was derived by dividing the total number of white rural farm people who were not unrelated individuals in the county by the number of white rural farm families in the county. Mixed white and nonwhite families were classified as nonwhite families. Families were those that existed in 1960.

Labor force participation of females, X_{12}: Female participation in the female labor force is measured by the per cent of white rural farm females, age 14 years and over, who were in the white female rural farm labor force, in the county. The data referred to April, 1960.

Distance variable, X_{13}: The distance variable constitutes one hypothesis as to the location and character of industrial-urban matrices in the United States. It is an indicator of the distance of a county from the nearest SMSA. The value zero was assigned to all counties in which cities of 50,000 or more population in 1960 were located. All counties which were located within 50 miles of an SMSA were assigned the value one. The value two was assigned to all counties which were located from 50 to 100 miles from an SMSA. Those counties which were located from 100 miles to 150 miles from an SMSA were assigned the value three. A county located from 150 to 200 miles from the nearest SMSA received a value of four. A county located between 200 and 250 miles from an SMSA was assigned a value of five. And, the value six was assigned to all counties from 250 to 300 miles from the nearest SMSA. No county in the conterminous United States was located more than 300 miles from an SMSA. In determining the value assigned to a county, the distance used was that from the central city of the SMSA to the most distant boundary of the county.

"White Family Income" Equation (2)

$$Y_i = a + c_1X_{i1} + \dots + c_{12}X_{i12} + c_{14}X_{i14} + u_i$$

where:

$i = 1, 2, \dots, N$

$j = 1, 2, \dots, 12, 14$

and:

Y_i is the ith observed value of the dependent variable.

X_{ij} is the ith value of the jth independent variable.

u_i is the ith random disturbance term. It is assumed that the u_i are independent and come from a normal distribution with zero mean and σ^2 variance.

a is the constant term.

c_j is the coefficient of the jth independent variable.

Variable Specification

The variables in this equation are identical to those in the "white family income" equation (1) with one exception. The distance variable, X_{13}, is omitted and the size-distance$_1$ variable, X_{14}, is included. The size-distance$_1$ variable constitutes a hypothesis as to the location and character of industrial-urban matrices in the United

States. It took into account not only the distance a county was from an SMSA, but also the size of the SMSA.

SMSA counties (counties in which cities of 50,000 or more population were located) were given a value of one for every 100,000 population. SMSA counties with populations between 50,000 and 100,000 were given a value of .5. No SMSA county was given a value greater than 20. This restriction expressed the assumption that SMSA's of two million or more had similar influences on the income levels of the rural families and farmers in the counties in which they were located. It also expressed the hypothesis that SMSA's of two million or more had similar influences on the income levels of rural families and farmers in outlying counties.

Counties within 50 miles of the central city of the SMSA were assigned a value two less than the value assigned to the SMSA county. Counties between 50 and 100 miles of an SMSA were assigned a value two less than the value assigned to counties within 50 miles of the SMSA. This procedure was followed until the value of zero was assigned. An implication of this scheme is that no SMSA of two million population or more is assumed to influence the level of income in a community which is more than 450 miles distant. An SMSA county of one million was assigned a value of ten. Thus, under the procedures, such SMSA's could influence counties at a distance up to a maximum of 200 miles. SMSA's larger or smaller than one million could influence outlying counties in proportion to their population size. In cases where one county could be assigned two values, one value from one SMSA and another value from a different SMSA, the value assigned to the county was the greater of the two. In a number

of cases one SMSA was in the range of influence of another SMSA. This occurred with great frequency in the Northeast. In such cases the value of the SMSA county plus the value derived from the influencing SMSA was assigned to the county, subject to the constraint that the value assigned could not be greater than the value assigned to the influencing SMSA. Each county in the United States, therefore, was assigned a number from zero to 20 by this procedure.

"White Family Income" Equation (3)

$$Y_i = a + c_1X_{i1} + \dots + c_{12}X_{i12} + c_{15}X_{i15} + u_i$$

where:

$i = 1, 2, \dots, N$

$j = 1, 2, \dots, 12, 15$

and:

Y_i is the ith observed value of the dependent variable.

X_{ij} is the ith value of the jth independent variable.

u_i is the ith random disturbance term. It is assumed that the u_i are independent and come from a normal distribution with zero mean and σ^2 variance.

a is the constant term.

c_j is the coefficient of the jth independent variable.

Variable Specification

The variables in this equation are identical to those in the "white family income" equation (1) with one exception. The distance variable, X_{13}, is omitted and the size-distance$_2$ variable is included. The size-distance$_2$ variable constitutes a hypothesis as to the location and character of industrial-urban matrices in the United States. It is

similar to the size-distance$_1$ variable in that it takes into account not only the distance of the county from the SMSA, but also the size of the SMSA. It is different from the size-distance$_1$ variable in that it expresses the hypothesis that industrial-urban concentrations extend their influence shorter distances than is hypothesized in the size-distance$_1$ variable.

The same values were assigned to SMSA counties by the size-distance$_2$ variable as were assigned by the size-distance$_1$ variable. The rules for assigning values to non-SMSA counties were similar to those used for the size-distance$_1$ variable with the following exception. The value assigned to a county between x and ($x \neq 50$) miles from an SMSA according to the size-distance$_2$ variable was four less than the value assigned to counties between ($x - 50$) miles and x miles from the SMSA. It was this decrease by four rather than by two that distinguished X_{15} from X_{14}. It expressed the assumption that no SMSA influenced the level of income in a community which was more than 200 miles distant. As with the size-distance$_1$ variable, the size-distance$_2$ variable assigned values from zero to 20 to each county in the United States.

"Nonwhite Family Income" Equations

"Nonwhite family income" equations (1), (2), and (3) are identical to "white family income" equations (1), (2), and (3) with the exception that variables X_2 through X_{12} refer to the nonwhite population rather than the white population. Variables X_1, X_{13}, X_{14}, and X_{15} in the "nonwhite family income" equations are identical to those used in the "white family income" equations. These equations are estimated for each Southern division and for the Southern region as a whole.

The Constant Terms

In the "family income" equations certain variables have been omitted to gain determinant solutions. The omitted variables are:

(a) the per cent of (white or nonwhite) rural farm males who are age 45 years and over;

(b) the per cent of the employed male rural farm labor force (white or nonwhite) who are professional and technical workers; managers, officials, and proprietors; sales, clerical, and service workers; and laborers;

(c) the per cent of the (white or nonwhite) rural farm males, age 25 years and over, who have completed seven to 11 years of school.

If any or all of these variables had been included in the equations, their X'X matrices would have been singular because the three age variables, for instance, would have been linearly dependent.

It can be shown that functions of each of the means of the omitted variables times their respective (implicitly) estimated regression coefficients are included in the constant term of each estimated equation. The functions are quite complex and vary with the assumptions one chooses to make about the relationships between the estimated regression coefficients of the included age, education, and occupation variables and the implicitly estimated regression coefficients of the omitted age, education, and occupation variables. There are no adequate grounds for making such assumptions. Thus, the effects of the omitted variables are not available. While the constant terms do contain functions of these effects, no interpretation of the constant terms with respect to the effects of the omitted variables can be made without knowledge or assumptions about the functions. A similar situation exists with respect to the constant terms in the "earnings of farmers" equations.

"Earnings of Farmers" Equations

There are six "earnings of farmers" equations. Each equation includes one of the indices of Schultz's industrial-urban matrix. Three of these equations are estimated with county data for each division in the conterminous United States. Three equations are estimated with county data for the conterminous United States as a whole. These are presented below.

"Earnings of Farmers" Equation (1)

$$Y_i = a + c_1 X_{i1} + \dots + c_9 X_{i9} + u_i$$

where:

$i = 1, 2, \dots, N$

$j = 1, 2, \dots, 9$

and:

Y_i is the ith observed value of the dependent variable.

X_{ij} is the ith value of the jth independent variable.

u_i is the ith random disturbance term. It is assumed that the u_i are independent and come from a normal distribution with zero mean and σ^2 variance.

a is the constant term.

c_j is the coefficient of the jth independent variable.

Variable Specification

The dependent variable, Y_1. The median earnings in 1959 of farmers and farm managers in the county in 1960 is the dependent variable. It is taken to be an index of the income level of farmers in the community. Earnings of farmers and farm managers includes the earnings of white and nonwhite farmers and farm managers because earnings by occupation by color is not available. Sections in Chapters I and III have discussed the attributes of this variable.

The independent variables, X_j. Age and education are not available by occupation group. The age and education distributions of rural farm males are used as proxy variables for the age and education of farmers and farm managers. Since farmers and farm managers typically form the highest proportion of the male rural farm labor force, these measures are considered adequate.

Value of land and buildings per farm, X_1: The average value of farm land and buildings per farm in a county is used as a measure of the value of land per farm in the rural community and as a proxy variable for the average value of all non-land capital inputs per farm in the rural community.

The unemployment rate, X_2: Unemployed males as a per cent of the male civilian labor force in the county is used as the measure for this variable. The difference between this variable and X_2 in the "family income" equations is that this variable includes both white and nonwhite males in the labor force. This is necessary because the earnings figures include both whites and nonwhites.

Color of farmers, X_3: This variable measures nonwhite male farmers and farm managers in the county as a per cent of all male

farmers and farm managers in the county. This variable is included to take account of the color composition of farmers and farm managers in the community.

Education, X_4 and X_5: As in the "family income" equations two variables are included which measure education to allow for any curvilinear relationship between education and the earnings of farmers.

X_4 measures the per cent of rural farm males, age 25 or over, who had completed zero to six years of school in a county.

X_5 measures the per cent of rural farm males, age 25 and over, who had completed 12 or more years of school in a county. The education of rural farm males is used in lieu of data on the education of farmers and farm managers.

Alternative occupations, X_6: The per cent of the male labor force in the county who were craftsmen, foremen, operatives, and kindred workers is used to measure the relative availability of alternative nonfarm jobs for farmers and farm managers in the community.

Age, X_7 and X_8: In lieu of age data for farmers and farm managers in the county the age of rural farm males is used. To allow for the curvilinear relationship between age and income, two variables are used.

X_7 measures the per cent of rural farm males who were age 15 to 24 years in a county.

X_8 measures the per cent of rural farm males who were age 25 to 44 years in a county.

Distance variable, X_9: This variable was specified in the Variable Specification section for the "family income" equations.

<u>"Earnings of Farmers" Equation (2)</u>

X_{10}, the size-distance$_1$ variable is included in this equation and the distance variable is omitted. The form of the equation is the same as "earnings of farmers" equation (1) and need not be repeated. Also, the other independent variables remain as specified for "earnings of farmers" equation (1).

<u>"Earnings of Farmers" Equation (3)</u>

The size-distance$_2$ variable, X_{11}, is included in this equation and the distance variable is omitted. This equation has all other attributes of "earnings of farmers" equation (1).

"Earnings of farmers" equations (1), (2), and (3) are estimated with county data for each division in the conterminous United States.

<u>"Earnings of Farmers" Equation (4)</u>

$$Y_i = a_1 Z_{i1} + \dots + a_9 Z_{i9} + c_1 X_{i1} + \dots + c_9 X_{i9} + u_i$$

where:

$i = 1, 2, \dots, N$

$j = 1, 2, \dots, 9$

$k = 1, 2, \dots, 9$

and:

Y_i is the <u>ith</u> observed value of the dependent variable.

Z_{ik} is the <u>ith</u> value of the <u>kth</u> dummy variable.

X_{ij} is the <u>ith</u> value of the <u>jth</u> independent variable.

u_i is the ith random disturbance term. It assumes that the u_i are independent and come from a normal distribution with zero mean and σ^2 variance.

a_k is the coefficient of the kth dummy variable.

c_j is the coefficient of the jth independent variable.

Variable Specification

The dependent variable, Y_i. The median earnings of farmers and farm managers in 1959 in the county is used as the dependent variable.

The dummy variables, Z_k. This equation is estimated with county data for the conterminous United States as a whole. The assumption is made that the regression coefficients in the "earnings of farmers" equations are equal for all divisions, but that divisions had the effect of shifting the equation by a constant factor. Accordingly, to take account of the effects of the division from which the observations come, a dummy variable is included in the equation for each division.

Therefore:

$$Z_{ik} \begin{cases} = 1 \text{ if } Y_i \text{ is an observation from division } k \\ = 0 \text{ otherwise} \end{cases}$$

The dummy variables are defined as follows:

Z_1 = the New England division

Z_2 = the Middle Atlantic division

Z_3 = the East North Central division

Z_4 = the West North Central division

Z_5 = the South Atlantic division

Z_6 = the East South Central division

Z_7 = the West South Central division

Z_8 = the Mountain division

Z_9 = the Pacific division

The independent variables, X_j. The independent variables in this equation are identical to the independent variables which were specified for "earnings of farmers" equation (1). Thus, they need not be specified in this section.

"Earnings of Farmers" Equation (5)

This equation differs from "earnings of farmers" equation (4) only in that X_9, the distance variable, is replaced by X_{10}, the size-distance$_1$ variable.

"Earnings of Farmers" Equation (6)

X_{11}, the size-distance$_2$ variable, replaces X_9, the distance variable in "earnings of farmers" equation (4). All other attributes of "earnings of farmers" equation (4) are retained.

The Beta Coefficients

The equations in the preceding sections have been presented in the usual form using partial regression coefficients, (c_j's). Less frequently, regression equations are presented utilizing beta coefficients, or standard partial regression coefficients.[1, 2] For a regression of

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[1]M. Ezekiel and K. A. Fox, Methods of Correlation and Regression Analysis (3rd ed.; New York: John Wiley & Sons, Inc., 1959), p. 148. Ezekiel and Fox use the term beta coefficient. This term is the one used in this study.

[2]G. W. Snedecor, Statistical Methods (4th ed.; Ames: Iowa State College Press, 1946), pp. 342-43. Snedecor uses the term standard partial regression coefficient.

a dependent variable, Y, on two independent variables, X_1 and X_2, the estimated equation in terms of the beta coefficients is as follows:

$$y'' = b_1'x_1' + b_2'x_2'$$

where:

Y'' = predicted value of the dependent variable,

$\bar{Y}$ = mean of the observed values of the dependent variable,

S_Y = standard deviation of the observed values of the dependent variable,

$y'' = Y'' - \bar{Y}$

X_i = value of the <u>ith</u> independent variable, $(i = 1, 2)$,

$\bar{X}_i$ = mean of the <u>ith</u> independent variable,

S_{X_i} = standard deviation of the <u>ith</u> independent variable,

$x_i' = \dfrac{X_i - \bar{X}_i}{S_{X_i}}$ = the standard deviate of X_i,

b_i = estimated partial regression coefficient of X_i,

$b_i' = b_i \cdot \dfrac{S_{X_i}}{S_y}$ = estimated beta coefficient of X_i.

Thus, if the standard deviate of X_1 changes by 1 (in a positive or negative direction), and if the standard deviate of X_2 remains constant, then the predicted Y, (Y''), deviates from the estimated mean of Y, $(\bar{Y})$, by the amount b_1' (in a positive or negative direction).

Beta coefficients are pure numbers which take into account the variation in the independent variable relative to the variation in the dependent variable. As such, the absolute value of a beta coefficient gives an indication of the relative importance of the effect of an independent variable on the dependent variable. The sign of a beta coefficient indicates the direction of the effect. The beta coefficients of all independent variables in all equations are estimated. In the chapters to follow the results of each equation are presented in terms of the beta coefficients, the coefficient of multiple correlation, the standard error of estimate, and the significance from zero at the .05 level of confidence.

Simple Correlation Analysis

In addition to the linear regression equations presented above, simple correlation coefficients are calculated. They are computed between each of the independent variables in each of the equations which is estimated. They are also calculated between each of the independent variables and the dependent variable in each of the equations which is estimated. These coefficients shed some light on the presence of intercorrelation among the variables. They also constitute further evidence for some of the hypotheses. The implications, when pertinent, will be discussed in conjunction with the results.

Statistical Hypotheses

Chapter III presented and discussed the economic hypotheses which the study tested. This section relates the hypotheses to the equations which were presented above.

Table 4.1 shows the hypothesized signs of the estimated regression coefficients of the independent variables in both the "white family income" equations and the "nonwhite family income" equations. The same signs are expected on each estimated regression coefficient in both the white and nonwhite equations. Standard two-tailed

TABLE 4.1

Expected results of the analyses of the factors influencing median incomes of white and nonwhite rural farm families in a county

Independent Variables	Expected signs of estimated regression coefficients		
	Equation 1	Equation 2	Equation 3
Distance (X_{13})	-		
Size-distance$_1$ (X_{14})		+	
Size-distance$_2$ (X_{15})			+
Average value of land and buildings (X_1)	+	+	+
White (nonwhite) male unemployment rate of county (X_2)	-	-	-
Per cent of white (nonwhite) rural farm males who are age:			
15-24 (X_3)	-	-	-
25-44 (X_4)	+	+	+
Per cent of white (nonwhite) rural farm males, age 25 or over who have completed:			
0-6 years of school (X_5)	-	-	-
12 or more years of school (X_6). . .	+	+	+
Per cent of employed white (nonwhite) rural farm males who are:			
Farmers and farm managers (X_7) . . .	-	-	-
Craftsmen and foremen (X_8)	+	+	+
Farm laborers, farm foremen (X_9) . .	-	-	-
Operatives, kindred workers (X_{10}) .	+	+	+
White (nonwhite) rural farm family size (X_{11})	+	+	+
Per cent of white (nonwhite) rural farm females who are employed (X_{12}). .	+	+	+

"T" tests are employed to ascertain whether the estimated regression coefficients are significantly different from zero.

While the direction of the effects of each variable on the median incomes of white and nonwhite families is expected to be the same, the size of the effects of some variables is expected to be different. The average value of farm land and buildings per county is expected to have a greater effect on the median incomes of white families than on the median incomes of nonwhite families. Such hypotheses are not tested statistically. However, if the estimated regression coefficients of the variable in the white equations in the South are positive and significantly different from zero, and the estimated regression coefficients of the variable in the nonwhite equations are not significantly different from zero, or are negative, then such results are taken as confirming evidence for the hypothesis. It should be emphasized that such evidence is invalid on statistical grounds. Yet, on economic grounds, the evidence seems to be adequate.

The positive effect of high education levels (12 or more years) is hypothesized to be greater on white family income than on nonwhite family income. Estimated regression coefficients of this variable which are negative or not different from zero in the nonwhite equations in the South, and estimated regression coefficients which are positive in the white family income equations are taken to be confirming evidence for this hypothesis.

It is expected that the effects of SMSA's are greater on the median income of white families than on the median incomes of nonwhite families in the Southern divisions and the Southern region. Confirming evidence for this hypothesis is taken to be the following: The estimated regression coefficients on the distance, size-distance$_1$, and size-distance$_2$ variables have signs as shown in Table 4.1 in the white equations, but have opposite signs or are not different from zero in the nonwhite equations.

The expected signs for the estimated regression coefficients shown in Table 4.1 apply to the divisional, regional, and national equations estimated for median income of white families per county. Chapter III hypothesized that the effects of SMSA's on the median income of white rural farm families per county would be smaller in the Mountain, West North Central, and West South Central divisions. Again, this hypothesis is not tested statistically. Evidence similar to that presented above is taken to confirm this hypothesis.

Table 4.2 shows the hypothesized signs of the estimated regression coefficients of the independent variables in the "earnings of farmers" equations. These equations are estimated for each division and for the conterminous United States as a whole. The signs of the regression coefficients of each variable are hypothesized to be the same for each division and for the nation. Divisional differences in the results similar to those hypothesized for the "family income" equations are expected. Thus, for instance, the effects of proximity to large cities on the earnings levels of farmers in counties in the West North Central, West South Central, and Mountain divisions are expected to be less than the effects on earnings levels of farmers in counties in the Northeast and South.

The Choice of the Appropriate Proximity Variable

The equations estimated for each geographic area represent alternative hypotheses about the nature and extent of the influences

TABLE 4.2

Expected results of the analyses of factors influencing median earnings of farmers and farm managers in a county.

Independent Variables	Expected signs of estimated regression coefficients		
	Equation 1	Equation 2	Equation 3
Distance (X_9)	-		
Size-distance$_1$ (X_{10})		+	
Size-distance$_2$ (X_{11})			+
Average value of land and buildings (X_1)	+	+	+
Male unemployment rate in county (X_2) .	-	-	-
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-	-	-
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-	-	-
12 or more years of school (X_5) . . .	+	+	+
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6) .	+	+	+
Per cent of rural farm males who are age:			
15-24 (X_7)	-	-	-
25-44 (X_8)	+	+	+

of industrial-urban concentrations on the income levels in communities in the area. The equations differ only with respect to the particular measure of the proximity variable included. Equation (1) includes the distance variable; equation (2) includes the size-distance$_1$ variable; and, equation (3) includes the size-distance$_2$ variable. For each geographic area for which the equations were estimated one of the distance, size-distance$_1$, and size-distance$_2$ variables is selected as the variable which most closely measures the influence of industrial-urban concentrations in the area. There is no presumption that one particular variable would be appropriate for all divisions, regions, and for the nation as a whole. The choice is made on the basis of the coefficients of multiple determination estimated for each equation. For each geographic area the equation with the highest coefficient of multiple determination is chosen. This is based on the assumption that the equation with the correct measure of the influence of industrial-urban concentrations is the equation which maximizes the per cent of the variance in median income for which it accounts. In general, for any geographic area the coefficients of multiple determination for the three equations are very similar. Given this similarity, the consequences of selecting any one of the equations are relatively minor.

In succeeding chapters the results of the analysis are presented, interpreted, and discussed. Chapter V contains a discussion of the results of the analyses of the "white family income" and "nonwhite family income" equations. Chapter VI contains the results of the analysis of the "earnings of farmers" equations. In Chapter VII a comparison of the results from the analysis of rural farm family income and the analysis of the earnings of farmers and farm managers is attempted. Chapter VIII summarizes the results of the study and draws the conclusions and implications.

CHAPTER V

RURAL FARM FAMILY INCOME: THE RESULTS OF THE ANALYSIS

Introduction

This chapter presents the results obtained from the analysis of the family income equations. The results and their interpretation are organized by geographic region. The equations for each division are discussed, followed by a discussion of the equations estimated for the region. The "nonwhite family income" equations were estimated only for the three Southern divisions and for the Southern region. The results of these analyses are discussed along with those of the "white family income" equations for the three divisions and one region in the South. Next, the analysis of the "white family income" equations estimated for the conterminous United States is discussed. Following a summary of the results, the relevance of the divisional and regional analyses is discussed.

As was discussed in Chapter IV, one equation of the three, which were estimated for each geographic area, was chosen as that equation which includes the proximity variable which most closely measured the influence of industrial-urban concentrations. For each geographic area the results of this equation are discussed and interpreted fully. The results of the other two equations, however, are presented also. Only major differences among the results of the estimated equations are discussed. The tables presented in this chapter only summarize the results of the equations. Appendix I contains a table of results for each equation estimated.

The Northeast

The Northeastern region of the United States as defined by the Census contains the following states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. The New England division comprises the first six states mentioned, while the Middle Atlantic division contains New Jersey, New York and Pennsylvania.

The New England Division

Table 5.1 presents a summary of the results of the three equations which were estimated for the New England division. Tables 1, 2, and 3 of Appendix I present the estimated partial regression coefficients, the computed "t" values, and the estimated beta coefficients.

The coefficient of multiple determination for equation (1) was .8057; for equation (2) the coefficient of multiple determination was .7503; for equation (3) it was .7937. The simple correlation coefficient between the distance variable (X_{13}) and median income was -.6906; between the size-distance$_1$ variable (X_{14}) and median income the simple correlation coefficient was .7225; and, between the size-distance$_2$ variable (X_{15}) and median income it was .7586. The estimated partial regression coefficients of these three variables were all significantly different from zero at the .05 level of confidence. Because equation (1) had the highest coefficient of multiple

TABLE 5.1

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

New England Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.8976	.8662	.8909
Standard error of estimate	158.5960	179.7893	163.4330
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.6309*		
Size-distance$_1$ (X_{14})		.4592*	
Size-distance$_2$ (X_{15})			.7511*
Average value of land and buildings (X_1)	.2986*	.3022*	.2027*
White male unemployment rate of county (X_2)	.1063	.0392	.1422
Per cent of white rural farm males who are age:			
15-24 (X_3)	.2571*	.0929	.1390
25-44 (X_4)	.1715	.0602	.1859
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0109	-.0387	-.1765
12 or more years of school (X_6) .	-.4171*	-.3364*	-.3928*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.1150	-.1488	-.0420
Craftsmen and foremen (X_8)	.1036	.0925	.1466
Farm laborers, farm foremen (X_9) .	.1107	.2207	.2312
Operatives, kindred workers (X_{10})	-.2663*	-.1617	-.1617
White rural farm family size (X_{11}) .	.0001	-.1007	.0520
Per cent of white rural farm females who are employed (X_{12}) . . .	.0026	.2518	.1698

[1] See Appendix I, Tables 1, 2, 3, for complete results.
*Significantly different from zero at the .05 level.

determination, the distance variable was taken as most closely measuring the influence of industrial-urban concentrations in the New England area.

As measured by the absolute size of the estimated beta coefficients, the distance variable is the most important variable relative to other variables in equation (1). Next most important is the variable measuring high education levels (X_6), followed by average value of farm land and buildings (X_1), operatives and kindred workers (X_{10}), and per cent of white rural farm males, age 15-24, (X_3). The regression coefficients of all other variables in equation (1) were not significantly different from zero. Of the five significant variables in equation (1), three had signs which were contrary to the expectations stated in Table 4.1. These variables were the proportion of males, age 15-24, (X_3); the per cent of males over 25 with 12 years or more of school (X_6); and the per cent of operatives and kindred workers (X_{10}) in the labor force.

There was a high degree of intercorrelation among the independent variables for the New England division. This intercorrelation may have increased the standard errors of some of the estimated regression coefficients sufficiently to mask the significance which may have been present. It also could have affected the estimates of the regression coefficients sufficiently to change signs.

Males, age 15-24, (X_3) was correlated with the per cent of farmers and farm managers ($r_{3.7} = .5053$). Males, age 25-44, (X_4) was correlated with the per cent of males with 12 or more years of school ($r_{4.6} = .5257$), with farmers and farm managers ($r_{4.7} = .5137$), and with the per cent of females who were employed ($r_{4.12} = .5697$). The per cent of the white rural farm labor force who were farmers and farm managers (X_7) was correlated with farm laborers ($r_{7.9}$ = .6517). Craftsmen and foremen (X_8) was correlated with family size ($r_{8.11}$ = -.5504). Finally, the average value of land and buildings (X_1) was highly correlated with the distance variable ($r_{1.13}$ = -.5686).

The interpretation of these results in this division is made difficult by the high degree of intercorrelation among the independent variables and the inconsistent signs of three of the estimated regression coefficients. Nevertheless, some important conclusions are drawn from these results.

First, the industrial-urban development hypothesis is strongly confirmed regardless of the variable used as a measure of the influence of industrial-urban concentrations. Indeed, the measure of industrial-urban concentrations is the most important variable relative to other variables in all three equations. The estimated regression coefficient of the distance variable (X_{13}) in equation (1) is -137.15 (see Appendix I, Table 1). Ceteris paribus, the differential between the median income of white rural farm families in an SMSA county and a county between 50 and 100 miles from an SMSA is estimated to be $274.30. That is, the median income of white rural farm families in the SMSA county is estimated to be $274.30 higher than the median income in the county between 50 and 100 miles from the SMSA.

The overwhelming importance of industrial-urban concentrations in determining income levels of rural farm families in communities explains the relative lack of low rural farm income levels in New England compared to other areas in the country (Table 1.1). Only nine counties in New England are more than 100 miles from a city of

50,000 population or more. These are in northern Vermont. Forty-one counties of the 67 are within 50 miles of SMSA's.

Second, the average value of farm land and buildings per farm in a county is important in determining the income level of rural farm families in the county. This variable was correlated with distance ($r_{1.13}$ = -.5686) and thus may have picked up some of the effects of distance on income levels. Most certainly, it reflects the opportunity cost of land in agriculture in New England. The average value of farm land and buildings per farm in a county was highly correlated with median income ($r_{y.1}$ = .7307). Clearly, the value of all capital inputs has an effect on the income levels of rural farm families in this division. These three statistics indicate that the ratio of capital to labor in agriculture may be higher in the counties near SMSA's than in those in northern Vermont and New Hampshire. Given the presence of shade grown tobacco in Connecticut and Massachusetts and the large amounts of marginal farming and recreational land in the northern portions of the division, the positive effect of X_1 is reasonable.

The interpretation of the other significant estimated regression coefficients is more difficult. The positive regression coefficient of X_3 (males, age 15-24) was unexpected. The per cent of white rural farm males, age 15-24, was highly correlated with the per cent of white rural farm males, age 45 and over, per county (-.7374). If young rural farm adults receive higher incomes on the average than those over 45 years in the division, then the positive sign of the regression coefficient of X_3 is correct. The correlation between males, age 15-24 (X_3) and operatives and kindred workers

($r_{3.10}$ = .5053) may have something to do with the unexpected negative estimated regression coefficient of X_{10}. Operatives may receive less income on the average than white rural farm individuals in occupations not represented in the equation. A relative lack of white rural farm males in operative occupations in a county may indicate that there is a relative prevalence of white rural farm males in other higher income occupations. The unexpected negative estimated regression coefficient of X_6 (12 or more years of school) cannot be rationalized with the available information.

The Middle Atlantic Division

A summary of the results of estimating the three equations for the Middle Atlantic division are shown in Table 5.2. Tables 4, 5, and 6 in Appendix I contain more complete results. As noted before, New Jersey, New York, and Pennsylvania constitute the Middle Atlantic division.

Of the three equations, equation (3) had the highest coefficient of multiple determination (R_3^2 = .3310). The size-distance$_2$ variable seemed to most closely measure the influence of industrial-urban concentrations in this division. The simple correlation between the size-distance$_2$ variable and median income was also highest ($r_{y.15}$ = .4480). While the coefficients of both the size-distance$_1$ (X_{14}) and size-distance$_2$ (X_{15}) variables were significantly different from zero, the coefficient of the distance variable was not.

The influence of industrial-urban concentrations as measured by the size-distance$_2$ variable again is the most important variable relative to other variables. High education levels (X_6) is the next

TABLE 5.2

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

Middle Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.5115	.5292	.5753
Standard error of estimate	49.0284	48.4131	46.6692
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.7445		
Size-distance$_1$ (X_{14})		2.3122*	
Size-distance$_2$ (X_{15})			4.4427*
Average value of land and buildings (X_1)	.0000	-.0447	-.0893
White male unemployment rate of county (X_2)	-.2526*	-.2040*	-.1384
Per cent of white rural farm males who are age:			
15-24 (X_3)	.1436	.1222	.0622
25-44 (X_4)	-.0811	-.1167	-.2042
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.4301*	.3584*	.2494*
12 or more years of school (X_6) .	.3088*	.2927*	.2854*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.1814	-.0925	.0204
Craftsmen and foremen (X_8)	.0125	.0219	.0442
Farm laborers, farm foremen (X_9) .	-.2920*	-.2415	-.1361
Operatives, kindred workers (X_{10})	.0274	.0422	.0962
White rural farm family size (X_{11}) .	-.0640	-.0574	-.0256
Per cent of white rural farm females who are employed (X_{12}) . . .	-.2748	-.2237	-.1564

[1] See Appendix I, Tables 4, 5, 6, for complete results.
*Significantly different from zero at the .05 level.

important, followed by the per cent of white rural farm males who had completed 0-6 years of school (X_5). None of the other variables in equation (3) had coefficients which were significantly different from zero.

Again, intercorrelation among the independent variables was serious. The average value of farm land and buildings per farm in a county (X_1) was positively correlated with both the size-distance$_1$ and the size-distance$_2$ variables ($r_{1.14} = .5498$, $r_{1.15} = .5541$). The per cent of white rural farm males, age 15-24, (X_3) was highly (greater than .5000) and positively correlated with males, age 25-44, (X_4), farmers and farm managers (X_7), farm laborers (X_9), and the per cent of white rural farm females who were employed (X_{12}). Males, age 25-44, (X_4) was highly and positively correlated with farmers and farm managers (X_7), high education levels (X_6), and with employed females in the rural farm labor force (X_{12}). The per cent of white rural farm males who were farmers and farm managers (X_7) was correlated with farm laborers ($r_{7.9} = .5915$), and with both size-distance variables ($r_{7.14} = -.5739$, $r_{7.15} = -.5541$). Finally, the per cent of white rural farm males who had completed 12 or more years of school was correlated with employed females ($r_{6.12} = .6483$). Given the high degree of intercorrelation, some of the results of these equations are suspect. However, the simple correlation coefficients indicate some of the relationships.

It is clear that the major factor affecting differentials in income levels of rural farm families among communities in this division is the proximity to large cities. The differential between the median income of white rural farm families in a county in which a city of one million population is located and a county between 50 and 100 miles from the city is estimated by equation (3) to be $321.36, ceteris paribus. The two other measures of proximity to large cities estimate much lower differentials between the same two counties. This, taken in conjunction with the fact that more regression coefficients in equations (1) and (2) were significantly different from zero than in equation (3) may indicate that the size-distance$_2$ variable picked up the effects of some of the other variables in the equation. Noted above were the negative simple correlations between farmers (X_7) and the size-distance$_1$ and size-distance$_2$ variables. Also noted was the positive correlation between farmers (X_7) and farm laborers (X_9). These two statistics indicate that farmers form a smaller proportion of the rural farm labor force near large cities than in more distant counties. The higher is the proportion of farmers, the higher, also, is the proportion of farm laborers in the rural farm labor force in the Middle Atlantic division. Finally, the simple correlation between the average value of farm land and buildings per farm in a county and the proximity of the county to a large city was high and positive. All of these statistics are confirming evidence for the hypothesis that the capital to land ratio in agriculture near a large city in the Middle Atlantic is higher than in a more distant county. Both income from farming and nonfarm income of rural families is higher near a large city.

From equations (1) and (2) it is clear that high levels of local unemployment have a deleterious effect on the median income of rural farm families in a county. Although the coefficient of unemployment (X_2) became non-significant in equation (3) it retained the expected sign. Also, the coefficients of farmers (X_7), craftsmen (X_8), farm laborers (X_9), and operatives (X_{10}) were in the expected direction even though they were not significantly different from zero. Although the evidence is weak, these statistics indicate that local nonfarm employment has positive effects on the income levels of rural farm families.

The high intercorrelation between both the age variables and other independent variables may have masked any effects which age and experience have on income levels. The regression coefficients of both education variables were highly significant and positive. Clearly, high education levels affect median income positively. The positive coefficient of X_5 (zero to six years of school completed) is puzzling. Apparently, functional illiteracy does not have adverse effects on the incomes of rural farm families in the Middle Atlantic division. More puzzling is the high intercorrelation between employed females (X_{12}) and a number of other independent variables.

<u>The Northeast Region</u>

The results of the equations estimated for the Northeast region as a whole are presented in Tables 7, 8, and 9 in Appendix I. They are summarized in Table 5.3.

Equation (1) accounted for more of the variance in median income of white rural farm families among counties in the Northeast than either of the other two equations ($R_1^2 = .3819$, $R_2^2 = .2616$, $R_3^2 = .3015$). Although the distance variable was the least accurate in the Middle Atlantic and the most accurate in New England, it appeared to most closely measure the influence of industrial-urban

TABLE 5.3

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

Northeast Region

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6180	.5115	.5491
Standard error of estimate	291.2115	318.2960	309.5744
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.5149*		
Size-distance$_1$ (X_{14})		.3740*	
Size-distance$_2$ (X_{15})			.5044*
Average value of land and buildings (X_1)	.2378*	.2318*	.1962*
White male unemployment rate of county (X_2)	.2300*	.2039*	.2468*
Per cent of white rural farm males who are age:			
15-24 (X_3)	.2934*	.2448*	.2133*
25-44 (X_4)	.1092	.1266	.1061
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0404	-.0122	-.0770
12 or more years of school (X_6) .	-.1659	-.2134*	-.2153*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.2355*	.2986*	.3437*
Craftsmen and foremen (X_8)	.0561	.0332	.0421
Farm laborers, farm foremen (X_9) .	-.2182*	-.2542*	-.1803
Operatives, kindred workers (X_{10})	.1430	-.1229	-.0953
White rural farm family size (X_{11}) .	.0178	-.0265	.0132
Per cent of white rural farm females who are employed (X_{12}) . . .	-.1860	-.0784	-.0705

[1]See Appendix I, Tables 7, 8, 9, for complete results.

*Significantly different from zero at the .05 level.

concentrations in the Northeast as a whole. Thus, income differentials among SMSA counties resulting from differences in the size of city apparently are unimportant, as is the effect of differing city size on the income levels among non-SMSA counties. This appears reasonable given the concentration of large cities in the Northeast and the small number of counties outside their influence.

As expected, the influence of industrial-urban concentrations is relatively the most important factor which affects median incomes, regardless of the measure used. In equation (1) the per cent of white rural farm males, age 15-24, (X_3) is the next most important, followed by the average value of land and buildings (X_1), farmers (X_7), the local unemployment rate (X_2), and farm laborers (X_9) in that order. The regression coefficients of the other variables in equation (1) were not significantly different from zero.

The intercorrelation problem was greatly reduced by grouping the Middle Atlantic and New England divisions together. The average value of land and buildings (X_1) was positively correlated with both the size-distance$_1$, and size-distance$_2$ variables. The per cent of white rural farm males, age 25-44, (X_4) was correlated with farmers and farm managers ($r_{4.7} = .6393$), and with employed females ($r_{4.12} = .6396$). X_6 (high education levels) was correlated with employed females ($r_{6.12} = .6313$), and farmers (X_7) was correlated with farm laborers ($r_{7.9} = .5721$).

The influence of industrial-urban concentrations on the median income of white rural farm families in a county is the most important factor affecting income differentials. A differential of $332.20 is estimated by the distance variable between the median income in an

SMSA county and the median income in a county 50 to 100 miles distant, ceteris paribus. Clearly, the nonfarm job alternatives which are present in large cities of the region make reorganization in agriculture easier and influence income positively. The distance variable also probably measures the differential wage rates and transportation costs between the center and periphery of the matrices around the large Northeastern cities. The average value of land and buildings per farm was correlated with both of the size-distance variables. Thus, these variables may have picked up some of the effects of differing land values.

The estimated regression coefficient of the local unemployment rate (X_2) was positive and highly significant. This was not expected. It was argued in Chapter III that the unemployment rate in a county may be a proxy in some areas for the presence of urban centers smaller than SMSA's. It was assumed that the influence of smaller cities is similar to that of large industrial cities. In such cases positive signs were expected. If this is the case, then, cities smaller than 50,000 population have a positive effect on the income levels of rural farm families in the same county.

The positive and highly significant regression coefficient of X_{10} (the per cent of white rural farm males who were farmers and farm managers) was unexpected. The signs of the regression coefficients of this variable in the divisional equations were negative with one exception. The simple correlation coefficients between X_{10} and median income for both divisions were negative but very low. However, none of the estimated coefficients of X_{10} were significantly different from zero in the divisional equations. The sign simply may be the result of grouping the two divisions.

To summarize, in the Northeast region, an area of intense industrial-urban concentration, it is not surprising that the effects of large cities on the median incomes of white rural farm families are of overwhelming importance. Compared to the effects of industrial-urban concentrations, the effects of other variables in determining variations in income levels of rural farm families among communities are very minor.

The North Central Region

The East North Central Division

Ohio, Indiana, Illinois, Michigan, and Wisconsin make up the East North Central division. Table 5.4 contains a summary of the results of the analysis of median rural farm family incomes in this division.

The coefficients of determination for the three equations were almost identical for the East North Central division ($R_1^2 = .3152$, $R_2^2 = .3343$, $R_3^2 = .3278$). In accordance with the criterion set forth in Chapter IV the size-distance$_1$ variable was chosen as the variable most closely measuring the influence of industrial-urban concentrations. Clearly, however, the effects of the three variables were very similar and there was little basis for choice among them.

The relative prevalence of rural farm males with at least a high school education is the most important variable affecting inter-community differentials in the income levels of white rural farm families in all three equations. The local unemployment rate is next

TABLE 5.4

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

East North Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.5614	.5782	.5725
Standard error of estimate	61.5365	60.6673	60.9654
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.0135		
Size-distance$_1$ (X_{14})		-.1767*	
Size-distance$_2$ (X_{15})			-.1400*
Average value of land and buildings (X_1)	-.1377*	-.0344	-.0689
White male unemployment rate of county (X_2)	-.2697*	-.3069*	-.3001*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.0744	-.0634	-.0685
25-44 (X_4)	-.1063	-.0954	-.0994
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0660	.0306	.0357
12 or more years of school (X_6) .	.4811*	.4330*	.4451*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.1223	.0476	.0817
Craftsmen and foremen (X_8)	.0476	.0899	.0820
Farm laborers, farm foremen (X_9) .	-.1582*	-.1629*	-.1616*
Operatives, kindred workers (X_{10})	.0881	.0528	.0715
White rural farm family size (X_{11}) .	-.0519	-.0691	-.0724
Per cent of white rural farm females who are employed (X_{12}) . . .	-.0219	-.0196	-.0264

[1]See Appendix I, Tables 10, 11, 12, for complete results.
*Significantly different from zero at the .05 level.

in relative importance, followed by the size-distance$_1$ variable and farm laborers, in that order.

X_6 (high education levels) is the variable which affected income differentials among communities most relative to other variables in the East North Central. X_6 was positively correlated with the average value of farm land buildings per farm in a county ($r_{1.6}$ = .5133), and negatively correlated with low education levels ($r_{5.6}$ = -.6745). The relative prevalence of highly educated rural farm males plus the relative lack of functional illiterates raises income in one county relative to another. There is no evidence from the simple correlation coefficients to suggest that high education levels are related to craftsmen and operative occupations. One could rationalize that the positive correlation between X_1 and X_6 indicates that farmers with at least high school education tend to have a higher capital to labor ratio on their farms. If such is the case, income from farming is higher in those counties where rural farm males with high school education or over are relatively prevalent.

Local unemployment rates are very important in explaining the variation in median income of white rural farm families among counties. The sign of the regression coefficient of X_2 (unemployment) is consistent with the hypothesis that a high unemployment rate in the local community creates under-employment in local agriculture. It is also consistent with the hypothesis that fewer rural farm males hold nonfarm jobs, either part- or full-time, in counties with a high unemployment rate. The simple correlation coefficient between farmers (X_7) and craftsmen (X_8) was -.7074, and between farmers and operatives it was -.6758.

These statistics provide additional evidence that the local labor market is an important determinant of rural farm family income, and that craftsmen and operative occupations are relevant alternative occupations for farmers in the East North Central division. Although the estimated regression coefficients of X_7, X_8, and X_{10} were not significantly different from zero, their signs were consistent with expectations. The estimated regression coefficient of X_9 (farm laborers) was significantly different from zero and in the expected direction.

The proximity to large industrial-urban concentrations in the East North Central is a relatively unimportant factor in determining variations in the income levels of rural farm families among communities. The negative signs of both size-distance variables indicate that counties near the periphery of industrial-urban matrices in this division have slightly higher median rural farm family incomes than do those near the center. It may have been that none of the measures approximated the influence of large industrial-urban centers in the East North Central. Chicago-Gary, Detroit, Cleveland, St. Louis, and Cincinnati dominated both the size-distance variables. If the influence of these cities was less than or equal to the influence of smaller SMSA's, then the measures were incorrectly constructed.

<u>The West North Central Division</u>

This division is made up of Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. Table 5.5 presents a summary of the results of the analysis for this division and Tables 13, 14, and 15 of Appendix I show more complete results.

TABLE 5.5

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

West North Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.2880	.3423	.3654
Standard error of estimate	89.1481	87.4666	86.6547
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.0520		
Size-distance$_1$ (X_{14})		-.2648*	
Size-distance$_2$ (X_{15})			-.2987*
Average value of land and buildings (X_1)	-.0600	-.0900	-.0300
White male unemployment rate of county (X_2)	.1391*	.1184*	.0923*
Per cent of white rural farm males who are age:			
15-24 (X_3)	.0290	.0361	.0197
25-44 (X_4)	-.0822	-.1049	-.1113*
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0156	.0025	.0254
12 or more years of school (X_6) .	.1522*	.1082	.0738
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.0366	-.0928	-.1238
Craftsmen and foremen (X_8)	.0818	.0233	.0283
Farm laborers, farm foremen (X_9) .	.0595	.0269	-.0036
Operatives, kindred workers (X_{10})	.0490	.1016	.0779
White rural farm family size (X_{11}) .	-.1482*	-.1882*	-.1371*
Per cent of white rural farm females who are employed (X_{12}) . . .	-.0197	-.0166	-.0221

[1] See Appendix I, Tables 13, 14, 15, for complete results.
*Significantly different from zero at the .05 level.

Of the three equations, equation (3) accounted for most of the variance in the median income of white rural farm families per county in the West North Central division (R_1^2 = .0829, R_2^2 = .1172, R_3^2 = .1335). Even equation (3), however, accounted for very little of the total variance.

The size-distance$_2$ variable is the most important variable relative to other variables in explaining the variation in income levels among communities. Average family size is the next most important, followed by farmers and farm managers (not significantly different from zero), males, age 25-44, and the local unemployment rate. X_6 (high education levels) was significantly different from zero in equations (1) and (2) but not in equation (3). There was more intercorrelation among the independent variables in the West North Central division than in the East North Central.

The sign of the estimated regression coefficient of the size-distance$_2$ variable (X_{15}) is inconsistent with expectations. Ceteris paribus, a differential of $44.06 is estimated between the median income of white rural farm families in a county in which a city of one million is located and a county between 50 and 100 miles from the city. The median income in the outlying county is estimated to be higher than the income in the large industrial-urban center. Of all the counties in the division, 67 per cent were assigned zero values by the size-distance$_2$ variable. This percentage varied by state in the division from 10.4 per cent in Missouri to 98.5 per cent in South Dakota. The assignment of a zero value to a county entailed the hypothesis that large industrial-urban centers have no influence on the income level in the county. In general, counties assigned non-zero values were in dairy, and general farming areas, whereas counties assigned zero values were in corn belt, small grain, and ranching areas. A rationalization for the negative signs on the coefficients of the size-distance variables would be that the government programs and local weather conditions have more to do with determining the income levels of farm families in these areas than the influence of either the local labor markets or the labor markets in large industrial-urban centers. This also may explain the low proportion of the variance in median income explained by the equations.

Local labor market conditions in communities in the West North Central division account for some of the variation in income levels of rural farm families among communities, however. A high rate of unemployment in a county has a positive effect on median income relative to a county with a low rate. In this division, the county unemployment rate may be a rough indicator of local urbanization, in which case the local labor markets in relatively urbanized counties provide nonfarm employment to rural farm males. The high negative correlation coefficients between farmers (X_7) and craftsmen ($r_{7.8} = -.6353$) and between farmers and operatives ($r_{7.10} = -.7705$) are confirming evidence that craftsmen and operative occupations are relevant alternative nonfarm occupations for farmers in this division. Neither craftsmen nor operatives was highly correlated with the proximity variables (X_{13}, X_{14}, X_{15}), evidence which tends to confirm the hypothesis that local labor markets are the relevant markets rather than labor markets in large industrial-urban concentrations.

X_4 (males, age 25-44) was negatively related to median income levels. However, it was positively correlated with farmers ($r_{4.7} = .5056$), negatively correlated with operatives ($r_{4.10} = -.5102$) and with size-distance$_2$ ($r_{4.15} = -.5077$). The fact that the estimated regression coefficient of X_4 was negative and significantly different from zero may be related to this high degree of intercorrelation.

The relationship between the income level of white rural farm families and average family size in a county is a negative one, a relationship which was unexpected. Since the relationship between family size and family income is a complex one involving many sociological and economic factors, one cannot be sure of the reason for this relationship.

The North Central Region

Tables 16, 17, and 18 in Appendix I present the results of the analysis for the North Central region as a whole; Table 5.6 shows a summary of these results. The three equations accounted for much more of the variance in median income for the region as a whole than they did for each of the divisions separately. Equation (1) accounted for 50.95 per cent; equation (2) accounted for 53.74 per cent; and equation (3) accounted for 53.45 per cent of the variance in the median income of white rural farm families per county in the North Central region. The size-distance$_1$ variable most closely measured the influence of large industrial-urban concentrations, although both the distance and size-distance$_2$ variables approximated this influence about as closely. These results indicate that the influence of large industrial-urban concentrations probably extends further in the North Central region than in the Northeast.

The variable measuring the relative predominance of operatives in the white male rural farm labor force (X_{10}) is the most important

TABLE 5.6

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

North Central Region

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.7138	.7331	.7311
Standard error of estimate	358.4034	348.0403	349.1085
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.2143*		
Size-distance$_1$ (X_{14})		.3285*	
Size-distance$_2$ (X_{15})			.2953*
Average value of land and buildings (X_1)	.1480*	.1110*	.0687*
White male unemployment rate of county (X_2)	.2168*	.2170*	.2204*
Per cent of white rural farm males who are age:			
15-24 (X_3)	.0156	.0187	.0222
25-44 (X_4)	.0284	.0213	.0121
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0093	-.0221	-.0200
12 or more years of school (X_6) .	.1126*	.1676*	.1803*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.2221*	-.0765	-.1101*
Craftsmen and foremen (X_8)	-.0665	-.0374	-.0582
Farm laborers, farm foremen (X_9) .	-.0230	-.0087	-.0074
Operatives, kindred workers (X_{10})	.3695*	.3802*	.3868*
White rural farm family size (X_{11}) .	.0724*	.0866*	.0642*
Per cent of white rural farm females who are employed (X_{12})	.1045*	.1084*	.1232*

[1]See Appendix I, Tables 16, 17, 18, for complete results.
*Significantly different from zero at the .05 level.

variable relative to other variables in equation (2). The size-distance$_1$ variable is the next most important variable. In order of declining importance the unemployment rate (X_2), high education levels (X_6), capital in agriculture (X_1), employed females (X_{12}), and average family size (X_{11}) significantly affect income levels of white rural farm families among communities. As in the Northeast region, intercorrelation was not a serious problem. Rather, the intercorrelation present aids in interpreting the results.

Some preliminary descriptive comments about the East and West North Central divisions are appropriate before presenting the interpretation of the results of equation (2). The average distance of counties in the West North Central division from SMSA's is almost double that for the East North Central division. The average value assigned to counties in the East North Central by the size-distance$_1$ variable was over 2.3 times the average value assigned to counties in the West North Central division. In general, the rural farm parts of counties in the West North Central division are much further removed from cities of 50,000 population or more as measured by the distance and the size-distance$_1$ variables. Further, farmers and farm managers formed an average of 50.6 per cent of the employed rural farm labor force of counties in the East North Central compared to 69.3 per cent in the West North Central division in 1960. Craftsmen formed an average of 8.8 per cent of the employed rural farm labor force of counties in the East North Central division compared to an average of 4.2 per cent in the West North Central division. Similarly, operatives formed an average of 13.2 per cent of the employed rural farm labor force of counties in the East North

Central compared to only 5.1 per cent in the West North Central. Thus, the rural farm parts of counties in the West North Central division are much more oriented toward agriculture than are the rural farm parts of counties in the East North Central division. The North Central region, therefore, groups together two sets of communities, one set which is less agricultural and much closer to large urban centers than the other. Some of the results of equation (2) for the North Central region as a whole are due to this grouping of two rather disparate groups of communities.

The second most important variable in equation (2) is the measure of the influence of large industrial-urban concentrations. The sign of the estimated regression coefficient of X_{14} was positive as expected. The signs of the regression coefficients of the size-distance variables in the divisional equations were negative, however. The grouping of the counties in the West and East North Central divisions resulted in this change in sign. The mean of median incomes per county in the West North Central was \$3144; the mean of median incomes per county in the East North Central division was \$4162 (see Table 1.1). The preceding paragraph pointed out that the values assigned by the size-distance_1 variable to counties in the West North Central were on the average less than half the values assigned to counties in the East North Central. Over the region as a whole the relative proximity of a community to large industrial-urban concentrations has a strong positive effect on the income level of rural farm families in a community.

The relative prevalence of nonfarm employment of white rural farm males has a positive effect on the income level of rural farm families. The relative prevalence of operatives in the male rural farm labor force is the most important variable accounting for variations in income levels among communities. However, X_{10} (operatives) was highly correlated with size-distance$_1$ ($r_{10.14}$ = .5408). The effects of the proximity of a community to large cities and the effects of nonfarm employment in operative jobs are probably mixed in the regression coefficients of the two variables. Farmers (X_7) and operatives (X_{10}) were highly correlated as were farmers and craftsmen ($r_{7.10}$ = -.8011, $r_{7.8}$ = -.7364). Clearly both craftsmen and operative occupations are relevant nonfarm occupations for farmers in the region as a whole. The fact that craftsmen and operatives were highly and positively correlated probably indicates that the regression coefficient of the operatives variable picked up some of the effects of craftsmen. Previously noted was that rural farm operatives and craftsmen are much less prevalent, and median incomes of rural farm families on the average are lower in the West than in the East North Central division. Since the regression coefficients of X_{10} in none of the divisional equations were significantly different from zero, the significance in the regional equation may be the result of a divisional effect. The same may be true of the positive estimated regression coefficient of X_2, the unemployment rate in a county. The average percentage unemployed in East North Central counties in 1960 was 5.3 whereas it was 3.6 in West North Central counties. These statistics are consistent with the hypothesis that the unemployment rate serves as a proxy for local urbanization in the region as a whole.

The relative prevalence of rural farm males with at least high school education has a positive effect on the median income of rural farm families. X_6 (high education levels) was correlated with the average value of land and buildings ($r_{1.6}$ = .5321). There is no indication that X_6 was correlated with craftsmen and operative groups or with the proximity variables. The average value of land and buildings (X_1) has a positive and significant estimated regression coefficient. This was expected. Finally, the regression coefficient of X_{11} (average family size) was significantly different from zero and was positive as expected.

In summary, both the relative proximity of counties to large cities and the local labor markets have strong positive effects on the median incomes of rural farm families in the North Central region. The relative predominance of nonfarm employment opportunities and the relative proximity to large cities of counties in the East North Central division result in higher income levels of rural farm families in the East North Central division than in the West North Central division. Within each division, however, the local labor markets appear to be more important in determining variations in income levels of rural farm families among communities. Finally, the independent variables in the equations accounted for much more of the variation in median incomes in the East than the West North Central division. It has been hypothesized that the farm product markets and local weather conditions may explain more of the income differentials in the West North Central division than the variables which were used.

The Southern Region

The South Atlantic Division

Eight states plus the District of Columbia are included in the South Atlantic division. The states are Delaware, Maryland, the Virginias, the Carolinas, Georgia, and Florida. For this division and the East and West South Central divisions, nonwhite as well as white rural farm family incomes were analyzed. The discussion of the results of the nonwhite analysis follows the discussion of the analysis of white rural farm family income.

White rural farm family income. Table 5.7 is a summary of the results of the analysis of median income of white rural farm families in the South Atlantic division. Tables 19, 20, and 21 in Appendix I show more complete results.

Equation (2) accounted for more of the variance in median income than did the other equations ($R_1^2 = .1379$, $R_2^2 = .5255$, $R_3^2 = .4739$). The size-distance$_1$ variable most closely measured the influence of industrial-urban concentrations. This influence overshadows all other factors in relative importance in equation (2) as measured by the estimated beta coefficients. The unemployment rate is next most important, followed by white average family size. The effects of no other variables in equation (2) were significantly different from zero. X_3 (males, age 15-24) was correlated with functional illiteracy ($r_{3.5} = .6292$). X_4 (males, age 25-44) was correlated with employed white females ($r_{4.12} = .5642$).

The influence of large industrial-urban concentrations, as measured by the size-distance$_1$ variable is of overwhelming importance

TABLE 5.7

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

South Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.3714	.7249	.6884
Standard error of estimate	295.6550	219.3383	230.9533
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.1441*		
Size-distance$_1$ (X_{14})		.6909*	
Size-distance$_2$ (X_{15})			.6428*
Average value of land and buildings (X_1)	-.0219	.0219	.0219
White male unemployment rate of county (X_2)	.1639*	.0876*	.1254*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.1375*	-.0189	-.0504
25-44 (X_4)	.0074	.0397	.0160
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0373	.0502	.1103*
12 or more years of school (X_6) .	-.0889	-.0152	-.0168
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.0841	.0192	.0532
Craftsmen and foremen (X_8)	-.0170	-.0294	-.0682
Farm laborers, farm foremen (X_9) .	.0719	.0114	-.0415
Operatives, kindred workers (X_{10})	-.0023	-.0145	.0170
White rural farm family size (X_{11}) .	.1098*	.0675*	.0712*
Per cent of white rural farm females who are employed (X_{12}) . . .	-.1517*	-.0570	-.1058*

[1]See Appendix I, Tables 19, 20, 21, for complete results.

*Significantly different from zero at the .05 level.

in accounting for the variation in the median income of white rural farm families among counties. Clearly, distance from SMSA's alone does not account for much of the variation. Apparently, the influence of large cities is greater than smaller cities, and in the South Atlantic income differentials among SMSA counties in part are caused by differences in city size.

The local unemployment rate has a positive effect on the income level of white rural farm families in the county. This is consistent with the view that the unemployment rate served as a proxy for the presence of local urban centers of less than 50,000 population. A relative prevalence of farmers, farm laborers, operatives and craftsmen has no effect on the income level. Neither varying age levels nor varying education levels of white rural farm males among counties have significant effects on the median income of white rural farm families among counties. Given the presence of many industries in the South which utilize large amounts of unskilled labor, differing age and education levels of the employees may not be important.

Finally, the average size of white rural farm families has a moderate positive effect on income levels. While this effect may be the result of increasing numbers of workers per family as family size increases, the negative effect of employed white females tends to be in conflict with this rationalization.

In summary, the effect of the proximity to large cities overwhelms the effects of the other variables in importance. While the white unemployment rate has a slight positive effect on the income level of white rural farm families in the South Atlantic, other variables related to the local labor markets have no effects. Compared to the opportunities for nonfarm employment offered by large cities in the South Atlantic division, the local labor market does not appear to offer profitable alternative employment opportunities.

<u>Nonwhite rural farm family income</u>. Equation (2) accounted for more variance in the median income of nonwhite rural farm families than did the other equations ($R_1^2 = .1846$, $R_2^2 = .4335$, $R_3^2 = .3612$). (See Table 5.8.) As in the white equation for the South Atlantic, the size-distance$_1$ variable measured most closely the influence of large industrial-urban concentrations. Also, the size-distance$_1$ variable is of overwhelming importance relative to other variables. Next in importance is X_1 (average value of land and buildings), followed by farmers and farm managers. No other variables have effects which are significantly different from zero in equation (2). Intercorrelation was not serious in that only two variables (nonwhite average family size and employed nonwhite females) were intercorrelated ($r_{11.12} = .5026$).

Contrary to expectations, large industrial-urban centers do have powerful positive effects on the income levels of nonwhite rural farm families among communities. In Chapter III it was suggested that cities like New York, Chicago, and Detroit are the important influencing cities because nonwhite migration streams are heavily directed toward large northern cities. While this may be, large Southern cities do affect the median incomes of nonwhite rural farm families in a county positively. Large southern cities also may serve as the first stopping place in gradual migration to the North. While in large southern cities, nonwhites may earn resources to be used for further migration.

TABLE 5.8

Some results of the analysis of factors influencing median income per county of nonwhite rural farm families in 1959

South Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4297	.6584	.6010
Standard error of estimate	437.0982	364.3597	386.9088
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	.0228		
Size-distance$_1$ (X_{14})		.5583*	
Size-distance$_2$ (X_{15})			.4611*
Average value of land and buildings (X_1)	-.2088*	-.0974*	-.1670*
Nonwhite male unemployment rate of county (X_2)	.0547	.0126	.0348
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	-.0378	-.0783	-.0719
25-44 (X_4)	.0851	.0659	.0589
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.2387*	-.0767	-.1405*
12 or more years of school (X_6) .	-.0455	-.0467	-.0571
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) . .	-.0968*	-.0819*	-.0435
Craftsmen and foremen (X_8)	-.0001	-.0489	-.0441
Farm laborers, farm foremen (X_9) .	-.0208	-.0113	-.0394
Operatives, kindred workers (X_{10})	-.0335	-.0243	-.0486
Nonwhite rural farm family size (X_{11})	-.1260	-.0124	.0019
Per cent of nonwhite rural farm females who are employed (X_{12}) . . .	.1001*	.0518	.0408

[1]See Appendix I, Tables 22, 23, 24, for complete results.
*Significantly different from zero at the .05 level.

The effect of the average value of farm land and buildings per farm in a county on the income level of nonwhite rural farm families is negative and significantly different from zero. This result is not surprising. In Chapter III it was hypothesized that in counties with high average values of land per farm, whites own and control most of the land. In these counties most of the returns to land and capital resources per farm accrue to whites. In counties with low average values of land per farm, nonwhites own and control more of the land and capital resources. In these counties nonwhites receive more of the returns to what little land and capital resources there are available per farm. Therefore, it is reasonable that in counties with relatively low average values of land and buildings per farm, the income level of nonwhite rural farm families is relatively high.

The negative and significant effect of the relative prevalence of nonwhite farmers is consistent with expectations. The effects of the per cent of nonwhite rural farm females who are employed are positive and significant in equation (1) but not in equations (2) and (3). This suggests that more nonwhite rural farm females are employed in counties close to large cities than close to small cities.

To summarize, the major determinant of inter-community differentials in the income levels of nonwhite rural farm families is the relative proximity to large cities. Also, it appears that local nonfarm labor markets provide few nonfarm job alternatives to nonwhite rural farm residents.

The East South Central Division

The East South Central division is made up of four states, Kentucky, Tennessee, Alabama, and Mississippi. The discussion of the results of the analysis of white family income levels among communities is followed by the discussion of the nonwhite analysis.

White rural farm family income. Table 5.9 is a summary of the results of this analysis. As in the South Atlantic division, equation (2) accounted for most of the variance in median income of rural farm white families in the East South Central division ($R_1^2 = .2165$, $R_2^2 = .2551$, $R_3^2 = .2172$). The size-distance$_1$ variable most closely measured the influence of large industrial-urban centers.

The size-distance$_1$ variable is the most important variable relative to other variables in equation (2); functional illiteracy (X_5) is the next most important, followed by the local unemployment rate (X_2), farm laborers (X_9), and employed white rural farm females (X_{12}). The intercorrelation which is present among the independent variables is not serious and aids in the interpretation of the equation.

Again, the influence of large industrial-urban concentrations is the most important single determinant of inter-community differentials in the income levels of white rural farm families. The evidence provided by the regression coefficients in equation (2) tends to confirm the hypothesis that local labor markets are as important. The effect of local white unemployment is positive and significant. The effects of the relative prevalence of white craftsmen and operatives in the rural farm labor force are positive but not significantly

TABLE 5.9

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

East South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4653	.5051	.4660
Standard error of estimate	86.8367	84.6680	86.8020
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	.1010*		
Size-distance$_1$ (X_{14})		.2594*	
Size-distance$_2$ (X_{15})			.1152*
Average value of land and buildings (X_1)	.0723	-.0090	-.0090
White male unemployment rate of county (X_2)	.2564*	.2250*	.2643*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.2267*	-.1601*	-.2057*
25-44 (X_4)	-.0702	-.0858	-.0817
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.2418*	-.2490*	-.2298*
12 or more years of school (X_6) .	-.1028	-.0096	-.0734
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.1288	.1559	.1791
Craftsmen and foremen (X_8)	.0577	.0555	.0618
Farm laborers, farm foremen (X_9) .	.1798*	.1712*	.2006*
Operatives, kindred workers (X_{10})	-.0160	.0098	.0136
White rural farm family size (X_{11}) .	-.1107	-.0879	-.0948
Per cent of white rural farm females who are employed (X_{12})	-.1907*	-.1269*	-.1640*

[1]See Appendix I, Tables 25, 26, 27, for complete results.
*Significantly different from zero at the .05 level.

different from zero in equation (2). However, the simple correlation coefficients between farmers (X_7) and craftsmen (X_8) was -.6180, and between farmers and operatives (X_{10}) the simple correlation coefficient was -.7405. This intercorrelation may have masked any significance in the effects of the three variables. Moreover, the intercorrelation does indicate that craftsmen and operative occupations are relevant nonfarm occupations for farmers in the county. The positive sign of the regression coefficient of the unemployment variable may indicate that X_2 served as a proxy for the presence of local urban centers. Although weak, the evidence is consistent with the hypothesis that local labor markets have positive effects on the income level of rural farm white families in the county. The relative prevalence of functional illiteracy among white rural farm males has a strong negative effect on the income level of rural farm white families. Presumably, little or no education prevents white rural farm males from obtaining any but menial, low wage jobs.

Contrary to expectations the effect of the relative prevalence of white farm laborers is positive and significant. The average value of farm land and buildings per farm in a county is positively correlated with the relative prevalence of white farm laborers ($r_{1.9} = .5336$). X_9 may have picked up the effect of the value of land on median income. Finally, the relative prevalence of employed white females has a negative effect on median income.

Nonwhite rural farm family income. Equation (3) (Table 5.10) accounted for more of the variance in median incomes of rural farm nonwhite families in the East South Central division than the other two equations ($R_1^2 = .2953$, $R_2^2 = .2998$, $R_3^2 = .3808$). For nonwhites

TABLE 5.10

Some results of the analysis of factors influencing median income per county of nonwhite rural farm families in 1959

East South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.5434	.5475	.6171
Standard error of estimate	170.0613	169.5228	159.4020
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.0967*		
Size-distance$_1$ (X_{14})		.1204*	
Size-distance$_2$ (X_{15})			.3502*
Average value of land and buildings (X_1)	.1312*	.1443*	.0262
Nonwhite male unemployment rate of county (X_2)	.0606	.0533	.0589
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0196	.0209	.0544
25-44 (X_4)	.0602	.0761	.0516
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.1171*	-.1171*	-.1097*
12 or more years of school (X_6) .	.0522	.0545	.0673
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) . .	.0069	-.0144	.0253
Craftsmen and foremen (X_8)	-.0700	-.0275	-.0984*
Farm laborers, farm foremen (X_9) .	.0181	.0230	-.0113
Operatives, kindred workers (X_{10})	.0273	.0119	.0380
Nonwhite rural farm family size (X_{11})	-.4798*	-.4591*	-.4407*
Per cent of nonwhite rural farm females who are employed (X_{12}) . . .	.0137	.0056	.0350

[1]See Appendix I, Tables 28, 29, 30, for complete results.

*Significantly different from zero at the .05 level.

the size-distance$_2$ variable most closely measured the influence of large industrial-urban concentrations.

Most important relative to other variables in equation (3) is the average rural farm nonwhite family size. Next most important is the size-distance$_2$ variable, followed by X_5 (0-6 years of school completed), and craftsmen and foremen. No simple correlation coefficient between independent variables was higher than .4645.

Contrary to expectations, X_{11} (rural farm nonwhite family size) has a strong negative effect on income levels of rural farm nonwhite families in the East South Central division. X_{11} was correlated with a number of other variables but the coefficients of simple correlation were rather low (in the neighborhood of .4300). This intercorrelation may have resulted in the negative sign.

Size-distance$_2$ (X_{15}) is next most important among the variables in equation (3). Clearly, the relative proximity to large cities has a strong positive effect on the income levels of rural farm nonwhite families among counties. The fact that equation (3) accounted for more variance than equation (2) may indicate that the influence of large cities on nonwhite income levels extends a shorter distance than does the influence of large cities on white income levels (see Table 5.9). The evidence is not clear, however.

Functional illiteracy among rural farm nonwhite males in the East South Central division has a significant depressing effect on nonwhite income levels. High education levels among nonwhite rural farm males does not have an effect significantly different from zero. In general, the local county labor markets have little or effect on the income levels of nonwhite rural farm families. This is

in contrast to the significant effects which local labor markets have on white rural farm family income levels among communities in this division. Apparently, the labor markets in large cities provide most of the nonfarm employment opportunities to rural farm nonwhite males in the East South Central division. The weak but significant negative effect of the relative prevalence of craftsmen may reflect the prevalence of nonwhites in the textile industry in some counties.

Although the average value of farm land and buildings per farm in a county has significant positive regression coefficients in both equations (1) and (2), its regression coefficient was not significantly different from zero in equation (3). X_1 and distance, and X_1 and size-distance$_1$ were not highly intercorrelated. However, X_1 and size-distance$_2$ were correlated ($r_{1.15} = .4054$). The size-distance$_2$ variable probably picked up the effects of higher land values near large cities and the intercorrelation may have masked the significance of X_1 in equation (3).

In summary, the relative proximity to large urban centers is a major determinant of inter-community income differentials of rural farm nonwhite families in the East South Central division. The local labor markets in the counties do not appear to affect significantly the income levels of nonwhite rural farm families. Functional illiteracy among nonwhite rural farm males has a moderate depressing effect on nonwhite family income. Presumably, little or no education acts as a barrier to local nonfarm employment and off-farm migration.

The West South Central Division

Arkansas, Louisiana, Oklahoma, and Texas make up the West South Central division. Again, the median incomes per county of both white and nonwhite rural farm families were analyzed. The analysis of white family incomes is discussed first, followed by the discussion of the nonwhite analysis.

White rural farm family income. Table 5.11 provides a summary of the results of estimating the three equations for the West South Central division. Tables 31, 32, and 33 in Appendix I show more complete results. Equation (3) accounted for slightly more variance in the median incomes of white rural farm families among counties than did the other two equations ($R_1^2 = .3677$, $R_2^2 = .3590$, $R_3^2 = .3827$). Equation (3), therefore, is discussed in this section.

Most important of all the variables in equation (3) is X_9 (farm laborers). In declining order of importance are family size (X_{11}), 12 or more years of school (X_6), size-distance$_2$ (X_{15}), farmers and farm managers (X_7), craftsmen (X_8), and the local white unemployment rate (X_2). The regression coefficients of the other independent variables are not significantly different from zero. The effects of several variables are inconsistent with expectations.

A relative prevalence of white rural farm laborers and a relative prevalence of white farmers both raise the income level of white rural farm families in a community in the West South Central division. Both of these effects are inconsistent with expectations. Both farmers and craftsmen, and farmers and operatives were intercorrelated (approximately -.5 in each case). This intercorrelation

TABLE 5.11

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

West South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6064	.5992	.6186
Standard error of estimate	75.9055	76.4224	75.0000
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.1513*		
Size-distance$_1$ (X_{14})		.1253*	
Size-distance$_2$ (X_{15})			.2042*
Average value of land and buildings (X_1)	.1813*	.2417*	.1209
White male unemployment rate of county (X_2)	-.1837*	-.1846*	-.1626*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.1047*	-.1088*	-.1101*
25-44 (X_4)	-.0036	-.0085	.0137
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0124	.0004	-.0283
12 or more years of school (X_6) .	-.2391*	-.1943*	-.2174*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.1539*	.1372*	.1784*
Craftsmen and foremen (X_8)	.1368*	.1710*	.1692*
Farm laborers, farm foremen (X_9) .	.3911*	.4076*	.4796*
Operatives, kindred workers (X_{10})	-.0484	-.0638	-.0067
White rural farm family size (X_{11}) .	-.2741*	-.2522*	-.2542*
Per cent of white rural farm females who are employed (X_{12}) . . .	.1146*	.1112*	.0972*

[1]See Appendix I, Tables 31, 32, 33, for complete results.

*Significantly different from zero at the .05 level.

may account for the positive effect of a relative prevalence of farmers. However, white farmers on the average might have higher incomes than do members of occupations not represented in the equation in which case the positive sign of the regression coefficient of X_7 is correct. The average value of farm land and buildings per farm in a county (X_1) was highly correlated with the relative prevalence of white farm laborers ($r_{1.9}$: .7446), a fact which may account for the positive effect of X_9. In this division cotton farming and cattle ranching are important types of farming. Both require hired farm labor and both entail high values of land per farm. Therefore, the high intercorrelation between these two variables is reasonable. If most hired farm laborers are unrelated individuals, then their incomes were not reflected in family income, and the relative prevalence of farm laborers may have served as a partial proxy variable for the average value of farm land and buildings per farm in a county.

Although the regression coefficients of the average value of land per farm in a county were significantly different from zero and positive in equations (1) and (2), its regression coefficient was not significantly different from zero in equation (3). The inclusion of the size-distance$_2$ variable must account for this lack of significance. In total, the more oriented is a community toward agriculture and agricultural employment in the West South Central division, the higher is the income level of its white rural farm families.

In the West South Central, the median income of white rural farm families in a community varies inversely with the local white male unemployment rate. This is consistent with the hypothesis that fewer white rural farm males hold nonfarm jobs, either full- or part-time, in a community with high unemployment. It is also consistent with the hypothesis that in such counties off-farm migration is impeded and the capital to labor ratio is lower in agriculture than in counties with lower rates of unemployment. A relative prevalence of craftsmen among white rural farm males in a community also raises the income level in the community. The relative prevalence of white operatives apparently has little or no effect on the income level in the community. In total, the income level of white rural farm families in a community in the West South Central division is sensitive to conditions in the local nonfarm labor market and to the proportion of white rural farm males who hold nonfarm employment especially in craftsmen occupations. A relative prevalence of white rural farm males, age 15-24, lowers the income level in a community while a relative prevalence of white rural males with at least high school education lowers the income level. The former is consistent with expectations while the latter is not. The simple correlation coefficients among the independent variables provide no clues as to the reason for this latter effect.

The influence of large industrial-urban concentrations is positive and significant. Clearly, white rural farm families in counties near large cities have higher income levels than do families in counties further removed from large cities. The size-distance$_2$ variable was not highly correlated with any of the occupation, education, or age variables. Thus, the effect of large cities is on wage rates rather than on the relative numbers of males in various occupation, age, or education groups.

Nonwhite rural farm family income. Table 5.12 is a summary of the results of the analysis of median income of nonwhite rural farm families in the West South Central division. Equation (3) had the highest R^2 indicating that the size-distance$_2$ variable most closely measured the influence of large industrial-urban concentrations on the income levels of nonwhite rural farm families (R_1^2 = .2288, R_2^2 = .2170, R_3^2 = .2573).

Most important among the variables in equation (3) is X_1 (the average value of farm land and buildings per farm in a county). The size-distance$_2$ variable is next most important followed by farm laborers, and operatives. Males, age 25-44, and farm laborers were correlated ($r_{4.9}$ = .5311). Males, age 15-24, was correlated with family size ($X_{3.11}$ = .6014).

As in the other Southern divisions, the influence of large industrial-urban concentrations is one of the major determinants of variation in the median incomes of nonwhite rural farm families among counties. Proximity to large cities has a positive effect on income levels of these families. The effect, however, is very small in absolute terms. Ceteris paribus, the differential between the median income of nonwhite rural farm families in a county in which a city of one million is located and a county 50 to 100 miles distant is estimated to be \$20.36.

In terms of relative importance, the average value of farm land and buildings per farm in a county is the most important determinant of nonwhite income differentials among counties. The county with the

TABLE 5.12

Some results of the analysis of factors influencing median income per county of nonwhite rural farm families in 1959

West South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4783	.4658	.5072
Standard error of estimate	22.1137	22.2833	21.7013
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-1.1253*		
Size-distance$_1$ (X_{14})		-.6728	
Size-distance$_2$ (X_{15})			.2054*
Average value of land and buildings (X_1)	.2291*	.2291*	.2291*
Nonwhite male unemployment rate of county (X_2)	-.0926*	-.0962*	-.0894*
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0269	.0327	.0276
25-44 (X_4)	.0377	.0330	.0443
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0752	-.0657	-.0804
12 or more years of school (X_6) .	.0507	.0576	.0419
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) . .	.0386	.0309	.0369
Craftsmen and foremen (X_8)	-.0191	-.0075	-.0114
Farm laborers, farm foremen (X_9) .	.1797	.1761*	.1718*
Operatives, kindred workers (X_{10})	-.1068	-.1062*	-.1033*
Nonwhite rural farm family size (X_{11})	-.0750	-.0617	-.0750
Per cent of nonwhite rural farm females who are employed (X_{12}) . . .	.0762	.0868	.0618

[1]See Appendix I, Tables 34, 35, 36, for complete results.

*Significantly different from zero at the .05 level.

lowest value of land per farm ($5,037) in the West South Central division was in Arkansas; the county with the highest ($372,353) was in Texas. Both these counties were assigned zero values by the size-distance$_2$ variable. Ceteris paribus, the differential as estimated by the coefficient of X_1 between the median incomes of these two counties is $37. Given the wide differentials which exist (see Table 1.1), the most important determinants in equation (3) explain only a very small portion of the total variation in income levels of nonwhite rural farm families. In general, the further west and north in the West South Central division was a county, the higher was the value of farm land and buildings in the county in 1959. Also, the number of nonwhites per county decreased the further west and north was the county. Finally, in 1959 the median income of nonwhite rural farm families in Louisiana was $1224; in Arkansas it was $1151; in Texas it was $1430; and, in Oklahoma it was $1684. Thus, the effect of X_1 on the income level of nonwhite rural farm families in a county in this division probably picked up this shifting income level by state.

The relative prevalence of nonwhite farm laborers is the next most important variable relative to other variables; the more nonwhite farm laborers, the higher the income level. Although not significant, a relative prevalence of farmers among nonwhite rural farm males has a positive effect on the income level in a county. The relative prevalence of craftsmen and operatives among nonwhite rural farm males was negative. These results, taken in conjunction with the positive effects of high land values per farm, seem to indicate that local nonfarm labor markets do not present nonwhite rural farm males in the West South Central division with profitable nonfarm alternatives. The negative effect of the local nonwhite unemployment rate may reflect the effect of unemployed local hired farm labor. If this is the case, it is consistent with the view that local nonfarm labor markets in the West South Central do not present profitable nonfarm employment alternatives to nonwhite rural farm males.

In summary, agricultural employment and the relative proximity to large cities appear to be the major determinants of income differentials of rural farm nonwhite families among counties. Other determinants, not included in the equation, may be more important.

The Southern Region

White rural farm family income. The results of the analysis are summarized in Table 5.13. The difference in the proportion of the variance accounted for by equation (2) and equation (3) was negligible (R_1^2 = .1481, R_2^2 = .3787, R_3^2 = .3828). Either equation (2) or (3) worked about as well. Nevertheless, equation (3) was chosen for discussion to be consistent with the choice criterion set forth in Chapter IV.

All but four variables in equation (3) have effects on the median income of white rural farm families per county which are significantly different from zero. These are the average value of farm land and buildings per farm in a county, both of the education variables, and X_3 (age 15-24). The influence of large industrial-urban concentrations is most important relative to the other variables.

TABLE 5.13

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

South Region

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.3848	.6154	.6195
Standard error of estimate	378.6409	323.3562	322.0301
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.0339		
Size-distance$_1$ (X_{14})		.5257*	
Size-distance$_2$ (X_{15})			.5240*
Average value of land and buildings (X_1)	-.0317	.0634*	-.0106
White male unemployment rate of county (X_2)	-.0882*	-.1091*	-.0711*
Per cent of white rural farm males who are age:			
15-24 (X_3)	.0219	.0601*	.0523
25-44 (X_4)	.0605	.0720*	.0751*
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0369	-.0147	.0205
12 or more years of school (X_6) .	-.0700*	.0199	-.0220
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.3543*	-.2638*	-.2342*
Craftsmen and foremen (X_8)	-.0977*	-.0753*	-.0960*
Farm laborers, farm foremen (X_9) .	-.1457*	-.1008*	-.1203*
Operatives, kindred workers (X_{10})	-.1807*	-.1143*	-.0838*
White rural farm family size (X_{11}) .	.1202*	.0839*	.0825*
Per cent of white rural farm females who are employed (X_{12}) . . .	.1481*	.1403*	.1185*

[1]See Appendix I, Tables 37, 38, 39, for complete results.

*Significantly different from zero at the .05 level.

In spite of the lack of intercorrelation among the independent variables, the results of some of the variables present a somewhat confusing picture.

Clearly, the influence of large industrial-urban concentrations is the major determinant of income differentials of white rural farm families among communities. Ceteris paribus, a differential of \$455.69 is estimated by the size-distance$_2$ variable between the median income in a county in which a city of one million is located and a county 50 to 100 miles distant. The average value assigned by the size-distance$_2$ variable to counties in the South Atlantic was 3.4 compared to an average value of .8 assigned to counties in both the East and West South Central divisions. Thus, the higher average levels of income in the South Atlantic division are in part the result of proximity to large cities (see Table 1.1).

The coefficients of X_7 (farmers) and of X_9 (farm laborers) are both negative and significantly different from zero for the Southern region as a whole but are positive and significant for each of the divisions separately. The regional equation apparently fitted planes through each of the positive divisional planes with the result being negative regression coefficients of both X_7 and X_9. The average value of farm land and buildings per farm in a county does not have a significant effect in equation (3) or (1) but has a small positive effect in equation (2). Presumably, the positive effects of X_1 in equation (2) are the result of the influence of city size which is taken into account by the size-distance$_2$ variable in equation (3). In total, for the South as a whole, the more oriented toward farming and toward agricultural employment is a county, the lower is the income level of the white rural farm families in the county.

The effect of the local white unemployment rate on white rural farm family income is negative. So are the effects of a relative prevalence of white rural farm males in craftsmen and operative occupations. For the region as a whole, white rural farm family income may be positively affected by occupations not considered in the study. The positive effect of the per cent of white rural farm males, age 25-44, was expected. X_3 was highly correlated with the per cent of white rural farm males, age 45 and over (-.6480). Also, X_4 was highly correlated with the per cent of white rural farm males, age 45 and over (-.6715). On the average, in Southern counties, white rural farm males, age 45 and over, formed 66.7 per cent of all males over 14 years of age. Thus, the age variables reflect the effect of a relative lack of males in the older age groups. A relative prevalence of older males, then, has a significant negative effect on the income level of white rural farm families in Southern communities. In the South as a whole education seems to have little or no effect on the income levels of white rural farm families.

Variations in white family size and the per cent of white females who were employed have positive and significant effects on the income levels of white rural farm families among communities. However, most of the regression coefficients of these two variables in the divisional equations were negative.

In summary, for white rural farm families, the major determinant of income variations among communities is the influence of industrial-urban concentrations. White rural farm families have a lower income level in counties in which agriculture predominates. A high local white unemployment rate affects the income level of these families adversely. Relative to other nonfarm occupations, employment in craftsmen and operative occupations also lowers income levels. Finally, the age distribution of white rural farm males in a county has a significant effect on the income level of the white rural farm families in the community.

Nonwhite rural farm family income. The results of the nonwhite regional analysis are summarized in Table 5.14. Equation (3) accounted for more of the variance in the median incomes of rural farm nonwhite families among counties than did the other two equations ($R_1^2 = .1590$, $R_2^2 = .3266$, $R_3^2 = .3975$). The size-distance$_2$ variable is the most important variable relative to the other variables in equation (3). Next important is the average value of land and buildings per farm in a county. Far less important but still significant are farmers (X_7), farm laborers (X_9), employed females (X_{12}), operatives (X_{10}), craftsmen (X_8), and males, age 25-44, (X_4). Intercorrelation was not a problem at the regional level.

The results of the nonwhite analysis at the regional level are similar to the white analysis for the Southern region. The influence of large industrial-urban concentrations is the most important determinant of variation in the income levels of nonwhite rural farm families among communities. None of the proximity variables were highly correlated with the nonwhite age, education, and occupation variables. The effects of large industrial-urban centers are probably on wage rates and product prices, rather than on the age, education, and occupation distributions. Further, the size-distance$_2$ variable may have captured a divisional effect on income levels. The

TABLE 5.14

Some results of the analysis of factors influencing median income per county of nonwhite rural farm families in 1959

South Region

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.3988	.5715	.6305
Standard error of estimate	378.9696	339.1110	320.7502
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.0512*		
Size-distance$_1$ (X_{14})		.4373*	
Size-distance$_2$ (X_{15})			.5154*
Average value of land and buildings (X_1)	-.3360*	-2.1837*	-.2380*
Nonwhite male unemployment rate of county (X_2)	.0198	-.0008	.0062
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0139	-.0127	.0044
25-44 (X_4)	.0655*	.0674*	.0507*
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0259	.0174	-.0074
12 or more years of school (X_6) .	-.0003	.0005	-.0219
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) . .	-.1746*	-.1725*	-.0926*
Craftsmen and foremen (X_8)	-.0449	-.0108	-.0595*
Farm laborers, farm foremen (X_9) .	-.0876*	-.0641*	-.0894*
Operatives, kindred workers (X_{10})	-.0677*	-.0655*	-.0687*
Nonwhite rural farm family size (X_{11})	-.0524	-.0120	.0002
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.1333*	.0847*	.0767*

[1]See Appendix I, Tables 40, 41, 42, for complete results.
*Significantly different from zero at the .05 level.

average income level of nonwhite rural farm families was highest in the South Atlantic counties and lowest in West South Central counties. And, on the average, counties in the South Atlantic division are much closer to large cities than elsewhere in the South.

Average land values per farm in a county have a negative effect on nonwhite rural farm family income levels in Southern communities. At the divisional level the effects of land values were negative only in the South Atlantic division. The average value of farm land and buildings per farm in a county were, on the average, about five times higher in the West South Central than in the South Atlantic division. Again the negative regression coefficient of X_1 at the regional level may reflect the difference in nonwhite income levels between the South Atlantic and West South Central divisions.

The effects of the occupation variables are negative as in the white analysis for the South as a whole. A relative prevalence of nonwhite males, age 25-44, has a slight positive effect on the income level in a county as was expected. The local nonwhite unemployment rate has no effect. Finally, the per cent of nonwhite rural farm females who were employed has a slight positive effect as expected.

In summary, at the regional level the influence of industrial-urban concentrations is the single most important determinant of variations in income levels of nonwhite rural farm families among communities. The influence of the local nonfarm labor market appears to have little positive effect on the income levels of nonwhites. The average value of farm land and buildings per farm in a county seems to exert a strong negative effect. While this effect may include a divisional effect, it also may include the effect of white ownership of farms with high total land values. In counties in which land values per farm are lower, nonwhite ownership may be higher. In these counties the income of nonwhites may include some returns to investment in land and other capital inputs.

The Western Region

The Mountain Division

Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada are the states of the Mountain division. Table 5.15 summarizes the results of the analysis of median income of white rural farm families. None of the equations accounted for more than 8.79 per cent of the variance in median income among counties in this division ($R_1^2 = .0879$, $R_2^2 = .0818$, $R_3^2 = .0779$). Such low R^2's are similar to those obtained in the West North Central and were expected.

None of the proximity variables have effects significantly different from zero. Thus, the results suggest that no relationship exists between the location of a community with respect to industrial-urban concentrations and the income level of the rural farm families in the community.

In equation (1) the relative prevalence of white rural farm males, age 15-44, has a positive effect; the relative prevalence of farm laborers has a negative effect in equation (2); no variable in equation (3) has an effect significantly different from zero. The variables included in the equations, therefore, do not have much relevance to the determination of variation in the income levels of white rural farm families among communities in the Mountain division.

TABLE 5.15

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

Mountain Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.2964	.2860	.2799
Standard error of estimate	67.6247	67.8497	67.9775
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	.1063		
Size-distance$_1$ (X_{14})		.0661	
Size-distance$_2$ (X_{15})			-.1310
Average value of land and buildings (X_1)	.0631	.0631	.0631
White male unemployment rate of county (X_2)	-.0716	-.0580	-.0634
Per cent of white rural farm males who are age:			
15-24 (X_3)	.1375*	.1297	.1302
25-44 (X_4)	.1427	.1517	.1476
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0770	-.0909	-.0891
12 or more years of school (X_6) .	-.0480	-.0235	-.0308
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	.0480	.0921	.0702
Craftsmen and foremen (X_8)	-.0883	-.0997	-.0934
Farm laborers, farm foremen (X_9) .	-.0909	-.0510*	-.0777
Operatives, kindred workers (X_{10})	-.0762	-.0608	-.0729
White rural farm family size (X_{11}) .	.0378	.0447	.0387
Per cent of white rural farm females who are employed (X_{12}) . . .	-.0479	-.0597	-.0498

[1]See Appendix I, Tables 43, 44, 45, for complete results.

*Significantly different from zero at the .05 level.

The Pacific Division

Table 5.16 is a summary of the results obtained by estimating equations (1), (2), and (3) for the Pacific division. Tables 46, 47, and 48 in Appendix I contain more complete results. The Pacific division is made up of Oregon, Washington, California, Hawaii, and Alaska. For this study Alaska and Hawaii were omitted.

Equation (2) accounted for more variance in the median income of white rural farm families among counties than did the other two equations (R_1^2 = .4052, R_2^2 = .5645, R_3^2 = .4861). The size-distance$_1$ variable most closely measured the influence of large industrial-urban concentrations in the Pacific division.

Only three variables in equation (2) have effects which are significantly different from zero. These are the size-distance$_1$ variable (X_{14}), the average value of farm land and buildings per farm in a county (X_1), and the local white male unemployment rate in a county (X_2). The above are listed in order of their relative importance in explaining the variations in median income of white rural farm families among counties.

The proximity of a community to large industrial-urban concentrations is the most important determinant of variations in the income level of white rural farm families among communities in the Pacific division. Clearly, the great metropolitan centers in the San Francisco, Los Angeles, and Seattle areas exert great influences on income levels throughout the division.

The average value of farm land and buildings per farm in a county is an important determinant also. Its positive effect on the income level of white rural farm families probably reflects the returns

TABLE 5.16

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

Pacific Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6381	.7513	.6972
Standard error of estimate	90.5561	77.6006	84.2999
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.2421*		
Size-distance$_1$ (X_{14})		.6141*	
Size-distance$_2$ (X_{15})			.4382*
Average value of land and buildings (X_1)	.3287*	.2739*	.3834*
White male unemployment rate of county (X_2)	.3004*	.2438*	.3006*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.0788	-.0424	-.0424
25-44 (X_4)	.0696	.0731	.0517
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.1919	-.0384	.0661
12 or more years of school (X_6) .	.0280	-.0528	.0130
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.1709	.0919	-.0596
Craftsmen and foremen (X_8)	-.0206	.0388	.0146
Farm laborers, farm foremen (X_9) .	-.0584	.0702	.0351
Operatives, kindred workers (X_{10})	-.3188*	-.0574	-.1141
White rural farm family size (X_{11}) .	-.1655*	-.0930	-.1066
Per cent of white rural farm females who are employed (X_{12})	-.0179	-.0167	-.0166

[1]See Appendix I, Tables 46, 47, 48, for complete results.

*Significantly different from zero at the .05 level.

to investment in irrigation, orchards, vineyards, plus the investment in machinery. Thus, this variable probably measures type of farming area as well as the return to capital inputs and a high capital to labor ratio.

Finally, the local white unemployment rate has a positive effect on the income level of white rural farm families in a community. In this division the unemployment rate probably did measure local urbanization. Counties with low unemployment rates in the Pacific division are also sparsely populated.

The Western Region

Table 5.17 summarizes the results of the analysis for the region as a whole. Equation (2) accounted for more variance than did the other equations ($R_1^2 = .2184$, $R_2^2 = .5142$, $R_3^2 = .3799$).

Most important relative to other variables in equation (2) is the size-distance$_1$ variable. Next in importance, but far less important, relative to X_{14}, is the local white unemployment rate in the county (X_2), followed by the average value of farm land and buildings per farm in a county (X_1), farmers (X_7), functional illiteracy (X_5), operatives (X_{10}), and family size (X_{11}). Intercorrelation was not a problem, either at the divisional or regional levels of analysis.

Given the irrelevance of the equations in explaining differentials in the Mountain division, the results of the regional analysis are dominated by the Pacific relationships and include some divisional effects.

For the region as a whole the influence of industrial-urban concentrations on the West coast is the major determinant of

TABLE 5.17

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

West Region

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4663	.7171	.6164
Standard error of estimate	131.3569	103.4924	116.9236
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance from nearest SMSA (X_{13}) . .	-.1979*		
Size-distance$_1$ (X_{14})		.6819*	
Size-distance$_2$ (X_{15})			.5011*
Average value of land and buildings (X_1)	.3079*	.1026*	.1710*
White male unemployment rate of county (X_2)	.1866*	.1391*	.1877*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.0554	-.0114	-.0256
25-44 (X_4)	-.0375	.0001	-.0058
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0330	-.0934*	-.0783
12 or more years of school (X_6) .	-.0459	-.0311	-.0488
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.0415	.0985	.0475
Craftsmen and foremen (X_8)	.1006	.0382	.0939
Farm laborers, farm foremen (X_9) .	-.0329	.0535	.0377
Operatives, kindred workers (X_{10})	.0306	.0808	.0757
White rural farm family size (X_{11}) .	-.1658*	-.0798*	-.1341*
Per cent of white rural farm females who are employed (X_{12}) . . .	.0781	.0032	.0431

[1]See Appendix I, Tables 49, 50, 51, for complete results.

*Significantly different from zero at the .05 level.

inter-community differentials in the income levels of white rural farm families. The value of land per farm in a county positively affects the income level in the county. On the average counties in the Pacific division have higher average values of land and buildings per farm than do counties in the Mountain division. Also, on the average, counties in the Pacific division have higher median incomes of white rural farm families than do counties in the Mountain division. Thus, the positive effect of the average value of land and buildings may include a divisional effect. The same is true of the effect of the size-distance$_1$ variable, for counties in the Pacific division on the average are much closer to SMSA's than are counties in the Mountain division.

The white male unemployment rate exerts a positive influence on the level of income of white rural farm families in a community. For the region as a whole those counties which have low unemployment rates also tend to be those which are most sparsely populated. Thus, the unemployment rate for the Western region probably did serve as a proxy variable for the presence of local urbanization. The relative prevalence of rural farm males with little or no education (X_5) has a moderate depressing effect on the income level of white rural farm families in a community. This is consistent with the hypothesis that functional illiteracy bars individuals from any but the most menial, low wage, nonfarm jobs. It also probably prevents the individual from obtaining credit. Thus, the incomes of functional illiterates both from farm and nonfarm sources are likely to be lower than the income of individuals with higher levels of formal education.

Finally, the average size of white rural farm families has a depressing effect on the income level of white rural farm families in a county. The data does not provide evidence for a rationalization of this unexpected relationship. In summary, the proximity of a community to industrial-urban concentrations is the most important determinant of the income level of the community's white rural farm families. Local urbanization also appears to have a positive influence on the income level. Communities with higher average values of farm land and buildings per farm also have higher income levels than do communities with lower land values per farm.

The Conterminous United States

Table 5.18 summarizes the results of the analysis for the nation as a whole. Equation (3) accounted for the most variance in median income of white rural farm families among counties ($R_1^2 = .3984$, $R_2^2 = .4915$, $R_3^2 = .4996$). Thus, the size-distance$_2$ variable most closely measured the influence of industrial-urban concentrations according to the choice criterion stated in Chapter IV. However, perhaps the most which can be concluded is that both X_{14} and X_{15} worked better than did the distance variable. Most certainly, distance from large industrial-urban concentrations, alone, did not measure the influence adequately.

Regardless of the equation, the degree of functional illiteracy (X_5) among white rural farm males is the most important determinant of inter-community income differentials. In equation (3) the size-distance$_2$ variable (X_{15}) is next most important, followed by the local white male unemployment rate (X_2). In declining order of

TABLE 5.18

Some results of the analysis of factors influencing median income per county of white rural farm families in 1959

Conterminous United States

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6312	.7011	.7068
Standard error of estimate	540.3223	496.7260	492.7749
Independent variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{13}) . .	-.0542*		
Size-distance$_1$ (X_{14})		.3423*	
Size-distance$_2$ (X_{15})			.3542*
Average value of land and buildings (X_1)	.0409	.0468*	.0175
White male unemployment rate of county (X_2)	.2309*	.2132*	.2286*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.0006	.0167	.0138
25-44 (X_4)	-.0058	.0106	.0051
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.5555*	-.4912*	-.4720*
12 or more years of school (X_6) .	.0197	.0604*	.0547*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) . .	-.1126*	-.0353	-.0160
Craftsmen and foremen (X_8)	-.0350	-.0202	-.0277
Farm laborers, farm foremen (X_9) .	.1343*	.1725*	.1703*
Operatives, kindred workers (X_{10})	.0366	.0415*	.0597*
White rural farm family size (X_{11}) .	.1321*	.1241*	.1179*
Per cent of white rural farm females who are employed (X_{12}) . . .	.1832*	.1356*	.1360*

[1]See Appendix I, Tables 52, 53, 54, for complete results.
*Significantly different from zero at the .05 level.

importance, farm laborers (X_9), employed females (X_{12}), family size (X_{11}), operatives (X_{10}), and high education levels (X_6) are also important and had effects significantly different from zero.

Of the regression coefficients which were significantly different from zero in equation (3) only one had a sign which was inconsistent with expectations. The relative prevalence of farm laborers and farm foremen among white rural farm males was expected to exert a negative effect. However, farm laborers (X_9) was correlated with the average value of land and buildings per farm in a county ($r_{1.9}$ = .5862). The intercorrelation may have resulted in the positive effect of X_9.

Functional illiteracy among white rural farm males is the most important variable relative to other variables in explaining income differentials among white rural farm communities. A relative prevalence of white rural farm males with little or no education depresses the income level of white rural farm families in a community. The effects of functional illiteracy are presumed to be two-fold. First, functional illiteracy prevents individuals from obtaining any but the most menial, low wage nonfarm jobs, thus impeding nonfarm migration. Second, such an individual may not be aware of the sources of farm credit and capital, or may be considered a poor credit risk by credit agencies because of his functional illiteracy. Also, he may not be aware of technological change which would benefit his farm business. These factors tend to lower the capital to labor ratio on farms operated by individuals with little or no education relative to other farms. It is significant that the counties in which white rural farm males with little or no education are most prevalent are concentrated in the three Southern divisions, the divisions with the lowest income levels of white rural farm families. High education levels among white rural farm males impart a modest positive influence on the income level of white rural farm families in a community. Again, it seems to be significant that the counties in which white rural farm males are most prevalent are concentrated in the Mountain and Pacific divisions, the divisions with the highest income levels of white rural farm families.

The industrial-urban development hypothesis is strongly confirmed for the nation as a whole. Clearly, distance from the nearest SMSA (X_{13}) does not measure the influence of industrial-urban concentrations as well as variables which take into account city size as well as distance. The hypothesis is disconfirmed for the Mountain division. For the North Central region as a whole it is confirmed, but for each of the East and West North Central divisions the hypothesis is disconfirmed.

The local white unemployment rate (X_2) is positively related to the income level of white rural farm families in a community. This variable may have served as a proxy for the presence of local urban centers of under 50,000 population. A more appropriate measure for the effect of unemployment may be the unemployment rate of white rural farm males in a county, rather than the rate for all white males in the county. Such a measure might be less correlated with the relative urbanization of the county.

Nonfarm employment in operative occupations raises the income level of white rural farm families in a county for the nation as a whole. However, the effect of employment in craftsmen occupations does not seem to have an effect on the income level. Craftsmen, operatives, and farmers were all intercorrelated to a similar degree (approximately -.5). This intercorrelation may have masked the significance of the effect of a relative prevalence of craftsmen among white rural farm males in a community.

The relative prevalence of farmers in a community does not appear to have an effect on the income level. The sign of the regression coefficient of X_7, however, is consistent with expectations. Contrary to expectations, a relative prevalence of farm laborers imparts a positive effect on the income level. Farm laborers (X_9), however, was positively correlated with the average value of farm land and buildings per farm in a county ($r_{1.9} = .5862$). Thus, the regression coefficient of X_9 probably included part of the effect of variations in the average value of farm land and buildings per farm among counties. Farming, then, appears to raise the income level of white rural farm families in a county where the value of land (and probably the value of all capital inputs) per farm is high. Such is the case, generally, in the Pacific and Mountain divisions. The effects of high values of land per farm in counties in the West South Central division are probably offset by other factors such as the high rate of functional illiteracy.

Finally, both average white rural farm family size in a community and the relative prevalence of white rural farm employed females have positive effects on the income level of white rural farm families in a community. Probably both of these variables reflect the increase in the number of family members who are employed as family size increases.

Summary of the Analysis of White Rural Farm Family Income

The analysis of the median income of white rural farm families in a county was conducted at the divisional, regional, and national level. Forty-two equations in all were estimated. One equation was discussed for each division, region, and for the nation as a whole. A partial summary of these equations is presented in Table 5.19. The signs in Table 5.19 refer to the signs of the estimated partial regression coefficients of the variables. Those signs in parentheses are consistent with the hypotheses stated and discussed in Chapter III. The numbers preceding the signs in Table 5.19 refer to the ranking of the variables in each equation as measured by the absolute size of the estimated beta coefficients. Only variables which had estimated partial regression coefficients significantly different from zero at the .05 level are ranked.

For the divisions, the influence of industrial-urban concentrations, as measured by the proximity variables (X_{13}, X_{14}, and X_{15}), is the most important determinant of variations in the levels of income of white rural farm families among counties. The influence of industrial-urban concentrations is positive in all divisions with the exception of the East and West North Central and the Mountain divisions. In the former two divisions the effects of industrial-urban concentrations on rural farm family income levels are negative. In the latter division there is no effect. Variations in the size of SMSA's apparently have little effect on income levels in the New England division.

TABLE 5.19

A summary of the analysis of median income of white rural farm families in a county, by division, region, and for the nation.

Area	X_1 r* s**	X_2 r s	X_3 r s	X_4 r s	X_5 r s	X_6 r s	X_7 r s	X_8 r s	X_9 r s	X_{10} r s	X_{11} r s	X_{12} r s	X_{13} r s	X_{14} r s	X_{15} r s
New England	3 (+)	+	5 +	(+)	(-)	2 -	(-)	(+)	+	4 -	(+)	(+)	1 (-)		
Middle Atlantic	-	(-)	+	-	3 +	2 (+)	+	(+)	(-)	(+)	-	-			1 (+)
E. N. Central	-	2 (-)	(-)	-	+	1 (+)	+	(+)	4 (-)	(+)	-	-		3 -	
W. N. Central	-	4 +	+	3 -	+	(+)	(-)	(+)	(-)	(+)	2 -	-			1 -
South Atlantic	(+)	2 +	(-)	(+)	+	-	+	-	+	-	3 (+)	-		1 (+)	
E. S. Central	-	3 +	(-)	-	2 (-)	-	+	(+)	4 +	(+)	-	5 -		1 (+)	
W. S. Central	(+)	7 (-)	8 (-)	(+)	(-)	3 -	5 +	6 (+)	1 +	-	2 -	(+)			4 (+)
Mountain	(+)	(-)	1 +	(+)	(-)	-	+	-	(-)	-	(+)	-	+		
Pacific	2 (+)	3 +	(-)	(+)	(-)	-	+	(+)	+	-	-	-		1 (+)	
Northeast	3 (+)	5 +	2 +	(+)	+	-	4 +	(+)	6 (-)	(+)	(+)	-	1 (-)		
North Central	(+)	3 +	+	(+)	(-)	4 (+)	(-)	-	(-)	1 (+)	6 (+)	5 (+)		2 (+)	
South	-	9 (-)	+	8 (+)	+	-	2 (-)	5 -	3 (-)	6 -	7 (+)	4 (+)			1 (+)
West	3 (+)	2 +	(-)	(+)	4 (-)	-	+	(+)	+	(+)	5 -	(+)		1 (+)	
Conterminous U. S.	(+)	3 +	+	(+)	1 (-)	8 (+)	(-)	-	4 +	7 (+)	6 (+)	5 (+)			2 (+)

*r = rank of variable in terms of relative importance in each equation. Only variables which had effects significantly different from zero at the .05 level are ranked.

**s = sign of partial regression coefficient. Parentheses around a sign indicate that the sign is consistent with expectations.

X_1 value of land
X_2 unemployment
X_3 age 15-24
X_4 age 25-44
X_5 educ. 0-6 years
X_6 educ. ≥ 12 years
X_7 farmers
X_8 craftsmen
X_9 farm laborers
X_{10} operatives
X_{11} family size
X_{12} employed females
X_{13} distance
X_{14} size-distance$_1$
X_{15} size-distance$_2$

In general, the unemployment rate in a county (X_2) is the next most important in accounting for the variations in income levels of white rural farm families among counties at the divisional level. In six of the nine divisions the effects are significantly different from zero at the .05 level. However, in only two of these divisions (the East North Central and the West South Central) are the effects of the unemployment rate negative as expected. Positive effects were rationalized as indicating the presence and effects of urban centers smaller than 50,000 population.

Third most important in determining variations in the income levels of white rural farm families among counties is the relative prevalence of rural farm males with at least a high school education (X_6). In the Middle Atlantic and the East North Central divisions the effects of X_6 are positive and significant as expected. The effects of X_6 are negative and significant in the New England and West South Central divisions.

At the regional level of analysis the influence of industrial-urban concentrations is the most important determinant of differentials in the income levels of white rural farm families among communities. In each region the influence of SMSA's is positive; the closer is a county to large cities the higher is the median income of rural farm families in the county. The combination of the more urban East North Central and the more rural West North Central divisions resulted in a positive effect for the North Central region as a whole. Similarly, the grouping of the very rural Mountain division with the Pacific division, in which many more large SMSA's are located, resulted in a positive effect for the Western region as a whole.

Variation in the unemployment rate among counties, in general, is the second most important determinant of differentials in income levels of white rural farm families among communities. However, in only one region (the South) is the effect negative as hypothesized. The significant and positive effects in the remaining three regions are taken as measuring the effects of the presence of urban centers smaller than 50,000 population.

Finally, at the regional level of analysis, in general, both the average value of land and buildings per farm in a county (X_1) and the relative prevalence of farmers among rural farm males (X_7) rank about third in relative importance. X_1 imparts a positive and significant effect in the Northeast and Western regions. X_7 imparts a positive and significant effect in the Northeastern region. In the South the effects of X_1 and of X_7 are negative, the effect of X_7 being significantly different from zero.

For the nation as a whole, the relative prevalence of functional illiteracy (X_5) among rural farm males is most important in determining the differentials in income levels of white rural farm families among communities. Ranked next in importance is the influence of industrial-urban concentrations. Over the nation as a whole, the closer is a community to a large city the higher is the income level of the community's white rural farm families. Moreover, the size of the city seems to affect the income level as well as the distance of the city from outlying communities. The local unemployment rate (X_2) follows functional illiteracy and proximity to large cities in terms of relative importance. However, the effect of X_2 is positive. Again, this effect was rationalized as measuring the effects of the presence of urban centers smaller than 50,000.

The Relevance of Divisional and Regional Analysis

The analysis was conducted at the divisional, regional, and national levels. Some observations can be made concerning the results obtained at the three levels. First, some variables which were unimportant in the divisional equations became the most important variables in the national equation. The most dramatic example of this was the case of X_5 (functional illiteracy). In only two of the divisional equations were the estimated partial regression coefficients of X_5 significantly different from zero. Yet, in the national equation, X_5 ranked first in relative importance. Second, fewer signs were consistent with expectations in the divisional equations than in the regional equations. The same relationship held between the regional equations and the national equation. Third, more estimated regression coefficients were significantly different from zero in the national equation than in the regional equations. Similarly, more estimated regression coefficients were significantly different from zero in the regional equations than in the divisional equations. Finally, intercorrelation posed fewer problems in the national equation than in either the regional or divisional equations. Most intercorrelation was at the divisional level. Does the national equation more closely represent the relationships which prevail between the independent variables and median income of rural farm families per county than the divisional or regional equations? Do the regional equations more closely represent the relationships which prevail than do the divisional equations?

The classification of counties by divisions grouped counties which were relatively homogeneous with respect to a number of variables which may have affected income levels, but which were not included in the equation. By so doing, the classification provided the opportunity to study the effects of the variables in the equation while holding the other variables constant. However, the classification may have been inappropriate in three ways.

First, the divisional classification may have grouped counties which were not homogeneous with respect to variables excluded from the equation. Such may have been the case with respect to the divisions in the South. Texas and Oklahoma have different types of agriculture and lower nonwhite rural farm populations than do the other states in the West South Central division. Maryland, Delaware, and West Virginia have lower nonwhite rural farm populations and somewhat different types of agriculture than do the other states in the South Atlantic division. Also, Kentucky has a much lower nonwhite rural farm population than other states in the East South Central. These non-homogeneities may have blurred some of the effects of the variables included in the equation.

Second, the classification may have grouped counties which were relatively homogeneous with respect to some of the variables in the equation. Such grouping may have minimized the variance (relative to a different or large grouping) of the variables in the equation. In such cases the estimated regression coefficients of the variables with small variances may not have been significantly different from zero or may have exhibited signs contrary to the true signs. Such may have been the case with a number of variables in the equation. Apparently, this was the case for X_5, functional illiteracy. Within each division and region, the variance of this variable was rather small. For the nation as a whole, however, its variance was much larger. Presumably, in the national equation the variable assumed its true relative importance and effect.

Third, by grouping counties into divisions, the classification may have grouped counties in which two (or more) independent variables in the equation were spuriously intercorrelated or were interrelated in the sense that some "third" factor operated on both of the variables in a similar fashion. In either case the resulting intercorrelation increased the standard errors of the estimated regression coefficients with the result that the estimates of the partial regression coefficients were unreliable. Thus, the significant difference from zero of regression coefficients may have been masked and the signs of the estimates may have been contrary to the true signs. The "third" factor, however, may have varied among counties only in one division. At the regional or national level, the additional observations may have decreased the intercorrelation. Since intercorrelation posed serious problems in a number of divisional equations, the varying signs and non-significance of some of the independent variables in the divisional equations may have been the result of this intercorrelation.

In the light of the comments in the preceding paragraphs, the answers to the questions posed at the beginning of this section are not entirely clear. At the regional and national levels variables not included in the equation were more likely to have varied among counties substantially. However, conditions peculiar to certain divisions, and which probably affected the results of the divisional equations, were submerged in the regional and national equations. While the divisional equations were limited in their usefulness by the problems of intercorrelation and small variance of some independent variables, they did highlight some important variations in the relationships which appeared to hold for the nation as a whole.

CHAPTER VI

THE EARNINGS OF FARMERS AND FARM MANAGERS: THE RESULTS OF THE ANALYSIS

The chapter presents the results of the analysis of variations in the earnings level of farmers and farm managers among communities. Three "earnings of farmers" equations were estimated for each division in the conterminous United States. Equation (1) included the distance variable (X_9, in this equation); equation (2) included the size-distance$_1$ variable (X_{10}); and, equation (3) included the size-distance$_2$ variable (X_{11}). As with the family income equations, one equation was chosen as best and will be discussed. The same choice criterion was employed. The equation with the highest coefficient of multiple determination was chosen.

The chapter is organized by geographic division in the same fashion as was Chapter V.

The New England Division

Table 6.1 is a summary of the results of the analysis for the New England division. More complete results are shown in Tables 1, 2, and 3 of Appendix II. Equation (1) accounted for more variance in median earnings of farmers and farm managers among counties than either of the other two equations (R_1^2 = .4624, R_2^2 = .4298, R_3^2 = .4267). The distance variable most closely measured the influence of industrial-urban concentrations in this division.

TABLE 6.1

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

New England Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6800	.6496	.6532
Standard error of estimate	397.3884	412.0523	410.4007
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	-.4699*		
Size-distance$_1$ variable (X_{10}) . . .		.2927	
Size-distance$_2$ variable (X_{11}) . . .			.3591
Average value of land and buildings (X_1)	.4861*	.5333*	.5002*
Male unemployment rate of county (X_2)	.3996*	.3058*	.3286*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.0363	-.0510	-.0567
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.2021	-.2253	-.2552
12 or more years of school (X_5) .	-.2347	-.1411	-.2006
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	.1043	.2299*	.2063
Per cent of rural farm males who are age:			
15-24 (X_7)	.2995*	.2426	.2575*
25-44 (X_8)	.0164	-.0234	.0282

[1]See Appendix II, Tables 1, 2, 3, for complete results.
*Significantly different from zero at the .05 level.

In equation (1) the average value of farm land and buildings per farm in a county (X_1) is the most important variable relative to other variables. The distance variable (X_9) ranks second in importance. In equations (2) and (3) X_1 ranks first and the size-distance variables rank second even though the estimated regression coefficients of the size-distance$_1$ variable (X_{10}) and the size-distance$_2$ variable (X_{11}) are not significantly different from zero. The intercorrelation between each of the proximity variables and X_1, however, is high ($r_{1.9} = -.5686$, $r_{1.10} = .6516$, $r_{1.11} = .6805$). Clearly, the lack of significance of the effects of the proximity variables in equations (2) and (3) is the result of this intercorrelation. Thus, the estimated regression coefficients of X_1 and X_9 in equation (1) jointly measure the effects of the average value of capital inputs per farm in a county and the proximity of the county to industrial-urban concentrations. The effects of both these variables indicate that the higher is the average value of land per farm and the closer is a county to such centers as Boston, Hartford, and New York, the higher is the median earnings of farmers and farm managers in the county. The high intercorrelation between the average value of farm land and buildings per farm in a county and the distance of the county from an SMSA also probably indicates that the average value of farm land and buildings per farm in a county is a function of the proximity of the county to SMSA's.

Following the distance variable (X_9), the male unemployment rate in a county is most important. The positive sign of the regression coefficient of this variable (X_2) suggests that it served as a proxy for the presence of local urban centers smaller than SMSA's. X_2 was correlated with the distance variable ($r_{2.9}$ = .5222). Thus, unemployment is lower the more distant is a county from a large city. Despite this correlation, the regression coefficient of X_2 is positive. It seems unlikely that X_2 measured much of the effects of proximity to large cities.

Of the variables which had effects significantly different from zero, X_7 (males, age 15-24) is the least important. A relative prevalence of males, age 15-24, among rural farm males imparts a positive effect on the level of earnings of farmers in a county. X_7 was correlated with the per cent of males, age 45 years and over in a county (-.5867). On the average 71.7 per cent of all rural farm males in a county were 45 years of age or over. It seems likely that X_7 picked up the effects of a relative lack of older rural farm males in a county.

In equation (2) the estimated regression coefficient of X_6 (per cent of males in a county who were craftsmen and operatives) was positive and significant. In equation (1) the effect was positive but not significant. X_6 and the proximity variables were not intercorrelated which indicates that the relative prevalence of craftsmen and operatives in a county was not related to the proximity of a county to SMSA's. However, the effect of X_6 in equations (2) and (3) was double that in equation (1). One or both of two conclusions can be reached on the basis of these results. First, farmers in counties near to large SMSA's held more part-time nonfarm jobs, and had higher earnings than farmers in counties near to smaller SMSA's. The higher earnings may have been the result of increased part-time nonfarm employment and a higher capital to labor ratio in agriculture. Second,

wage rates for craftsmen and operative occupations may have been higher in counties near to large SMSA's than small SMSA's. Thus, part-time nonfarm employment in counties near large SMSA's yielded higher annual earnings than part-time nonfarm employment in counties near to small SMSA's in the New England division. In either case the effect of city size on the earnings of farmers and farm managers in the New England division appeared to be positive. And, craftsmen and operative occupations apparently were relevant alternative nonfarm jobs for farmers in this division.

The Middle Atlantic Division

Table 6.2 contains a summary of the results for this division. Tables 4, 5, and 6 in Appendix II contain more complete results.

All of the equations accounted for nearly the same variance in median earnings of farmers among counties in the Middle Atlantic division (R_1^2 = .1726. R_2^2 = .1725, R_3^2 = .1726). None of the regression coefficients of the variables which measured the effects of industrial-urban concentrations were significantly different from zero. Some of the independent variables were correlated with each other. Yet, the intercorrelation did not seem extensive enough to have resulted in the non-significance of many of the regression coefficients or the low coefficients of determination.

Only the estimated regression coefficient of the local male unemployment rate was significantly different from zero. The earnings of farmers in a county with a high unemployment rate is lower than in a county with a low unemployment rate. Presumably, fewer farmers in high unemployment counties hold more part-time nonfarm jobs than in counties with lower unemployment rates.

TABLE 6.2

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Middle Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4154	.4153	.4155
Standard error of estimate	814.4597	814.4899	814.4203
Independent variables	Beta coefficients[1] (relative importance)		
Distance variable (X_9)	.0310		
Size-distance$_1$ variable (X_{10}) . . .		.0356	
Size-distance$_2$ variable (X_{11}) . . .			.0400
Average value of land and buildings (X_1)	.1374	.1178	.1150
Male unemployment rate of county (X_2)	-.2185*	-.2023*	-.2013*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.1364	-.1432	-.1439
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.0167	-.0264	-.0291
12 or more years of school (X_5) .	.1832	.1817	.1807
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.0533	-.0655	-.0690
Per cent of rural farm males who are age:			
15-24 (X_7)	-.0971	-.0826	-.0823
25-44 (X_8)	-.1308	-.1245	-.1223

[1]See Appendix II, Tables 4, 5, 6, for complete results.
*Significantly different from zero at the .05 level.

Even though the regression coefficients of the other variables in the equations were not significantly different from zero, only three had signs which were inconsistent with expectations. These were the distance variable (X_9); males, age 25-44 (X_8); and craftsmen and operatives (X_6).

In total, the variables only explained about 17 per cent of the variance in median earnings of farmers among communities. The counties in Pennsylvania and New York dominated the division. The relative isolation of the communities in the mountainous areas of these two states may have resulted in the failure of the proximity variables to explain any significant amount of the variance in median earnings. The dispersion of industry throughout the division, and the prevalence of unemployment in Pennsylvania coal and steel areas may explain the significance of the unemployment variable. The average value of land and buildings was correlated with the proximity variables (approximately .5). This may explain the failure of both X_1 and the proximity variables.

The East North Central Division

The results of the analysis for the East North Central division are summarized in Table 6.3. More complete results are contained in Tables 7, 8, and 9 of Appendix II.

The three equations accounted for about the same proportion of the variance in median earnings among communities ($R_1^2 = .5376$, $R_2^2 = .5407$, $R_3^2 = .5392$). Equation (2), however, accounted for slightly more than the other two equations and is discussed.

TABLE 6.3

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

East North Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.7332	.7353	.7343
Standard error of estimate	418.7193	417.2768	417.9595
Independent variables	Beta coefficients[1] (relative importance)		
Distance variable (X_9)	-.0881*		
Size-distance$_1$ variable (X_{10}) . . .		.1036*	
Size-distance$_2$ variable (X_{11}) . . .			.0924*
Average value of land and buildings (X_1)	.5834*	.5628*	.5628*
Male unemployment rate of county (X_2)	-.1834*	-.1976*	-.2005*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.0268	-.0378	-.0346
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.0669	-.0629	-.0610
12 or more years of school (X_5) .	-.1037*	-.0858	-.0858
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	.0228	.0232	.0273
Per cent of rural farm males who are age:			
15-24 (X_7)	-.0127	-.0110	-.0174
25-44 (X_8)	.0657	.0701	.0661

[1]See Appendix II, Tables 7, 8, 9, for complete results.
*Significantly different from zero at the .05 level.

The average value of farm land and buildings per farm in a county is the most important determinant of variations in the level of earnings of farmers among counties in the East North Central division. The local unemployment rate is the next most important variable, followed by the influence of industrial-urban concentrations.

The results indicate that in the East North Central division the value of capital inputs per farm in a county, more than any other variable, determines the level of earnings of farmers in a county; the higher the value, the higher the median earnings. Part-time nonfarm employment and the opportunity for off-farm migration to local nonfarm employment also appear to be important determinants. A high unemployment rate in a county presumably lowers the number of farmers holding part-time employment and impedes local off-farm migration. Although the effect of the relative prevalence of craftsmen and operatives in a county is not significant, the sign is consistent with expectations. It tends to support the hypothesis that the local labor market is important in the determination of the level of earnings of farmers in a community.

The influence of large industrial-urban concentrations also has a positive effect on the earnings level of farmers in a community. The closer is a county to a large city the higher is the median earnings of farmers and farm managers. Apparently, labor markets in large cities provide greater and more varied job availability and, therefore, better opportunities for adjustment than do local county labor markets in areas removed from large urban centers.

The West North Central Division

Table 6.4 contains a summary of the results of the analysis for the West North Central division. Tables 10, 11, and 12 in Appendix II show more complete results. Equations (1) and (2) accounted for about the same proportion of the variance in median earnings among counties and equation (3) accounted for somewhat less ($R_1^2 = .5924$, $R_2^2 = .5907$, $R_3^2 = .5662$). Equation (1) is discussed to be consistent with the choice criterion.

The average value of land and buildings per farm in a county is the most important variable relative to the other variables in all three equations. Besides being a proxy for all capital inputs per farm in a county, it is likely that X_1 is a rough proxy for the dominant type of farming in the county. Dairy farming dominates all but the southwestern part of Minnesota. Iowa is almost entirely in the Corn Belt which also covers the eastern parts of South Dakota, Nebraska, and the northeastern part of Kansas, and the northern part of Missouri. Cattle ranching dominates the western parts of Nebraska and South Dakota while small grains, chiefly wheat, dominate in North Dakota and Kansas. Also, general farming and some cotton are dominant in southern Missouri. The high land values per farm in a county are in Nebraska and Kansas while the lower land values per farm in a county are in Minnesota and Missouri. Similarly, the counties with high median earnings of farmers are located in Kansas and Nebraska, and the counties with the lowest earnings of farmers are located in Missouri and Minnesota.

The size-distance$_1$ variable is next in importance. The more distant is a county in the West North Central division from an

TABLE 6.4

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

West North Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.7697	.7686	.7525
Standard error of estimate	530.1266	531.2840	546.9133
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	.1997*		
Size-distance$_1$ variable (X_{10}) . . .		-.2179*	
Size-distance$_2$ variable (X_{11}) . . .			-.0397
Average value of land and buildings (X_1)	.4861*	.5095*	.5498*
Male unemployment rate of county (X_2)	-.1036*	-.1195*	-.0835*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	.0627*	.0877*	.0780*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.0348	.0179	-.0048
12 or more years of school (X_5) .	.1697*	.1264*	.1366*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	.1445*	.1621*	.0907*
Per cent of rural farm males who are age:			
15-24 (X_7)	.1070*	.1010*	.0995*
25-44 (X_8)	.1514*	.1247*	.1682*

[1]See Appendix II, Tables 10, 11, 12, for complete results.

*Significantly different from zero at the .05 level.

SMSA, the higher is the median earnings of farmers in the county. The industrial-urban development hypothesis is disconfirmed for the West North Central division by this result. Yet, the local nonfarm labor market is an important positive determinant of the level of earnings of farmers in a county. The negative and significant effect of the local unemployment rate and the positive and significant effect of the relative prevalence of operatives and craftsmen in a county strongly confirm this hypothesis. However, the relative prevalence of craftsmen and operatives was correlated with the size-distance variable ($r_{6.10} = .5287$). X_6 may have picked up some of the effects of proximity to large cities, therefore; the effects seem to be on the occupation distribution rather than on wage rates. It is clear, however, that craftsmen and operative occupations are alternative nonfarm employment opportunities for farmers in this division; that fewer farmers hold part-time nonfarm jobs in a county with a high unemployment rate; and that local off-farm migration may be impeded by a high local unemployment rate.

Both age variables have a strong positive effect on the median earnings of farmers in a county. The per cent of rural farm males who were 45 years of age and over was highly correlated with males, age 15-24 (-.6353) and with males, age 25-44 (-.7893). These results imply that the relative prevalence of rural farm males, age 45 and over, have a significant and negative effect on the median earnings of farmers.

High education levels (X_5) among rural farm males have a positive effect on the level of earnings of farmers in a county. X_5 was correlated, however, with the average value of land and buildings per farm in a county ($r_{1.5}$ = .5282) and with the relative prevalence of functional illiteracy among rural farm males ($r_{4.5}$ = -.6352). X_5, therefore, could have picked up some of the effects of the value of land per farm and the relative lack of functional illiterates among rural farm males.

Finally, the ratio of nonwhite to all farmers and farm managers in a county has a significant and positive effect on the median earnings of farmers. This result was unexpected. The simple correlation coefficients between X_3 and the other independent variables provide no basis for a rationalization of this result.

The South Atlantic Division

Table 6.5 shows a summary of the results of the analysis for the South Atlantic division. Again, each of the equations accounted for about the same proportion of the variance in the median earnings of farmers among counties (R_1^2 = .3717, R_2^2 = .3838, R_3^2 = .3812). Equation (2) seemed to account for slightly more variance than the other two equations and is discussed.

The average value of farm land and buildings per farm in a county is the most important variable in equation (2). A county with a high average value of land per farm has a higher median earnings of farmers than one with a lower value of land per farm. While the variable probably was a proxy for the value of all capital inputs per farm it also probably measured the type of farming dominant in the county. The high average land values per farm occurred in Maryland, Delaware, and Florida. In Maryland, Delaware, and Virginia the variable probably reflected peanut, dairy, and truck crop farms. In

TABLE 6.5

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

South Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6097	.6195	.6174
Standard error of estimate	831.9362	823.9590	825.6219
Independent variables	Beta coefficients[1] (relative importance)		
Distance variable (X_9)	-.0311		
Size-distance$_1$ variable (X_{10}) . . .		.1264*	
Size-distance$_2$ variable (X_{11}) . . .			.1148*
Average value of land and buildings (X_1)	.3476*	.3642*	.3576*
Male unemployment rate of county (X_2)	-.0626	-.0823*	-.0738*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.0943*	-.0854*	-.0875*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.1651*	-.1526*	-.1473*
12 or more years of school (X_5) .	.0190	.0016	-.0077
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.1459*	-.1357*	-.1311*
Per cent of rural farm males who are age:			
15-24 (X_7)	-.1953*	-.1670*	-.1747*
25-44 (X_8)	-.1810*	-.1668*	-.1678*

[1]See Appendix II, Tables 13, 14, 15, for complete results.

*Significantly different from zero at the .05 level.

Florida high land values indicated citrus and vegatable production. The low land values per farm in the Carolinas probably reflected small tobacco and cotton farms and subsistence farms. Median earnings of farmers per county are high in Maryland, Delaware, Virginia, and Florida compared to earnings levels in the Carolinas, West Virginia, and Georgia.

The influence of industrial-urban concentrations is significant and positive on the earnings of farmers. Presumably, the labor markets in large cities in and near the South Atlantic division provide nonfarm employment opportunities to prospective off-farm migrants. The general conditions of the local labor markets also have a positive effect on the earnings levels of farmers among counties. The median earnings of farmers in a county is affected negatively by the unemployment rate in the county. A high unemployment rate in a county indicates that fewer farmers hold part-time nonfarm jobs, and prospective local off-farm migration is impeded. The relative prevalence of craftsmen and operatives among males in the county exerted a significant and negative effect on the earnings level of farmers in the county. With the evidence available no rationalization of the negative effect of the relative prevalence of operatives and craftsmen can be made. In total, however, the influence of the nonfarm economy on the level of earnings of farmers is positive in that both the proximity of a county to an industrial-urban concentration and the full employment conditions in the county impart positive effects on the level of earnings.

Functional illiteracy among rural farm males has a depressing effect on the level of earnings of farmers in a county. X_4 (zero to six years of school) was correlated with the per cent of rural farm males, age 15-24 ($r_{4.7} = .7631$). Thus, the effects of these two variables probably are intermingled. Clearly, both a relative prevalence of young rural farm males and functional illiterates depresses the earnings of farmers in a county. The effects of both the age variables are negative and significant. These results are inconsistent with expectations. Negative effects of a relative prevalence of rural farm males, age 15-44, imply a positive effect of a relative prevalence of rural farm males, age 45 and over. A relative prevalence of rural farm males, age 45 and over, in a county may indicate that the county experienced great out-migration in the last decade. Presumably, those rural farm males which remained were better, more prosperous farmers, or were the age group for whom migration was economically impossible. The out-migration, also, may have facilitated enlargement and reorganization of the remaining farms. The result may have been a higher median earnings of farmers in the county relative to counties in which less out-migration occurred.

Finally, the ratio of nonwhite farmers to all farmers in a county has a significant negative effect on the level of earnings of farmers in a county. This result is consistent with expectations. This variable presumably picked up the effects of discrimination against nonwhites in the labor and capital markets. It may also have measured the tendency of rural farm nonwhites to be of younger age and have less education than rural farm whites.

The East South Central Division

Table 6.6 is a summary of the results for the East South Central division. Tables 16, 17, and 18 in Appendix II contain more complete results. Kentucky, Tennessee, Alabama, and Mississippi make up the division.

Equation (3) accounted for slightly more variance in median earnings than did the other two equations (R_1^2 = .6813, R_2^2 = .6991, R_3^2 = .7132). The size-distance$_2$ variable measured most closely the influence of industrial-urban concentrations.

Most important relative to other variables in equation (3) is the average value of farm land and buildings per farm in a county. The higher the value of land per farm is in a county, the higher is the median earnings of farmers and farm managers.

Next most important is the ratio of nonwhite farmers to all farmers in a county. The higher the ratio is in a county the lower the earnings level of farmers. X_3 was highly and positively correlated with the relative prevalence of functional illiterates ($r_{3.4}$ = .5360), with the relative prevalence of rural farm males, age 15-24 ($r_{2.7}$ = .7982), and negatively correlated with the relative prevalence of males, age 25-44 ($r_{3.8}$ = .6980). Thus, the effects of functional illiteracy, a young rural farm male labor force, and a relative prevalence of nonwhite farmers in a county are mixed in the regression coefficients of the three variables. It appears that the rural farm males, age 15-44, and functional illiterates may tend to be nonwhites in the East South Central division.

The influence of industrial-urban concentrations is next important relative to other variables in equation (3). The

TABLE 6.6

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

East South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.8254	.8361	.8445
Standard error of estimate	300.6834	292.1978	285.2355
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	-.0645*		
Size-distance$_1$ variable (X_{10}) . . .		.1803*	
Size-distance$_2$ variable (X_{11}) . . .			.2310*
Average value of land and buildings (X_1)	.5839*	.5541*	.5062*
Male unemployment rate of county (X_2)	.0275	.0072	.0327
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.2356*	-.2383*	-.2949*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.1217*	-.0575	-.0330
12 or more years of school (X_5) .	-.0226	.0450	.0134
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.1843*	-.1646*	-.1903*
Per cent of rural farm males who are age:			
15-24 (X_7)	-.1356*	-.0621	-.0519
25-44 (X_8)	.1142*	.1267*	.1301*

[1]See Appendix II, Tables 16, 17, 18, for complete results.

*Significantly different from zero at the .05 level.

size-distance$_2$ variable seemed to measure the influence of industrial-urban concentrations more closely than did the distance variable. There is more doubt that the size-distance$_2$ variable was more appropriate than the size-distance$_1$ variable. Clearly, however, the size of industrial-urban concentrations has an influence on the level of earnings of farmers in outlying counties as well as the location of the city with respect to the counties. The effects of functional illiteracy and males, age 15-24, were significant in equation (1) but not in equations (2) and (3). In equations (2) and (3) the negative effects of these two variables were reduced by the inclusion of the size-distance variables. The relative prevalence of functional illiterates and of rural farm males, age 15-24, were not correlated with the size-distance variables. Presumably, wage rates for individuals with low levels of education are higher in counties near large SMSA's than in counties near small SMSA's, and the size-distance variables accounted for these differential wage rates. Thus, the closer is a county to a large city the more opportunity there is for part-time nonfarm employment and for off-farm migration.

The effect of the county unemployment rate on the earnings of farmers in the county is positive but not significantly different from zero. The effect of a relative prevalence of craftsmen and operatives in the county is negative and significant. It appears that the local labor markets in counties in the East South Central do not provide profitable opportunities for part-time and full-time off-farm employment. However, the labor markets in large cities do provide such opportunities in the East South Central division. Similarly, it is suspected that the large northern labor markets provide even more opportunities for nonfarm employment via geographical migration.

The West South Central Division

Table 6.7 contains a summary of the results of the analysis for the West South Central division. Tables 19, 20, and 21 in Appendix II show more complete results. Equation (2), which accounted for slightly more variance than did the other two equations, is discussed in this section ($R_1^2 = .6990$, $R_2^2 = .7056$, $R_3^2 = .7001$).

The West South Central division is similar to the other divisions in that X_1 (the average value of farm land and buildings per farm in a county) is the most important variable relative to other variables in the equations. In addition to measuring the value of all capital inputs on farms in a county, X_1 also measures the effects a dramatic shift in farm size and type of farming from one state to another within the division. The southeast portion of the division (Louisiana) has small farm size and is devoted to cotton, rice, and sugar cane production and some general farming. Oklahoma and northern Texas have large farms devoted to irrigated cotton, cash grain, and cattle ranching. From the southeast to the northwest, earnings of farmers per county increases. The average value of farm land and buildings per farm in a county probably in part contributes to this shift.

The ratio of nonwhite to all farmers in a county is the next most important variable relative to the other variables in equation (2). As the ratio increases, the median earnings in a county decreases. This is consistent with expectations. Since this ratio declines from

TABLE 6.7

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

West South Central Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.8354	.8400	.8367
Standard error of estimate	873.7464	862.4835	870.5339
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	.0237		
Size-distance$_1$ variable (X_{10}) . . .		-.1080*	
Size-distance$_2$ variable (X_{11}) . . .			-.0547*
Average value of land and buildings (X_1)	.6826*	.6537*	.6862*
Male unemployment rate of county (X_2)	-.1288*	-.1323*	-.1352*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.1801*	-.1894*	-.1814*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	.0081	.0048	.0147
12 or more years of school (X_5) .	.1240*	.0925*	.1270*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.0458	-.0344	-.0428
Per cent of rural farm males who are age:			
15-24 (X_7)	.0767*	.0732*	.0721*
25-44 (X_8)	-.0481	-.0480	-.0567

[1]See Appendix II, Tables 19, 20, 21, for complete results.
*Significantly different from zero at the .05 level.

the southeast to the northwest in the division, probably this variable also picked up some of the effects of shifting farm size and type of farming mentioned above. The ratio in a county was highly correlated with the relative prevalence of rural farm males, age 15-24 ($r_{3.7} = .6235$). Thus, the regression coefficients of these two variables probably include some of the effects of both variables.

The county unemployment rate is the third most important variable as measured by the estimated beta coefficients. The effect of the unemployment rate is negative and indicates that farmers in a county with a high unemployment rate relative to other counties have a lower level of earnings. This result is consistent with the hypothesis that in counties with a high unemployment rate farmers hold fewer part-time jobs and local off-farm migration is impeded.

The median earnings of farmers in a county is positively related to the distance of the county from a large SMSA; the more distant from a large SMSA the higher the level of earnings. For the West South Central division, then, the industrial-urban development hypothesis is disconfirmed. The distance variable has an effect not significantly different from zero, whereas the size-distance variables have significant effects. The irrigated cotton areas, cattle ranching, and cash grain areas are not located near the larger SMSA's but are in areas with no cities or areas with smaller SMSA's. The counties in Texas and Oklahoma dominated the division. However, including Louisiana and Arkansas in the East South Central division probably would not have changed the signs or significance of the estimated regression coefficients of the variables for the East or West South Central equations.

A relative prevalence in a county of rural farm males with at least high school education raises the level of earnings of farmers in the county. X_5 (12 years of school and over) was positively correlated with the average value of land per farm in a county ($r_{1.5}$ = .5518), positively correlated with the per cent of rural farm males, age 25-44, ($r_{5.8}$ = .5995), and negatively correlated with the relative prevalence of functional illiteracy ($r_{4.5}$ = -.6479). This intercorrelation suggests a shift in the age and education distributions of rural farm males from southeast to northwest in the division which is similar to the shift in the average value of farm land and buildings per farm in a county. The average value of land was also correlated with males, age 25-44 ($r_{1.8}$ = .6068). Probably, the estimated regression coefficients of X_1 and X_5 had in them the effects of a relative prevalence of males, age 25-44 years. The effect of a relative prevalence of rural farm males, age 15-24 is significant and positive, a result which was unexpected. Given the high intercorrelation among the age, education, and the average value of land this result appears to be reasonable. The simple correlation coefficient between X_7 and the median earnings of farmers was -.3667. Apparently, the intercorrelation among the independent variables was sufficient to change the sign from negative to positive.

The Mountain Division

A summary of the results of the analysis for the Mountain division is contained in Table 6.8. Tables 22, 23, and 24 in

TABLE 6.8

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Mountain Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.4507	.4889	.4625
Standard error of estimate	1151.3510	1125.1365	1143.5364
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	-.0051		
Size-distance$_1$ variable (X_{10}) . . .		-.2051*	
Size-distance$_2$ variable (X_{11}) . . .			-.1071
Average value of land and buildings (X_1)	.3333*	.3849*	.3574*
Male unemployment rate of county (X_2)	-.1706*	-.1940*	-.1842*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.1114	-.0793	-.1056
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.0754	-.0983	-.0886
12 or more years of school (X_5) .	-.0300	-.0200	-.0365
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.0339	.0063	-.0173
Per cent of rural farm males who are age:			
15-24 (X_7)	.0596	.0360	.0547
25-44 (X_8)	.0986	.0565	.0719

[1]See Appendix II, Tables 22, 23, 24, for complete results.

*Significantly different from zero at the .05 level.

Appendix II contain more complete results. Each of the equations accounted for about the same proportion of the variance in median earnings of farmers among communities ($R_1^2 = .2031$, $R_2^2 = .2390$, $R_3^2 = .2139$).

The estimated regression coefficients of three variables in equation (2) were significantly different from zero. The average value of farm land and buildings per farm in a county is most important, followed by the size-distance$_1$ variable and the male unemployment rate in a county.

As was expected, the average value of land exerts a strong positive effect on the median earnings of farmers in a county. High land values per farm in a county in this division probably reflect irrigated land in various parts of the division, notably in Arizona and Utah, and the large sheep, cattle, and cash grain ranches in the division.

The sign of the estimated regression coefficient of the size-distance$_1$ variable is negative and significant. The more distant a county is from an SMSA, the higher the median earnings of farmers and farm managers. This disconfirms the industrial-urban development hypothesis for the Mountain division. The income from farming in this division probably is more dependent upon the national prices of cotton, potatoes, wheat, and livestock along with local weather conditions, soil type, and the presence or absence of water.

The local unemployment rate has a negative effect on the level of earnings of farmers. Presumably, a high unemployment rate in a county lowers the amount of part-time nonfarm employment for farmers. Approximately 25 per cent of the employed males in the division were employed in the construction, mining, transportation, communications, and other public utility industries in 1959. Local part-time nonfarm employment opportunities for farmers are probably in these industries.

In summary, of the variables studied, part-time nonfarm employment and the value of all capital inputs are the major determinants of variations in the level of earnings of farmers and farm managers in the Mountain division. However, these account for only a very small proportion of the total variation.

The Pacific Division

Table 6.9 is a summary of the results for the Pacific division. Tables 25, 26, and 27 in Appendix II show more complete results. Again, there was very little difference in the proportion of the variance in median earnings explained by the three equations ($R_1^2 = .4494$, $R_2^2 = .4462$, $R_3^2 = .4413$). Equation (1) is discussed to remain consistent with the choice criterion.

The average value of farm land and buildings per farm in a county is the most important variable. Next most important is the local male unemployment rate, followed by age, 15-24 years. The estimated regression coefficients of the other variables were not significantly different from zero.

The value of land and other capital inputs imparts a strong positive effect on the level of earnings of farmers and farm managers in a county. High land values probably reflect the investment in irrigation and orchards in the Pacific division as well as some wheat farms in the northeast part of Washington and Oregon.

TABLE 6.9

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Pacific Division

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.6704	.6680	.6642
Standard error of estimate	1055.4864	1058.6479	1063.2753
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	.1444		
Size-distance$_1$ variable (X_{10}) . . .		-.1451	
Size-distance$_2$ variable (X_{11}) . . .			-.0935
Average value of land and buildings (X_1)	.4164*	.4252*	.3986*
Male unemployment rate of county (X_2)	-.2988*	-.2683*	-.2768*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	.0207	.0579	.0378
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	.0060	.0188	-.0025
12 or more years of school (X_5) .	.0113	.0219	.0126
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.1046	-.1061	-.1204
Per cent of rural farm males who are age:			
15-24 (X_7)	.1518*	.1157	.1217
25-44 (X_8)	.1461	.1576	.1726*

[1]See Appendix II, Tables 25, 26, 27, for complete results.
*Significantly different from zero at the .05 level.

The local unemployment rate of males in a county exerts a negative effect on the level of earnings of farmers in the county. Presumably, farmers in a county with a high unemployment rate hold fewer part-time nonfarm jobs than the farmers in a county with a low unemployment rate. Also local off-farm migration is probably impeded by a high unemployment rate.

Age, 15-24 years, exerts a significant and positive effect on the level of earnings of farmers. This was not expected. X_7 (the per cent of rural farm males, age 15-24) was highly correlated with the per cent of rural farm males, age 45 and over (-.8801). The positive effect of X_7, then, probably reflects the relative absence of rural farm males, age 45 and over. Clearly, farmers in the older age groups in the Pacific division have lower earnings levels than do younger farmers.

The Conterminous United States

A summary of the results of the analysis for the conterminous United States as a whole is contained in Table 6.10. For the nation as a whole, each equation accounted for nearly the same proportion of the variance in median earnings of farmers and farm managers among counties ($R_1^2 = .3422$, $R_2^2 = .3407$, $R_3^2 = .3404$). Although the differences in the amount of the variance explained by the three equations were negligible, equation (1) is discussed.

At the national level the average value of farm land and buildings per farm in a county is the most important variable in all three equations. Next most important is functional illiteracy. The male unemployment rate, the ratio of nonwhite to all farmers, the

TABLE 6.10

Some results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Conterminous United States

	Equation 1	Equation 2	Equation 3
Multiple correlation coefficient . .	.5850	.5837	.5834
Standard error of estimate	778.7179	779.8879	780.2169
Independent variables	**Beta coefficients[1] (relative importance)**		
Distance variable (X_9)	.0540*		
Size-distance$_1$ variable (X_{10}) . . .		-.0317*	
Size-distance$_2$ variable (X_{11}) . . .			.0170
Average value of land and buildings (X_1)	.5091*	.5125*	.5091*
Male unemployment rate of county (X_2)	-.1151*	-.1078*	-.1045*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-.1141*	-.1172*	-.1167*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.1618*	-.1646*	-.1665*
12 or more years of school (X_5) .	.0276	.0187	.0188
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-.0360*	-.0443*	-.0528*
Per cent of rural farm males who are age:			
15-24 (X_7)	-.0372*	-.0383*	-.0298
25-44 (X_8)	-.0251	-.0214	-.0135

[1] See Appendix II, Tables 28, 29, 30, for complete results.

*Significantly different from zero at the .05 level.

distance variable, males age 15-24 years, and the relative prevalence of craftsmen and operatives are important in the order listed.

The average value of farm land and buildings per farm in a county exerts a strong positive effect on the level of earnings of farmers in the county. Only in the Middle Atlantic division is the effect of X_1 not significantly different from zero. In all other divisions, X_1 has a strong positive effect. For the nation as a whole, therefore, the variation in the average value of farm land per farm among counties is the most important determinant of differentials in the level of earnings of farmers among counties.

At a much lower level of importance, as measured by the estimated beta coefficients, the relative prevalence of functional illiteracy among rural farm males has a strong negative effect. Clearly, little or no education has a depressing effect on the earnings of farmers. Presumably, functional illiteracy acts as a barrier to off-farm migration. Fewer part-time jobs are available to such individuals. Finally, functional illiteracy may prevent farmers from obtaining capital resources because of lack of knowledge of the credit institutions. Functional illiteracy was positively correlated with the ratio of nonwhite to all farmers ($r_{3.4} = .5987$), and with males, age 15-24 ($r_{4.7} = .6010$). It was negatively correlated with high education levels ($r_{4.5} = -.6334$). Thus, X_4 may have picked up some of the effects of these other variables. It also may reflect the high ratio of nonwhite to all farmers, the greater prevalence of functional illiteracy, and young rural farm males in Southern counties, which also have the lowest levels of earnings of farmers.

The variation in the male unemployment rate among counties is an important determinant of variations in the level of earnings of farmers among counties; the higher the unemployment rate, the lower the earnings. This result is consistent with the hypothesis that in counties with a high unemployment rate farmers hold fewer nonfarm part-time jobs. Also, the result is consistent with the hypothesis that a high local unemployment rate impedes local off-farm migration. Ceteris paribus, in such counties the capital to labor ratio in agriculture is probably lower than in other counties. At the divisional level the effect of the unemployment rate is negative with the exception of two divisions, the New England and East South Central divisions. In the latter the effect is not significantly different from zero.

The effect of a relative prevalence of craftsmen and operatives in a county (X_6) is negative for the nation as a whole. This is inconsistent with expectations. The effect of X_6 is positive and significant in the West North Central, and negative and significant in the South Atlantic and East South Central divisions. The two occupation classifications include a very wide range of job types (from goldsmiths to laundry workers). The mix of job types included in these two occupation classifications must vary widely from one county and area to another as the dominant industry in counties and areas varies. The variation of types of jobs included from county to county for the nation as a whole may have resulted in the negative effect.

The ratio of nonwhite to all farmers in a county has a depressing effect on the earnings of farmers in the county for the nation as a whole. This result was expected. Most nonwhite farmers are in the three Southern divisions where earnings are lowest. The ratio may reflect discrimination against nonwhites in the labor, capital, and land markets. It also may reflect the fact that nonwhite rural farm males have lower average education levels and tend to be younger than white rural farm males ($r_{3.4} = .5987$, $r_{3.7} = .5625$). Only in the West North Central is the effect of X_3 positive and significant.

The results having relevance to the industrial-urban development hypothesis for the nation as a whole tend to disconfirm the hypothesis. Only the effect of the size-distance$_2$ variable is consistent with the hypothesis and it is not significantly different from zero. At the divisional level the results are mixed. The results for three divisions confirmed the hypothesis (New England, South Atlantic, and East South Central divisions). The effects of the proximity variables in the Middle Atlantic are consistent with the hypothesis but are not significantly different from zero. The results for three divisions disconfirm the hypothesis (West North Central, West South Central, and Mountain divisions). The effects of the proximity variables for the Pacific division are inconsistent with the hypothesis but none of the effects are significantly different from zero. In general, the industrial-urban hypothesis holds east of the Mississippi River but fails west of the Mississippi.

There were 211 SMSA's in the conterminous United States in 1960. Seventy-five of these were located west of the Mississippi. Thirty-two SMSA's of the 75 were in Texas and California. In general, counties east of the Mississippi were closer to SMSA's than were counties west of the Mississippi. Very little of the farm products, except fluid milk, produced west of the Mississippi remain in the area. Much of the fruit and vegetable, cotton, grain, and livestock products are produced for export out of the area. With the exception of fluid milk, markets for these products are national and do not relate directly to cities in the Pacific, Mountain, West North, and West South Central divisions. In addition many of the product prices are governed by support programs. In general, then, it seems reasonable that the hypothesis was disconfirmed for this area.

For the nation as a whole the relative prevalence of rural farm males, age 15-24, has a negative effect on the level of earnings of farmers in a county. Such a result was expected. X_7 was correlated with the per cent of rural farm males, age 45 and over (-.7052), the nonwhite ratio ($r_{3.7}$ = .5625), and with functional illiteracy ($r_{4.7}$ = .6010). Probably, the effects of all these variables are intermingled.

In summary, the value of all capital inputs, as measured by the average value of farm land and buildings per county, is the most important determinant of the level of earnings of farmers in a county for the nation as a whole. Much less important but significant are the local unemployment rate, functional illiteracy, and the relative prevalence of nonwhite farmers. For the nation as a whole, the more distant a county is from a city of 50,000 population or more the higher is the median earnings of farmers and farm managers in the county. Thus, the industrial-urban development hypothesis does not hold for the nation as a whole. In general, however, the hypothesis does hold for the area east of the Mississippi.

A Summary

The analysis of median earnings of farmers and farm managers per county was conducted at the divisional and national levels. Twenty-one equations in total were estimated. One equation for each division and one for the nation was discussed. A partial summary of the results of these equations is contained in Table 6.11. The signs in Table 6.11 refer to the signs of the estimated partial regression coefficients of the variables in each equation. Those signs surrounded by parentheses are consistent with the hypotheses discussed in Chapter III and summarized in Table 4.2. The numbers in Table 6.11 refer to the rank of the variables in each equation in terms of relative importance as measured by the estimated beta coefficients. The ranked variables had partial regression coefficients which were significantly different from zero at the .05 level. The partial regression coefficients of the unranked variables were not significantly different from zero.

In each division, except the Middle Atlantic, the average value of farm land and buildings per farm in a county (X_1) is the most important determinant of variation in the level of earnings of farmers and farm managers among counties. The simple correlation coefficients between X_1 and the proximity variables were equal to or greater than .5 in only the New England and Middle Atlantic divisions. Thus, X_1 does not measure the effects of the proximity of a county to industrial-urban concentrations in the other seven

TABLE 6.11

A summary of the analysis of median earnings of farmers and farm managers in a county, by division and for the nation.

Area	X_1 r* s**	X_2 r s	X_3 r s	X_4 r s	X_5 r s	X_6 r s	X_7 r s	X_8 r s	X_9 r s	X_{10} r s	X_{11} r s
New England	1 (+)	3 +	(-)	(-)	-	(+)	4 +	(+)	2 (-)		
Middle Atlantic	(+)	1 (-)	(-)	(-)	(+)	-	(-)	-			(+)
East North Central	1 (+)	2 (-)	(-)	(-)	-	(+)	(-)	(+)		3 (+)	
West North Central	1 (+)	7 (-)	8 +	(-)	3 (+)	5 (+)	6 +	4 (+)	2 +		
South Atlantic	1 (+)	8 (-)	7 (-)	4 (-)	(+)	5 -	2 (-)	3 -		6 (+)	
East South Central	1 (+)	+	2 (-)	(-)	(+)	4 -	(-)	5 (+)			3 (+)
West South Central	1 (+)	3 (-)	2 (-)	+	5 (+)	-	6 +	-		4 -	
Mountain	1 (+)	3 (-)	(-)	(-)	-	(+)	+	(+)		2 -	
Pacific	1 (+)	2 (-)	+	+	(+)	-	3 +	(+)	+		
Conterminous U. S.	1 (+)	3 (-)	4 (-)	2 (-)	(+)	7 -	6 (-)	-	5 +		

*r = rank of variable in terms of relative importance in each equation. Only variables which had effects significantly different from zero at the .05 level are ranked.

**s = sign of partial regression coefficient. Parentheses around a sign indicate that the sign is consistent with expectations.

X_1 value of land
X_2 unemployment
X_3 nonwhite/total farmer ratio
X_4 educ. 0-6 years
X_5 educ. ≥ 12 years
X_6 craftsmen, operatives
X_7 age 15-24 years
X_8 age 25-44 years
X_9 distance
X_{10} size-distance$_1$
X_{11} size-distance$_2$

divisions, and probably measures only a small portion of the effects of proximity to large cities in the Northeast. X_1 was considered to be a proxy variable for all capital inputs per farm in a county. This assumption is probably more correct in the North Central, South, and West than in the Northeastern divisions. Clearly, variation in the value of capital inputs per farm among counties in each division is the major determinant of differentials in the level of earnings of farmers among counties at the divisional level.

The determination of the next most important variables in the divisional analyses as a whole is complicated by some widely divergent relationships which prevailed among certain divisions. With the exception of the divisions in the South, the local unemployment rate appears to be second most important among the variables in the equation. Contrary to the relationships in the other divisions, the local labor markets in Southern counties apparently do not provide conditions favorable to a reorganization of local agriculture via part-time nonfarm employment or local off-farm migration. The level of earnings of farmers in counties in the other divisions, generally, are quite sensitive to the local unemployment rate.

In the Southern divisions, the proximity to large industrial-urban concentrations and the ratio of nonwhite to all farmers are very important determinants of the earnings level of farmers in a county. Increased nonfarm job availability, higher wage rates, and lower transportation cost to large cities presumably are the advantages farmers close to large cities have over farmers more distant. Proximity to large cities is very important in all divisions east of the Mississippi.

At the national level the average value of farm land and buildings is most important. Functional illiteracy is next most important in determining the differentials in earnings levels of farmers among counties. Presumably, the increased variance of this independent variable at the national level allowed it to assume its correct sign and relative importance. Only in the South Atlantic is the effect of X_4 significantly different from zero. In this division its effect is negative.

Intercorrelation, in general, was not a serious problem at either the divisional or national level of analysis. The fact that whites and nonwhites were not separated may have reduced some of the intercorrelation. The measurement of some of the variables in "county" rather than "rural farm part of county" units also may have contributed to the reduction in intercorrelation. The signs of the estimated regression coefficients were, on the whole, quite consistent with the hypotheses and consistent among divisional equations. Finally, on the average, more of the variance in the median earnings of farmers and farm managers per county was accounted for by the divisional equations than by the national equation. Thus, the national equation may be considered an over-all summary of the results of the divisional equations with the possible exception of the effects of the proximity variables.

CHAPTER VII

A SUMMARY AND COMPARISON OF THE TWO ANALYSES

Variations in the income levels of rural farm families among communities were analyzed in Chapter V. The analysis of the variations in the levels of earnings of farmers and farm managers among communities was discussed in Chapter VI. The former analysis was concerned with the income levels of families who reside on places defined as farms by the Census, while the latter analysis was concerned with the levels of earnings of individuals classified as farmers and farm managers by the Census. Both analyses attempted to delineate some of the factors which affect inter-community income differentials in agriculture and to measure the direction and magnitude of their effects.

In a rough fashion, one can classify these factors into four categories according to whether the variables reflect (1) the influence of industrial-urban concentrations, (2) the influence of the local nonfarm labor market, (3) the characteristics of the population, or (4) local agriculture. The proximity variables fall into the first category and reflect the influence of industrial-urban concentrations. The nonfarm occupation variables (the relative prevalence of craftsmen and operatives) along with the local unemployment rate fall into the second category and reflect the influence of the local nonfarm labor market. The age, education, and color variables fall into the

category of characteristics of the population. Finally, the farm occupation variables (the relative prevalence of farmers and farm laborers) and the average value of farm land and buildings per farm in a county fall into the fourth category containing those factors which reflect the influence of local agriculture.

With the variables classified in such a fashion, a summary and consideration of the results of the two analyses together highlight some important aspects of the relationships. Such a consideration is undertaken in this chapter.

The Influence of Industrial-Urban Concentrations

It was hypothesized that the income level of farm families and the level of earnings of farmers would be higher in a community near an industrial-urban concentration than in a community further removed. The higher income and earnings levels would be the result of lower transportation costs for farm products and inputs, greater participation in the nonfarm labor market because of greater nonfarm job availability, more complete knowledge of markets, and lower migration costs.

The evidence supports the hypothesis with respect to the income level of rural farm families for the nation as a whole, each region, and each division with the exception of the East and West North Central divisions and the Mountain division. The influence of the proximity of a county to industrial-urban concentrations is the second most important determinant of variations in the income level of rural farm families for the nation as a whole and on the average the most important determinant at the divisional and regional levels. The closer is a county to a SMSA, the higher is the income level of its rural farm families. In addition, the size of the SMSA, as well as its proximity to a county, has a strong positive effect on the income level of rural farm families. The larger is a SMSA, the higher is the income level of rural farm families in nearby counties, and the further is this positive influence felt. Only in the Northeastern region and the New England division is the size of the industrial-urban concentration unimportant. In this area it is hypothesized that the SMSA's are so large and so close together that the distance from the SMSA, rather than the size of the SMSA, is the important factor.

With respect to the variations in the level of earnings of farmers and farm managers among communities, the evidence is sharply divided. Roughly, the Mississippi River forms the boundary line between two areas; the area to the east in which the industrial-urban hypothesis holds, and the area to the West in which the industrial-urban hypothesis does not hold. East of the Mississippi with the exception of the Middle Atlantic Division, the closer is a county to an industrial-urban concentration, the higher is the level of earnings of its farmers and farm managers. West of the Mississippi with the exception of the Pacific division, the closer is a county to an industrial-urban concentration, the lower is the level of earnings of its farmers and farm managers. The level of earnings of farmers in a county in the Middle Atlantic and Pacific divisions has no relationship to the proximity of the county to large cities. With respect to the nation as a whole the closer is a county to an industrial-urban concentration, the lower is the level of earnings of its farmers and farm managers. In addition, the size of the industrial-urban concentration has little effect on the earnings levels of farmers. Distance from an industrial-urban concentration explains as much of the variance in earnings levels among counties as does distance in conjunction with the size of the city. Finally, whereas the proximity to large cities is very important in determining variations in the income level of rural farm families among communities, it was of less importance in the determination of variations in the level of earnings of farmers among communities. In summary, the evidence with respect to variations of earnings levels of farmers among communities does not support the industrial-urban development hypothesis for the nation as a whole nor for the area west of the Mississippi. Only to the east of the Mississippi does the industrial-urban development hypothesis hold.

The two analyses provide several indications that the higher levels of rural farm family income in counties close to industrial-urban concentrations are primarily the results of higher income from nonfarm sources. Rural farm family income includes the earnings of individuals in the family who are classified as farmers or farm managers, but it also includes the income of other family members plus income from interest, dividends, and transfer payments. These latter sources of income are probably nonfarm sources of income. Since the proximity to large cities is a very important determinant of the income level of rural farm families but a relatively unimportant determinant of the level of earnings of farmers, it is probably the income from nonfarm sources which is affected most by proximity to large cities. If income from farming is most affected by proximity to large cities, then the proximity variables in the earnings of farmers equations would rank much higher in relative importance. It seems likely, then, that it is the earnings from nonfarm sources included in the earnings of farmers and farm managers which are affected most by proximity to large cities east of the Mississippi River.

Although the results of the analyses provide no evidence on the point, it is probable that the major part of the income and earnings from nonfarm sources which are affected by proximity to large cities are wages and salaries from part- and full-time nonfarm employment on the part of farmers and other rural farm family members. Close to a city there are more nonfarm jobs, the availability of which facilitates the obtaining of a nonfarm job. Moreover, wage rates are higher in and near large cities than in counties further removed. Both raise income from nonfarm employment in the communities near to large cities relative to income in counties further removed. In addition, in counties close to large cities the number of residential farms probably is larger than in more distant counties.

The foregoing, however, does not say that income from farming east of the Mississippi is not positively affected by the proximity to large cities. First, farm product prices are higher and farm input prices are lower because of lower transportation costs. Second, the increase in part- and full-time nonfarm employment among farmers increases the capital to labor ratio in agriculture in counties close to large cities relative to that in more distant counties. Given that the returns to capital are higher than the returns to labor in agriculture, the decreased labor in agriculture close to cities increases income from farming. Thus, while the income and earnings from nonfarm sources are probably most affected by proximity to large cities, income from farming also is positively affected.

West of the Mississippi River, the industrial-urban development hypothesis does not hold with respect to the earnings level of farmers and farm managers. It was argued in Chapter VI that agriculture in the four western divisions is more oriented to national markets than to local urban markets. It may also be the case that the cities west of the Mississippi are so dispersed that their influence on the surrounding counties is more diffuse than is the influence of eastern cities. If this is the case, then the proximity variables were not constructed properly to fit the relationship in this area of the country.

The Influence of Population Characteristics

A number of variables measured, in part or in full, the influences of the characteristics of the local population on the income levels of rural farm families and the earnings levels of farmers and farm managers. The education and age variables are discussed first followed by the discussion of color.

Education

Two education variables were included in the rural farm family income equations and the earnings of farmers equations; the relative prevalence of rural farm males with zero to six years of school completed and the relative prevalence of rural farm males with at least a high school education. Little or no education (functional illiteracy) was believed to be an impediment to migration, for only very menial, low wage nonfarm jobs generally are open to such individuals. Rural farm males with little or no education would, therefore, tend to remain in agriculture or, if they could obtain a part-time or full-time nonfarm job, would be paid very low wages relative to others with more education. It was believed that functional illiteracy also would result in low income from farming, for individuals with little or no education may not have knowledge of the available credit facilities nor have knowledge of the most efficient farming techniques. Thus, a relative prevalence of rural farm males in a county with little or no education was hypothesized to result in a low level of rural farm family income and a low level of earnings of farmers. On the other hand, rural farm males with at least a high school education would be less impeded in migrating to a nonfarm job, would have better knowledge of the credit facilities available and the most efficient farming techniques. A relative prevalence of rural farm males with at least a high school education in a county, therefore, would have a positive effect on the income and earnings levels in the county.

For the nation as a whole the results of the analysis of rural farm family income levels support both hypotheses. Functional illiteracy is the most important determinant of the income level of rural farm families in a community; the more prevalent are rural farm males with little or no education, the lower is the income level of rural farm families in the community. A relative prevalence of rural farm males with at least a high school education is much less important but does raise the income level of rural farm families in a county.

Variations among counties in the relative prevalence of rural farm males with little or no education is the second most important determinant of variations in the level of earnings of farmers among counties for the nation as a whole. Again, the more prevalent are rural farm males with little or no education, the lower is the earnings level in the county. Variations in the relative prevalence of rural farm males with at least a high school education does not have any effect on variations in the level of earnings of farmers among counties for the nation as a whole.

For the regions and divisions the education variables have quite mixed, and on the whole, less important effects on variations in earnings levels and income levels among communities. The direction of the effects of the education variables are consistent with the hypotheses more often with respect to earnings levels of farmers than income levels of rural farm families.

Age

Two variables were included in the analyses to measure the influence of variations in the age distribution of rural farm males among counties. The relative prevalence of rural farm males, age 15-24, and age 25-44, were the two variables used. The age variables presumably measured the productivity, the level of informal education, and experience of the rural farm males in each county. A relative prevalence of rural farm males, age 15-24, was hypothesized to have a deleterious effect on the income and earnings levels in a community.

A county with a relative prevalence of rural farm males, age 25-44, was hypothesized to have higher earnings and income levels than other communities.

Differing age distributions of rural farm males among communities have no effects on variations in the income level of rural farm families among communities for the nation as a whole. A relative prevalence of rural farm males, age 15-44, has a moderate depressing effect on the level of earnings of farmers and farm managers in a community for the nation as a whole. At the divisional and regional levels of analysis the effects of differing age distributions among communities are very mixed, often inconsistent with expectations, and of little importance in general. Their importance may have been masked by the high intercorrelation between the age variables and the other variables in the equations.

The Prevalence of Nonwhite Farmers

The nonwhite farmers to all farmers ratio was included in the earnings of farmers equation to take account of the relative prevalence of nonwhite farmers in a county. It was hypothesized that the ratio would have no effect on the earnings levels of farmers in counties outside of the South. And, in the South, negative effects were expected. The ratio presumably measured the effects of discrimination in the land, labor, and capital markets. Nonwhite farmers tend to have smaller farms, lower capital to labor ratios on their farms, and hold fewer, lower paid part-time nonfarm jobs than do white farmers.

The ratio is the second most important determinant of the level of earnings of farmers in counties in the East and West South

Central divisions. In all three Southern divisions the more prevalent are nonwhite farmers in a county, the lower is the level of earnings of farmers in the county. In the South the ratio is correlated with the relative prevalence of rural farm males, age 15-24, and with the relative prevalence of rural farm males with little or no education. Thus, the ratio probably picks up some of the effects of young age and functional illiteracy. For the nation as a whole a relative prevalence of nonwhite farmers depresses the earnings of farmers in a county.

The Local Labor Market

Nonfarm Occupations

The relative prevalence of craftsmen and the relative prevalence of operatives were included as variables in the rural farm family income equations, and the relative prevalence of craftsmen and operatives was included as a variable in the earnings of farmers equations. These variables indicated the local relative prevalence of nonfarm occupations among which farmers seek part-time or full-time employment. Craftsmen and operative occupations were selected on the assumption that these two occupation groups include the majority of the jobs for which farmers are qualified. Presumably, the more such jobs there are available in a county relative to other counties, the greater the number of alternative nonfarm employment opportunities there are for farmers. Given a relative prevalence of relevant nonfarm alternatives for farmers, the easier would be local out-migration and job-migration, and consequently, the higher would be the income level of farm families and the earnings level of farmers.

The evidence provided by the results of the two equations in support of this thesis is slight. At the national level of analysis the results of the two equations conflict; a relative prevalence of craftsmen has no effect and a relative prevalence of operatives has a moderate positive effect on income levels of rural farm families, whereas a relative prevalence of craftsmen and operatives has a moderate depressing effect on the level of earnings of farmers. At the regional level a relative prevalence of operatives increases the level of income of rural farm families in North Central communities but decreases it slightly in Southern communities. In the South, the only region in which a relative prevalence of craftsmen affects family income levels, a relative prevalence of craftsmen decreases the income level. With respect to variations in the income level of rural farm families at the divisional level, a relative prevalence of operatives has a negative effect in New England and a relative prevalence of craftsmen has a positive effect in the West South Central division. In no other divisions do these two variables affect the income level of rural farm families. With respect to variations in the level of earnings of farmers and farm managers among communities at the divisional level of analysis, a relative prevalence of craftsmen and operatives has a depressing effect in the South Atlantic and East South Central divisions and a positive effect in the West North Central division. The evidence in support of the hypothesis, therefore, is tenuous. In a number of divisions and regions the two variables are highly intercorrelated, which may account for the inconclusive results.

Local Unemployment

The male unemployment rate in a county was included in the two analyses as a measure of the demand for labor relative to the supply of labor in the county. It was argued in Chapter III that a high unemployment rate in a county relative to other counties indicates that fewer members of rural farm families hold full- and part-time nonfarm jobs, and that fewer farmers hold part-time nonfarm jobs. Further, a high unemployment rate in a county impedes local job migration and off-farm migration. Both result in a lower capital to labor ratio in the agriculture of a county and lower income from farming than in counties with a lower unemployment rate.

Also, it was pointed out in Chapter III that the measure of unemployment in a county was a poor one in that it measured unemployment in April, 1960, rather than the average for 1959, the year to which income and earnings refer. Moreover, it was suggested that the unemployment rate in a county may be a proxy for local urbanization, because, in general, the more urban is a county, the higher is the unemployment rate. But, the more urban is a county, the more nonfarm jobs there are available. Thus, rural farm families and farmers in such a county could be expected to have high income and earnings levels relative to a county with a low unemployment rate.

The results of the two equations support both hypotheses. The income of rural farm families in a county with a high unemployment rate is higher than the income level in a county with a low unemployment rate. This relationship holds for the nation as a whole, and for each region with the exception of the South where the relationship is negative. At the divisional level it holds with the exception of the East North Central and the West South Central divisions where the relationship is negative. Conversely, the level of earnings of farmers in a county with a high unemployment rate is lower than the level in a county with low unemployment for the nation as a whole. This relationship holds at the divisional level except for the New England divisions where the relationship is a positive one.

Rationalization of these contradictory results is difficult and one is inclined to believe neither relationship. However, in both equations, for the nation as a whole, the unemployment rate is third in relative importance. And, at the regional and divisional level the unemployment rate is generally relatively important. One can argue in the following fashion. Most of the work experience accumulated by farmers is in agricultural and not in nonfarm employment. Farmers tend to be older and have less formal education than nonfarm workers. Farmers engaged in part-time nonfarm employment have less job security because of their age, education levels, and low seniority. They also may tend to work in industries with unstable employment patterns.

On the other hand, the incomes of rural farm families include the incomes from additional family members. Unmarried sons and daughters of rural farm families in a county in which a city is located are more likely to live on the farm and commute to work than if there is no city in the county. Sons and daughters of farmers tend to have higher formal education levels than do their parents. They tend to be qualified for work in different occupations than are farmers. Moreover, because they are full-time nonfarm employees, they tend to have more work experience, more seniority and thus more job security. It is probable, then, that unemployment has a differential impact on rural farm residents. Farmers may be more susceptible to unemployment than are other rural farm residents. Finally, rural farm family income includes interest, dividends, and transfer payments which earnings exclude. Transfer payments include unemployment benefits. Thus, family income, by definition, is not as sensitive as earnings to unemployment. While the earnings level of farmers is negatively related to the unemployment rate, the income level of rural farm families is positively related to the unemployment rate. The latter relationship may reflect the positive effects of the presence of a city in providing nonfarm employment to members of rural farm families, and the differential impact of conditions of unemployment on farmers who hold nonfarm jobs, and on other rural farm family members who hold nonfarm jobs. Because farmers have lower education levels, less nonfarm work experience, and less seniority than do other members of rural farm families they may be more susceptible to local unemployment conditions.

Employed Females

The per cent of rural farm females who were employed in a county was included to take account of the effect on income of working female family members. It was hypothesized that median family income would be positively related to the per cent of rural farm females who were employed.

For the nation as a whole this hypothesis was confirmed. The per cent of rural farm females who were employed has a moderate positive effect on the income level of rural farm families in a community. The hypothesis was confirmed for the North Central and Southern regions also. The effect of employed females on rural farm family income levels was not significantly different from zero in all divisions but one.

The Influence of Agriculture

Three variables were included in the family income equation to measure the effects of farming, farm capital, and agricultural employment on the income level of rural farm families in a community. These variables were the average value of farm land and buildings per farm in a county, the relative prevalence of farmers, and the relative prevalence of farm laborers. Indirect evidence of the influence of agriculture on the income level of rural farm families is provided by the results of the earnings of farmers equation.

Average Value of Land and Buildings Per Farm

The average value of farm land and buildings per farm in a county was used as a proxy for the average value of all capital inputs per farm in a county. For the nation as a whole and for every division, with the exception of the Middle Atlantic, the average value of farm land and buildings per farm in a county is the most important determinant of the level of earnings of farmers and farm managers in the community. It is clear that farmers in a county with a high average value of capital inputs per farm have a high level of earnings, whereas farmers in a county with a low average value of capital inputs per farm have a low level of earnings.

It was argued in Chapter III that more capital and credit is available in communities close to industrial-urban concentrations than in more distant counties. If this is true, then one would expect to find more capital per farm in counties close to industrial-urban concentrations than in more distant counties. Evidence to support this contention would be a high positive correlation between the average value of farm land and buildings per farm in a county and the proximity of the county to an industrial-urban concentration. Such is the case only in the New England and Middle Atlantic divisions. For the rest of the nation the correlation is very low. The average value of farm land per farm in counties near large cities in the Northeast probably reflects urban and suburban property values more than the value of capital per farm. In any case the value of capital per farm does not seem to be related to the proximity of large cities for most of the nation.

The foregoing paragraph has pointed out the lack of any relationship between the numerator of the ratio of capital to labor and the influence of industrial-urban concentrations. However, it is the ratio which is a determinant of income from farming rather than just the numerator. Given that the marginal value product of capital in agriculture is higher than the marginal value product of labor, then one would expect farmers in a county with a high average capital to labor ratio per farm to have higher earnings than farmers in a county with a low average capital to labor ratio per farm. The results of the earnings of farmers equation suggest that east of the Mississippi River both the local labor markets and the labor markets in large cities increase the ratio by providing farmers with part-time and full-time nonfarm employment. West of the Mississippi local labor markets appear to have more effect in this regard.

Despite the fact that the average value of land and buildings is the most important determinant of variations in the earnings level of farmers among counties, it does not seem to have any effect on variations among communities in the income level of rural farm families for the nation as a whole. However, for the nation as a whole the average value of land and buildings per farm is highly and positively correlated with the relative prevalence of farm laborers, and the relative prevalence of farm laborers does exert a positive effect on the income level of rural farm families in a community. The effect of a relative prevalence of farm laborers, therefore, probably reflects the effects of the value of capital inputs per farm. Varying values of capital per farm among communities for the nation as a whole probably do contribute modestly to variations among communities in the income level of rural farm families.

At the regional level, varying values of land and buildings per farm among communities in the Northeastern and Western regions contribute positively to variations in the income level of rural farm families. In the Northeastern region, however, the variation in the values of farm land per farm among communities is highly correlated with the proximity to large cities and the positive effect on income levels may be the result of this intercorrelation. At the divisional level varying values of farm land per farm among counties have effects on variations in the income level among communities only in the New England and Pacific divisions. Again the effect in the New England division may simply be the result of the intercorrelation between proximity to large cities and the value of farm land per farm in the county. Thus, while varying land values per farm among communities affect variations among communities in the level of earnings of farmers, variations in the value of land per farm among communities have little or no effect on variations in the income level of rural farm families among communities.

The Prevalence of Farmers and Farm Laborers

It was hypothesized that a county with a relative prevalence of farmers and farm managers would have a lower income level of rural farm families than would other counties. In the West South Central division, the only division in which the relative prevalence of farmers has an effect, the more prevalent are farmers in a community the higher is the income level of rural farm families in the community. At the regional level of analysis the relative prevalence of farmers has a positive effect on the income level of rural farm families in the Northeastern region and a negative effect in the Southern region. The relative prevalence of farmers has no effect on the income level of rural farm families for the nation as a whole. Over all, therefore, the relative prevalence of farmers has little or no effect on the income level of rural farm families.

A negative relationship between the income level of rural farm families in a community and the relative prevalence of farm laborers was hypothesized. At the divisional level the results of analysis are mixed. At the regional level the relative prevalence of farm laborers exerts a negative influence on the income level in the Northeastern and Southern regions. For the nation as a whole the relative prevalence of farm laborers exerts a positive effect on the income level of rural farm families. This effect, however, probably reflects the influence of the average value of farm land and buildings per farm in a county because the relative prevalence of farm laborers and the average value of farm land are highly and positively correlated.

Summary

The influence of agriculture, local population characteristics, local labor markets, and the proximity of industrial-urban concentrations on variations among communities in the income level of rural farm families and the level of earnings of farmers and farm managers have been summarized. From this discussion some conclusions seem quite clear.

First, only a small portion of the variations among communities in the income level of rural farm families result from variations in the factors studied which reflect the varying influence of agriculture among communities. Variations in the average value of farm land and buildings per farm, the relative prevalence of farmers, and the relative prevalence of farm laborers among communities explain very little of the variation in the income level of rural farm families among communities. On the other hand, variations in the average value of farm land and buildings per farm among communities are primarily responsible for variations among communities in the level of earnings of farmers and farm managers.

Second, factors outside of local agriculture, emanating from the local labor markets, and industrial-urban concentrations, and

involved with the local population characteristics are the most important determinants of the income level of rural farm families in a community. More specifically, the relative prevalence of functional illiteracy, the proximity and size of industrial-urban concentrations, and the local unemployment rate are the most important determinants of the income level of rural farm families in a community. With respect to the level of earnings of farmers and farm managers in a community, the prevalence of functional illiteracy, and the local unemployment rate are important determinants but less so than the average value of capital inputs per farm. Only in the eastern part of the United States is the proximity of industrial-urban concentrations an important determinant of the earnings level of farmers and farm managers.

In brief, a relative prevalence of functional illiteracy among rural farm males, a relative lack of local nonfarm employment opportunities for rural farm residents, and a low average value of farm land and buildings per farm in a community all result in low income and earnings levels. With respect to rural farm families in communities for the nation, and with respect to farmers and farm managers in communities east of the Mississippi, the remoteness of the community from industrial-urban concentrations also is an important cause of low earnings and income levels.

CHAPTER VIII

IMPLICATIONS AND AN EVALUATION OF THE ANALYSIS

Two tasks are undertaken in this chapter, that of outlining the policy implications of the study, and that of evaluating the analysis used in the study. The first section of the chapter is devoted to a discussion of the policy implications of the study, while in the seond section suggestions are made for improvements to be considered in subsequent analyses. The second section also notes areas in which further research would be fruitful as judged by the results of the study.

Policy Implications of the Study

Variations in both median income of rural farm families and median earnings of farmers and farm managers among communities were analyzed. Variations in the median income of nonwhite rural farm families among communities were analyzed only for the South. Through these analyses some of the factors which affect inter-community income differentials in agriculture were delineated and measured.

The importance of some factors among those studied is very striking. Also striking is the similarity between the factors which cause low income levels of rural farm families, and those which cause low earnings levels of farmers and farm managers. A relative prevalence of functional illiteracy among rural farm males, a

relative lack of local nonfarm employment opportunities for rural farm residents, and a low average value of farm land and buildings per farm in a community all result in low income and earnings levels. With respect to rural farm families in communities for the nation as a whole, and with respect to farmers and farm managers east of the Mississippi, the remoteness of the community from industrial-urban concentrations also is an important cause of low income and earnings levels.

These findings have important implications for policies designed to eradicate or reduce the number of low income rural areas. Most important is the implication that policies dealing with the poverty problem in agriculture need not be inconsistent with policies dealing with the resource allocation problem in agriculture. Indeed, the two types of policies can be complementary with each other. Also important is the implication that policies attacking the prevalence of poverty in agriculture also attack problems of general national concern and need to be separated from other national policies only to the extent that they concentrate on the rural facet of the problem.

Two problems are posed by the fact that the prevalence of functional illiteracy is the most important factor (of the variables studied) which results in low income rural areas. The first problem is the long term one of preventing the continuance of functional illiteracy in rural areas. Policies which would reduce the school drop out rate in rural areas would reduce the continuance of functional illiteracy.

The second problem is a short term one and involves enhancing the productivity of those who presently have little or no education.

Adult education and retraining programs in rural areas are among those which would improve the productivity of those rural residents with little or no education. Such programs should be directed toward raising the productivity of these individuals in nonfarm jobs to be consistent with programs which seek to reduce the resource allocation problem in agriculture by removing labor resources.

However, programs seeking to raise the productivity of rural residents in nonfarm jobs are to no avail if there are no nonfarm jobs available. The lack of local nonfarm employment opportunities is very important as a factor related to low income and earnings levels in rural areas. High local unemployment rates depress the level of earnings of farmers in communities. National policies to reduce unemployment, then, would increase the part-time and full-time nonfarm earnings of farmers. Such policies would not only increase earnings levels of farmers, but also would increase the number of local nonfarm jobs available. The increase in the number of nonfarm jobs available in a community would facilitate the transfer of farmers in the community to local nonfarm jobs.

The results of the family income equation, if correctly interpreted, suggest that communities which have no urban center supplying nonfarm jobs to local rural farm residents are communities in which the median income of rural farm families is low. Further, the income level of rural farm families and the earnings level of farmers tend to be low in communities east of the Mississippi which are far removed from large cities. Both of these relationships refer to the lack of nonfarm employment opportunities available to rural farm residents and farmers. The former refers to local nonfarm employment opportunities, while the latter refers to the opportunities for nonfarm employment in industrial-urban concentrations.

These relationships hold out several possibilities for policy purposes. One set of possible programs involves attracting industry and commerce to low income rural areas. Nonfarm employment would become available to rural farm residents close to the development. The growth of industry in these urban centers would also reduce the costs of migration to rural farm residents who are not within commuting distance of the developing urban centers. While individuals may not be able to finance long distance migration, migration costs to cities which are closer may be within their means. The location of military, defense, and other government installations which provide civilian employment in low income rural areas would have similar effects.

The other set of possible programs involves assisting migration from low income rural areas to more urban centers where nonfarm employment is available. One such method would be to provide information about available jobs in other areas to residents in low income rural areas. Other programs might reduce the costs of migration or allow families to spread the cost of migration over a number of years by borrowing funds for this purpose.

That the average value of farm land and buildings per farm in a county is the major determinant of the level of earnings of farmers in the county has relevance to those farmers in low income rural areas who remain in agriculture. The problem for these individuals is that of obtaining ownership or control over more land. If, as has been suggested, the average value of farm land per farm is a proxy for the average value of capital per farm in a county, then another problem is that of obtaining more nonland capital inputs. Farm enlargement in low income rural areas probably entails changes in the type of agriculture, also. Farm enlargement could be encouraged by increasing the amount of agricultural credit available in such areas. And, information on alternative types of farm enterprises also could be made available.

An Evaluation of the Analysis

The regression analysis of median income of rural farm families and of median earnings of farmers and farm managers done in conjunction with the simple correlation analysis did allow one to separate and measure the magnitude of the effects of some of the factors which cause variations in income and earnings levels among counties. Some facets of the analysis hindered the task it set out to accomplish.

The independent variables of the family income equation accounted for greater than 50 per cent of the variance in median income of rural farm families in only three divisions, the New England, South Atlantic, and Pacific divisions. They accounted for more than 50 per cent of the variance in median income among counties in the North Central and Western regions. For the nation as a whole, the independent variables accounted for about 50 per cent of the variance in median income of rural farm families among counties.

The independent variables in the earnings of farmers equation accounted for more than 50 per cent of the variance in median earnings among counties in four divisions, the East North Central, West North Central, East South Central, and West South Central divisions. For the nation as a whole, the independent variables accounted for only 34 per cent of the variance in median earnings of farmers among counties.

In terms of the proportion of the variance in the two income concepts for which the independent variables accounted, the independent variables in the earnings of farmers equation appeared to predict better than did those in the family income equation at the divisional level of analysis. For the nation as a whole, however, the independent variables in the family income equation appeared to predict better than those in the earnings of farmers equation.

Considering the data which were employed in the analyses, the proportions of the variances in median income and earnings which the two sets of independent variables explained are substantial. The measurements of rural farm family income were inadequate for several reasons. The rural farm population in 1960, as estimated by the 1960 Census of Population, was approximately 13.4 million, whereas the rural farm population in 1960, as estimated by the Current Population Survey, was 15.7 million. Part of the difference is because the Current Population Survey used the 1950 definition of urban territory, thereby including some persons in the farm population which were classified as urban residents by the Census of Population.[1] This means that the Census of Population estimates of rural farm family income are somewhat dubious. Also, there was some understatement of income because of the tendency to

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[1]U. S. Census of Population, op. cit., p. viii.

forget minor and irregular sources of income. Finally, the family income measure was the 1959 income of rural farm families in 1960. The families may or may not have been rural farm residents in 1959, and may or may not have been families in 1959.

Similar statements can be made about the measurement of the earnings of farmers and farm managers. It was the 1959 earnings of individuals who were classified as farmers and farm managers in April, 1960. The same types of understatement occurred with respect to earnings as occurred with respect to income. Thus, both dependent variables were subject to a certain amount of "noise" which the independent variables could not explain. Finally, the observations of the independent variables were subject to as many inaccuracies. And, they were observations of characteristics and conditions in 1960 which were used to explain 1959 median income and earnings. In view of these inadequacies and inaccuracies in the data used in the study, perhaps only modest improvement in the proportions of the variances in median income and median earnings explained by the independent variables can be expected by modifications of the equations.

High intercorrelation was present among some of the independent variables in both equations at both the division and national levels of analysis. The intercorrelation reduced the reliability of the estimates of the effects of the factors. Also, it may have reduced the coefficients of determination of the two equations. In the paragraphs which follow, a number of modifications to the equations are suggested. These modifications are aimed at increasing the coefficients of determination of the two equations and reducing the intercorrelation among the independent variables.

The variables which were included in the two equations to measure the effects of a relative prevalence of nonfarm jobs for which farmers are qualified did not live up to expectations. The relative prevalence of craftsmen among rural farm males had little effect on the income level of rural farm families. The relative prevalence of operatives among rural farm males had more effect. The relative prevalence of craftsmen and operatives among the males of the county did not have much effect on the median earnings of farmers and farm managers. The craftsmen occupation classification includes a great many skilled jobs for which farmers probably are not qualified. The operatives occupation classification appears to be more appropriate. The "laborers, except farm and mine," classification may contain more types of jobs for which farmers are qualified. The exclusion of craftsmen and the inclusion of laborers might improve the explanatory power of the two equations.

The age variables in both equations had little effect for most divisions and regions. For the divisions and regions in which they did have significant effects, one or both of the age variables were highly correlated with the per cent of rural farm males, age 45 and over. Thus, both variables tended to measure the relative lack of rural farm males, age 45 and over. But, since there were two age variables, the effect of a relative lack of rural farm males, age 45 and over, was split between the two variables. The exclusion of the two age variables and the inclusion of a variable which measures the relative prevalence of rural farm males, age 45 and over, would directly measure the effect of a relative prevalence of older rural farm males on income and earnings which may be very important in areas which have experienced great out-migration from younger age groups.

While the male unemployment rate of the county measured the effects of unemployment on the level of earnings of farmers and farm managers, it did not measure the effects of unemployment on the income level of rural farm families. The unemployment rate of both male and female members of the rural farm labor force of the county may be a better measure.

The variables measuring the effects of family size and employed females in general did not contribute much to the explanation of the income level of rural farm families. Both variables were intended as measures of the effects of more than one employed family member per family on the income level of rural farm families. These two variables were highly correlated with other variables. Presumably, the variables did not measure the complex economic and sociological relationships which determine the number of working family members and their individual incomes. An analysis using observations on individual families may better measure these effects.

The average value of farm land and buildings per farm in a county is highly and positively correlated with the relative prevalence of farm laborers at both the national level, and for several divisions. Exclusion of the relative prevalence of farm laborers from the family income equation might improve the reliability of the regression coefficient of the average value of land.

Built into the formulation of the proximity variables was the assumption that the relationships between median income in a county and the proximity of the county to a large city, and between the median earnings and the proximity to a large city, were linear. The consideration of city size in conjunction with the distance of a county from an SMSA increased the proportion of the variance in median income explained by the family income equation in some divisions and regions. Such a consideration added little to the explanation of variations in median earnings among counties. The failure of the size-distance variables to increase the proportion of the variance in median earnings which was explained may be because no relationship exists. However, it also may be that a curvilinear relationship exists and was not approximated by the size-distance variables. A set of dummy variables in which each dummy variable represents counties in which a city of size "x" is situated, or counties which are situated "y" miles from a city of size "x" is a likely alternative formulation. Such a formulation would relax the linearity assumption and allow the data to determine the relationship.

The results of the analysis suggest a number of areas which further research could investigate. A portion of these areas have been touched upon in the discussion of the modifications. The most important of these areas is linked with the industrial-urban hypothesis and the changes in the formulation of the proximity variables suggested above. The low correlation between the average value of farm land and buildings per farm in a county and the proximity of a county to large cities suggests that capital and credit availability to agriculture is not related to the presence of large cities. The evidence is very weak and tenuous, however. More conclusive evidence could be produced by incorporating the suggested modifications to the

proximity variables into a study of agricultural credit and capital availability. The fact that the average value of land and buildings assumed primary importance in the determination of earnings levels of farmers indicates that such a study of capital is warranted.

The analysis has indicated that the conditions in local labor markets and in the labor markets in nearby large cities are very important determinants of income levels. Knowledge of local job migration and residence migration from agriculture to nonfarm employment is needed. Further, the question of the effects of national employment policies on agriculture at both the micro and macro levels needs to be investigated. As was suggested, local unemployment may have different effects on farmers than on other members of the rural farm labor force. If such is the case, the nature and magnitude of the differential impact needs to be investigated. For, if the poverty problem in agriculture is to be solved, in part by local job-migration, a knowledge of the differential impact is crucial if adequate policies in this area are to be conceived.

This study could not have been conducted if only the published reports of the 1960 Census of Population had been available. The great detail, in which the Census made its unpublished data available to us, particularly the residence classification by county, and the fact that the data was made available in a form amenable for use on an electronic computer made this study possible. The great detail allowed consideration of factors which would not have been possible otherwise. The availability of the data on electronic computer tape eliminated the costly transfer of data from the published reports to tape or cards. If one purpose of the Census is to collect and provide data

for research purposes, then more consideration should be given to making Census data available for direct use on computers.

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APPENDIX I

THE RESULTS OF THE ANALYSIS OF THE MEDIAN INCOME OF RURAL FARM FAMILIES IN A COUNTY, BY DIVISION, REGION, AND FOR THE CONTERMINOUS UNITED STATES

TABLE I.1

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

New England Division

Multiple correlation coefficient			.8976
Standard error of estimate			158.5960
Independent variables	**Partial regression coefficients**	**Beta coefficients**	**Computed t values**
Constant term	3692.0466		159.8759*
Average value of land and buildings (X_1)	.0081	.2986	3.5012*
White male unemployment rate of county (X_2)	16.3518	.1063	1.3100
Per cent of white rural farm males who are age:			
15-24 (X_3)	19.6273	.2571	2.2192*
25-44 (X_4)	12.4285	.1715	1.4506
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6150	-.0109	-.1141
12 or more years of school (X_6)	-16.1039	-.4171	-3.9582*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-3.7206	-.1150	-1.0296
Craftsmen and foremen (X_8) . . .	7.9068	.1036	1.1567
Farm laborers, farm foremen (X_9)	5.1466	.1107	.9110
Operatives, kindred workers (X_{10})	-17.6333	-.2663	-2.9752*
White rural farm family size (X_{11})	-6.4429	.0001	-.0758
Per cent of white rural farm females who are employed (X_{12}) . .	4.8222	.0026	1.0338
Distance from nearest SMSA (X_{13}) .	-137.1481	-.6309	-5.8690*

*Significantly different from zero at the .05 level.

TABLE I.2

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

New England Division

Multiple correlation coefficient	.8662
Standard error of estimate	179.7893

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3588.4016		141.6125*
Average value of land and buildings (X_1)	.0082	.3022	2.9401*
White male unemployment rate of county (X_2)	6.0286	.0392	.4355
Per cent of white rural farm males who are age:			
15-24 (X_3)	7.0895	.0929	.7529
25-44 (X_4)	4.3636	.0602	.4617
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-2.1744	-.0387	-.3387
12 or more years of school (X_6)	-12.9889	-.3364	-2.8305*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-4.8164	-.1488	-1.1792
Craftsmen and foremen (X_8) . . .	7.0627	.0925	.9102
Farm laborers, farm foremen (X_9)	10.2640	.2207	1.6111
Operatives, kindred workers (X_{10})	-10.7110	-.1617	-1.6618
White rural farm family size (X_{11})	-91.5894	-.1007	-.9835
Per cent of white rural farm females who are employed (X_{12}) . .	9.6861	.2518	1.8884
Size-distance$_1$ (X_{14})	18.6650	.4592	3.8796*

*Significantly different from zero at the .05 level.

TABLE I.3

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

New England Division

Multiple correlation coefficient	.8909
Standard error of estimate	163.4330

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2818.5260		117.7110*
Average value of land and buildings (X_1)	.0055	.2027	2.0656*
White male unemployment rate of county (X_2)	21.8796	.1422	1.6340
Per cent of white rural farm males who are age:			
15-24 (X_3)	10.6077	.1390	1.2315
25-44 (X_4)	13.4729	.1859	1.5097
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-9.9180	-.1765	-1.5829
12 or more years of school (X_6)	-15.1668	-.3928	-3.6290*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-1.3598	-.0420	-.3581
Craftsmen and foremen (X_8) . . .	11.1913	.1466	1.5653
Farm laborers, farm foremen (X_9)	10.7557	.2312	1.8591
Operatives, kindred workers (X_{10})	-10.7088	-.1617	-1.8408
White rural farm family size (X_{11})	47.2904	.0520	.5120
Per cent of white rural farm females who are employed (X_{12}) . .	6.5311	.1638	1.3766
Size-distance$_2$ (X_{15})	34.1404	.7511	5.4179*

*Significantly different from zero at the .05 level.

TABLE I.4

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

Middle Atlantic Division

Multiple correlation coefficient	.5115
Standard error of estimate	49.0284

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4489.7117		421.1363*
Average value of land and buildings (X_1)	.0000	.0000	.0949
White male unemployment rate of county (X_2)	-5.5267	-.2526	-2.5606*
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.7880	.1436	1.0156
25-44 (X_4)	-.7622	-.0811	-.4554
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	3.3135	.4301	4.0720*
12 or more years of school (X_6)	1.6311	.3088	2.4039*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.7139	-.1814	-1.1282
Craftsmen and foremen (X_8) . . .	.1303	.0125	.1088
Farm laborers, farm foremen (X_9)	-2.4473	-.2920	-2.2485*
Operatives, kindred workers (X_{10})	.2684	.0274	.2224
White rural farm family size (X_{11})	-9.6934	-.0640	-.7291
Per cent of white rural farm females who are employed (X_{12}) . .	-1.7134	-.2748	1.8915
Distance from nearest SMSA (X_{13}) .	-45.3976	-.7445	-.8189

*Significantly different from zero at the .05 level.

TABLE I.5

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

Middle Atlantic Division

Multiple correlation coefficient	.5292
Standard error of estimate	48.4131

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	4434.8855		432.2072*
Average value of land and buildings (X_1)	-.0001	-.0447	-.3437
White male unemployment rate of county (X_2)	-4.4629	-.2040	-2.0448*
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.5214	.1222	.8726
25-44 (X_4)	-1.0967	-.1167	-.6670
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	2.7608	.3584	3.2247*
12 or more years of school (X_6)	1.5461	.2927	2.3184*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.3639	-.0925	-.5610
Craftsmen and foremen (X_8) . . .	.2291	.0219	.1951
Farm laborers, farm foremen (X_9)	-2.0239	-.2415	-1.8805
Operatives, kindred workers (X_{10})	.4130	.0422	.3480
White rural farm family size (X_{11})	-8.7010	-.0574	-.6639
Per cent of white rural farm females who are employed (X_{12}) . .	-1.3944	-.2237	-1.5390
Size-distance$_1$ (X_{14})	17.1653	2.3122	2.0412*

*Significantly different from zero at the .05 level.

TABLE I.6

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

Middle Atlantic Division

Multiple correlation coefficient	.5753
Standard error of estimate	46.6692

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4385.9878		426.6426*
Average value of land and buildings (X_1)	-.0002	-.0893	-.8832
White male unemployment rate of county (X_2)	-3.0287	-.1384	-1.4300
Per cent of white rural farm males who are age:			
15-24 (X_3)	.7741	.0622	.4563
25-44 (X_4)	-1.9190	-.2042	-1.1978
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	1.9216	.2494	2.2382*
12 or more years of school (X_6)	1.5077	.2854	2.3449*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.0802	.0204	.1273
Craftsmen and foremen (X_8) . . .	.4618	.0442	.4079
Farm laborers, farm foremen (X_9)	-1.1410	-.1361	-1.0507
Operatives, kindred workers (X_{10})	.9427	.0962	.8157
White rural farm family size (X_{11})	-3.8818	-.0256	-.3051
Per cent of white rural farm females who are employed (X_{12}) . .	-.9752	-.1564	-1.1059
Size-distance$_2$ (X_{15})	40.1695	4.4427	3.8519*

*Significantly different from zero at the .05 level.

TABLE I.7

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

Northeast Region

Multiple correlation coefficient	.6180
Standard error of estimate	291.2115

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3844.2724		183.4636*
Average value of land and buildings (X_1)	.0040	.2378	3.2030*
White male unemployment rate of county (X_2)	34.3234	.2300	3.2527*
Per cent of white rural farm males who are age:			
15-24 (X_3)	24.2500	.2934	3.0289*
25-44 (X_4)	7.2313	.1092	.9691
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	2.1725	.0404	.5370
12 or more years of school (X_6)	-6.0777	-.1659	-1.6139
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	6.5796	.2355	2.2665*
Craftsmen and foremen (X_8) . . .	4.0964	.0561	.7046
Farm laborers, farm foremen (X_9)	-11.7305	-.2182	-2.3555*
Operatives, kindred workers (X_{10})	-9.5958	.1430	-1.7651
White rural farm family size (X_{11})	17.7592	.0178	.2732
Per cent of white rural farm females who are employed (X_{12}) . .	-7.7158	-.1860	-1.9053
Distance from nearest SMSA (X_{13}) .	-166.0963	-.5149	-7.7831*

*Significantly different from zero at the .05 level.

TABLE I.8

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

Northeast Region

Multiple correlation coefficient	.5115
Standard error of estimate	318.2960

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3495.6942		154.2256*
Average value of land and buildings (X_1)	.0039	.2318	2.6936*
White male unemployment rate of county (X_2)	30.4308	.2039	2.5671*
Per cent of white rural farm males who are age:			
15-24 (X_3)	20.2352	.2448	2.3135*
25-44 (X_4)	8.3869	.1266	1.0276
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6573	-.0122	-.1409
12 or more years of school (X_6)	-7.8184	-.2134	-2.1416*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	8.3395	.2986	2.5537*
Craftsmen and foremen (X_8) . . .	-2.4214	.0332	.3814
Farm laborers, farm foremen (X_9)	-13.6665	-.2542	-2.4839*
Operatives, kindred workers (X_{10})	-8.2504	-.1229	-1.3895
White rural farm family size (X_{11})	-26.5351	-.0265	-.3756
Per cent of white rural farm females who are employed (X_{12}) . .	-3.2514	-.0784	-.7364
Size-distance$_1$ (X_{14})	17.8100	.3740	4.1986*

*Significantly different from zero at the .05 level.

TABLE I.9

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

Northeast Region

Multiple correlation coefficient	.5491
Standard error of estimate	309.5744

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3295.3975		149.0896*
Average value of land and buildings (X_1)	.0033	.1962	2.3213*
White male unemployment rate of county (X_2)	36.8389	.2468	3.1635*
Per cent of white rural farm males who are age:			
15-24 (X_3)	17.6283	.2133	2.0665*
25-44 (X_4)	7.0289	.1061	.8843
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-4.1396	-.0770	-.8905
12 or more years of school (X_6)	-7.8862	-.2153	-2.2215*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	9.5994	.3437	3.0076*
Craftsmen and foremen (X_8) . . .	3.0730	.0421	.4975
Farm laborers, farm foremen (X_9)	-9.6945	-.1803	-1.7705
Operatives, kindred workers (X_{10})	-6.3984	-.0953	-1.1079
White rural farm family size (X_{11})	13.1784	.0132	.1895
Per cent of white rural farm females who are employed (X_{12}) . .	-2.9248	-.0705	-.6812
Size-distance$_2$ (X_{15})	28.3393	.5044	5.4986*

*Significantly different from zero at the .05 level.

TABLE I.10

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

East North Central Division

Multiple correlation coefficient	.5614
Standard error of estimate	61.5365

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	4203.6966		420.9765*
Average value of land and buildings (X_1)	-.0004	-.1377	-2.3903*
White male unemployment rate of county (X_2)	-7.9101	-.2697	-4.9606*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.9787	-.0744	-1.2738
25-44 (X_4)	-2.8049	-.1063	-1.7724
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.6333	.0660	.9767
12 or more years of school (X_6)	3.9761	.4811	7.2040*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.7768	.1223	1.4401
Craftsmen and foremen (X_8) . . .	.8349	.0476	.6881
Farm laborers, farm foremen (X_9)	-2.7519	-.1582	-2.7210*
Operatives, kindred workers (X_{10})	1.0574	.0881	1.1774
White rural farm family size (X_{11})	-10.5921	-.0519	-1.0933
Per cent of white rural farm females who are employed (X_{12}) . .	-.2357	-.0219	-.4649
Distance from nearest SMSA (X_{13}) .	-1.0121	-.0135	-.2316

*Significantly different from zero at the .05 level.

TABLE I.11

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

East North Central Division

Multiple correlation coefficient	.5782
Standard error of estimate	60.6673

Independent variables	Partial regression coefficients	Beta coeffi- cients	Computed t values
Constant term	4277.8217		439.0617*
Average value of land and buildings (X_1)	-.0001	-.0344	-.9584
White male unemployment rate of county (X_2)	-9.0012	-.3069	-6.0783*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.6854	-.0634	-1.0991
25-44 (X_4)	-2.5162	-.0954	-1.6105
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.2939	.0306	.4626
12 or more years of school (X_6)	3.5782	.4330	6.5430*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.3033	.0476	.5574
Craftsmen and foremen (X_8) . . .	1.5772	.0899	1.3634
Farm laborers, farm foremen (X_9)	-2.8335	-.1629	-2.8435*
Operatives, kindred workers (X_{10})	.6341	.0528	.7098
White rural farm family size (X_{11})	-14.1047	-.0691	-1.4871
Per cent of white rural farm females who are employed (X_{12}) . .	-.2111	-.0196	-.4243
Size-distance$_1$ (X_{14})	-2.6223	-.1767	-3.4979*

*Significantly different from zero at the .05 level.

TABLE I.12

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

East North Central Division

Multiple correlation coefficient	.5725
Standard error of estimate	60.9654

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4249.6303		436.0967*
Average value of land and buildings (X_1)	-.0002	-.0689	-1.2964
White male unemployment rate of county (X_2)	-8.7996	-.3001	-5.9190*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.8219	-.0685	-1.1832
25-44 (X_4)	-2.6216	-.0994	-1.6707
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.3429	.0357	.5366
12 or more years of school (X_6)	3.6781	.4451	6.7156*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.5201	.0817	.9677
Craftsmen and foremen (X_8) . . .	1.4389	.0820	1.2387
Farm laborers, farm foremen (X_9)	-2.8110	-.1616	-2.8072*
Operatives, kindred workers (X_{10})	.8586	.0715	.9622
White rural farm family size (X_{11})	-14.7757	-.0724	-1.5417
Per cent of white rural farm females who are employed (X_{12}) . .	-.2837	-.0264	-.5669
Size-distance$_2$ (X_{15})	-2.0650	-.1400	-2.8281*

*Significantly different from zero at the .05 level.

TABLE I.13

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

West North Central Division

Multiple correlation coefficient	.2880
Standard error of estimate	89.1481

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3229.0987		334.5019*
Average value of land and buildings (X_1)	-.0002	-.0600	-.9777
White male unemployment rate of county (X_2)	6.7867	.1391	2.8806*
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.3346	.0290	.6385
25-44 (X_4)	-2.6627	-.0822	-1.4483
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.2213	.0156	.2516
12 or more years of school (X_6)	1.4906	.1522	2.3336*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.2708	.0366	.4227
Craftsmen and foremen (X_8) . . .	1.4929	.0818	1.3262
Farm laborers, farm foremen (X_9)	.9138	.0595	.8558
Operatives, kindred workers (X_{10})	1.0778	.0490	.6455
White rural farm family size (X_{11})	-35.2771	-.1482	-2.7676
Per cent of white rural farm females who are employed (X_{12}) . .	-.2543	-.0197	-.4503
Distance from nearest SMSA (X_{13}) .	-3.2469	-.0520	-.1113

*Significantly different from zero at the .05 level.

TABLE I.14

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

West North Central Division

Multiple correlation coefficient	.3423
Standard error of estimate	87.4666

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3395.7185		351.7042*
Average value of land and buildings (X_1)	-.0003	-.0900	-1.5131
White male unemployment rate of county (X_2)	5.7759	.1184	2.4914*
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.6646	.0361	.8133
25-44 (X_4)	-3.3940	-.1049	-1.8782
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0354	.0025	.0416
12 or more years of school (X_6)	1.0595	.1082	1.6746
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.6856	-.0928	-1.0430
Craftsmen and foremen (X_8) . . .	.4257	.0233	.3791
Farm laborers, farm foremen (X_9)	.4130	.0269	.3935
Operatives, kindred workers (X_{10})	2.2326	.1016	1.3729
White rural farm family size (X_{11})	-44.8120	-.1882	-3.5621*
Per cent of white rural farm females who are employed (X_{12}) . .	-.2151	-.0166	-.3890
Size-distance$_1$ (X_{14})	-4.3059	-.2648	-4.4815*

*Significantly different from zero at the .05 level.

TABLE I.15

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

West North Central Division

Multiple correlation coefficient	.3654
Standard error of estimate	86.6547

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3377.0073		349.9329*
Average value of land and buildings (X_1)	-.0001	-.0300	-.6850
White male unemployment rate of county (X_2)	4.5000	.0923	2.1672*
Per cent of white rural farm males who are age:			
15-24 (X_3)	.8741	.0197	.4310
25-44 (X_4)	-3.6015	-.1113	-2.0108*
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.3599	.0254	.4277
12 or more years of school (X_6)	.7724	.0738	1.1397
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.9150	-.1238	-1.4023
Craftsmen and foremen (X_8) . . .	.5158	.0263	.4675
Farm laborers, farm foremen (X_9)	-.0554	-.0036	-.0529
Operatives, kindred workers (X_{10})	1.7177	.0779	1.0712
White rural farm family size (X_{11})	-32.6384	-.1371	-2.6483*
Per cent of white rural farm females who are employed (X_{12}) . .	-.2851	-.0221	-.5205
Size-distance$_2$ (X_{15})	-8.0080	-.2987	-5.9488*

*Significantly different from zero at the .05 level.

TABLE I.16

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

North Central Region

Multiple correlation coefficient	.7138
Standard error of estimate	358.4034

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2816.1777		221.6047*
Average value of land and buildings (X_1)	.0028	.1480	4.6812*
White male unemployment rate of county (X_2)	47.1301	.2168	7.7140*
Per cent of white rural farm males who are age:			
15-24 (X_3)	3.3238	.0156	.5696
25-44 (X_4)	4.9044	.0284	.8758
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6671	-.0093	-.2776
12 or more years of school (X_6)	6.2218	.1126	3.2507*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-7.4514	-.2221	-4.0292*
Craftsmen and foremen (X_8) . . .	-6.4600	-.0665	-1.8032
Farm laborers, farm foremen (X_9)	-2.1716	-.0230	-.6761
Operatives, kindred workers (X_{10})	29.0950	.3695	7.8769*
White rural farm family size (X_{11})	103.4920	.0724	2.8494*
Per cent of white rural farm females who are employed (X_{12}) . .	7.3098	.1045	4.2414*
Distance from nearest SMSA (X_{13}) .	-76.5242	-.2143	-8.0603*

*Significantly different from zero at the .05 level.

TABLE I.17

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

North Central Region

Multiple correlation coefficient			.7331
Standard error of estimate			348.0403

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	1963.5450		157.9339*
Average value of land and buildings (X_1)	.0021	.1110	3.5233*
White male unemployment rate of county (X_2)	47.1781	.2170	7.9843*
Per cent of white rural farm males who are age:			
15-24 (X_3)	3.9859	.0187	.7037
25-44 (X_4)	3.6787	.0213	.6769
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.5758	-.0221	-.6817
12 or more years of school (X_6)	9.2599	.1676	4.9289*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-2.5682	-.0765	-1.3681
Craftsmen and foremen (X_8) . . .	-3.6352	-.0374	-1.0427
Farm laborers, farm foremen (X_9)	-.6218	-.0087	-.2633
Operatives, kindred workers (X_{10})	29.9387	.3802	8.3870*
White rural farm family size (X_{11})	123.7281	.0866	3.5012*
Per cent of white rural farm females who are employed (X_{12}) . .	7.5803	.1084	4.5552*
Size-distance$_1$ (X_{14})	25.2684	.3285	11.4835*

*Significantly different from zero at the .05 level.

TABLE I.18

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

North Central Region

Multiple correlation coefficient	.7311
Standard error of estimate	349.1085

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2283.8955		183.2860
Average value of land and buildings (X_1)	.0013	.0687	2.1772*
White male unemployment rate of county (X_2)	47.9055	.2204	8.0715*
Per cent of white rural farm males who are age:			
15-24 (X_3)	4.7251	.0222	.8316
25-44 (X_4)	2.0802	.0121	.3815
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.4276	-.0200	-.6153
12 or more years of school (X_6)	9.9629	.1803	5.2549*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-3.6944	-.1101	-1.9889*
Craftsmen and foremen (X_8) . . .	-5.6502	-.0582	-1.6190
Farm laborers, farm foremen (X_9)	-.6959	-.0074	-.2221
Operatives, kindred workers (X_{10})	30.4573	.3868	8.5119*
White rural farm family size (X_{11})	91.7040	.0642	2.6082*
Per cent of white rural farm females who are employed (X_{12}) . .	8.6149	.1232	5.1771*
Size-distance$_2$ (X_{15})	30.7644	.2953	11.1668*

*Significantly different from zero at the .05 level.

TABLE I.19

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

South Atlantic Division

Multiple correlation coefficient			.3714
Standard error of estimate			295.6550

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3153.5665		252.9149*
Average value of land and buildings (X_1)	-.0002	-.0219	-.3998
White male unemployment rate of county (X_2)	21.2821	.1639	3.5077*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-8.8718	-.1375	-2.1660*
25-44 (X_4)	.3824	.0074	.1247
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.9298	-.0373	-.5740
12 or more years of school (X_6)	-2.0718	-.0889	-1.7291
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	1.6547	.0841	1.2293
Craftsmen and foremen (X_8) . . .	-.9016	-.0170	-.3462
Farm laborers, farm foremen (X_9)	3.1113	.0719	1.3465
Operatives, kindred workers (X_{10})	-.0809	-.0023	-.0384
White rural farm family size (X_{11})	84.4582	.1098	2.5967*
Per cent of white rural farm females who are employed (X_{12}) . .	-5.1439	-.1517	-2.7268*
Distance from nearest SMSA (X_{13}) .	-57.6234	-.1441	-3.4780*

*Significantly different from zero at the .05 level.

TABLE I.20

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

South Atlantic Division

Multiple correlation coefficient	.7249
Standard error of estimate	219.3383

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	2718.9674		298.8076*
Average value of land and buildings (X_1)	.0002	.0219	.6879
White male unemployment rate of county (X_2)	11.3778	.0876	2.5461*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.2207	-.0189	-.3991
25-44 (X_4)	2.0467	.0397	.9009
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	1.2523	.0502	1.0424
12 or more years of school (X_6)	-.3546	-.0152	-.3973
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.3772	.0192	.3792
Craftsmen and foremen (X_8) . . .	-1.5560	-.0294	-1.8074
Farm laborers, farm foremen (X_9)	.4927	.0114	.2870
Operatives, kindred workers (X_{10})	-.5024	-.0145	-.3216
White rural farm family size (X_{11})	51.9095	.0675	2.1533*
Per cent of white rural farm females who are employed (X_{12}) . .	-1.9308	-.0570	-1.3849
Size-distance$_1$ (X_{14})	34.2031	.6909	22.1010*

*Significantly different from zero at the .05 level.

TABLE I.21

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

South Atlantic Division

Multiple correlation coefficient	.6884
Standard error of estimate	230.9533

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	2881.0530		292.6065*
Average value of land and buildings (X_1)	.0002	.0219	.4792
White male unemployment rate of county (X_2)	16.2895	.1254	3.4698*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-3.2526	-.0504	-1.0124
25-44 (X_4)	.6710	.0160	.2808
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	2.7504	.1103	2.1541*
12 or more years of school (X_6)	-.3905	-.0168	-.4154
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	1.0476	.0532	1.0008
Craftsmen and foremen (X_8) . . .	-3.6088	-.0682	-1.7728
Farm laborers, farm foremen (X_9)	-1.7952	-.0415	-.9864
Operatives, kindred workers (X_{10})	.5917	.0170	.3597
White rural farm family size (X_{11})	54.7527	.0712	2.1572*
Per cent of white rural farm females who are employed (X_{12}) . .	-3.5853	-.1058	-2.2490*
Size-distance$_2$ (X_{15})	40.6832	.6428	19.6105*

*Significantly different from zero at the .05 level.

TABLE I.22

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (1)

South Atlantic Division

Multiple correlation coefficient	.4297
Standard error of estimate	437.0982

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2035.3039		11.2524*
Average value of land and buildings (X_1)	-.0015	-.2088	-5.0589*
Nonwhite male unemployment rate of county (X_2)	4.2115	.0547	1.4266
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	-1.5557	-.0378	-.7488
25-44 (X_4)	3.8145	.0851	1.7491
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-4.6615	-.2387	-5.1793*
12 or more years of school (X_6)	-1.6261	-.0455	-1.0693
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-2.1804	-.0968	-2.1512*
Craftsmen and foremen (X_8) . . .	-.0079	-.0001	-.0020
Farm laborers, farm foremen (X_9)	-.3997	-.0208	-.4096
Operatives, kindred workers (X_{10})	-1.0827	-.0335	-.7796
Nonwhite rural farm family size (X_{11})	-24.2279	-.1260	-1.8932
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	2.3067	.1001	2.1056*
Distance from nearest SMSA (X_{13}) .	13.4201	.0228	.5761

*Significantly different from zero at the .05 level.

TABLE I.23

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (2)

South Atlantic Division

Multiple correlation coefficient			.6584
Standard error of estimate			364.3597

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1502.1009		99.6518*
Average value of land and buildings (X_1)	-.0007	-.0974	-2.9751*
Nonwhite male unemployment rate of county (X_2)	.9698	.0126	.3944
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	-3.2237	-.0783	-1.8617
25-44 (X_4)	2.9554	.0659	1.6273
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.4977	-.0767	-1.9301
12 or more years of school (X_6)	-1.6687	-.0467	-1.3165
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-1.8442	-.0819	-2.1891*
Craftsmen and foremen (X_8) . . .	-4.7439	-.0489	-1.4336
Farm laborers, farm foremen (X_9)	-.2172	-.0113	-.2671
Operatives, kindred workers (X_{10})	-.7854	-.0243	-.6790
Nonwhite rural farm family size (X_{11})	-2.3757	-.0124	-.2209
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	1.1934	.0518	1.3079
Size-distance$_1$ (X_{14})	39.8805	.5583	15.8498*

*Significantly different from zero at the .05 level.

TABLE I.24

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (3)

South Atlantic Division

Multiple correlation coefficient	.6010
Standard error of estimate	386.9088

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1747.2276		109.1656*
Average value of land and buildings (X_1)	-.0012	-.1670	-4.3835*
Nonwhite male unemployment rate of county (X_2)	2.6906	.0348	1.0330
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	-2.9594	-.0719	-1.6095
25-44 (X_4)	2.6420	.0589	1.3691
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-2.7450	-.1405	-3.3858*
12 or more years of school (X_6)	-2.0403	-.0571	-1.5153
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-.9804	-.0435	-1.0904
Craftsmen and foremen (X_8) . . .	-4.2810	-.0441	-1.2177
Farm laborers, farm foremen (X_9)	-.7557	-.0394	-.8746
Operatives, kindred workers (X_{10})	-1.5724	-.0486	-1.2796
Nonwhite rural farm family size (X_{11})	.3698	.0019	.0322
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.9400	.0408	.9671
Size-distance$_2$ (X_{15})	44.3399	.4611	12.5766*

*Significantly different from zero at the .05 level.

TABLE I.25

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

East South Central Division

Multiple correlation coefficient	.4653
Standard error of estimate	86.8367

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2789.3006		469.9088*
Average value of land and buildings (X_1)	.0008	.0723	1.0224
White male unemployment rate of county (X_2)	9.3923	.2564	4.2082*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-8.9618	-.2267	-3.7762*
25-44 (X_4)	-2.9385	-.0702	-1.2807
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-2.2060	-.2418	-3.2060*
12 or more years of school (X_6)	-.5855	-.1028	-1.5951
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.9680	.1288	1.0905
Craftsmen and foremen (X_8) . . .	1.2706	.0577	.7024
Farm laborers, farm foremen (X_9)	3.0217	.1798	2.2332*
Operatives, kindred workers (X_{10})	-.2108	-.0160	-.1648
White rural farm family size (X_{11})	-31.6254	-.1107	-1.5869
Per cent of white rural farm females who are employed (X_{12}) . .	-2.8385	-.1907	-3.3563*
Distance from nearest SMSA (X_{13}) .	14.2245	.1010	1.9755*

*Significantly different from zero at the .05 level.

TABLE I.26

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

East South Central Division

Multiple correlation coefficient	.5051
Standard error of estimate	84.6680

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2695.2469		475.4917*
Average value of land and buildings (X_1)	-.0001	-.0090	-.1527
White male unemployment rate of county (X_2)	8.2432	.2250	3.7615*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-6.3263	-.1601	-2.6573*
25-44 (X_4)	-3.5910	-.0858	-1.6122
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-2.2722	-.2490	-3.4017*
12 or more years of school (X_6)	-.0548	-.0096	-.1465
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	1.1713	.1559	1.3632
Craftsmen and foremen (X_8) . . .	1.2227	.0555	.6938
Farm laborers, farm foremen (X_9)	2.8778	.1712	2.1949*
Operatives, kindred workers (X_{10})	.1289	.0098	.1040
White rural farm family size (X_{11})	-25.1079	-.0879	-1.2885
Per cent of white rural farm females who are employed (X_{12}) . .	-1.8882	-.1269	-2.2319*
Size-distance$_1$ (X_{14})	6.8987	.2594	4.7186*

*Significantly different from zero at the .05 level.

TABLE I.27

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

East South Central Division

Multiple correlation coefficient	.4660
Standard error of estimate	86.6020

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	2753.5082		477.0513*
Average value of land and buildings (X_1)	-.0001	-.0090	-.1056
White male unemployment rate of county (X_2)	9.6806	.2643	4.3579*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-8.1322	-.2057	-3.3783*
25-44 (X_4)	-3.4174	-.0817	-1.4967
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-2.0969	-.2298	-3.0191*
12 or more years of school (X_6)	-.4184	-.0734	-1.1168
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	1.3454	.1791	1.5209
Craftsmen and foremen (X_8) . . .	1.3609	.0618	.7519
Farm laborers, farm foremen (X_9)	3.3715	.2006	2.5167*
Operatives, kindred workers (X_{10})	.1788	.0136	.1406
White rural farm family size (X_{11})	-27.0747	-.0948	-1.3491
Per cent of white rural farm females who are employed (X_{12}) . .	-2.4410	-.1640	-2.8321*
Size-distance$_2$ (X_{15})	6.2274	.1152	2.0459*

*Significantly different from zero at the .05 level.

TABLE I.28

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (1)

East South Central Division

Multiple correlation coefficient	.5434
Standard error of estimate	170.0613

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1465.0180		163.5597*
Average value of land and buildings (X_1)	.0030	.1312	2.5324*
Nonwhite male unemployment rate of county (X_2)	1.4452	.0606	1.2928
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.3114	.0196	.3691
25-44 (X_4)	1.0389	.0602	1.1679
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.8736	-.1171	-2.1929*
12 or more years of school (X_6)	.8839	.0522	1.0770
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	.0502	.0069	.1170
Craftsmen and foremen (X_8) . . .	-1.8464	-.0700	-1.3633
Farm laborers, farm foremen (X_9)	.1474	.0181	.3042
Operatives, kindred workers (X_{10})	.5127	.0273	.5499
Nonwhite rural farm family size (X_{11})	-42.0837	-.4798	-7.2856*
Per cent of nonwhite rural farm females who are employed (X_{12})	.1339	.0137	.2762
Distance from nearest SMSA (X_{13}) .	-26.8400	-.0967	-1.9791*

*Significantly different from zero at the .05 level.

TABLE I.29

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (2)

East South Central Division

Multiple correlation coefficient	.5475
Standard error of estimate	169.5228

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1391.9350		156.1677*
Average value of land and buildings (X_1)	.0033	.1443	2.8725*
Nonwhite male unemployment rate of county (X_2)	1.2713	.0533	1.1425
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.3314	.0209	.3946
25-44 (X_4)	1.3144	.0761	1.4754
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.8741	-.1171	-2.2014*
12 or more years of school (X_6)	.9226	.0545	1.1283
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-.1052	-.0144	-.2470
Craftsmen and foremen (X_8) . . .	-.7256	-.0275	-.5216
Farm laborers, farm foremen (X_9)	.1880	.0230	.3886
Operatives, kindred workers (X_{10})	.2242	.0119	.2421
Nonwhite rural farm family size (X_{11})	-40.2723	-.4591	-6.9397*
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.0551	.0056	.1135
Size-distance$_1$ (X_{14})	3.4906	.1204	2.4837*

*Significantly different from zero at the .05 level.

TABLE I.30

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (3)

East South Central Division

Multiple correlation coefficient	.6171
Standard error of estimate	159.4020

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1392.8691		166.1044*
Average value of land and buildings (X_1)	.0006	.0262	.4799
Nonwhite male unemployment rate of county (X_2)	1.4062	.0589	1.3441
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.8624	.0544	1.0899
25-44 (X_4)	.8908	.0516	1.0682
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.8186	-.1097	-2.1921*
12 or more years of school (X_6)	1.1383	.0673	1.4796
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	.1852	.0253	.4618
Craftsmen and foremen (X_8) . . .	-2.5961	-.0984	-2.0413*
Farm laborers, farm foremen (X_9)	-.0922	-.0113	-.2041
Operatives, kindred workers (X_{10})	.7131	.0380	.8184
Nonwhite rural farm family size (X_{11})	-38.6543	-.4407	-7.1127*
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.3410	.0350	.7501
Size-distance$_2$ (X_{15})	38.9107	.3502	7.2696*

*Significantly different from zero at the .05 level.

TABLE I.31

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

West South Central Division

Multiple correlation coefficient	.6064
Standard error of estimate	75.9055

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2818.3048		403.9444*
Average value of land and buildings (X_1)	.0003	.1813	2.8345*
White male unemployment rate of county (X_2)	-8.6669	-.1837	4.2731*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-2.8673	-.1047	-2.4549*
25-44 (X_4)	-.0595	-.0036	-.0700
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0824	.0124	.2417
12 or more years of school (X_6)	-2.0898	-.2391	-5.0852*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.9940	.1539	2.1864*
Craftsmen and foremen (X_8) . . .	2.4648	.1368	2.2096*
Farm laborers, farm foremen (X_9)	3.0992	.3911	4.7263*
Operatives, kindred workers (X_{10})	-.5591	-.0484	-.8200
White rural farm family size (X_{11})	-54.8241	-.2741	-5.2029*
Per cent of white rural farm females who are employed (X_{12}) . .	1.6760	.1146	2.8733*
Distance from nearest SMSA (X_{13}) .	-18.0119	-.1513	-3.7320*

*Significantly different from zero at the .05 level.

TABLE I.32

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

West South Central Division

Multiple correlation coefficient	.5992
Standard error of estimate	76.4224

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2753.2438		394.5930*
Average value of land and buildings (X_1)	.0004	.2417	3.1411*
White male unemployment rate of county (X_2)	-8.7069	-.1846	-4.2584*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-2.9806	-.1088	-2.5339*
25-44 (X_4)	-.1394	-.0085	-.1630
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.0027	.0004	.0078
12 or more years of school (X_6)	-1.6984	-.1943	-4.0624*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.8862	.1372	1.9449*
Craftsmen and foremen (X_8) . . .	3.0807	.1710	2.7733*
Farm laborers, farm foremen (X_9)	3.2299	.4076	4.8293*
Operatives, kindred workers (X_{10})	-.7368	-.0638	-1.0772
White rural farm family size (X_{11})	-50.4402	-.2522	-4.7334*
Per cent of white rural farm females who are employed (X_{12}) . .	1.0261	.1112	2.7506*
Size-distance$_1$ (X_{14})	3.8071	.1253	2.7529*

*Significantly different from zero at the .05 level.

TABLE I.33

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

West South Central Division

Multiple correlation coefficient	.6186
Standard error of estimate	75.0000

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2744.0894		392.8732*
Average value of land and buildings (X_1)	.0002	.1209	1.8359
White male unemployment rate of county (X_2)	-7.6692	-.1626	-3.7931*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-3.0164	-.1101	-2.6133*
25-44 (X_4)	.2253	.0137	.2677
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.1881	-.0283	-.5464
12 or more years of school (X_6) .	-1.9006	-.2174	-4.7129*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	1.1523	.1784	2.5492*
Craftsmen and foremen (X_8) . . .	3.0495	.1692	2.7972*
Farm laborers, farm foremen (X_9).	3.8000	.4796	5.6714*
Operatives, kindred workers (X_{10})	-.0778	-.0067	-.1134
White rural farm family size (X_{11}).	-50.8426	-.2542	-4.8808*
Per cent of white rural farm females who are employed (X_{12}) . .	1.4211	.0972	2.4467*
Size-distance$_2$ (X_{15})	9.4969	.2042	5.0366*

*Significantly different from zero at the .05 level.

TABLE I.34

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (1)

West South Central Division

Multiple correlation coefficient	.4783
Standard error of estimate	22.1137

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1079.7083		444.3870*
Average value of land and buildings (X_1)	.0001	.2291	7.1151*
Nonwhite male unemployment rate of county (X_2)	-.3186	-.0926	-2.1395*
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0625	.0269	.4999
25-44 (X_4)	.0616	.0377	.6993
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0577	-.0752	-1.4929
12 or more years of school (X_6)	.0648	.0507	1.1076
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	.0417	.0386	.7401
Craftsmen and foremen (X_8) . . .	-.0682	-.0191	-.4423
Farm laborers, farm foremen (X_9)	.1459	.1797	.2962
Operatives, kindred workers (X_{10})	-.1644	-.1068	-2.2646*
Nonwhite rural farm family size (X_{11})	-.7147	-.0750	-1.0655
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.0673	.0762	1.7030
Distance from nearest SMSA (X_{13}) .	-34.9483	-1.1253	-2.6570*

*Significantly different from zero at the .05 level.

TABLE I.35

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (2)

West South Central Division

Multiple correlation coefficient	.4658
Standard error of estimate	22.2833

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1072.9183		451.2435*
Average value of land and buildings (X_1)	.0001	.2291	6.7852*
Nonwhite male unemployment rate of county (X_2)	-.3309	-.0962	-2.2043*
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0759	.0327	.6012
25-44 (X_4)	.0539	.0330	.6076
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0504	-.0657	-1.2950
12 or more years of school (X_6)	.0736	.0576	1.2499
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	.0334	.0309	.5864
Craftsmen and foremen (X_8) . . .	-.0268	-.0075	-.1735
Farm laborers, farm foremen (X_9)	.1430	.1761	2.8820*
Operatives, kindred workers (X_{10})	-.1635	-.1062	-2.2355*
Nonwhite rural farm family size (X_{11})	-.5872	-.0617	-.8705
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	.0994	.0868	1.9273
Size-distance$_1$ (X_{14})	-2.7130	-.6728	-.1569

*Significantly different from zero at the .05 level.

TABLE I.36

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (3)

West South Central Division

Multiple correlation coefficient	.5072
Standard error of estimate	21.7013

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1072.1767		449.1694*
Average value of land and buildings (X_1)	.0001	.2291	7.1189*
Nonwhite male unemployment rate of county (X_2)	-.3078	-.0894	-2.1044*
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.0642	.0276	.5232
25-44 (X_4)	.0723	.0443	.8364
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.0617	-.0804	-1.6283
12 or more years of school (X_6)	.0535	.0419	.9309
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	.0398	.0369	.7208
Craftsmen and foremen (X_8) . . .	-.0406	-.0114	-.2700
Farm laborers, farm foremen (X_9)	.1395	.1718	2.8861*
Operatives, kindred workers (X_{10})	-.1590	-.1033	-2.2319*
Nonwhite rural farm family size (X_{11})	-.7144	-.0750	-1.0873
Per cent of nonwhite rural farm females who are employed (X_{12})	.0708	.0618	1.4031
Size-distance$_2$ (X_{15})	2.5462	.2054	4.9866*

*Significantly different from zero at the .05 level.

TABLE I.37

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

South Region

Multiple correlation coefficient	.3848
Standard error of estimate	378.6409

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	3007.9427		292.9393*
Average value of land and buildings (X_1)	-.0003	-.0317	-.8257
White male unemployment rate of county (X_2)	-14.9477	-.0882	-3.0539*
Per cent of white rural farm males who are age:			
15-24 (X_3)	2.2324	.0219	.6566
25-44 (X_4)	4.6885	.0605	1.8306
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.1744	-.0369	-1.0842
12 or more years of school (X_6)	-2.0825	-.0700	-2.3460*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-9.3734	-.3543	-8.8580*
Craftsmen and foremen (X_8) . . .	-7.3998	-.0977	-3.0106*
Farm laborers, farm foremen (X_9)	-6.5911	-.1457	-3.5722*
Operatives, kindred workers (X_{10})	-8.7709	-.1807	-5.0267*
White rural farm family size (X_{11})	109.2412	.1202	3.8128*
Per cent of white rural farm females who are employed (X_{12}) . .	7.5184	.1481	5.0668*
Distance from nearest SMSA (X_{13}) .	-17.8239	-.0339	-1.2894

*Significantly different from zero at the .05 level.

TABLE I.38

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

South Region

Multiple correlation coefficient			.6154
Standard error of estimate			323.3562

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	2505.9827		283.8074*
Average value of land and buildings (X_1)	.0006	.0634	2.0660*
White male unemployment rate of county (X_2)	-18.4914	-.1091	-4.4426*
Per cent of white rural farm males who are age:			
15-24 (X_3)	6.1333	.0601	2.1089*
25-44 (X_4)	5.5823	.0720	2.5530*
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.4696	-.0147	-.5076
12 or more years of school (X_6)	.5915	.0199	.7713
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-6.9789	-.2638	-7.7996*
Craftsmen and foremen (X_8) . . .	-5.7060	-.0753	-2.7260*
Farm laborers, farm foremen (X_9)	-4.5616	-.1008	-2.8964*
Operatives, kindred workers (X_{10})	-5.5499	-.1143	-3.7283*
White rural farm family size (X_{11})	76.3140	.0839	3.1148*
Per cent of white rural farm females who are employed (X_{12}) . .	7.1198	.1403	5.6384*
Size-distance$_1$ (X_{14})	41.7186	.5257	22.8943*

*Significantly different from zero at the .05 level.

TABLE I.39

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

South Region

Multiple correlation coefficient	.6195
Standard error of estimate	322.0301

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2650.1875		301.1288*
Average value of land and buildings (X_1)	-.0001	-.0106	-.4357
White male unemployment rate of county (X_2)	-12.0552	-.0711	-2.9077*
Per cent of white rural farm males who are age:			
15-24 (X_3)	5.3354	.0523	1.8433
25-44 (X_4)	5.8249	.0751	2.6747*
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.6533	.0205	.7070
12 or more years of school (X_6)	-.6537	-.0220	-.8394
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-6.1962	-.2342	-6.9163*
Craftsmen and foremen (X_8) . . .	-7.2705	-.0960	-3.4892*
Farm laborers, farm foremen (X_9)	-5.4426	-.1203	-3.4742*
Operatives, kindred workers (X_{10})	-4.0689	-.0838	-2.7306*
White rural farm family size (X_{11})	75.0201	.0825	3.0743*
Per cent of white rural farm females who are employed (X_{12}) . .	6.0148	.1185	4.7761*
Size-distance$_2$ (X_{15})	56.9612	.5240	23.2396*

*Significantly different from zero at the .05 level.

TABLE I.40

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (1)

South Region

Multiple correlation coefficient	.3898
Standard error of estimate	378.9696

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1566.4968		155.3427*
Average value of land and buildings (X_1)	-.0024	-.3360	-13.1959*
Nonwhite male unemployment rate of county (X_2)	1.1464	.0198	.8024
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.4881	.0139	.4498
25-44 (X_4)	2.1412	.0655	2.1742*
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.3758	-.0259	-.8778
12 or more years of school (X_6)	-.0080	-.0003	-.0112
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-2.9739	-.1746	-5.8743*
Craftsmen and foremen (X_8) . . .	-2.8975	-.0449	-1.7412
Farm laborers, farm foremen (X_9)	-1.3582	-.0876	-2.6889*
Operatives, kindred workers (X_{10})	-1.9338	-.0677	-2.4789*
Nonwhite rural farm family size (X_{11})	-8.5822	-.0524	-1.3170
Per cent of nonwhite rural farm females who are employed (X_{12}) . . .	2.5775	.1333	4.8680*
Distance from nearest SMSA (X_{13}) .	-26.9464	-.0512	-2.0383*

*Significantly different from zero at the .05 level.

TABLE I.41

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (2)

South Region

Multiple correlation coefficient			.5715
Standard error of estimate			339.1110

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1308.8167		145.0433*
Average value of land and buildings (X_1)	-.0156	-2.1837	-9.3355*
Nonwhite male unemployment rate of county (X_2)	-.0470	-.0008	-.0368
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	-.4459	-.0127	-.4592
25-44 (X_4)	2.2039	.0674	2.5015*
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	.2520	.0174	.6557
12 or more years of school (X_6)	.0136	.0005	.0213
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-2.9384	-.1725	-6.5196*
Craftsmen and foremen (X_8) . . .	-.6994	-.0108	-.4712
Farm laborers, farm foremen (X_9)	-.9934	-.0641	-2.1963*
Operatives, kindred workers (X_{10})	-1.8727	-.0655	-2.6849*
Nonwhite rural farm family size (X_{11})	-1.9736	-.0120	-.3380
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	1.6374	.0847	3.4467*
Size-distance$_1$ (X_{14})	26.0272	.4373	18.8449*

*Significantly different from zero at the .05 level.

TABLE I.42

The results of the analysis of factors influencing the median income per county of nonwhite rural farm families in 1959

Nonwhite family income equation (3)

South Region

Multiple correlation coefficient			.6305
Standard error of estimate			320.7502

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	1358.5656		159.1231*
Average value of land and buildings (X_1)	-.0017	-.2380	-10.8342*
Nonwhite male unemployment rate of county (X_2)	.3591	.0062	.2973
Per cent of nonwhite rural farm males who are age:			
15-24 (X_3)	.1527	.0044	.1665
25-44 (X_4)	1.6557	.0507	1.9862*
Per cent of nonwhite rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.1077	-.0074	-.2971
12 or more years of school (X_6)	-.5846	-.0219	-.9678
Per cent of employed nonwhite rural farm males who are:			
Farmers and farm managers (X_7) .	-1.5769	-.0926	-3.6594*
Craftsmen and foremen (X_8) . . .	-3.8356	-.0595	-2.7359*
Farm laborers, farm foremen (X_9)	-1.3865	-.0894	-3.2444*
Operatives, kindred workers (X_{10})	-1.9624	-.0687	-2.9740*
Nonwhite rural farm family size (X_{11})	.0379	.0002	.0069
Per cent of nonwhite rural farm females who are employed (X_{12}) . .	1.4843	.0767	3.3048*
Size-distance$_2$ (X_{15})	56.6352	.5154	23.7177*

*Significantly different from zero at the .05 level.

TABLE I.43

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

Mountain Division

Multiple correlation coefficient	.2964
Standard error of estimate	67.6247

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	4195.4311		434.0741*
Average value of land and buildings (X_1)	.0001	.0631	.9763
White male unemployment rate of county (X_2)	-1.6193	-.0716	-1.1626
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.8809	.1375	2.0753*
25-44 (X_4)	1.4316	.1427	1.6745
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6036	-.0770	-1.1844
12 or more years of school (X_6)	-.0628	-.0480	-.7535
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.1935	.0480	.5580
Craftsmen and foremen (X_8) . . .	-.7434	-.0883	-.9979
Farm laborers, farm foremen (X_9)	-.5663	-.0909	-1.0557
Operatives, kindred workers (X_{10})	-.7054	-.0762	-1.0473
White rural farm family size (X_{11})	3.7439	.0378	.5969
Per cent of white rural farm females who are employed (X_{12}) . .	-.3346	-.0479	-.7854
Distance from nearest SMSA (X_{13}) .	4.8969	.1063	1.6830

*Significantly different from zero at the .05 level.

TABLE I.44

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

Mountain Division

Multiple correlation coefficient	.2860
Standard error of estimate	67.8497

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4195.7216		433.3119*
Average value of land and buildings (X_1)	.0001	.0631	.4351
White male unemployment rate of county (X_2)	-1.3113	-.0580	-.9407
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.7747	.1297	1.9561
25-44 (X_4)	1.5214	.1517	1.7743
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.7125	-.0909	-1.4022
12 or more years of school (X_6)	-.0308	-.0235	-.3731
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.3714	.0921	1.0657
Craftsmen and foremen (X_8) . . .	-.8389	-.0997	-1.1196
Farm laborers, farm foremen (X_9)	-.3178	-.0510	-5.9059*
Operatives, kindred workers (X_{10})	-.5631	-.0608	-.8259
White rural farm family size (X_{11})	4.4278	.0447	.7006
Per cent of white rural farm females who are employed (X_{12}) . .	-.4173	-.0597	-.9671
Size-distance$_1$ (X_{14})	1.9212	.0661	1.0225

*Significantly different from zero at the .05 level.

TABLE I.45

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

Mountain Division

Multiple correlation coefficient	.2799
Standard error of estimate	67.9775

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4205.8908		432.6879*
Average value of land and buildings (X_1)	.0001	.0631	.7439
White male unemployment rate of county (X_2)	-1.4351	-.0634	-1.0209
Per cent of white rural farm males who are age:			
15-24 (X_3)	1.7806	.1302	1.9586
25-44 (X_4)	1.4808	.1476	1.7205
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6981	-.0891	-1.3711
12 or more years of school (X_6)	-.0403	-.0308	-.4860
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.2829	.0702	.7930
Craftsmen and foremen (X_8) . . .	-.7863	-.0934	-1.0497
Farm laborers, farm foremen (X_9)	-.4380	-.0777	-.7993
Operatives, kindred workers (X_{10})	-.6753	-.0729	-.9915
White rural farm family size (X_{11})	3.8285	.0387	.6072
Per cent of white rural farm females who are employed (X_{12}) . .	-.3482	-.0498	-.8109
Size-distance$_2$ (X_{15})	-6.2963	-.1310	-.0197

*Significantly different from zero at the .05 level.

TABLE I.46

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

Pacific Division

Multiple correlation coefficient	.6381
Standard error of estimate	90.5361

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4755.7631		181.3029*
Average value of land and buildings (X_1)	.0006	.3287	3.1083*
White male unemployment rate of county (X_2)	14.9458	.3004	3.3962*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-3.0648	-.0788	-.9366
25-44 (X_4)	1.9112	.0696	.6530
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	3.4823	.1919	1.9745*
12 or more years of school (X_6)	.3826	.0280	.2600
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-1.5286	-.1709	-1.4117
Craftsmen and foremen (X_8) . . .	-.4567	-.0206	-.1853
Farm laborers, farm foremen (X_9)	-.6325	-.0584	-.5010
Operatives, kindred workers (X_{10})	-7.1483	-.3188	-2.8600*
White rural farm family size (X_{11})	-63.6702	-.1655	-2.0691*
Per cent of white rural farm females who are employed (X_{12}) . .	-.3013	-.0179	-.2166
Distance from nearest SMSA (X_{13}) .	-18.3394	-.2421	-2.5455*

*Significantly different from zero at the .05 level.

TABLE I.47

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

Pacific Division

Multiple correlation coefficient	.7513
Standard error of estimate	77.6006

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4427.9159		171.9480*
Average value of land and buildings (X_1)	.0006	.2739	3.1772*
White male unemployment rate of county (X_2)	12.1274	.2438	3.4182*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.6481	-.0424	-.5989
25-44 (X_4)	2.0085	.0731	.8104
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.6972	-.0384	-.4290
12 or more years of school (X_6)	-.7224	-.0528	-.5679
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.8219	.0919	.8279
Craftsmen and foremen (X_8) . . .	.8620	.0388	.4070
Farm laborers, farm foremen (X_9)	.7594	.0702	.6901
Operatives, kindred workers (X_{10})	-1.2859	-.0574	-.5594
White rural farm family size (X_{11})	-35.7673	-.0930	-1.3401
Per cent of white rural farm females who are employed (X_{12}) . .	-.2808	-.0167	-.2873
Size-distance$_1$ (X_{14})	8.4236	.6141	7.1972*

*Significantly different from zero at the .05 level.

TABLE I.48

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

Pacific Division

Multiple correlation coefficient	.6972
Standard error of estimate	84.2999

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4503.6114		174.0396*
Average value of land and buildings (X_1)	.0007	.3834	3.4930*
White male unemployment rate of county (X_2)	14.9551	.3006	3.8105*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.6487	-.0424	-.5515
25-44 (X_4)	1.4201	.0517	.5282
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	1.2005	.0661	.7000
12 or more years of school (X_6)	.1781	.0130	.1299
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.5332	-.0596	-.5172
Craftsmen and foremen (X_8) . . .	.3245	.0146	.1412
Farm laborers, farm foremen (X_9)	.3798	.0351	.3168
Operatives, kindred workers (X_{10})	-2.5590	-.1141	-1.0207
White rural farm family size (X_{11})	-41.0020	-.1066	-1.4114
Per cent of white rural farm females who are employed (X_{12}) . .	-.2798	-.0166	-.2174
Size-distance$_2$ (X_{15})	8.4099	.4382	5.0726*

*Significantly different from zero at the .05 level.

TABLE I.49

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

West Region

Multiple correlation coefficient	.4663
Standard error of estimate	131.3569

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4476.6058		437.1782*
Average value of land and buildings (X_1)	.0009	.3079	5.4472*
White male unemployment rate of county (X_2)	9.4223	.1866	3.9618*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-1.8052	-.0554	-1.1295
25-44 (X_4)	-.8470	-.0375	-.5844
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-.5977	-.0330	-.6763
12 or more years of school (X_6)	-.1530	-.0459	-.9613
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.3700	-.0415	-.6061
Craftsmen and foremen (X_8) . . .	1.9800	.1006	1.5386
Farm laborers, farm foremen (X_9)	-.4423	-.0329	-.4972
Operatives, kindred workers (X_{10})	.6517	.0306	.5381
White rural farm family size (X_{11})	-39.4818	-.1658	-3.4851*
Per cent of white rural farm females who are employed (X_{12}) . .	1.2500	.0781	1.7010
Distance from nearest SMSA (X_{13}) .	-18.3196	-.1979	-3.8969*

*Significantly different from zero at the .05 level.

TABLE I.50

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

West Region

Multiple correlation coefficient			.7171
Standard error of estimate			103.4924

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	4246.7215		449.1032*
Average value of land and buildings (X_1)	.0003	.1026	2.1770*
White male unemployment rate of county (X_2)	7.0231	.1391	3.7658*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.3715	-.0114	-.2956
25-44 (X_4)	.1442	.0001	.1262
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.6914	-.0934	-2.4347*
12 or more years of school (X_6)	-.1037	-.0311	-.8372
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.8790	.0985	1.8261
Craftsmen and foremen (X_8) . . .	.7524	.0382	.7403
Farm laborers, farm foremen (X_9)	.7204	.0535	1.0331
Operatives, kindred workers (X_{10})	1.7222	.0608	1.8004
White rural farm family size (X_{11})	-18.9961	-.0798	-2.1062*
Per cent of white rural farm females who are employed (X_{12}) . .	.0504	.0032	.0864
Size-distance$_1$ (X_{14})	16.0826	.6819	16.3968*

*Significantly different from zero at the .05 level.

TABLE I.51

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

West Region

Multiple correlation coefficient	.6164
Standard error of estimate	116.9236

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	4314.1383		438.8293*
Average value of land and buildings (X_1)	.0005	.1710	3.7655*
White male unemployment rate of county (X_2)	9.4795	.1877	4.4993*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.8338	-.0256	-.5875
25-44 (X_4)	-.1379	-.0058	-.1068
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-1.4183	-.0783	-1.8037
12 or more years of school (X_6)	-.1626	-.0488	-1.1631
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	.4234	.0475	.7799
Craftsmen and foremen (X_8) . . .	1.8488	.0939	1.6161
Farm laborers, farm foremen (X_9)	.5078	.0377	.6419
Operatives, kindred workers (X_{10})	1.6134	.0757	1.4916
White rural farm family size (X_{11})	-31.9188	-.1341	-3.1588*
Per cent of white rural farm females who are employed (X_{12}) . .	.6899	.0431	1.0514
Size-distance$_2$ (X_{15})	18.7662	.5011	11.1362*

*Significantly different from zero at the .05 level.

TABLE I.52

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (1)

Conterminous United States

Multiple correlation coefficient			.6312
Standard error of estimate			540.3223

Independent variables	Partial regression coefficients	Beta coeffi- cients	Computed t values
Constant term	2548.6440		21.9598*
Average value of land and buildings (X_1)	.0006	.0409	1.8935
White male unemployment rate of county (X_2)	64.1257	.2309	14.7625*
Per cent of white rural farm males who are age:			
15-24 (X_3)	-.1117	-.0006	-.0332
25-44 (X_4)	-.8306	-.0058	-.3088
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-27.4999	-.5555	-32.0411*
12 or more years of school (X_6)	.6809	.0197	1.2787
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-4.5023	-.1126	-4.6176*
Craftsmen and foremen (X_8) . . .	-4.1695	-.0350	-1.7862
Farm laborers, farm foremen (X_9)	10.9187	.1343	6.2193*
Operatives, kindred workers (X_{10})	3.2988	.0366	1.7410
White rural farm family size (X_{11})	220.1931	.1321	9.2423*
Per cent of white rural farm females who are employed (X_{12}) . .	15.6571	.1832	12.0131*
Distance from nearest SMSA (X_{13}) .	-30.1036	-.0542	-3.4609*

*Significantly different from zero at the .05 level.

TABLE I.53

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (2)

Conterminous United States

Multiple correlation coefficient	.7011
Standard error of estimate	496.7260

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1972.8974		18.0367*
Average value of land and buildings (X_1)	.0008	.0468	2.6239*
White male unemployment rate of county (X_2)	59.2255	.2132	14.9892*
Per cent of white rural farm males who are age:			
15-24 (X_3)	3.1448	.0167	1.0167
25-44 (X_4)	1.5150	.0106	.6123
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-24.3191	-.4912	-30.5396*
12 or more years of school (X_6)	2.0907	.0604	4.2503*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-1.4117	-.0353	-1.5902
Craftsmen and foremen (X_8) . . .	-2.4040	-.0202	-1.1209
Farm laborers, farm foremen (X_9)	14.0221	.1725	8.7451*
Operatives, kindred workers (X_{10})	3.7349	.0415	2.1444*
White rural farm family size (X_{11})	206.9044	.1241	9.5079*
Per cent of white rural farm females who are employed (X_{12}) . .	11.5905	.1356	9.6343*
Size-distance$_1$ (X_{14})	34.5830	.3423	24.0949*

*Significantly different from zero at the .05 level.

TABLE I.54

The results of the analysis of factors influencing the median income per county of white rural farm families in 1959

White family income equation (3)

Conterminous United States

Multiple correlation coefficient	.7068
Standard error of estimate	492.7749

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2087.2841		19.4352*
Average value of land and buildings (X_1)	.0003	.0175	.8324
White male unemployment rate of county (X_2)	63.4958	.2286	16.2031*
Per cent of white rural farm males who are age:			
15-24 (X_3)	2.5977	.0138	.8468
25-44 (X_4)	.7236	.0051	.2949
Per cent of white rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_5)	-23.3647	-.4720	-29.3631*
12 or more years of school (X_6)	1.8920	.0547	3.7414*
Per cent of employed white rural farm males who are:			
Farmers and farm managers (X_7) .	-.6404	-.0160	-.7234
Craftsmen and foremen (X_8) . . .	-3.2932	-.0277	-1.5483
Farm laborers, farm foremen (X_9)	13.8470	.1703	8.7126*
Operatives, kindred workers (X_{10})	5.3792	.0597	3.1095*
White rural farm family size (X_{11})	196.5057	.1179	9.0996*
Per cent of white rural farm females who are employed (X_{12}) . .	11.6267	.1360	9.7536*
Size-distance$_2$ (X_{15})	49.8911	.3542	25.2919*

*Significantly different from zero at the .05 level.

APPENDIX II

THE RESULTS OF THE ANALYSIS OF THE MEDIAN EARNINGS OF FARMERS AND FARM MANAGERS IN A COUNTY, BY DIVISION, AND FOR THE CONTERMINOUS UNITED STATES

TABLE II.1

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

New England Division

Multiple correlation coefficient	.6800
Standard error of estimate	397.3884

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1311.2693		27.0094*
Average value of land and buildings (X_1)	.0206	.4861	3.7015*
Male unemployment rate of county (X_2)	102.4696	.3996	3.3032*
Per cent of employed male farmers and farm managers in a county who are nonwhite (X_3)	-5.4163	-.0363	-.2909
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-17.7277	-.2021	-1.4991
12 or more years of school (X_5)	-10.1614	-.2347	-1.6015
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	8.6171	.1043	.8895
Per cent of rural farm males who are age:			
15-24 (X_7)	45.3716	.2995	2.4564*
25-44 (X_8)	1.7850	.0164	.1070
Distance from nearest SMSA (X_9) .	-162.0474	-.4699	-2.7936*

*Significantly different from zero at the .05 level.

TABLE II.2

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

New England Division

Multiple correlation coefficient	.6496
Standard error of estimate	412.0523

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	420.6659		8.3565*
Average value of land and buildings (X_1)	.0226	.5333	3.8513*
Male unemployment rate of county (X_2)	78.4059	.3058	2.6252*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-7.6060	-.0510	-.3899
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-10.7607	-.2253	-1.4990
12 or more years of school (X_5)	-6.1091	-.1411	-.9749
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	18.9967	.2299	2.1479*
Per cent of rural farm males who are age:			
15-24 (X_7)	36.7527	.2426	1.9660
25-44 (X_8)	-2.5408	-.0234	-.1474
Size-distance$_1$ (X_{10})	18.5257	.2927	1.8093

*Significantly different from zero at the .05 level.

TABLE II.3

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

New England Division

Multiple correlation coefficient	.6532
Standard error of estimate	410.4007

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	572.3657		11.4157*
Average value of land and buildings (X_1)	.0212	.5002	3.4539*
Male unemployment rate of county (X_2)	84.2634	.3286	2.7573*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-8.4608	-.0567	-.4345
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-22.3816	-.2552	-1.6468
12 or more years of school (X_5)	-8.6857	-.2006	-1.3099
Per cent of employed male labor force in county who are crafts-men, foremen, operatives, and kindred workers (X_6)	17.0461	.2063	1.8855
Per cent of rural farm males who are age:			
15-24 (X_7)	39.0225	.2575	2.0672*
25-44 (X_8)	3.0673	.0282	.1706
Size-distance$_2$ (X_{11})	25.4678	.3591	1.9390

*Significantly different from zero at the .05 level.

TABLE II.4

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

Middle Atlantic Division

Multiple correlation coefficient	.4154
Standard error of estimate	814.4597

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	3330.1622		50.0774*
Average value of land and buildings (X_1)	.0049	.1374	1.3177
Male unemployment rate of county (X_2)	-66.2193	-.2185	-2.4098*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-32.4791	-.1364	-1.2011
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-1.9603	-.0167	-.1748
12 or more years of school (X_5)	12.0510	.1832	1.5529
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-7.8386	-.0533	-.6259
Per cent of rural farm males who are age:			
15-24 (X_7)	-25.5499	-.0971	-.9226
25-44 (X_8)	-19.5248	-.1308	-.9527
Distance from nearest SMSA (X_9) .	31.0243	.0310	.3533

*Significantly different from zero at the .05 level.

TABLE II.5

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

Middle Atlantic Division

Multiple correlation coefficient	.4153
Standard error of estimate	814.4899

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3317.4842		49.8849*
Average value of land and buildings (X_1)	.0042	.1178	1.0898
Male unemployment rate of county (X_2)	-61.3078	-.2023	-2.2651*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-34.0866	-.1432	-1.2590
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-3.1071	-.0264	-.2710
12 or more years of school (X_5)	11.9534	.1817	1.5359
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-9.6304	-.0655	-.7589
Per cent of rural farm males who are age:			
15-24 (X_7)	-21.7281	-.0826	-.7776
25-44 (X_8)	-18.5774	-.1245	-.8929
Size-distance$_1$ (X_{10})	4.1916	.0356	.3382

*Significantly different from zero at the .05 level.

TABLE II.6

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

Middle Atlantic Division

Multiple correlation coefficient	.4155
Standard error of estimate	814.4203

Independent variables	Partial regression coefficients	Beta coeffi- cients	Computed t values
Constant term	3353.2875		50.4275*
Average value of land and buildings (X_1)	.0041	.1150	1.0512
Male unemployment rate of county (X_2)	-61.0046	-.2013	-2.2492*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-34.2577	-.1439	-1.2644
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-3.4271	-.0291	-.2949
12 or more years of school (X_5)	11.8883	.1607	1.5256
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-10.1527	-.0690	-.7808
Per cent of rural farm males who are age:			
15-24 (X_7)	-21.6501	-.0823	-.7770
25-44 (X_8)	-18.2519	-.1223	-.8730
Size-distance$_2$ (X_{11})	5.7947	.0400	.3720

*Significantly different from zero at the .05 level.

TABLE II.7

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

East North Central Division

Multiple correlation coefficient	.7332
Standard error of estimate	418.7193

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1896.3739		94.5680*
Average value of land and buildings (X_1)	.0141	.5834	13.4077*
Male unemployment rate of county (X_2)	-37.4339	-.1834	-4.3286*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-14.1285	-.0268	-.7900
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-5.3092	-.0669	-1.2360
12 or more years of school (X_5)	-6.3637	-.1037	-2.0207*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	1.7700	.0228	.5989
Per cent of rural farm males who are age:			
15-24 (X_7)	-2.9539	-.0127	-.3214
25-44 (X_8)	14.6000	.0657	1.6899
Distance from nearest SMSA (X_9) .	-55.0820	-.0881	-2.0142*

*Significantly different from zero at the .05 level.

TABLE II.8

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

East North Central Division

Multiple correlation coefficient	.7353
Standard error of estimate	417.2768

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1614.7974		80.8048*
Average value of land and buildings (X_1)	.0136	.5628	12.5112*
Male unemployment rate of county (X_2)	-40.3263	-.1976	-4.9479*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-19.9128	-.0378	-1.1026
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-4.9914	-.0629	-1.1660
12 or more years of school (X_5)	-5.2667	-.0858	-1.6738
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	1.7963	.0232	.6310
Per cent of rural farm males who are age:			
15-24 (X_7)	-2.5534	-.0110	-.2797
25-44 (X_8)	15.5670	.0701	1.8042
Size-distance$_1$ (X_{10})	12.7849	.1036	2.6524*

*Significantly different from zero at the .05 level.

TABLE II.9

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

East North Central Division

Multiple correlation coefficient	.7343
Standard error of estimate	417.9595

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1725.9798		8[illegible].2273*
Average value of land and buildings (X_1)	.0136	.5628	12.4519*
Male unemployment rate of county (X_2)	-40.9256	-.2005	-5.0229*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-18.2032	-.0346	-1.0096
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-4.8437	-.0610	-1.1255
12 or more years of school (X_5)	-5.2639	-.0858	-1.6685
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	2.1178	.0273	.7454
Per cent of rural farm males who are age:			
15-24 (X_7)	-4.0358	-.0174	-.4439
25-44 (X_8)	14.6933	.0661	1.7045
Size-distance$_2$ (X_{11})	11.4082	.0924	2.3711*

*Significantly different from zero at the .05 level.

TABLE II.10

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

West North Central Division

Multiple correlation coefficient	.7697
Standard error of estimate	530.1266

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	-613.4145		-28.7885*
Average value of land and buildings (X_1)	.0145	.4861	13.2927*
Male unemployment rate of county (X_2)	-34.5400	-.1036	-3.2434*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	18.4339	.0627	2.1907*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-4.2442	-.0348	-.9579
12 or more years of school (X_5)	13.9121	.1697	4.2298*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	12.5681	.1445	4.5037*
Per cent of rural farm males who are age:			
15-24 (X_7)	50.9599	.1070	3.7140*
25-44 (X_8)	44.5336	.1514	4.4663*
Distance from nearest SMSA (X_9) .	110.9714	.1997	6.3635*

*Significantly different from zero at the .05 level.

TABLE II.11

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

West North Central Division

Multiple correlation coefficient	.7686
Standard error of estimate	531.2840

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	51.3312		2.4038*
Average value of land and buildings (X_1)	.0152	.5095	14.2769*
Male unemployment rate of county (X_2)	-39.8457	-.1195	-3.6765*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	25.7905	.0877	3.0556*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	2.1868	.0179	.4915
12 or more years of school (X_5)	10.3582	.1264	3.1422*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	14.0998	.1621	4.8503*
Per cent of rural farm males who are age:			
15-24 (X_7)	48.0835	.1010	3.4987*
25-44 (X_8)	36.6669	.1247	3.5856*
Size-distance$_1$ (X_{10})	-32.0500	-.2179	-6.1373*

*Significantly different from zero at the .05 level.

TABLE II.12

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

West North Central Division

Multiple correlation coefficient	.7525
Standard error of estimate	546.9133

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	-324.7775		-14.7745*
Average value of land and buildings (X_1)	.0164	.5498	15.1791*
Male unemployment rate of county (X_2)	-27.8277	-.0835	-2.4959*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	22.9551	.0780	2.6320*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.5847	-.0048	-.1277
12 or more years of school (X_5)	11.1927	.1366	3.2157*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	7.8873	.0907	2.6214*
Per cent of rural farm males who are age:			
15-24 (X_7)	47.3960	.0995	3.3471*
25-44 (X_8)	49.4748	.1082	4.7512*
Size-distance$_2$ (X_{11})	-9.4491	-.0397	-1.1113

*Significantly different from zero at the .05 level.

TABLE II.13

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

South Atlantic Division

Multiple correlation coefficient	.6097
Standard error of estimate	831.9362

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3419.2622		99.4078*
Average value of land and buildings (X_1)	.0105	.3476	9.2700*
Male unemployment rate of county (X_2)	-24.0704	-.0626	-1.7118
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-5.2404	-.0943	-2.1918*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-11.3078	-.1651	-2.6058*
12 or more years of school (X_5)	2.1796	.0190	.3997
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-15.0424	-.1459	-3.8880*
Per cent of rural farm males who are age:			
15-24 (X_7)	-43.3889	-.1953	-3.4617*
25-44 (X_8)	-32.3144	-.1810	-3.7819*
Distance from nearest SMSA (X_9) .	-38.9159	-.0311	-.8237

*Significantly different from zero at the .05 level.

TABLE II.14

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

South Atlantic Division

Multiple correlation coefficient	.6195
Standard error of estimate	823.9590

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	3044.8465		89.3795*
Average value of land and buildings (X_1)	.0110	.3642	9.7709*
Male unemployment rate of county (X_2)	-31.6680	-.0823	-2.3136*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-4.7424	-.0854	-2.0310*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-10.4535	-.1526	-2.4355*
12 or more years of school (X_5)	.1838	.0016	.0341
Per cent of employed male labor force in county who are crafts-men, foremen, operatives, and kindred workers (X_6)	-13.9867	-.1357	-3.7472*
Per cent of rural farm males who are age:			
15-24 (X_7)	-37.1100	-.1670	-2.9568*
25-44 (X_8)	-29.7863	-.1668	-3.5254*
Size-distance$_1$ (X_{10})	20.7276	.1264	3.4466*

*Significantly different from zero at the .05 level.

TABLE II.15

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

South Atlantic Division

Multiple correlation coefficient	.6174
Standard error of estimate	825.6219

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	3133.9690		91.8103*
Average value of land and buildings (X_1)	.0108	.3576	9.6347*
Male unemployment rate of county (X_2)	-28.3655	-.0738	-2.0785*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-4.8586	-.0875	-2.0769*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-10.0885	-.1473	-2.3372*
12 or more years of school (X_5)	-.3880	-.0077	-.1618
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-13.5127	-.1311	-3.6053*
Per cent of rural farm males who are age:			
15-24 (X_7)	-38.8293	-.1747	-3.0990*
25-44 (X_8)	-29.9658	-.1678	-3.5366*
Size-distance$_2$ (X_{11})	23.9086	.1148	3.0851*

*Significantly different from zero at the .05 level.

TABLE II.15

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

East South Central Division

Multiple correlation coefficient	.8254
Standard error of estimate	300.6834

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1204.4339		76.4230*
Average value of land and buildings (X_1)	.0353	.5839	15.5949*
Male unemployment rate of county (X_2)	4.9957	.0275	.7109
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-5.3172	-.2356	-3.5302*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-5.7967	-.1217	-2.3003*
12 or more years of school (X_5)	-2.1948	-.0226	-.4471
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-9.2606	-.1843	-4.4917*
Per cent of rural farm males who are age:			
15-24 (X_7)	-21.5167	-.1356	-2.5159*
25-44 (X_8)	21.9693	.1142	2.2371*
Distance from nearest SMSA (X_9) .	-49.5884	-.0645	-1.9954*

*Significantly different from zero at the .05 level.

TABLE II.17

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

East South Central Division

Multiple correlation coefficient	.8361
Standard error of estimate	292.1978

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	560.8547		36.6205*
Average value of land and buildings (X_1)	.0335	.5541	15.0926*
Male unemployment rate of county (X_2)	1.3014	.0072	.1900
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-5.3784	-.2383	-3.6757*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-2.7385	-.0575	-1.0987
12 or more years of school (X_5)	4.3698	.0450	.8934
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-8.2700	-.1646	-4.2080*
Per cent of rural farm males who are age:			
15-24 (X_7)	-9.8565	-.0621	-1.1408
25-44 (X_8)	24.3577	.1267	2.5700*
Size-distance$_1$ (X_{10})	26.1245	.1803	5.0075*

*Significantly different from zero at the .05 level.

TABLE II.18

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

East South Central Division

Multiple correlation coefficient	.8445
Standard error of estimate	285.2355

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	703.7115		47.0697*
Average value of land and buildings (X_1)	.0306	.5062	13.5361*
Male unemployment rate of county (X_2)	5.9412	.0327	.8916
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-6.6578	-.2949	-4.6089*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-1.5696	-.0330	-.6415
12 or more years of school (X_5)	1.2963	.0134	.2783
Per cent of employed male labor force in county who are crafts-men, foremen, operatives, and kindred workers (X_6)	-9.5610	-.1903	-4.9658*
Per cent of rural farm males who are age:			
15-24 (X_7)	-8.23[illegible]1	-.0519	-.9851
25-44 (X_8)	25.0173	.1301	2.7039*
Size-distance$_2$ (X_{11})	67.[illegible]520	.2310	6.6187*

*Significantly different from zero at the .05 level.

TABLE II.19

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

West South Central Division

Multiple correlation coefficient	.8354
Standard error of estimate	873.7464

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	1358.9195		33.7176*
Average value of land and buildings (X_1)	.0189	.6826	19.0077*
Male unemployment rate of county (X_2)	-85.8647	-.1288	-4.3134*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-19.7914	-.1801	-5.0693*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	.7897	.0081	.1970
12 or more years of school (X_5)	18.2410	.1240	2.6890*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-7.8985	-.0458	-1.6127
Per cent of rural farm males who are age:			
15-24 (X_7)	33.3559	.0767	2.1564*
25-44 (X_8)	-12.6628	-.0481	-1.2574
Distance from nearest SMSA (X_9) .	47.4134	.0237	.8858

*Significantly different from zero at the .05 level.

TABLE II.20

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

West South Central Division

Multiple correlation coefficient	.8400
Standard error of estimate	862.4835

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1777.5400		44.6804*
Average value of land and buildings (X_1)	.0181	.6537	17.8150*
Male unemployment rate of county (X_2)	-88.2105	-.1323	-4.4865*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-20.8094	-.1894	-5.3910*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	.4744	.0048	.1203
12 or more years of school (X_5)	13.6061	.0925	2.0100*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-5.9359	-.0344	-1.2461
Per cent of rural farm males who are age:			
15-24 (X_7)	31.8427	.0732	2.0874*
25-44 (X_8)	-12.6248	-.0480	-1.2768
Size-distance$_1$ (X_{10})	-53.9763	-.1080	-3.5913*

*Significantly different from zero at the .05 level.

TABLE II.21

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

West South Central Division

Multiple correlation coefficient	.8367
Standard error of estimate	870.5339

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1508.8167		37.5751*
Average value of land and buildings (X_1)	.0190	.6862	19.1839*
Male unemployment rate of county (X_2)	-30.1626	-.1352	-4.9181*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-19.0385	-.1814	-5.1285*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	1.4437	.0147	.3602
12 or more years of school (X_5)	18.6801	.1270	2.7675*
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-7.3755	-.0428	-1.5381
Per cent of rural farm males who are age:			
15-24 (X_7)	31.3360	.0721	2.0288*
25-44 (X_8)	-14.0167	-.0567	-1.4771
Size-distance$_2$ (X_{11})	-42.0443	-.0547	-2.0474*

*Significantly different from zero at the .05 level.

TABLE II.22

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

Mountain Division

Multiple correlation coefficient	.4507
Standard error of estimate	1151.3510

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2478.3025		36.0828*
Average value of land and buildings (X_1)	.0097	.3333	5.8012*
Male unemployment rate of county (X_2)	-60.9244	-.1706	-2.8747*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-13.5886	-.1114	-1.5830
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-7.6988	-.0754	-.9841
12 or more years of school (X_5)	-3.0280	-.0300	-.4299
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-3.8047	-.0339	-.5815
Per cent of rural farm males who are age:			
15-24 (X_7)	16.0089	.0596	.9805
25-44 (X_8)	18.9641	.0986	1.5295
Distance from nearest SMSA (X_9) .	-4.2404	-.0051	-.0889

*Significantly different from zero at the .05 level.

TABLE II.23

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

Mountain Division

Multiple correlation coefficient	.4889
Standard error of estimate	1125.1365

Independent variables	Partial regression coefficients	Beta coeffi-cients	Computed t values
Constant term	2599.6872		38.7319*
Average value of land and buildings (X_1)	.0112	.3849	6.6538*
Male unemployment rate of county (X_2)	-69.2767	-.1940	-3.3382*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-9.6748	-.0793	-1.1436
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-10.0259	-.0983	-1.3078
12 or more years of school (X_5)	-2.0238	-.0200	-.2976
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	.7073	.0063	.1093
Per cent of rural farm males who are age:			
15-24 (X_7)	9.7269	.0360	.6037
25-44 (X_8)	10.3652	.0565	.9016
Size-distance$_1$ (X_{10})	-107.9227	-.2051	-3.5754*

*Significantly different from zero at the .05 level.

TABLE II.24

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

Mountain Division

Multiple correlation coefficient	.4625
Standard error of estimate	1143.5364

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2578.9131		37.8043*
Average value of land and buildings (X_1)	.0104	.3574	6.1511*
Male unemployment rate of county (X_2)	-65.7963	-.1842	-3.1177*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-12.8733	-.1056	-1.5085
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-[illegible].0422	-.0086	-1.1600
12 or more years of school (X_5)	-3.6012	-.0365	-.5335
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-1.9453	-.0173	-.2983
Per cent of rural farm males who are age:			
15-24 (X_7)	14.7834	.0547	.9075
25-44 (X_8)	13.8238	.0719	1.1231
Size-distance$_2$ (X_{11})	-[illegible]7.3327	-.1071	-1.9299

* Significantly different from zero at the .05 level.

TABLE II.25

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

Pacific Division

Multiple correlation coefficient	.6704
Standard error of estimate	1055.4864

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	1935.1984		21.3817*
Average value of land and buildings (X_1)	.0094	.4164	4.3813*
Male unemployment rate of county (X_2)	-166.0077	-.2988	-3.8986*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	3.6312	.0207	.2562
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	1.2709	.0060	.0642
12 or more years of school (X_5)	1.8166	.0113	.1234
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-19.7443	-.1046	-1.2102
Per cent of rural farm males who are age:			
15-24 (X_7)	94.8515	.1518	1.9809*
25-44 (X_8)	54.0930	.1461	1.6843
Distance from nearest SMSA (X_9) .	131.2876	.1444	1.6731

*Significantly different from zero at the .05 level.

TABLE II.26

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

Pacific Division

Multiple correlation coefficient	.6680
Standard error of estimate	1058.6479

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2316.3877		25.5170*
Average value of land and buildings (X_1)	.0096	.4252	4.3410*
Male unemployment rate of county (X_2)	-149.0419	-.2683	-3.6085*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	10.1659	.0579	.6266
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	4.0049	.0188	.1972
12 or more years of school (X_5)	3.5266	.0219	.2380
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-20.0219	-.1061	-1.2185
Per cent of rural farm males who are age:			
15-24 (X_7)	72.2928	.1157	1.5158
25-44 (X_8)	58.3754	.1576	1.8336
Size-distance$_1$ (X_{10})	-24.5955	-.1451	-1.4252

*Significantly different from zero at the .05 level.

TABLE II.27

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (3)

Pacific Division

Multiple correlation coefficient	.6643
Standard error of estimate	1063.2753

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Constant term	2334.9992		25.6101*
Average value of land and buildings (X_1)	.0090	.3986	4.1942*
Male unemployment rate of county (X_2)	-153.8001	-.2768	-3.6671*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	6.6358	.0378	.4017
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-.5241	-.0025	-.0263
12 or more years of school (X_5)	2.0398	.0126	.1375
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-22.7264	-.1204	-1.3943
Per cent of rural farm males who are age:			
15-24 (X_7)	76.0927	.1217	1.5925
25-44 (X_8)	63.9406	.1726	2.0229*
Size-distance$_2$ (X_{11})	-22.2656	-.0935	-.9588

*Significantly different from zero at the .05 level.

TABLE II.28

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (1)

Conterminous United States

Multiple correlation coefficient	.5850
Standard error of estimate	778.7179

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Average value of land and buildings (X_1)	.0151	.5091	34.5948*
Male unemployment rate of county (X_2)	-8.4957	-.1151	-8.4957*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3)	-9.1269	-.1141	-7.0387*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-11.3178	-.1618	-6.7010*
12 or more years of school (X_5)	2.6818	.0276	1.3976
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-3.9520	-.0360	-2.4022*
Per cent of rural farm males who are age:			
15-24 (X_7)	-11.9910	-.0372	-2.3535*
25-44 (X_8)	-6.1148	-.0251	-1.6573
Distance from nearest SMSA (X_9) .	49.0668	.0540	3.6265*

Division constant	Partial regression coefficients	Computed t values
New England	2562.11	17.6765*
Middle Atlantic	2722.06	21.8772*
East North Central	2304.85	20.4489*
West North Central	2052.31	19.9545*
South Atlantic	2073.72	18.4745*
East South Central	2031.14	17.8651*
West South Central	2259.28	20.3258*
Mountain	2490.63	20.2266*
Pacific	2673.12	20.5541*

*Significantly different from zero at the .05 level.

TABLE II.29

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (2)

Conterminous United States

Multiple correlation coefficient	.5837
Standard error of estimate	779.8879

Independent variables	Partial regression coefficients	Beta coefficients	Computed t values
Average value of land and buildings (X_1)	.0152	.5125	34.5748*
Male unemployment rate of county (X_2)	-44.9068	-.1078	-8.0642*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-9.3751	-.1172	-7.2213*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-11.5120	-.1646	-6.8103*
12 or more years of school (X_5)	1.8184	.0187	.9529
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-4.8632	-.0443	-2.9958*
Per cent of rural farm males who are age:			
15-24 (X_7)	-12.3566	-.0383	-2.3898*
25-44 (X_8)	-9.2199	-.0214	-1.4099
Size-distance$_1$ (X_{10})	-5.5569	-.0317	-1.9615*

Division Constant	Partial regression coefficients	Computed t values
New England	2769.63	18.0395*
Middle Atlantic	2901.80	21.1233*
East North Central	2487.61	20.6399*
West North Central	2233.71	21.9707*
South Atlantic	2230.95	19.4593*
East South Central	2176.07	18.8886*
West South Central	2397.98	21.7415*
Mountain	2692.15	23.3255*
Pacific	2885.23	21.7748*

*Significantly different from zero at the .05 level.

TABLE II.30

The results of the analysis of factors influencing median earnings per county of farmers and farm managers in 1959

Earnings of farmers equation (5)

Conterminous United States

Multiple correlation coefficient			.5834
Standard error of estimate			780.2169
Independent variables	**Partial regression coefficients**	**Beta coefficients**	**Computed t values**
Average value of land and buildings (X_1)	.0151	.5091	34.1425*
Male unemployment rate of county (X_2)	-43.5392	-.1045	-7.7966*
Per cent of employed male farmers and farm managers in county who are nonwhite (X_3) . . .	-9.3362	-.1167	-7.1893*
Per cent of rural farm males, age 25 or over, who have completed:			
0-6 years of school (X_4)	-11.6448	-.1665	-6.8905*
12 or more years of school (X_5)	1.6207	.0188	.9536
Per cent of employed male labor force in county who are craftsmen, foremen, operatives, and kindred workers (X_6)	-5.8010	-.0528	-3.5818*
Per cent of rural farm males who are age:			
15-24 (X_7)	-3.6088	-.0298	-1.8632
25-44 (X_8)	-3.3038	-.0135	-.8932
Size-distance$_2$ (X_{11})	4.1360	.0170	1.1130
Division Constant	**Partial regression coefficients**		**Computed t values**
New England	2611.80		17.5520*
Middle Atlantic	2730.56		20.6281*
East North Central	2353.05		20.3659*
West North Central	2157.55		21.8489*
South Atlantic	2134.89		19.1284*
East South Central	2100.69		18.6650*
West South Central	2341.95		21.5206*
Mountain	2647.13		23.0669*
Pacific	2736.12		21.5681*

*Significantly different from zero at the .05 level.