AN ECONOMIC ANALYSIS OF FERTILITY DIFFERENTIALS AMONG RURAL-FARM COMMUNITIES IN THE UNITED STATES IN 1960

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY
Asoka B. Andarawewa

1964

This is to certify that the

thesis entitled

AN ECONOMIC ANALYSIS OF FERTILITY DIFFERENTIALS
AMONG RURAL-FARM COMMUNITIES
IN THE UNITED STATES IN 1960

presented by

ASOKA B. ANDARAWEWA

has been accepted towards fulfillment
of the requirements for

Ph. D degree in Agricultural Economics

Dale E. Hathaway
Major professor

Date February 26, 1964

O-169

ABSTRACT

AN ECONOMIC ANALYSIS OF FERTILITY DIFFERENTIALS
AMONG RURAL-FARM COMMUNITIES
IN THE UNITED STATES IN 1960

by Asoka B. Andarawewa

The purpose of this study was to delineate and examine some of the factors that affect fertility differentials among rural-farm communities in the United States. Data from the 1960 Census of Population were available on a magnetic tape, capable of computer processing, which enabled the use of multiple regression techniques to examine the relationships between fertility rates and a set of predominantly economic variables. The index of fertility used in the study was the number of children ever born to ever married females age 15-44 per 1000 ever married females age 15-44 per county in 1960. Fertility rates of white females per county were analyzed for each division, for each region and for the Conterminous United States. County fertility rates of non-white females were analyzed for each division of the Southern region and for the Southern region.

Asoka B. Andarawewa

The relative importance of the factors differed within each geographical area studied. Education (median years of school completed by males and females age 25 and over) was the most important determinant of white fertility rates in the East North Central, West North Central, East South Central, West South Central and Pacific divisions, the North Central and Southern regions, and in the nation. It was second most important determinant in the South Atlantic division. In all cases the relationship between fertility rates and education was negative, thus emphasizing the influence of education on the attitudes of couples towards family limitation.

Other important factors were median family income, median female income, urban influence, the percent of farm laborers and farm foremen in the labor force and married females age 15-24. In most of the divisions and in each region, female income and family income were negatively related to white fertility rates. The relative prevalence of farm laborers and farm foremen tended to raise fertility rates in a county. The relative prevalence of married females in the age group 15-24 depressed fertility rates. Urban influence tended to lower fertility rates. In all the divisions except in New England, in each region and in the nation, the cultural influence of urban concentrations on fertility rates was a function of both the distance of the community from the city and the size of the city itself.

Education, family income, and married females age 15-24 were the most important determinants of non-white fertility rates. Urban influence was an unimportant factor except in the East South Central division.

The effects of some of the variables were different among the divisions and among the regions. Among the divisions, the chief differences in the effects of female employment in the East South Central division, of education in the Mountain division, of family income in the West South Central division and of married females in the West North Central, West South Central and Mountain divisions. Among the divisions in the Southern region, the effect of most variables on non-white fertility rates studied were different in the West South Central division. Among the regions, the effect of most of the variables on white fertility rates were different in the North Central region as compared to the Southern and Western regions.

In summary, high education, high income, and the relative prevalence of married females in the younger age groups, tended to lower fertility rates of both white and non-white females. Urban influence also was an important factor tending to lower fertility rates among white females.

AN ECONOMIC ANALYSIS OF FERTILITY DIFFERENTIALS AMONG RURAL-FARM COMMUNITIES IN THE UNITED STATES IN 1960

by

Asoka B. Andarawewa

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Agricultural Economics

1964

ACKNOWLEDGMENTS

The author wishes to express his thanks to Dr. Dale E. Hathaway, who supervised this study. His criticisms and guidance were of invaluable help. Thanks are also due to Dr. Carl K. Eicher, Dr. A. Allan Schmid and Dr. Lester V. Mandersheid of the Department of Agricultural Economics. Dr. Robert Barrett and Dr. Gerald J. Massey of the Department of Philosophy, Dr. Subbiah Kannappen of the Department of Economics, and Dr. W. Keith Bryant, presently of the University of Minnesota for their suggestions, criticisms and help, at various stages of my studies.

My graduate career at Michigan State University was guided by Dr. Glenn L. Johnson. To him, I owe my intellectual training and the present confidence in my ability to make a substantial contribution towards the progress of my country.

My wife, Nancy, deserves special thanks, not only for the help on my thesis, but also for her patience and courage under the most trying circumstances.

Finally, I should note my debt to Dr. L. L. Boger, Head, Department of Agricultural Economics, for the generous financial assistance I received, during my stay in this country.

TABLE OF CONTENTS

LIST OF TABLES

Table | Page

LIST OF APPENDICES

Table		Page

Table		Page

CHAPTER I

FERTILITY DIFFERENTIALS IN THE RURAL-FARM SECTOR

Introduction

During the past few decades, there has grown a marked interest in population problems both in the United States and in the rest of the world. Since World War II, the attempts at economic development by the underdeveloped countries, which have high rates of population growth, have made population problems the focus of intensive study. Sociologists and demographers have carried the burden of demographic research till recently. Their studies have analyzed trends and differentials among geographic divisions by socio-economic status, residence and color. However, the area of population study is becoming increasingly inter-disciplinary.

Economists, in their analyses, have long considered population as an exogenous variable. But the recent emphasis placed on economic development has stirred the interest of the economists in problems of population growth. A considerable number of studies have been conducted on the relation between population growth and economic development.[1] These studies have stressed the impact of population growth on development, especially the barriers to development presented by high rates of population growth. For example, the study by Coale and Hoover made use of economic models to estimate the rate of growth of National Income, the rate of growth of investment and the disposition of labor supply assuming different population projections.[2]

But the influence of economic factors on population growth has received scant attention, especially the study of the influence of economic factors such as employment, income, education, etc., on fertility rates. Occasionally studies have attempted to relate a variable, e.g., urban influence, to fertility. But these studies have been such that the relevance of their results was limited. The relationship of economic variables to

---

[1]H. Leibenstein, Economic Backwardness and Economic Growth (New York: John Wiley and Sons, Inc., 1957).

A. J. Coale and E. M. Hoover, Population Growth and Economic Development of Low-Income Countries; A Case Study of India (Princeton: Princeton University Press, 1958).

[2]Ibid, pp. 227-294.

fe

a c

si

fertility differentials--not among countries but within a country stratified broadly by census or political divisions, by color and by residence, has been relatively unexplored. No extensive study has been undertaken on the differentials in fertility arising from differences in cultural and economic factors among rural-farm communities.

The main reason for the lack of such studies, other than the economist's tendency to view the field of population study as outside the scope of his discipline, is the lack of adequate data. Either adequate measures of variables were absent or they have been available in units inappropriate to meaningful analysis. For a considerable period, data on many variables were available at the state level and not below. This is true even in the United States, where the coverage of the census is extensive, refinements and replacements of census concepts are continually made to improve the collection of data. It is pertinent to note that development of research on fertility in the United States has been dependent upon the development of the census of population.

Better data were available for an analysis of fertility differentials in the 1960 Census than have been previously available. In the 1960 Census of Population, a host of economic, demographic and sociological characteristics of the population were gathered for a 25 percent sample of households in the United States. These data were available for population groups classified by residence at the county level. Moreover, they were available for the first time on electronic computer tapes which facilitated analysis on a scale hitherto impossible. These data enabled the study of factors which affect fertility rates among rural-farm communities.

The primary purpose of this study was to examine the relationship of several factors on fertility differentials among rural-farm women in the United States in 1960. The study was undertaken for the census divisions, regions, and for the counterminous United States as a whole. Previous studies have concentrated either on the computation of trends and differentials by occupation, residence, or socio-economic status, or on explaining how these trends have occurred. Studies relating economic variables to fertility have concentrated on one indicator of economic conditions, namely, income or

urban influence, or were confined to a limited geographic area. The major hypothesis of the study was that economic factors were responsible for different fertility rates within a geographic area, and that there were differences in the importance of these factors among the geographic areas. In considering other factors along with urban influence, this study attempted to analyze the effects of a group of factors and to clarify the relations between these factors and the resulting fertility differentials.

A majority of the variables used in the analysis were related to the characteristics of the population in the community. Other variables were related to the location of the community with respect to other communities.

The Empirical Nature of the Problem

The problem studied pertained to inter-community fertility differentials within the rural-farm sector. The purpose of the study was to identify and evaluate some of the factors that affected these differentials. Prior to the actual study, the operational definition of a rural-farm community has to be clarified. A rural community may be defined as a group of people living in a limited area who are engaged primarily in agricultural

occupations. Data based on such a concept were not available. The concept of a rural community in this study closely follows the census classification. The United States Bureau of Census has experimented with new definitions and concepts to measure the transformation that has taken place in the residential distribution of the population. Since the first census of 1790, there has been a continuous change in the residential complexion of the population. Peterson has recapitulated the development of the differentiations used in each Census.[3] At the beginning of the nineteenth century, according to the Census definition, the rural population were mostly farmers, who lived in the countryside in unincorporated places. There were few ambiguities in the operational definition of a rural community. Today the census classifies the population in a county on the basis of residence in an urban place, or in a rural area. Those people living in a rural area were further classified into rural-non-farm and rural-farm on the basis of their residence on a place defined as a farm. Residents in a rural area, to be classified as rural-farm, had to live on a place of 10 acres or more from which the sale of farm products amounted

---

[3]W. Peterson, Population (New York: McMillan Company, 1961), Table 8-2, p. 188. The principal source for this table was Leon E. Truesdell, "The Development of the Urban-Rural Classification in the United States," United States Bureau of Census, Current Population Reports, Series P-23, No. 1, 1949.

to $50 or more in 1959 or on places of less than 10 acres from which the sale of products amounted to $250 or more in 1959.[4] It is possible, under this definition, that residents in rural areas, though their main occupation was non-farm, were classified as rural-farm by meeting the above requirements. In this study the rural-farm residents in a county, as defined by the census, were taken to be the rural community.

The operational variable used was the fertility rate of rural-farm women. Fertility has to be distinguished from fecundity. Fecundity is the physiological capacity to bear children and fertility is the realization of this potential, the actual birth performance as measured by the number of offspring. The fertility rate measures the number of children ever born per 1,000 ever-married women, age 15-44. Data on children ever born were enumerated in the census of 1960. A detailed discussion of this variable is included in Chapter III.

---

[4]For a detailed discussion of the bases of the rural-non-farm, rural-farm division, see U.S., Bureau of Census, United States Census of Population: 1960, United States Summary, General Social and Economic Characteristics, P. C. (1), 1C, pp. vii-viii. (Hereafter this publication will be referred to as P. C. (1), 1C).

The Organization of the Study

Much of the research on fertility has been confined to the analysis of trends and differentials by socio-economic groups, residence, and color, using data from the United States Censuses. Few studies have concentrated on the explanation of such trends and differentials. Little attention has been paid to the study of the effects of economic variables on differentials in fertility rates. Chapter II contains a review of the literature analyzing fertility differentials. In Chapter III, the hypotheses tested in this study are discussed. Chapter IV discusses the statistical methods used in the study. In Chapter V, the results of the analyses of fertility rates are discussed by each division, region, and for the conterminous United States. Chapter VI compares the results among divisions and regions, and Chapter VII summarizes the results of the study. The Appendix contains detailed statistical results.

CHAPTER II

THE ANALYSIS OF FERTILITY: A REVIEW OF LITERATURE

Introduction

A considerable amount of literature is available on the subject of fertility. These studies can be grouped into three broad categories. The first set contains studies which measure trends and differentials in fertility rates. The United States Census Reports have been the basis of such studies. Data on ratios of children to white women are available by states from published census data for each census year since 1800, and by counties, townships, and cities up to 1840 and since 1890, a part of the necessary data being omitted from the censuses of 1850 to 1880.[1] Rural-urban fertility ratios are available since 1910, and rural-farm and rural-non-farm ratios since 1930. Beginning with the census of 1890, census enumeration included women by age by marital status for states and other areas, and hence, ratios of children to married

---

[1]P. K. Whelpton, Needed Population Research (Lancaster: Science Press Printing Company, 1938), p. 41.

women can be secured for this period. Also, the number of children ever born to ever married women was enumerated for the censuses of 1890, 1900, and 1910. It was enumerated for a 5 percent sample of married women in 1940, and for a 3-1/3 percent sample in 1950. Since 1890, the inclusion, in the census, of children ever born, provides a better index of fertility than crude birth rates or other general measures.

The above ratios computed from census data make it possible to show trends of fertility for all white women in the nation and each state during a period of 160 years, and for all women and for married women by race, nativity, and residence in the various political units for shorter periods. The availability of such data has led to the build-up of a large body of knowledge regarding fertility trends and differentials in this country. The literature includes studies of trends and differentials in fertility between states, cities, counties, and rural areas in different parts of the nation; between large cities, small cities, rural-non-farm, and rural-farm groups in the same part of the nation, and

Between racial and nativity groups.[2]

These studies also have related trends and differentials in fertility rates to occupational groups, socio-economic status, and educational level.[3] The phenomenon of differential fertility according to occupational or socio-economic status has sometimes been described as a transitional phase of declining fertility. The theory postulates that family limitation practices find their first acceptance and extensive use among the so-called "upper" classes in urban areas. Later it spreads downwards to the so-called "middle" classes, and finally to the lower classes. The spread of knowledge and acceptance of family limitation practices is accompanied by a decline

---

[2]W. S. Thompson and P. K. Whelpton, Population Trends in the United States (New York: McGraw-Hill, 1933).

W. H. Grabill, C. V. Kiser, and P. K. Whelpton, The Fertility of American Women (New York: John Wiley and Sons, 1958).

T. J. Woofter, "Trends in Rural and Urban Fertility Rates," Rural Sociology (March 1959), XIII, No. 1.

[3]P. K. Whelpton, "Geographic and Economic Differentials in Fertility," Annals of the American Academy of Political and Social Science, CLXXXVIII, (November, 1936).

C. V. Kiser, "Differential Fertility in the United States," Demographic and Economic Change in Developed Countries (Princeton: National Bureau of Economic Research, 1960), pp. 77-112.

in fertility. In the meantime, such knowledge spreads outwards from the urban areas to the rural areas, and the process presumably follows a similar pattern, the declines in fertility beginning in the upper classes and spreading to the lower classes. If fertility declines do proceed on the pattern described above, first an enlargement, and later contractions of group differences in fertility can be expected. In the United States, the theory has been consistent, to a lesser degree with the data since 1800, and is in close agreement with the data since 1900.[4]

The second set of studies relate to the ways in which the trends and differentials have occurred, including psychological factors and voluntary control measures. On the one hand, fertility trends and differentials are attributed to biological factors such as the decline in the physical strength of the people vis a vis the previous generation. On the other hand, emphasis was placed on the planned actions of human individuals, such as early or late marriage and voluntary birth control measures. Studies conducted by public health authorities and by private groups prove conclusively that conscious control

---

[4]Grabil, Kiser, and Whelpton, op. cit., chaps. 2, 3, and 5.

of fertility is more important than biological or physiological factors in bringing about the observed trends and differentials in fertility. The Indianapolis Study, 1941, based on house-to-house interviews of 41,498 native white couples, found a large percentage (90 percent) of the couples interviewed using birth control measures.[5] A recent study showed that most American families are planned irrespective of religion, income, education, occupation or residence differences.[6]

While there is much evidence of fertility differentials for women grouped on geographic, economic, and social bases, and some evidence that these differences have occurred in a major degree due to individuals constituting certain groups having better information about contraception, there has been relatively little attention paid to the conditions affecting the differences in fertility. There is a dearth of research on the weight of various factors determining the individuals' or couples' age at marriage, the extent to which family limitation

---

[5]C. V. Kiser and P. K. Whelpton, Social and Psychological Factors Affecting Fertility (New York: Milbank Memorial Fund), II, Part VI, p. 253.

[6]R. Freedman, P. K. Whelpton, and A. A. Campbell, Family Planning, Sterility, and Population Growth (New York: McGraw-Hill Book Company, 1959), p. 155.

is tried, the number of children wanted by couples and the extent to which these factors are subject to social control. The third set of studies constitute the meager literature available on the attempts to measure the influence of psychological, social, and economic factors on the fertility of racial, geographic, and residence groups.

Fertility studies based both on census data and private surveys show that differential fertility has arisen mainly due to differences in the use of family limitation practices. Voluntary family limitation is achieved by the conscious efforts of individuals through the use of devices to prevent conception. The acceptance and use of contraceptive devices by a given couple depends on the cultural mores of the society of which they are a part, the attitude of their religious persuasions towards family limitation, psychological and social factors, and economic factors which determine the economics of child-bearing and rearing.

The effect of psychological factors on fertility is studied in the Indianapolis Survey. The evidence gathered in the survey did not yield a strong relationship between psychological variables such as a feeling of personal inadequacy, ego-centered interest in children,

or felt restriction of present freedom and fertility.[7] According to the authors, "Our measures of psychological characteristics were too crude to afford precise differentiations, [and] it may be little wonder that the study failed to indicate strong and consistent relations of fertility behavior to psychological characteristics among so homogeneous a sample."[8] They further stated that the chief lesson to be learned from the study was that fertility is generally more closely related to broad social factors (including economic) than to psychological factors. They concluded that family planning and actual fertility were clearly correlated with socio-economic status; but when this variable was held constant, the observed relation of fertility behavior to most psychological characteristics considered was generally less pronounced or less regular.[9] In the present study, psychological variables were not considered, not due to their unimportance, but essentially due to lack of adequate measures of such variables as would facilitate quantitative analysis.

---

[7]Kiser and Whelpton, op. cit., III, Part VI, p. 829.

[8]C. V. Kiser and P. K. Whelpton, "Summary of Chief Findings and Implications for Future Studies, "Milbank Memorial Fund Quarterly, XXXVI, No. 3 (July, 1958), p. 323.

[9]Ibid., pp. 318-19.

The effect of cultural variables has been long emphasized, both by demographers and sociologists. For example, Landis, in explaining the higher rural birth rate states,

> Rural life has always emphasized the family, placing family interests above individual interests, and is much more biological in its entire setting than is urban life. . . . Children are taken for granted in the rural family, mating and reproduction are part of the normal scene. . . . There are several logical reasons for a family on the farm where family members are engaged in a joint enterprise, have a common social life and live in a community where other families have children and where social functions are family rather than individual affairs, planned to include all age groups rather than one single age group. These general patterns of real culture all help to explain the much higher rate of rural areas.[10]

The influence of religion has also been studied, but the analysis was confined to computing fertility ratios for different religions by different socio-economic groups.[11]

The use of Census data precludes exact qualification of cultural concepts. However variables were included in this study to represent for example the influence of urban culture patterns. The next section discusses the literature on the economic analysis of fertility.

---

[10]Paul H. Landis, Population Problems--A Cultural Interpretation (2nd ed., prepared by Paul K. Hall, New York: American Book Company, 1954), p. 234.

[11]Friedman, Whelpton, and Campbell, loc. cit.

Economic Analysis of Fertility

The effect of economic variables on fertility has been studied for a considerable period of time. Some of the studies examine trends in economic conditions and trends in fertility for the United States as a whole.[12] These studies indicate a positive correlation between fertility and business activity. Recently there has been an increased interest in fertility research, using the theories and econometric methods developed in economic research. Becker uses the conventional theory of consumer demand to analyze the influence of income on fertility. He assumes that children are viewed primarily as a consumer or a productive good. However, in a urban setting, children lose their value as productive

---

[12] W. F. Ogburn and D. S. Thomas, "The Influence of Business Cycle on Certain Social Conditions," Journal of the American Statistical Association, XVIII (1922), pp. 324-40.

D. Kirk and D. L. Nortman, "Business and Babies: The Influence of the Business Cycle on Birth Rates," Proceedings of the American Statistical Association, Social Statistics Section (1958), pp. 151-160.

R. A. Easterlin, "The American Baby Boom in its Historical Perspective," American Economic Review, LI, No. 5 (December, 1961), pp. 869-911.

Grabill, Kiser, and Whelpton, op. cit., chaps. 5, 6, 7, pp. 113-203.

goods and are what are called in economic theory, superior goods. The number of children "consumed" then, increases as income increases.[13] Another development of macro-economic theory, the Relative-Income Hypothesis is used by Freedman to analyze the relationship between economic status and fertility. All the data in the study are from interviews conducted for the "Growth of American Families" study.[14] Freedman considers as the income variables not only the husband's actual income, but his income compared with the average earned by men of his age, educational level, and occupation. The ratio between the actual income of the husband and the income customary in his socio-economic group is called the relative income. Other economic variables used include the number of years worked since marriage, wife's income, wife's labor force status and wife's future work expectation. The women were divided into two groups, one group married ten or more years and the other married five to nine years. The study shows a stronger relationship when using the relative income, but

---

[13]G. S. Becker, "An Economic Analysis of Fertility," Demographic and Economic Change in Developed Countries, Princeton: National Bureau of Economic Research, 1960), pp. 209-31.

[14]Freedman, Whelpton, and Campbell, op. cit.

the two income variables for the husband were the most important. The total variance in family size explained by the six economic variables for the group married ten or more years was only four percent. For the second group, the work variables of the wife were most important, and the husband's income variables showed no consistent relationship to fertility. The total variance explained in this group by the economic variables was eighteen percent. The addition of demographic variables increased the coefficient of multiple determination (R^2) from .18 to .24 for the second group and from .04 to .10 for the first group. While the results show a consistent relationship between some of the economic variables and fertility, the proportion of the total variation in fertility rates explained is small. This probably can be explained by the purposive nature of the data. The study was restricted to white non-farm "fecund planners." The study showed a concensus among U. S. families to limit the range of both expected and desired family size. The desired norm for the fecund planners was two-four children. Since this is a marked concensus on a limited range of desired family size, there is less variance in family size to be explained, and less likelihood that a small group of factors will be able to account for it.[15]

In another study Adelman, using data gathered by the United Nations, examines the effects of economic variables on fertility for a sample of thirty-seven countries whose annual per capita incomes range from $125 (Morocco) to $1900 (United States), with half the incomes below $350.[16] Functions were fitted using least squares regression methods with age-specific birth rates as the dependent variables, and the percentage of the labor force employed outside agriculture, an index of education, population density, and the level of real national income per capita as the independent variables. The results of the study supported the hypothesis that, *ceteris paribus*, age-specific birth rates tend to vary directly with per capita income in the long run, that urbanization leads to a reduction of births in the long run, that the level of education is negatively correlated with fertility, and that over-population generates its own antidote by

---

[15]D. S. Freedman, "Relation of Economic Status to Fertility," *American Economic Review*, LIII, No. 3 (June 1963), pp. 414-26.

[16]I. Adelman, "An Econometric Analysis of Population Growth," *American Economic Review*, LIII, No. 3 (June, 1963), pp. 314-39

leading to fewer births. One criticism of the statistical procedure relates to the possible high inter-correlation among the independent variables, especially between the percent of the labor force employed outside agriculture and income, which would affect the significance of the regression coefficients through increased standard errors.

The study was a pioneering effort in that it has used statistical methods to show that economic variables account for a significant amount of the fertility differentials among countries.

Easterlin's study of the post-war baby boom incorporated an analysis of rural-farm fertility. Although the main emphasis of the study was on the non-farm sector, it yielded important implications for rural-farm fertility. Easterlin correlates birth rates with the Kuznets cycles of economic change. His findings provide an historical explanation of rural farm fertility trends. The accelerated decline of rural fertility in the Twenties and early Thirties are attributed to a set-back in the growth of farm income. The subsequent baby boom in the rural areas would be explained by the resurgence in farm income growth in the

---

[17] R. A. Easterlin, op. cit., pp. 889-90

late Thirties and Forties. The decline in the rate of growth in fertility in the 1950's is explained by the tapering off of the boom and the substantial drop in farm income growth. The increased significance of non-farm sources of total income and the progressive rise in the proportion of the farm's population not engaged in agriculture have tended to reduce the effect of farm income decreases on farm fertility. Other studies have attempted to examine the effect of urban concentrations on farm fertility. These have been examined in Chapter III.

In summary, although a considerable amount of literature is available on fertility analysis, a major proportion is devoted to the measurement of trends and differentials and to explanations as to their occurrence. Studies analyzing the influence of economic variables on fertility are of recent origin. There is only one instance of the application of economic models to the study of fertility. The study of the influence of economic conditions on rural-farm fertility was incidental to the main emphasis of Easterlin's study. There are no major studies which analyze relationships between fertility rates and economic variables within a county, among the various political units by urban-rural residence or by color.

A substantial amount of research is still to be carried out on the influence of economic variables on fertility by residence groups and color within the country. Econometric analysis of rural-farm fertility could be fruitful in understanding how differences in economic variables lead to differences in fertility among rural-farm residents in the various geographic units. It is hoped that it will also contribute to the meager literature in this area.

CHAPTER III

THE CONCEPTUAL FRAMEWORK: A DISCUSSION OF THE HYPOTHESES

A chapter outlines the conceptual framework within which the study of inter-regional rural-farm fertility differentials was conducted. It discusses the variable used to measure fertility. The independent variables are introduced, their rationale discussed, and their expected relationships with the dependent variable examined.

An Index of Fertility

Several measures are used as indices of fertility in the literature. These include crude birth rates, specific birth rates, gross reproductive rates, net reproductive rates, the general fertility rates, the nuptial, or marital, fertility and the age-specific fertility rate. The fertility rates are measures used to refine and supplement the birth rates. The limitations and advantages of these various measures are discussed in the literature.[1]

---

[1] Landis, op. cit., pp. 157-8.

Peterson, op. cit., Appendix, pp. 622-28.

Grabill, Kiser, and Whelpton, op. cit, pp. 13, 128, Appendix A, pp. 400-04.

In this study, the marital fertility rate was used as the dependent variable. This ratio refers to the number of children ever born per 1,000 ever married females age 15-44. The census data on fertility for 1960 were based on answers to a single question on the number of babies ever born, which was accompanied by a specific caution to exclude stillbirths.[2] The enumerator was instructed to leave out adopted children, stepchildren, or other children not born to the women; on the other hand, the count was to include children born to the women before the present marriage, children no longer living, and children away from home, as well as children borne by the women who were still in the home.

As it is possible in any census enumeration, over-counting or under-counting of children ever born could occur. Over-counting is possible through the inclusion, intentional or unintentional, of an adopted child, a stepchild, or a fetal death. An undercount may occur from the reporting of only births from the current marriage, or exclusion of illegitimate children (who should be included). However, it is believed very likely that many of the unwed mothers living

---

[2] P. C. (1), 1C, op. cit., p. xxv.

with an illegitimate child reported themselves as having been married, and therefore were among the women who were expected to report the number of children ever born, and that many of the mothers who married after the birth of an illegitimate child counted that child. Errors in the data are more probable for the rural women than for the urban women, and for the non-white women, especially in the South, than for white women. The above statements are speculative. The enumerator is not expected to probe intensively to obtain a precise answer to all parts of the records, especially when additional, often personal, questions are required to be sure. However, it is probable that the reports on children ever born do not contain any systematic bias, and that the measure offers a meaningful index of rural farm fertility.

The Conceptual Framework

The study was cross-sectional in nature, in that a number of geographical units were investigated at the same point in time. The data were observations on economic and demographic factors which vary from community to community. The hypotheses postulated that fertility rates of rural-farm women vary from community to community in accordance with inter-community variations in social and economic factors.

The statistical analysis of relationships among variables follows the specification of a model. A model is, loosely, a set of statements that are consistent with the advanced economic and statistical assumptions made by the investigator. The hypotheses to be tested are usually drawn from the model. In this study, the specification of such a model was based on assumptions about the nature of the factors, and about the relationships of the factors which were expected to explain intercommunity differentials in fertility rates of rural-farm women. The hypotheses to be tested can be grouped loosely with respect to these assumptions:

(1) Some of the factors which account for different fertility levels of women in rural-farm 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 other communities. Three alternative measures of urban influence were tested by estimation of three equations which had the fertility rate as the dependent variable, but each of which included only one of the above measures.

(2) Fertility rates may also differ among communities due to variations in certain factors among communities

and their population. These factors include income, education, employment, occupational distribution, and demographic variables. Variations in the above factors among communities lead to differential fertility rates. Variables measuring these factors were included in the estimated equations.

(3) Fertility rates may differ among regions due to differences in the effect of these factors in different regions. This applies both to the affect of urban influence and to the socio-economic variables. The equations were estimated individually for each census division, and region, of the United States, and for the conterminous United States.

In the following sections, the independent variables and their expected relationships with the fertility of rural-farm women are discussed. In addition, the expected relationships among the independent variables are noted and discussed.

The Discussion of the Hypotheses

Urban Influence

Urban influence is one of the factors which is expected to explain fertility differentials among rural communities. Urban influence stems from the presence of urban centers near the communities. The growth of large urban centers has been the result of the rapid industrialization of the economy. Large urban centers with industrial bases

have grown up throughout the United States. A map showing the distribution of population in the United States indicates that around each concentration of population marked by a city, the density of population decreases as the distance from the city increases. At all distances, the hinterlands of large metropolitan communities are more urban in comparison than the hinterlands of small metropolitan communities. Further, the characteristics of the population are expected to be different in communities which are nearer to the central city than those which are farther away from the city. It is hypothesized that differentials in fertility rates of rural-farm communities are affected by the location of the community with regard to urban centers and the size of the centers.

There is a considerable body of evidence which indicates that the rural population which lives within ready access of large population centers differs in its characteristics from the rural population located at more remote distance from such centers. One of the earliest studies was conducted by Brunner and Kolb.[3] They made comparisons of concentric zones, extending out of cities, on a large

---

[3]E. deS. Brunner and J. H. Kolb, Rural Social Trends (New York: McGraw-Hill, Incorporated, 1933), pp. 111-43.

number of factors. Taking the city as the center and the adjoining counties as tier one, the next counties as tier two, and so forth, they found measurable differences in the characteristics of the rural population between the tiers. The results, insofar as they pertain to fertility, show that urban characterisitics such as lower birth rates and fewer children were present in the city and tier one counties, and that such characteristics diminished as the distance of the county from tier one increased. Other studies have generally indicated that both the size of the urban center and the distance away from the center are important factors in producing inter-community differentials in rural-farm fertility.[4]

At this point it is relevant to discuss the rationale underlying the hypothesis that fertility levels of rural-

---

[4]For example, see W. S. Thompson and N. E. Jackson, "Fertility in Rural Areas in Relation to their Distance from the Cities, 1930," Rural Sociology, V, No. 2 (June, 1940). However, in this study, no strong relationships were found between fertility differentials and gradations of urban influence.

D. J. Bogue, The Structure of the Metropolitan Community (Ann Arbor: University of Michigan, 1949). The relevance of Bogue's study is limited only to an analysis of rural population density.

O. D. Duncan and A. J. Reiss, Jr., Social Characteristics of Urban and Rural Communities, A Volume in the Census Monograph Series (New York: John Wiley and Sons, 1956), p. 157.

farm communities are inversely related to the distance of the community from urban centers and to the size of the urban center. A study of the fertility of the rural farm sector cannot be carried out independently without reference to the influence of urban centers. Such a task was possible, for example, in 1860, when the United States was predominantly rural and sixty percent of the population lived on farms. Communications between the farm and city were minimal, due to lack of transport facilities and mass media. Today the isolation of the farm with the concomitant unique social characteristics has all but disappeared. Approximately seventy percent of the population of the United States were urban residents in 1960, while the rural-farm population was 7.5 percent. Seventy-six percent of the urban residents lived in urbanized areas.[5]

Urban areas exert an influence over the rural areas which transcends the census boundaries between the two sectors. These influences, as they relate to fertility, are mainly cultural in nature, and are associated with urbanism. Urbanism is the rise of new culture patterns, new attitudes, and values which are characteristic of urban populations.

---

[5]P. C. (1), 1C, op. cit., p. ix. An urbanized area is a city of 50,000 population or more, along with a densely populated urban fringe surrounding it.

There is an observed tendency of families to be smaller in highly urbanized areas. It is often argued that there are distinct culture patterns in the cities which encourage low fertility.[6] Modern city life provides a particularly favorable environment for the development of attitudes motivating family limitation. Many reasons are adduced for such attitudes. Urban culture patterns are based on competition, individualism, and a struggle for status. City family life is less cohesive as family members participate in other institutions and have a broader contact outside the family. This can be contrasted with the rural family which is still, to a considerable extent, a social and economic unit.[7] In the city, children do not have the same economic status as on a farm. There is no scope for employment of children. On the other hand, they have to be provided with an expensive technical or professional education to enable them to compete in the highly selective urban labor markets. Medical care, living expenses, maternity expenses, are high in

---

[6]United Nations, "The Determinants and Consequences of Population Trends" (New York: United Nations, Department of Social Affairs, Population Division, 1953), p. 78.

W. S. Thompson, Population Problems (New York: McGraw-Hill, 1943), pp. 207-10.

[7]Landis, loc. cit.

the cities. It costs less physically, as well as economically to rear children where there is plenty of housing space and adequate playgrounds, as on a farm. The above factors tend to limit the size of the urban family.

The role of women is also different in cities. The equal status given to city women in many aspects of public life and employment has reduced the traditional role of women as homemakers and mothers. Both city and rural women have a variety of interests, such as in clubs and associations. However, the main interest of such clubs, etc.,of rural women is centered around the home and family.

Further, status aspirations are more prominent in large cities. Where the consumption habits of a family are determined, as it has been often proposed, by the actions of its peers in the social scale, children and consumption goods compete for the available resources. "Keeping up with the Joneses" is more difficult if there is a large family requiring support.

Social mobility is also a factor tending towards fewer children in cities. The desire to improve one's status is associated with the phenomenon of Dumont's social capillarity. Just as a column of liquid must be thin to rise under the force of capillarity, so also must a family

be small in order to rise in the social scale. Social mobility is more feasible with one or two children than with a large number.

The above facets of urban life lead to attitudes motivating small families and fewer children. The effect of urban culture patterns on rural-farm fertility arises from the diffusion of these patterns from urban centers. In the United States, by virtue of the urban complexion of the population, urban culture is the dominant and dynamic culture. Urban and rural culture patterns tend to intermingle with one another. But the relative dominance of urban culture constantly influence and change rural culture patterns. Hence the attitudes of rural-farm communities towards fertility will be influenced by those of the urban communities. The extent of the influence is determined by the degree of exposure to urban culture patterns, which could occur either by personal contact or by mass communications media.

It follows from the above discussion that the distance of a rural community from an urban area will be directly related to the amount of exposure of the rural people to urban culture. In the case of personal contact, the amount of exposure to urban influence is clearly some function of distance. In the case of exposure via mass

communications media, it is very likely that the closer a rural community is to an urban area, the more probable it is that the newspaper would be a city paper rather than a local one from a rural town, and that the radio or television station will be a city rather than a local one, and so forth.

In the area of mass communications, it is hypothesized that the size of the population of the urban area is likely to be important. Large cities offer a greater diversity of cultural systems in their mass communications than do small cities because of the diverse nature of the population in them. Further, large cities not only have numerically a large number of television and radio stations, but also, their mass communications media have a wide geographic coverage.

Hence, it is hypothesized that urban culture patterns are favorable to low fertility and that those patterns diffuse over from the urban centers, influencing rural value systems. The extent of the exposure of rural culture to urban culture is both a function of distance of the rural community from the urban area and of the size of the city. Fertility rates in rural-farm communities near to urban centers are expected to be lower than those in rural-farm communities near to small urban centers.

To transform these hypotheses into operational variables, it was necessary not only to emphasize the proximity of the rural-farm community to the center, but also the size of the population of the center. One of the most relevant concepts of the urban community, expressed in terms of census data, is the SMSA.[8] It includes the inhabitants of the county or counties surrounding a major city, and their patterns of work and communications with the city. It provides a functional and a geographic and demographic entity. One of the three alternative measures used in this study to represent urban influence on rural-farm fertility was called the distance variable. Each county was assigned a number which was a linear function of its distance from the nearest SMSA. The hypotheses underlying the variable are the following: a) the influence of an SMSA on the fertility rates in nearby counties is a linear function of the distance of the county from the SMSA; b) rural-farm fertility levels do not vary among counties in which cities of 50,000 or more are located because of varying population size of the city; c) the effect of a large SMSA on fertility levels in a community "x" miles distant are the same as the effects of a

---

[8]In general, an SMSA is a county in which a city of 50,000 or more is located. See P. C. (1), 1C, op. cit., p. x, for a detailed discussion of the subject.

small SMSA on fertility levels in a community "x" miles distant.

The other two measures alter the hypotheses expressed by the distance variable. They represent the hypotheses that, a) the influence of any SMSA on the fertility levels of nearby counties 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 further 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 a city up to a population size of two million. It is hypothesized that cities of two million or more have similar influences on the fertility levels in the county in which they are located, and on outlying counties the same distance away.

The two measures other than the distance variable differ with respect to the maximum area over which they hypothesize a city of a given size extends its influence. The size-distance$_1$ variable expresses the hypothesis that a city of two or more million population extends its influence up to a maximum of 250 miles. Cities larger or smaller than one million are hypothesized to extend their influence in proportion according to their population size.

The size-distance$_2$ variable expresses the hypotheses that a city of two million or more extends its influence up to a maximum of 250 miles, whereas a city of one million extends its influence up to a maximum of 150 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 allowed intervening cities to add or cancel out the effect of any particular city on a particular county.

In summary, differentials in the fertility levels of rural-farm women in communities at the center and at the periphery of an industrial-urban matrix can be explained by differentials in the economic demographic and cultural influences of the matrix upon the community. The economic and demographic influences include differentials in education, rate of female labor force participation, and occupational status; the differentials in cultural influence arise from the differential diffusion, determined by the location of the community to the center, of urban culture patterns and the concomitant attitudes toward family size and acceptance of contraception. It is also hypothesized that the cultural influence was a function of city size as well as of distance from the city.

Age Distribution of Married Females

The fertility rates specific to the age group of married females reveal that the number of children ever born increases as the age of the group increases. For the rural-farm sector of the conterminous United States in 1960, the number of children ever born per 1000 ever married women age 15-24 was 1,436; for the age-specific group 25-34, it was 2,745; and for the group 35-44, it was 3,125.[9]

The number of children born to a woman is in part a function of time. As the age of the women increases, the number of children born increases. Intercommunity fertility rates will be affected by proportions of married women in the different age groups.

The previous discussion, therefore, suggests the following hypothesis. Fertility rates of rural-farm families are inversely related to the percent of married females who are in the younger age-groups. The variables used to represent this hypothesis in the statistical analysis are the percentage of ever married females age 15-44 who are 15-24, and the percentage who are age 25-34.

---

[9] P. C., (1), 1C, *op. cit.*, Table 82, p. 213.

Educational Level

The level of education of the husband and wife has both a direct and an indirect effect on fertility rates. Previous studies have examined fertility differentials and educational level, and have found an inverse relationship using the wife's education, or the husband's education, or the couple's education to measure the educational attainment.[10] The lowest fertility is shown for the cases where both the husband and wife have received a college education. The low fertility of college or university graduates has been particularly stressed. The direct effect of education is the observed relationship between the level of education and the use of family limitation practices. Education promotes rational attitudes towards family planning. Indirectly education affects some of the factors tending towards low fertility, such as income, female employment and occupation. The higher the educational level of the county, the greater will be the proportion of the labor force employed in the higher-income jobs. A high educational attainment by females enlarges their scope of gainful employment.

It follows from the preceding discussion that educational attainment of the rural population can be expected to

---

[10]Grabill, Kiser, and Whelpton, op. cit., pp. 198-217.

affect fertility levels. It was hypothesized that there was an inverse relationship between fertility and education level. The variable used to measure educational attainment was the median years of school completed by males and females 25 years and over. The educational level of married females and males would have been more appropriate, but such data were not available. However, no bias should result unless there is a significant relationship between educational levels and marriage rates in an age group.

Occupation

Another factor that is hypothesized to affect rural-farm fertility is the occupational status of the farm population. The pattern of differential fertility by occupations indicates an inverse relationship. Typically, farm laborers and farmers and farm managers are in the high fertility group. The service workers and craftsmen are in the middle group and the clerical, managerial, and professional personnel have the lowest fertility.[11] In agriculture, unlike other occupations, children can be gainfully employed after a certain age is reached. Children are assets in tobacco

---

[11]Grabill, Kiser, and Whelpton, op. cit., Table 54, pp. 131-2.

farms and other enterprises using hand labor. A great deal of tractor work is done by teen-agers on farms. In economic terms, as the organization of the farm is usually based around the family, the distribution of the product is not determined by marginal productivity considerations. Hence total value product and not net profit is maximized. Therefore, an additional farm hand increases total product and children constitute economic assets on farms.

In the case of farm laborers and farm foremen, they constitute both in the national occupational structure and within the rural-farm sector, the lowest stratum in terms of socio-economic status. Hence in accordance with the hypothesized relationship between socio-economic status and fertility rates, the proportion of farm laborers and farm foremen will be positively related to fertility.

The variables used in the equation to represent occupation groups in the county were a) the percent of the employed male rural-farm work force who are farmers and farm managers, and b) the percent of the employed rural-farm work force who are farm laborers and farm foremen. The other occupational groups were not included. The two groups included formed 68 percent of the employed rural-farm work force of the United

States in 1960.[12]

It is hypothesized that the proportion of the population engaged in agricultural pursuits tends to raise the fertility rates in a county. Further, it has been observed that the fertility rates of farm laborers tend to be generally higher than those for the farmers, and farm managers, so that, not only would the proportion of the total population engaged in agricultural pursuits tend to increase the fertility rate in the county, but the proportion of the agricultural population who are farm laborers and farm foremen tend to accentuate this rise in fertility. It was postulated that a positive relationship exists between these variables and fertility.

Female Labor Force Participation Rate and Female Personal Income

Women in the labor force and female income were two other variables hypothesized to affect fertility rates. In a sense, these two variables reflected the alternatives to having children. The variable used in the statistical analysis to represent female employment was the percent of females age 14 and over who were employed. Both married

---

[12]P. C., (1), 1C, op. cit., Table 87, p. 216

and un

been c

consid

those

less c

W
g
i
s
a
t
d
y
t
c
w
f
I
w

clea

less

marr

they

or h

with

was

lab

and unmarried women were included in this measure. It has been observed that fertility rates for married women were considerably lower for those in the labor force than for those not in the labor force. But the relationship may be less clear. According to the Bureau of Census:

> Women in the labor force at a given point of time generally have fewer children than the women not in the labor force. . . . In the last decade or so, however, a life pattern seems to be developing among many married women in which they work until the arrival of the first baby, temporarily withdraw from the labor force while their children are young, and then return to the labor force after their children are old enough to require little care. Even in terms of children ever born, young women who happen to be in the labor force are less fertile than those who happen not to be in the labor force; but it is possible that the two groups will not differ very much in the size of completed families.[13]

The above pattern is of recent origin, but it is clear that working wives, at a given point of time, are less fertile than non-working wives. In the case of unmarried women in the labor force, it is hypothesized that they constitute those women who have postponed marriage, or have chosen a professional career which is incompatible with the making of a home. It was hypothesized that there was an inverse relationship between fertility and female labor force participation rate.

---

[13] U. S. Bureau of Census, Census of Population, 1950, IV, Special Reports, Part V, Chap. 6, "Fertility," p. 11.

tility

comes

emplo

ing w

dren.

femal

to be

Tota

Inco

and

show

the

uppe

rep

cou

lat

inc

rel

pla

Female personal income was expected to affect fertility rates in a county. It reflected the opportunity incomes which women would have foregone if they had not been employed. In a sense, it represents loosely, for the working wives, the opportunity cost of bearing and rearing children. The measure of female income used was the median female personal income for county, and it was hypothesized to be inversely related to fertility.

Total Family Income

Family income is a major factor affecting fertility. Income has been used as a measure of socio-economic status and studies relating family income to fertility have often shown an inverse relationship. Within socio-economic classes, the same studies have shown a positive relationship, for the upper income brackets. In this study, the variable used to represent family income was the median family income for the county, and it was hypothesized that it was negatively related to fertility. If the distribution of median family incomes in counties is skewed to the right, the expected relationship may not hold.

The rationale for the above hypothesis can be explained in terms of the transitional phase of differential fertil

and u

sprea

lower

used

can b

A rel

be ex

come

the

Famil

also

to b

tive

like

ing

Colo

Perc

the

the

fertility.[14] Family limitation practices found acceptance and use first in the upper-socio-economic groups, and later spread downwards to the middle groups and finally to the lower socio-economic groups. Hence, when family income is used as an index of socio-economic status, fertility rates can be expected to be inversely related to family incomes. A relationship between family income and female income could be expected, especially for the working wives. Female income increases family income and is a factor conducive to the inverse relationship between family income and fertility. Family income, employment of the wife, and fertility are also related. Couples with low family income are more likely to be those in which the wife does not work, and has relatively more children; while couples with higher incomes are likely to be heavily weighted with those that include working wives.

Color

The equations with the children ever born as the dependent variable were estimated for non-white females using the same independent variables for the three divisions in the South and the southern region. The rationale behind a

---

[14]See text, Chap. II, p. 11.

separ

South

The d

among

lows:

the

gion,

pect

Abou

Sout

from

is

neg

But

tion

res

men

fac

of

les

separate set of equations for the non-white females in the South was that they formed a distinct group in this region. The distribution of the non-white rural-farm population among the regions in the United States in 1960 was as follows: .5 percent in the Northeast region, 2 percent in the North Central region, 93 percent in the southern region, and 4.5 percent in the western region.

The results of the non-white analysis can be expected to be different from those of the white analyses. About 98 percent of the rural non-white population of the South is negro, and the difference in the analysis arise from the distinct nature of the problems facing them. There is no cultural trait that affects the fertility rates of negro women independently of the variables discussed above. But the particular social organizations of the southern retion affects some of the variables.

Discriminatory practices among the employers would restrict the scope of female employment, or limit employment to low-paying jobs. Even educated non-whites may be faced with discrimination in employment.

The most important difference arises in the influence of the urban centers. The influence of urban centers may be less among non-white communities. There has been an observed tende

the r

Furth

ted

larg

tion

with

prop

late

a di

Sou

med

con

of

ana

ter

tro

Reg

ra

co

hy

tendency of non-white migration to be concentrated towards the northern cities rather than to the large southern cities. Further, the selective nature of non-white migration is limited to the younger age-groups, which will be reflected in a large proportion of the women remaining in the rural population, being in the higher age-specific groups. In accordance with the hypotheses expressed for the white women, a larger proportion of women in the higher age-groups is directly related to the number of children ever born.

It is also probable that urban culture may receive a different response from the non-white communities in the South region. The newspapers and other mass communications media in the cities are dominated by white culture. In the context of the racial problems in the South, the influence of urban culture patterns may be different in the non-white analyses to the extent that the non-whites reject the patterns of urban culture disseminated by the mass-media controlled by white interests.

Regional Differences

Equations were estimated for the white fertility rate for each census division, each region, and for the conterminous United States. The effects of the variables hypothesized to explain fertility differentials were expe

fere

sel

dom

pri

In

mos

wou

a w

of

cus

sin

lit

ha

wes

al

di

af

an

ex

di

e

expected to be different in the various regions. These different effects arise due to differences in the regions themselves. For example, in the southern region there is a predominance of small family farms and the type of farm enterprise is different from that of the North Central region. In the South, the type of farming is labor intensive, being mostly tobacco or cotton farms. It is expected that children would be more useful on a tobacco farm in the South than on a wheat farm in the North Central region. Further the degree of industrialization and urbanization differs among the various divisions and regions. The Northeast has been urban since the nineteenth century while the South has relatively little urbanization. The Northeast and North Central regions have been settled for a considerable period of time. The western region is still undergoing the process of settlement although the frontier disappeared in the last century. The differences in the composition of regions and divisions affect fertility rates.

In the preceding sections, the dependent variables and the independent variables were introduced. Some of the expected relationships among the independent variables were discussed. The rationale for the use of a separate set of equations for the non-white population in the South region was

in t

In t

mall

thes

was presented, and, finally, expected regional differences in the effects of the independent variables were discussed. In the following chapter, the equations are presented formally, the variables specified, and the statistical hypotheses stated.

CHAPTER IV

THE STATISTICAL FRAMEWORK: THE SOURCES OF DATA AND THE METHODS OF ANALYSIS

The Sources of Data

In the Eighteenth Decennial Census of Population, taken as of April 1, 1960, statistics on social and economic characteristics of persons were enumerated on the basis of a 25 percent sample of the population.[1] The data included statistics on children ever born, years of school completed, employment, occupation, and income by residence and color. For the purposes of the PC series of Census publications, the data were enumerated with the county as the unit of observation. The census schedules were microfilmed and placed on magnetic tape. The data used in this study were from a copy of the PC tape obtained by Michigan State University for use in preparing a Population Monograph. The statistical analyses were carried out by the Armour Research

---

[1]See P. C. (1), 1C, <u>op. cit</u>., pp. xli, for sampling procedures, accuracy of data, and methods of estimating population characteristics.

Corporation of the Illinois Institute of Technology in Chicago on a Remington-Rand Univac 1105 Computer.

The Equations Estimated

This study undertook a cross-sectional investigation of the effect of economic and other variables on average fertility rates in the rural-farm parts of counties. In a cross-sectional analysis, a number of geographic divisions are investigated at a point of time. Although the use of cross-sectional data has certain advantages over time-series, especially from the point of view of availability of comparable data, it raises a number of statistical problems. It assumes that historical and environmental conditions, not included in the study, have a constant affect on the population of each of the geographic units and that these conditions do not affect the quantifiable variables which are expected to explain fertility differentials. If these assumptions are not held, biases in the estimated statistics will result. Large standard errors, low correlation coefficients, non-significance of the estimated regression coefficients, and bias in the regression coefficients will be observed. In this study, the basic unit studied was the county but it is not unrealistic to assume that culturally, the populations of the various counties, in a division or a region of the United States form a mo

of m

mate

var

and

to

as

til

fit

rep

In

The

th

Tw

cl

ab

cl

a

a more homogeneous entity than, for example, a cross-section of nations across the world.

Least squares regression analysis was used to estimate two sets of equations. In the first set the dependent variable was the number of children born to white females, and in the second set it was the number of children born to non-white females. The above sets will be referred to as the "white fertility" equations and the "non-white fertility" equations. The "white fertility" equations were fitted for each census division in each region, for each region, and for the conterminous United States as a whole. In all, there were forty-two "white fertility" equations. The "non-white fertility" equations were fitted for the three divisions in the South and for the southern region. Twelve "non-white fertility" equations were estimated.

The Regression Models: "White Fertility" Equations

In this set of equations, three equations are included. They are identical with the exception of one variable. In Chapter III, the three measures of industrial-urban influence were discussed briefly. Equation (1) includes the distance variable but excludes the size-distance$_1$ and size-distance$_2$ variables. Equation (2) includes the siz

siz

dis

var

"Wh

whe

an

Va

Th

de
me

size-distance$_1$ variable and omits the distance variable and size-distance$_2$ variable. Equation (3) includes the size-distance$_2$ variable and omits the distance and size-distance$_1$ variables.

"White fertility" equation (1)

$$Y_i = a + C_4X_{i4} \ldots + C_{12}X_{i12} + U_i$$

where

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

$j = 4, 5, \ldots, 12$

and

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

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

U_i is the ith random disturbance term[2]

a is the constant term

C_j is the unbiased coefficient of the jth independent variable

<u>Variable specification</u>

The dependent variable, Y_i, . . ., the number of children

---

[2]It is assumed that the U's in all equations are independent and follow some probability distribution, with zero mean and finite variance.

See R. J. Foote, <u>Analytical Tools for Studying Demand and Price Structures</u> (Washington: United States Department of Agriculture Handbook No. 146, 1958), p. 58.

ever

the

depe

of r

ter

The

wor

196

ref

a m

wo

co

ab

t

pe

s

co

ever born per 1000 ever married white women age 15-44 in the rural-farm part of a country in 1960 was used as the dependent variable. This variable, taken to be an index of rural-farm fertility, was discussed in detail in Chapter III.

The independent variables, X_j

X_4 measured the percent of the employed white male work force who were farmers and farm managers in county in 1960. The information referred to the job held during the reference week. Therefore, the use of the measure assumed a minimal occupational mobility.

X_5 measured the percent of the employed white male work force who were farm laborers and farm foremen. The comments made for variable X_4 are applicable to this variable, also.

X_6 measured the white female labor force participation rate. Women in the labor force were measured by the percent of white rural-farm female labor force in the census period.

X_7 measured the median white female income for the county. The data were for median female income in 1959.

X_8 measured the median years of schooling completed

by rural-farm white males and white females, age 25 and over, in a county.

X_9 measured the median income of white rural-farm families in each county. The data measures median family incomes in 1959.

X_{10} and X_{11} measured the age distribution of the rural-farm white female population. X_{10} measured the percent of ever married white females age 15-44 who were 15-24, and X_{11} measured the percent of white rural-farm females age 15-44 who were age 25-34.

Distance Variable X_{12}

One of the variables that measured urban influence was X_{12}. It measured the distance of the county from the nearest SMSA. The value zero was assigned to all counties in which cities of 50,000 or more population were located in 1960. All counties which were located within 50 miles of an SMSA were assigned the value one. The value two was assigned to all counties located 50 to 100 miles from an SMSA. Counties which were located from 100 to 150 miles fron an SMSA were assigned the value three. The value four was assigned to a county located from 150 to 200 miles from an SMSA. The values five and six were assigned to all coun

from

Unit

In c

SMSA

"Wh

whe

and

an

th

th

th

counties located from 200 to 250 and from 250 to 300 miles from an SMSA, respectively. No county in the conterminous United States was located more than 300 miles from an SMSA. In determining the distance from the central city of the SMSA to the most distant boundary of the county was used.[3]

"White fertility" equation (2).

$$Y_i = a + C_4X_{i4} \ldots C_{11}X_{i11} + C_{13}X_{13} + U_i$$

where

$i = 1, 2, \ldots N$

$j = 4, 5, \ldots 11, 13$

and

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

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

U_i is the <u>ith</u> random disturbance term

a is the constant term

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

---

[3]The above section and the sections dealing with X_{13} and X_{14} are summarized from Bryant, W. K., "An Analysis of the Inter-Community Income Differentials in Agriculture in the United States," Unpublished Ph.D. Thesis, Michigan State University, 1963, Chap. IV, pp. 80-84.

Vari

thos

cep

dis

tak

an

or

one

pop

of

20

of

t

th

th

t

a

a

p

Variable Specification

The variables in this equation were identical to those of the "white fertility" equation (1), with the exception that distance variable X_{12} is omitted and size-distance$_1$ X_{13} is included. The size-distance$_1$ variable takes into account not only the location of the city 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 population between 50,000 and 100,000 were given a value of .5. No SMSA county was given a value of greater than 20. This restriction expressed the assumption that SMSA's of two million or more have similar influences on the fertility levels of rural-farm women in the counties in which they are located.

Counties within 50 miles of the central city of the SMSA were assigned a value two less than that assigned to the SMSA county. Counties between 50 to 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 zero was reached.

An

lic

of

mil

val

at

or

pro

one

one

va

of

th

th

th

as

co

fr

"

An implication of this scheme is that no SMSA of two million or more population is assumed to influence the level of fertility rates in a community which is more than 500 miles distant. An SMSA of one million was assigned a value of ten. Such SMSA's then could influence counties at a distance up to a maximum of 250 miles. SMSA's larger or smaller than one million could influence counties in proportion to their population size. In the case where one county could be assigned two values, one value from one SMSA and another value from a different SMSA, the value assigned was the greater of the two. In a number of cases, when one SMSA was in the range of another SMSA, the value of the SMSA county plus the value derived from the influencing SMSA were assigned subject to the restraint that the value assigned could not be greater than the value assigned to the influencing SMSA. By this procedure, each county in the United States was assigned a number ranging from zero to twenty.

"White fertility" equations (3)

$$Y_i = a + C_4X_{i4} \ . \ . + C_{11}X_{i11} + C_{14}X_{i14} + U_i$$

whe

and

Va

th

t

s

v

d

d

S

e

i

where

$i = 1, 2, \ldots N$

$j = 4, 5, \ldots 11, 14$

and

Y_i is the _ith_ observed value of the dependent variable

X_{i3} is the ith value of the _jth_ independent variable

U_i is the ith random disturbance term

a is the constant term

C_j is the increased coefficient of the _jth_ independent variable.

Variable Specification

The variables in this equation were identical with those in the "white fertility" equation (1) with the exception that the distance variable, X_{11}, was omitted and the size-distance$_2X_{14}$ variable was included. The size-distance$_2$ variable expressed a similar hypothesis to that of the size-distance$_1$ variable in that they took into account both the distance of the county from the SMSA and the size of the SMSA. They differed in that the size-distance$_2$ variable expressed the hypothesis that urban centers extended their influence shorter distances than was hypothesized by the size-

the
dist
SMSA
tanc
assi
ding
val
the
flu
tha
the
to

"No

use
equ
X_i
to
id
es
re

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 exceptions. The value assigned to a county X and (X+50) miles from an SMSA according to the size-distance$_2$ variable was four less than the value assigned to counties between (X-50) and X miles from the SMSA. It expressed the hypothesis that no SMSA influenced fertility levels in a community which was more than 300 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.

"Non-white fertility" equations

"Non-white fertility equations (1), (2), and (3) used identical variables to those in the "white fertility" equations (1), (2), and (3), with the exception that X_4 - X_{11} referred to the non-white population rather than to the white population. Variables X_{12}, X_{13}, and X_{14} were identical in both sets of equations. These equations were estimated for each division in the South and for the southern region as a whole.

Cons

not

(whi

are

far

The

For

inc

X'X

ter

the

sta

kno

Th

cl

co

th

a

F

s

Constant Terms

It should be noted that the estimated equations do not contain variables with respect to a) the percent of (whites or non-white) employed rural male work force who are in occupation categories other than that of farmers and farm managers, (white and non-white) age 15-44 who are 35-44. These variables were omitted to gain a determinant solution. For example, the three female age variables, if all had been included, would have been linearly dependent, resulting in X'X matrices which would have been singular. The constant terms are expected to contain functions of the effects of these omitted variables, but no interpretation of the constant terms with regard to the effects can be made without knowledge of assumptions about functions.[4]

The Beta Coefficients

In presenting the equations estimated, beta coefficients were used in addition to the usual partial regression coefficients.[5] The regression of Y, the dependent variable,

---

[4]See Bryant, op. cit., pp. 85-6, for discussion of the interpretation of constant terms.

[5]For the formulae for estimating beta coefficients and a discussion of their value see M. Ezekiel and K. A. Fox, Methods of Correlation and Regression Analysis (third edition, New York: John Wiley and Sons, Incorporated, 1959).

on X

the

The

wher

The

be

p.
ff

An
us

on X_1 and X_2, the independent variables, can be presented in the form of the following equation:

$$Y = b_1X_1 + b_2X_2$$

The beta coefficient is calculated by the following formula:

$$b_1' = b_1\frac{S_{x1}}{Sy} \; ; \; b_2' = b_2 \frac{S_{x1}}{S_y}$$

where

b_1' = the estimated beta coefficient of X_1

b_2' = the estimated beta coefficient of X_2

b_1 = the estimated regression coefficient of X_1

b_2 = the estimated regression coefficient of X_2

S_{x1}= the standard deviation of X_1

S_{x2}= the standard deviation of X_2

S_y = the standard deviation of Y

The estimated equation in terms of beta coefficients would be as follows:

$$Y'' = b_1'X_1' + b_2'X_2'$$

---

p. 148, and p. 196. Ezekiel and Fox use the term beta coefficient which is used in this study.

G. W. Snedecor, Statistical Methods, (fifth edition) Ames: The Iowa State College Press, 1956, p. 416. Snedecor uses the term standard partial regression coefficient.

whe

Thi

ti

X_2

fro

a p

ac

to

ca

wh

th

st

me

da

b

B

a

S

where

Y'' = the predicted value of the dependent variable

X' = the standard deviate of X and $x' = \dfrac{X_1 - \bar{X}_1}{S_{x1}}$

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 of b_i (in a positive or negative direction).

Beta coefficients are pure numbers which take into account the variation in the independent variable relative to the dependent variable. Partial regression coefficents cannot be directly compared as they vary with the units in which they are measured. But the beta coefficient makes them comparable by expressing them in terms of their own standard deviation. The beta coefficients are summary measures of the importance of the effect of each independent variable on the dependent variable. The sign of the beta coefficient indicates the direction of the effect. Beta coefficients were estimated for all independent variables in all equations and are presented in the results.

Simple Correlation Analyses

Simple correlation coefficients were calculated between each of the independent variables in each of the equations. These showed the degree of intercorrelation among the independent variables and wherever pertinent, the implications will be discussed in conjunction with the results. Simple correlation coefficients were also calculated between each of the independent variables and dependent variables in each of the equations.

Statistical Hypotheses

In Chapter III some of the relationships between the independent variables and the dependent variable were discussed. In this section, these relationships are expressed in relation to the equations presented earlier. Table 4.1 shows the expected signs of the estimated regression coefficients for the independent variables, in both the "white fertility" and "non-white fertility" equations. The same signs were expected for both sets of equations. The expected signs of the regression coefficients represent tentative hypotheses as to the direction of the influence of the independent variables on fertility rates. One-tailed "t" tests were used to ascertain whether the estimated regression coefficients were significantly different from zero. The one-tailed "t" test is statistically stronger and more definitive than the two-tailed tests. However,

Exp
the

Inc

Dis

Si

Si

Pe

Pe

Me

Ma

Me

Pe

TABLE 4.1

Expected Results of the Analysis of the Factors Influencing the White and Non-White Fertility Rates of Rural Farm Females in a County

Independent Variables	Expected Signs of Estimated Regression Coefficients		
	Equation 1	Equation 2	Equation 3
Distance from nearest SMSA (X_{12})	+		
Size-distance$_1$ (X_{13})		-	
Size-distance$_2$ (X_{14})			-
Percent of male employed work force who are:			
farmers and farm managers (X_4)	+	+	+
farm laborers and farm foremen (X_5)	+	+	+
Percent of females, age 14 and over, in county, who are employed (X_6)	-	-	-
Median female personal income (X_7)	-	-	-
Median years of school completed by males & females age 25 & over (X_8)	-	-	-
Median family income ($_9$)	-	-	-
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-	-	-
age 25-34 (X_{11})	-	-	-

it i

wil

"t"

cer

the

Ass

reg

val

hyp

one

si

ev

is

le

je

po

re

op

sy

th

za

it is expected that regional deviations in the expected signs will occur. Under these circumstances, the use of one-tailed "t" tests in place of the conventional two-tailed tests raise certain problems. The following is a hypothetical example of the problems created by the use of one-tailed "t" tests. Assume that it is hypothesized that the sign of a particular regression coefficient is positive and that the computed "t" value is -55.2620. The two-tailed test will reject a null hypothesis that the regression coefficient is zero. The one-tailed positive "t" test will accept the null hypothesis that the regression coefficient is not positive. However it does not indicate whether the regression coefficient is different from zero. The actual "t" value is very much less than zero, and a one-tailed negative "t" test will reject a null hypothesis that the regression coefficient is positive or zero. In the tables presenting the results, regression coefficients which are significant but have signs opposite to those expected are noted separately, with the symbols ([aa]). The hypothesis, tested in this case, is that the regression coefficient is significantly different from zero in the direction indicated by its sign.

Another statistical procedure used was the multiple comp

iden

eff

for

equ

whi

sou

cal

In

be

Wi

Sc
19

comparison or contrast tests offered by Scheffe.[6] This test identifies the significant differences among regression coefficients of an independent variable. This test was performed for each independent variable in the "white-fertility" equations, among divisions and among regions and in the "non-white fertility" equations among the three divisions in the southern region.

This chapter presented a discussion of the statistical framework, the statistics used, and the tests performed. In the following chapter, the results of the analyses will be presented, interpreted, and discussed.

---

[6] H. Scheffe, The Analysis of Variance (New York: John Wiley and Sons, Inc., 1959), pp. 66-72, and

K. A. Brownlee, Statistical Theory and Methodology in Science and Engineering (New York: John Wiley and Sons, Inc., 1959), pp. 252-4.

ses

gra

cus

si

wh

th

re

fe

St

a

a

e

f

o

d

CHAPTER V

THE RESULTS OF THE ANALYSIS

Introduction

In this chapter, the results obtained from the analyses of fertility rates are presented and interpreted by geographical regions. The "white fertility" equations are discussed for each division in a region, followed by a discussion of the equations estimated for the region. The "non-white fertility" equations, which were estimated for the three divisions in the southern region and for the southern region are discussed next. Finally, the results of the "white fertility" equations estimated for the conterminous United States are discussed.

Three equations were estimated for each geographic area. Each equation included a variable representing an alternative hypothesis about the nature and extent of the effect of urban influence on the fertility rates of rural farm communities near urban centers. The three measures of urban influence were the distance variable, the size-distance$_1$ variable and the size-distance$_2$ variable. The othe

mat

lec

was

ter

bee

eq

ma

us

ca

eq

re

th

ti

ab

a

p

h

m

w

s

other variables were identical in all three equations estimated for a geographic area.

In interpreting the results, one equation was selected for each geographic area. The selected equation was expected to explain variations in fertility rates better than the other two equations; statistical devices have been developed which indicate a basis for choice among equations. Two such devices, the standard error of estimate, and the multiple correlation coefficient (R), are used in this study.[1] The standard error of estimate indicates the closeness with which estimated values from an equation agree with the original values. The multiple correlation coefficient measures the combined importance of the independent variables as a means of explaining variations in the dependent variable. In this study, the variables in the three equations estimated for any geographic area were similar with the exception of the variable explaining urban influence. Hence, the equation with the highest multiple correlation coefficient would explain the most variation in fertility rates and also would indicate which of the three proximity variables was the better measure of urban influence in a geographic area. In a majority

---

[1]Ezekiel and Fox, op. cit., pp. 118-92.

of e

coe

mat

tai

of

the

est

der

par

tai

re

tal

th

in

di

di

m

n

y

of equations, those with the highest multiple correlation coefficient (R) had also the lowest standard error of estimate. One equation was chosen, on the above bases, for detailed discussion and interpretation.

Each table in this chapter summarizes the results of the three equations for a geographic area. They present the multiple correlation coefficient, the standard error of estimate, the estimated beta coefficients of the independent variables, and the results of the "t" tests of the partial regression coefficients. In the Appendix, the detailed results including computed "t" values and partial regression coefficients for an equation are given in one table. Each table in this chapter, then, is a summary of three tables included in the Appendix.

The Northeast

The Northeast region of the United States as defined in the census is comprised of two divisions, the New England division and the middle Atlantic division. The New England division constitutes six states: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island. The middle Atlantic division contains three states: New York, New Jersey, and Pennsylvania.

The New England Division

A summary of the results of the three equations estimated for the New England division is presented in Table 5.1. Tables 1, 2, and 3 of the Appendix present estimated regression coefficients, and the computed "t" values for this division.

The coefficient of multiple determination (R^2) in equation (1) was .4583; in equation (2) it was .4546, and for equation (3) it was .4571. The simple regression coefficient between white fertility rates and distance (X_{12}) was .4548; between fertility rates and size-distance$_1$ (X_{13}) it was -.4510, and between fertility rates and size-distance$_2$ (X_{14}) it was -.5085. None of the estimated partial regression coefficients of these three variables were significantly different from zero at the .05 level of significance. Equation (1) was selected for detailed discussion, as it had the highest coefficient of multiple determination and also the lowest standard error of estimate.

The median female personal income (X_7) was the most important relative to other variables as measured by the beta coefficients in equation (1). Next was the median family income (X_9). The regression coefficient of median female income (X_7) and the regression coefficient of median family

TABLE 5.1

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960

New England Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.6770	.6743	.6761
Standard Error of Estimate	284.1576	285.0873	284.4690
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.1421		
Size-distance$_1$ (X_{13})		-.0319	
Size-distance$_2$ (X_{14})			-.0115
Percent of male employed work force who are:			
farmers and farm managers (X_4)	.1379	.1272	.1215
farm laborers and farm foremen (X_5)	.2027	.1927	.1805
Percent of females, age 14 & over in county, who are employed(X_6)	.3076	.3032	.3184
Median female personal income for county (X_7)	-.5152**	-.4661**	-.4609**
Median years of school completed by males & females age 25 and over (X_8)	-.0248	.0143	.0306
Median family income (X_9)	-.4861**	-.3817**	-.3267
Percent of ever married females, age 15-44, who are:			
age 15-24(X_{10})	-.1546	-.1886	-.2032
age 25-34(X_{11})	-.1392	-.1368	-.1418

[1]See Appendix, Tables 1, 2, and 3 for complete results

**Significant at .05 level

income were significant at the .05 level of significance. The partial regression coefficients of all other variables in equation (1) were not significantly different from zero at the .05 level of confidence. Of the variables that were not significant, female employment (X_6), and distance variables (X_{12}) had signs contrary to those expected.

There was a large degree of intercorrelation among independent variables in the New England division. This intercorrelation may have resulted in the estimates of the partial regression coefficients having larger variances, and thus tending toward reducing their statistical significance. It could also affect the regression coefficients sufficiently to change the signs.

Female employment rate (X_6) was highly correlated with female personal income (X_7) ($r_{6.7}$=.8319). The percent of farmers and farm managers (X_4) was correlated with the percent of farm laborers and farm foremen (X_5) and with the median years of school completed (X_8) ($r_{4.5}$= .6299; $r_{4.8}$= -.6858). Both median female personal income (X_7) and median family income (X_9) were correlated with distance (X_{12}) ($r_{7.12}$= -.6245; $r_{9.12}$= -.6858).

Although the simple correlation coefficient between female employment (X_6) and white fertility rates was -.2524, the sign of the partial regression coefficient of this variable (X_6) was positive, and was not significantly different from zero. This is not unexpected in view of the high intercorrelation between female employment (X_6) and female personal income (X_7). It should also be noted that while simple correlation between the dependent variable and a particular independent variable measures a direct relationship, the partial regression coefficients are net, having taken into account the influence of other independent variables included in the study.

The interpretation of the results was made difficult because only two of the nine variables in equation (1) had partial regression coefficients that were significantly different from zero. Nevertheless, variations in the variables included in equation (1) explained about 45 percent of variation in white fertility rates in the New England division. Female personal income (X_7) and median family income (X_9) were the most important variables in expressing differential fertility in this division. The results of the "t" tests of the regression coefficients of these two variables showed that they were significant. Hence, the results of the analyses bear out the postulated relationship between income and fertility. They show a strong inverse relationship between fertility and income variables. The simple correlation between fertility rates and female income (X_7) was -.4167, and between fertility rates and family income (X_9) was .4432. Apparently income was a key factor in depressing fertility rates in this division.

The relationship between distance (X_{12}) and fertility was difficult to explain. The distance variable was one of the alternative hypotheses about the extent of urban influence. Not only was the regression coefficient non-significant, but its sign was the reverse of that expected.

The regression coefficients of the percent of farmers and farm managers (X_4) and the percent of farmers and farm foremen (X_6) had signs which were expected, but were non-significant. The high intercorrelation between these two variables may have resulted in large standard errors, thus resulting in their non-significance. The regression coefficients of the percent of married females age 15-44 who are 15-24 (X_{10}) and who are 25-34 (X_{11}) also had signs which were consistent with the hypotheses, but were non-significant.

The regression coefficients of the variables in equations (2) and (3) for the New England division had the same signs as those in equation (1). In equation (2), the size-distance$_1$ variable (X_{13}) and the size-distance$_2$ variable in equation (3) had negative signs which were consistent with the

the

tio

ab

va

Th

eq

re

of

At

c

d

t

s

b

b

a

I

s

f

the hypotheses. In summary, in the New England divisions, the results of the equation showed a strong inverse relationship between white fertility rates and the income variables. No clear relationship was shown between the other variables and fertility rates.

The Middle Atlantic Division

Table 5.2 contains a summary of the results of the equations for the middle-Atlantic division. The detailed results of the equations are shown in Tables 4, 5, and 6 of the Appendix.

Of the three equations estimated for the middle Atlantic division, equation (3) had the highest coefficient of multiple determination (R^2 = .2818), and the lowest standard error of estimate. The size-distance$_2$ variable seemed to be the most representative of the three variables measuring urban influence. The simple correlation coefficient between white fertility rates and distance (X_{12}) was .3495; between fertility rates and size-distance$_1$ it was .3942, and between fertility rates and size-distance$_2$ it was -.4318. The regression coefficients of the three variables were all significantly different from zero at the .05 level of confidence.

Som

Mul
Sta

Di
Si
Si
Pe

Pe

Ma

Me

Me
Pe

*

a

TABLE 5.2

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960

Middle Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4263	.4793	.5309
Standard Error of Estimate	312.1851	302.8961	292.4568
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.3586**		
Size distance$_1$ (X_{13})		-.4766**	
Size distance$_2$ (X_{14})			-.6019**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.0600	-.1469	-.2009[aa]
farm laborers and farm foremen (X_5)	.2624**	.2506**	.2446**
Percent of females, age 14 and over, in county, who are employed (X_6)	.0919	.1433	.1488
Median female personal income for county (X_7)	-.0623	-.2449	-.2687**
Median years of school completed by males and females age 25 and over (X_8)	-.0526	-.0722	-.1261
Median family income (X_9)	-.0216	-.0017	.0820
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.1142	-.1335	-.1438
age 25-34 (X_{11})	-.1280	-.1364	-.1438

[1]See Appendix, Tables 4, 5 and 6 for complete results

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

The cultural influence of urban areas as measured by the size-distance$_2$ variable was the most important variable relative to the others in explaining variations in fertility rates. Median female income (X_7) was the next important, followed by the percent of farm laborers and farm foremen (X_5). The regression coefficients of X_7 (female income) and of X_5 (percent of farm laborers and farm foremen) were significant at the .05 level of confidence. The regression coefficient of the percent of farmers and farm managers was significantly different from zero at the .05 level of confidence, but the relationship was the opposite of that hypothesized. None of the other variables in equation (3) had regression coefficients which were significantly different from zero.

There was less intercorrelation among the independent variables. The highest intercorrelation was again between female employment (X_6) and median female income (X_7) ($r_{6.7} = .8293$). This intercorrelation could account for the unexpected sign of the partial regression coefficient of the female employment variable (X_6) and its non-significance.

The regression coefficients of all variables in equation (3) had signs which were consistent with the hypothesized relationships between them and fertility, with the exception of those for the percent of farmers and farm managers (X_4), female employment (X_6), and median family income (X_9). The regression coefficients for median family income (X_9) and that for female employment (X_6) were not significantly different from zero. The regression coefficient for farmers and farm managers was significant at the .05 level, but in the opposite direction.

The results substantiated the postulated hypothesis that the closeness of a rural community to an urban area and the size of the urban area tend to lower the fertility rate in the community. This is shown by the results of all three equations. In all three equations, the beta coefficients for the variables representing urban influence were the highest and the regression coefficients of these variables were consistent with the expected signs and were significant. In all three equations, the sign of the regression coefficient for the percent of farm laborers and farm foremen was consistent with that expected and the regression coefficients themselves were significant at the .05 level of confidence.

In the middle-Atlantic Division, urban influence was the most important factor in explaining variations in fertility rates, followed by female income and the percent of the work force who are farm laborers and farm foremen.

The Northeast Region

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

The variables in equation (3) explain more of the variance in fertility rates of rural-farm women in the North east region than either of the other two equations (R_1^2 = 2410, R_2^2 = 2828, R_3^2 = 3066). Equation (3) had the highest coefficient of multiple determination and also the lowest standard error of estimate. The size-distance$_2$ variable appeared to measure the influence of cities more closely than either distance (X_{11}) or size-distance$_1$ (X_{12}). Thus, differences in distance from cities as well as differences in the sizes of the cities, were important factors affecting differentials in fertility rates.

As measured by the absolute size of the beta coefficients, the size-distance$_2$ (X_{14}) variable was the most important factor which affected fertility rates in equation (3).

TABLE 5.3

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960

Northeast Region

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4910	.5318	.5538
Standard Error of Estimate	304.7671	296.2525	291.2765
	Beta Coefficients[1] (relative importance)		
Independent Variables			
Distance from nearest SMSA (X_{12})	.0305**		
Size-distance$_1$ (X_{13})		-.3692**	
Size-distance$_2$ (X_{14})			-.4476**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	.0248	-.0590	-.1057
farm laborers and farm foremen (X_5)	.2524**	.2573**	.2336**
Percent of females, age 14 and over, in county, who are employed (X_6)	.1053	.1430	.1723
Median female personal income for county (X_7)	-.1518	-.2743**	-.2898**
Median years of school completed by males and females age 25 and over (X_8)	-.0104	-.0474	-.0511
Median family income (X_9)	-.1325	-.2014**	-.1427**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.1589**	-.1874**	-.1894**
age 25-34 (X_{11})	-.0953	-.1128	-.1239

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

**Significant at .05 level

Ne

la

ag

th

of

d

w

t

e

w

r

I

Next was female income (X_7), followed by percent of farm laborers and farm foremen (X_5), percent of married women age 15-44 who are 15-24 (X_{10}), and family income (X_9), in that order. The partial regression coefficients of the other variables in equation (3) were not significantly different from zero. These variables also had signs which were expected. Of the variables that were non-significant, the percent of farmers and farm managers (X_4) and female employment (X_6) had signs contrary to those hypothesized.

Intercorrelation among the independent variables was low, with the exception of that between female employment (X_6) and female income (X_u) ($r_{6.7}$ = .8282). This may be a factor affecting the sign of X_6 (female employment). The percent of farmers and farm managers (X_4) was correlated with the percent of farm laborers and farm foremen (X_5) ($r_{4.5}$ = .4122); education level (X_8) was correlated with female income (X_7) and with family income (X_9) ($r_{8.7}$ = .4246, $r_{8.9}$ = -.4182).

The influence of urban areas had the strongest influence on the fertility rates of rural-farm communities in the Northeast region. Irrespective of the measure used, the results, in all three equations, show that urban influence was important. The regression coefficients of all three

measures were significantly different from zero at the .05 level of confidence and had signs that were consistent with those hypothesized. Clearly, the presence of large cities and the proximity of rural-farm communities to these cities affected the rural cultural patterns regarding family size. The influence of large cities was not unexpected in the Northeast region, as there are large concentrations of SMSA's in this region. Some of the SMSA's are New York (10.7 million), Philadelphia (4.3 million), Pittsburgh (2.4 million), Boston (2.6 million), Newark (1.7 million), and Paterson-Clifton-Passaic (1.2 million). Of the 215 SMSA's in the United States, 48 are located in the Northeast region.[2]

The estimated regression coefficients for female income (X_7) and family incomes (X_9) were negative and highly significant. These relationships bear out the argument in Chapter III that incomes are inversely related to fertility rates.

The positive and significant regression coefficient for the percent of farm laborers and farm foremen (X_5) were

---

[2]United States Bureau of the Budget, Standard Metropolitan Statistical Areas, (Washington: U. S. Government Printint Office, 1961).

in accordance with expectations. The negative regression coefficients of the age distribution variables of married women (X_{10} and X_{11}) were also expected. The low but negative regression coefficients for education supported the expected inverse relationship between fertility rates and educational attainment. The positive regression coefficient for X_6 (female employment) can be rationalized in terms of the intercorrelation between female employment and female income. The negative regression coefficient for the percent of farmers and farm managers was contrary to that hypothesized.

In summary, in the Northeast region, which is an area of high urbanization, it was not surprising that influence of cities, as measured both by the distance of communities from large cities and by the size of the city, was the most important factor affecting variations in fertility rates among rural-farm communities. The effects of the income variables were also important. The other variables had a relatively minor effect.

The North Central Region

The North Central region is comprised of two divisions, the East North Central division and the West North

Central division. The East North Central division contains five states; Michigan, Indiana, Ohio, Illinois, and Wisconsin. The West North Central division contains Iowa, Minnesota, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

East North Central Division

Table 5.4 summarizes the results of the three equations for the division. Tables 10, 11, and 12 in the Appendix contain the detailed results.

The coefficient of multiple determination for equation (1) was .3601; for equation (2) it was .3596, and it was .3746 for equation (3) yielded the highest coefficient of multiple determination and also had the lowest standard error of estimate. Hence, it was chosen for detailed discussion.

Median years of school completed by males and females age 25 and over in a county (X_8), was the most important variable affecting intercommunity differentials in fertility rates of white rural-farm women, in all three equations. In equation (3) the size-distance$_2$ variable (X_{14}) was next in relative importance, followed by percent of married females age 15-24 (X_{10}), the percent of farm laborers and farm foremen (X_5), median female income (X_7) and

Sc

M
St

Di

S

S

Pe

P

M

M

M

P

TABLE 5.4

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

East North Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.6001	.5997	.6121
Standard Error of Estimate	309.8051	309.9162	306.2579

Independent Variables	Beta Coefficient[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.2567**		
Size-distance$_1$ (X_{13})		-.2347**	
Size-distance$_2$ (X_{14})			-.2648**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.2682[aa]	-.2495[aa]	-.2288[aa]
farm laborers and farm foremen (X_5)	.2007**	.1942**	.1812**
Percent of females, age 14 and over, in county, who are employed (X_6)	.2438[aa]	.2049[aa]	.2033[aa]
Median female personal income for county (X_7)	-.1796**	-.1692**	-.1720**
Median years of school completed by males and females age 25 and over (X_8)	-.3042**	-.3161**	-.3034**
Median family income (X_9)	-.0472	-.0990**	-.0965**
Percent of ever married females, age 15-44 who are:			
age 15-24 (X_{10})	-.2154**	-.2251**	-.2277**
age 25-34 (X_{11})	.0267	.2393	.2942

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

median family income (X_9), in that order.

Educational attainment (X_8) had the strongest influence on variations in fertility rates in the East North Central division. The simple correlation between X_8 (education) and fertility rates was the highest relative to that between fertility rates and any other variable in equation (3) ($r_{y.8} = -.4261$). Education was also positively correlated with family income (X_9) ($r_{8.9} = .4252$). The regression coefficient of X_8 (education) was negative, and it was significant at the .05 level of confidence. The higher the educational attainment of the people in the county, the lower was the fertility rate of the county.

The influence of urban areas was important in explaining variation in fertility rates among rural-farm communities. The regression coefficients of all three measures of urban influence used (X_{12}, X_{13}, and X_{14}) had signs consistent with the hypotheses and they were significantly different from zero at the .05 level of confidence. The negative and significant regression coefficient of X_{10}(percent of married women age 15-24) substantiated the hypothesis that a larger proportion of women in the younger age group tended to lower fertility rates. However, the positive and non-significant regression coefficient of X_{11}

(percent of married women age 25-34) was unexpected, especially in view of the low intercorrelation between X_{10} and other variables.

The percent of farm laborers and farm foremen (X_5) was also important. The results substantiated the argument that a relatively larger proportion of farm laborers and farm foremen in the rural work force tended to increase the fertility rates in rural-farm communities. However, the regression coefficient for X_4 (the percent of farmers and farm managers) had a negative sign and it was significant.

Both female income (X_7) and family income (X_9) influenced variations in white fertility rates in this division. The regression coefficients of both variables were negative. The regression coefficients of X_7 (female income) and that of X_9 (family income) were significant at the .05 level of confidence. These results bear out the hypothesized inverse relationships between the income variables and fertility rates.

The positive and significant regression coefficient of female employment (X_6) was contrary to the observed phenomenon that, at a given point of time, women in the labor force have lower fertility rates than those outside the labor force. However, the high intercorrelation between female income (X_7) and female employment (X_6) ($r_{6.7}$ = .6998) may be a cause for the unexpected results.

In general, the results of the analysis for the East North Central division substantiated the hypotheses regarding the effect of economic and cultural variables on variations in fertility rates. Except for three variables, female employment, percent of farmers and farm managers, and percent of married women age 25-34, the rest of the variables included in the study showed consistent relationships with fertility, as hypothesized.

West North Central Division

Table 5.5 presents a summary of the results of the analysis for this division. Tables 13, 14, and 15 in the Appendix show the detailed results.

Of the three equations, estimated for this division, equation (2) accounted for most of the variation in fertility rates (R_1^2 = .3218, R_2^2 = .3324, R_3^2 = .2992). It also had the lowest standard error of estimate of the three equations. The median years of school completed by males and females age 25 and over, (X_8), was the most important variable relative to other variables in explaining variation in fertility rates among communities. The next most important variable

TABLE 5.5

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

West North Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5673	.5766	.5470
Standard Error of Estimate	307.0689	304.6467	312.1330
Independent Variables	Beta Coefficient[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.1766**		
Size-distance$_1$ (X_{13})		-.2614**	
Size-distance$_2$ (X_{14})			-.0548
Percent of male employed work force who are:			
farmers and farm managers (X_4)	.0694**	-.0268	.0821**
farm laborers and farm foremen (X_5)	.3135**	.3042**	.3450**
Percent of females, age 14 and over, in county, who are employed (X_6)	.0838[aa]	.0626	.0805[aa]
Median female personal income for county (X_7)	-.1658**	-.1495**	-.1772**
Median years of school completed by males and females age 25 and over (X_8)	-.3357**	-.3868**	-.3512**
Median family income (X_9)	-.0125	-.0493	-.0285
Percent of ever married females, age 15-44 who are:			
age 15-24 (X_{10})	-.3111**	-.2939**	-.2807**
age 25-34 (X_{11})	.0245	.0087	.0329

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

was the percent of farm laborers and farm foremen (X_5) followed by the percent of married females age 15-24 (X_{10}), the size-distance$_1$ variable (X_{13}), and median female income (X_7).

Educational attainment was the most important variable. The regression coefficient of X_8 (educational attainment) was negative and significant. Education may be a factor which determines to a great extent the acceptance of urban cultural values in a community. The regression coefficient for the percent of farm laborers and farm foremen (X_5) was positive and significant. The regression coefficient of X_{10} (percent of married females age 15-24) was negative and significant. These results are consistent with the hypotheses.

The regression coefficient of the size-distance$_1$ variable (X_{13}) was negative and significant at the .05 level of confidence. It indicated that the proximity of rural communities to urban areas, as well as the size of the population of the urban area, were important factors in lowering fertility rates, but that the urban city extended its influence over a larger area than would be shown by the size-distance$_2$ variable. The regression coefficience for X_{12} (distance) and X_{13} (size-distance$_2$) had signs which were expected, but only that of X_{12} was significant.

Median female income (X_7) accounted for some of the variation in fertility rates in this division. Higher median family incomes had a negative effect on the fertility rates in a county relative to that with a lower median. The regression coefficient of X_9 (family income) was negative, but was non-significant.

The percent of females age 14 and over who were employed (X_6) was highly correlated with female income (X_7) and with education (X_8) ($r_{6.7} = .6995$, $r_{6.8} = .4954$). This may account for the unexpected sign of the regression coefficient of X_6 (female employment) and its non-significance. In equations (1) and (3) the regression coefficient for X_6 (female employment) was again positive but was significant at the .05 level of confidence.

X_4 (percent of farmers and farm managers) was correlated with X_5 (percent of farm laborers and farm foremen) ($r_{4.5} = .6507$). The regression coefficient of X_4 was negative and non-significant. However, in equations (1) and (3), the regression coefficient for X_4 (percent of farmers and farm managers) was consistent with the positive relationship hypothesized between farmers and farm managers and fertility rates, and was also significantly different

from zero at the .05 level of confidence. It was difficult to rationalize these conflicting results in the three equations.

The percent of married females age 15-24 (X_{10}) was also an important variable affecting white fertility rates. The regression coefficient of X_{10} was negative and significant. However, the regression coefficient of married females age 25-34 (X_{11}) was difficult to explain especially in view of the low intercorrelation among the variables.

In summary, the variables included in equation (2) substantiated the hypotheses formulated regarding their relationships with fertility rates. Except in the case of married females age 25-34 (X_{11}), farm managers and farm foremen (X_4) and female employment (X_6), the other variables had the expected relationships. Of these variables, only median family income (X_9) was non-significant.

The North Central Region

Table 5.6 presents the summary of the results of the three equations for the North Central region. Tables 16, 17, and 18, in the Appendix contain the detailed results by equation. Equation (1) accounted for 30.37 percent; equation (2) for 31.92 percent, and equation (3) for 29.76 percent

TABLE 5.6

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

North Central Region

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5511	.5650	.5456
Standard error of Estimate	314.5378	311.0129	315.9007
Independent Variables	Beta Coefficient[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.2280**		
Size-distance$_1$ (X_{13})		-.3214**	
Size-distance$_2$ (X_{14})			-.2170**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.0878aa	-.1653aa	-.1085aa
farm laborers and farm foremen (X_5)	.2356**	.2493**	.2625**
Percent of females, age 14 and over, in county, who are employed (X_6)	.1162aa	.1006aa	.1093aa
Median female personal income for county (X_7)	-.1704**	-.1552**	-.1756**
Median years of school completed by males and females age 25 and over (X_8)	-.3203**	-.3614**	-.3438**
Median family income (X_9)	.0463	.0838aa	.5938aa
Percent of ever married females, age 15-44 who are:			
age 15-24 (X_{10})	-.2779**	-.2615**	-.2518**
age 25-34 (X_{11})	.0424	.0318	.5074aa

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

**Significant at .05 level

aaSignificant at .05 level but the relationship was opposite to that hypothesized.

of the variance in fertility rates among rural-farm counties in the North Central region. The size-$distance_1$ variable more closely measured the extent of urban influence. However, there was not much difference among the statistics computed for the three measures of urban influence. The simple correlation between fertility rates and the distance variable was .2252; between fertility rate and size-$distance_1$, it was -.1780, and between fertility rates and size-$distance_2$ it was -.1550. The regression coefficients of all three variables were significant and had signs which were expected.

The median years of school completed by males and females age 25 and over (X_8) was the most important relative to others in equation (1). This importance of the influence of education on fertility rates was shown in the results of the analysis for the two divisions in this region. The next most important was size-$distance_1$ (X_{13}), followed in declining importance by the percent of married females age 15-24 (X_{10}), the percent of farm laborers and farm foremen (X_5), the percent of farmers and managers (X_4), median female income (X_7), female employment (X_6) and family income (X_9). All these variables significantly affected fertility rates among rural-farm communities.

The regression coefficient of X_8 (educational attainment) was negative and significant. This bears out the argument that a higher education level in a county is likely to be related to the complex relationships that determine fertility rates. The negative and significant regression coefficient of the size-distance$_1$ indicates the importance of both closeness of rural communities to a city and the size of the city.

The regression coefficients of X_{10} (married females age 15-24), X_5 (percent of farm laborers and farm foremen), and X_7 (female income) were significant at the .05 level of confidence and showed relationships which were expected. In equations (1) and (2), too, these variables showed significant relationships with fertility rates.

The percent of farmers and farm managers (X_4) was significantly related to fertility rates but in a direction contrary to that hypothesized. It may be that the high degree of intercorrelation between X_4 (farmers and farm managers) and other variables obscured the effects of this variable on fertility rates. The percent of farmers and farm managers (X_4) was correlated with median family income (X_9), with married females age 15-24 (X_{10}) and with the size-distance$_1$ variable, ($r_{4.9} = .6287$; $r_{4.10} = .4045$; $r_{4.13} = .6658$).

In equations (1) and (3), which showed similar negative relationships of X_4 and fertility rates, the correlation between X_4 (percent of farmers and farm managers) and distance was .4641 and between X_4 and X_{14} (size-distance$_2$) it was -.5754.

Female employment (X_6) showed a significant positive relationship to white fertility rates. Here again there was a high correlation between female employment (X_6) and female income (X_7) ($r_{6.7}$ = .6264). The regression coefficient of family income (X_9) was positive and significant. Although it was correlated with size-distance$_1$ ($r_{9.13}$ = .5870), it was difficult to rationalize the relationship between fertility rates and family income. The relationship of X_{11} (married females age 25-34) to fertility rates was positive, but the regression coefficient of X_{11} was non-significant.

In summary, the results show that in the divisions of the North Central region as well as in the region itself, education was the most important factor affecting variations in fertility rates. The influence of the proximity to and size of urban centers was also important. The percent of married females age 15-24 and female income had equal importance in each of the divisions and in the region. Farm laborers and farm foremen also affected fertility rates and the results of this variable were as expected in the divisions and in the region. Female employment was positively related to fertility rates in the East North Central division and for the region as a whole. This was contrary to the expected relationship. Finally, the proportion of married females who were age 25-34 had no significant influence in either division or in the region.

The Southern Region

The Southern region is comprised of three divisions. Eight states plus the District of Columbia constitute the South Atlantic division. These states are Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. The East South Central division contains four states; Kentucky, Tennessee, Alabama, and Mississippi, and the West South Central division contains Arkansas, Louisiana, Oklahoma and Texas.

The South Atlantic Division

A summary of the results for this division is presented in Table 5.7. Tables 19, 20, and 21 of the Appendix contain the detailed results of the analyses.

The percent of variance in white fertility rates explained by equation (1) was 16.08; by equation (2) it was

TABLE 5.7

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

South Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4011	.4490	.4243
Standard Error of Estimate	339.9806	331.6208	336.0785
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.0810**		
Size-distance$_1$ (X_{13})		-.3095**	
Size-distance$_2$ (X_{14})			-.2217**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.2176[aa]	-.2177[aa]	-.2252[aa]
farm laborers and farm foremen (X_5)	.1273**	.1224**	.1452**
Percent of females, age 14 and over, in county, who are employed (X_6)	-.0884	-.1063	-.1027
Median female personal income for county (X_7)	-.0095	-.0384	-.0335
Median years of school completed by males and females age 25 and over (X_8)	-.2796**	-.2680**	-.2482**
Median family income (X_9)	-.0922**	.1121[aa]	.0037
Percent of ever married females, age 15-44 who are:			
age 15-24 (X_{10})	-.0897**	-.1050**	-.1050**
age 25-34 (X_{11})	.0708	.0716	.0634

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

20.16, and by equation (3) it was 18.00. Equation (2) accounted for more of the variance than any of the other equations, suggesting that the size-distance$_1$ variable more closely measured the influence of urban areas. Urban influence was the most important variable affecting white fertility rates. The median years of school completed (X_8) was next most important, followed by the farmers and farm managers (X_4), farm laborers and farm foremen (X_5), family income (X_9), and married females age 15-24 (X_{10}), in that order. The regression coefficients of median female income (X_7), married females age 25-34 (X_{11}), and female employment (X_6) were not significantly different from zero.

The influence of large cities as measured by the size-distance$_1$ variable had the strongest effect on variations in fertility rates of white women in rural-farm counties in the South Atlantic division. This is also indicated by the results of equations (1) and (3). The distance variable (X_{12}) in equation (1) and the size-distance$_2$ variable in equation (3) were significantly related to fertility rates. However, the relative importance of these variables in the equations clearly indicates that distance from a city had a relatively weaker effect than the combined effect of distance and city size.

Educational attainment (X_8) had a positive and significant effect on the variations in white fertility rates. The negative effect of farmers and farm managers (X_4) was not expected. The regression coefficient of X_4 was negative as well as significant. Here again, the relationships shown were clearly opposite to those hypothesized. Both farm laborers and farm foremen (X_5) and family income were important variables. Farm laborers and farm foremen (X_5) were positively related to fertility rates. The positive relationship in the case of family income was inconsistent with the hypothesis. Family income (X_9) was correlated with size-distance$_1$ (X_{13}) ($r_{9.13}$ = .7062). The regression coefficients of both these variables were significantly different from zero at the .05 level of confidence.

The negative effects of the relative prevalence of married women in the age group 15-24 (X_{10}) was consistent with the hypotheses. The positive regression coefficient for X_{11} (married women 25-34) was non-significant. Female employment (X_6) and median female income (X_7) were negatively related to fertility rates. These relationships were expected, but the regression coefficients of these two variables were non-significant. There was a high degree of intercorrelation between these two variables

($r_{6.7}$ = .7519), which may have resulted in large standard errors of the regression coefficients and thus in their non-significance.

Although the percent of variance in fertility rates explained by the variables in this division was small, the results provide evidence for the hypothesized relationship between these variables and white fertility rates. The direction of influence of these variables was as expected, except in the case of family income, married females age 25-34, and percent of farmers and farm managers. Of the variables that showed relationships opposite to those expected, married females age 25-34 was non-significant.

The East South Central Division

Table 5.8 contains the summary of the results of the three equations estimated for this division. Tables 22, 23, and 24 of the Appendix present the detailed results for each equation.

Equation (3) accounted for most of the variance in white fertility rates in the East South Central division (R_1^2 = .3354; R_2^2 = .3388; R_3^2 = .3540). The size-distance$_2$ variable was a more representative measure of urban influence than either distance or size-distance$_1$ variables in this

TABLE 5.8

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

East South Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5792	.5821	.5950
Standard Error of Estimate	321.8234	321.0057	317.2849
	Beta Coefficients[1] (relative importance)		
Independent Variables			
Distance from nearest SMSA (X_{12})	.0851**		
Size-distance$_1$ (X_{13})		-.1158**	
Size-distance$_2$ (X_{14})			-.1673**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.3474[aa]	-.3250[aa]	-.3364[aa]
farm laborers and farm foremen (X_5)	.2042**	.2050**	.2252**
Percent of females, age 14 and over, in county, who are employed (X_6)	-.4913**	-.5059**	-.4962**
Median female personal income for county (X_7)	.0758	.0913	.0911
Median years of school completed by males and females age 25 and over (X_8)	-.0810	-.1137**	-.0784
Median family income (X_9)	-.0815**	-.0325	-.0334
Percent of ever married females, age 15-44 who are:			
age 15-24 (X_{10})	-.1886**	-.1962**	-.2084**
age 25-34 (X_{11})	.0070	-.0109	-.0093

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

division. As shown by the beta coefficients, the percent of females age 14 and over who are employed (X_6) was the most important variable relative to other variables in equation (3). The next most important were the percent of farmers and farm managers (X_4) and the percent of farm laborers and farm foremen (X_5), followed by married females age 15-24 (X_{10}) and the size-distance$_2$ variable.

Female employment had a predominant influence on fertility rates in this division. The regression coefficient of X_6 (female employment) was negative and significantly different from zero at the .05 level of confidence. It bears out the hypothesis that women in the labor force have a lower fertility than those outside the labor force. The direction of the influence of farmers and farm managers (X_4) was negative and significant, while that of X_5 (farm laborers and farm foremen) was positive and significant.

The effect of the predominance of married women in the younger age groups was negative as shown by the signs of X_{10} (married women age 15-24) and X_{11} (married females age 25-34) but only the regression coefficient of X_{10} was significant.

Urban influence was also an important factor affecting fertility rates. The results of all three equations tended to confirm this hypothesis. The regression coefficients of all three variables measuring urban influence were significant and had signs which were expected. However, size-distance$_2$ more closely measured the effects of urban influence. It confirmed the hypothesis that both size of the city and the proximity of rural communities to the city were important factors affecting fertility rates.

Female income (X_7) education (X_8) and family income (X_9) showed no significant influence on fertility rates. However, the direction of the influence of education and family income was consistent with expectations. Female income (X_7) was correlated with female employment (X_6) ($r_{6.7}$ = .6445).

In general, the variables explained a larger percentage of variation in fertility rates of white females in the East South Central division than in the South Atlantic division. The expected relationships between fertility rates and the variables were confirmed except in the case of female income and farmers and farm managers. However, only female employment, farm laborers and farm foremen and married females age 15-24 showed significant relationships with fertility rates.

The West South Central Division

A summary of the results for this division is presented in Table 5.9. Tables 25, 26, and 27 in the Appendix contain the complete results of the analyses. Equation (2) yielded the highest coefficient of multiple determination relative to the other two highest coefficient of multiple determination relative to the other two equations estimated for this division (R_1^2 = .3361; R_2^2 = .3432; R_3^2 = .3326), and also had the lowest standard error of estimate. Therefore equation (2) is discussed fully in this section. Years of school completed by males and females age 25 and over (X_8) was the most important variable affecting fertility rates of white females in rural-farm communities in the West South Central division. In declining order of importance were family income (X_9), farm laborers and farm foremen (X_5), farmers and farm managers (X_4), and size-distance$_1$ (X_{13}). The regression coefficients of the other variables were not significantly different from zero. Intercorrelation among the independent variables was very low.

Education had the greatest influence on white fertility rates. The direction of the influence was negative, tending to confirm the hypothesis that a higher educational level in a county depressed fertility rates. Median family

TABLE 5.9

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

West South Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5798	.5859	.5768
Standard Error of Estimate	323.3908	321.6679	324.2382
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.0686		
Size-distance$_1$ (X_{13})		-.1240**	
Size-distance$_2$ (X_{14})			-.0154
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	-.0752	-.1264[aa]	-.1029[aa]
farm laborers and farm foremen (X_5)	.2697**	.2151**	.2542**
Percent of females, age 14 and over, in county, who are employed (X_6)	-.0518	-.0333	-.0337
Median female personal income for county (X_7)	-.0713	-.0423	-.0631
Median years of school completed by males and females age 25 and over (X_8)	-.3651**	-.4082**	-.3677**
Median family income (X_9)	-.3157**	-.2805**	-.2974**
Percent of ever married females age 15-24, who are:			
age 15-24 (X_{10})	-.0436	-.0393	-.0386
age 25-34 (X_{11})	-.0381	-.0346	-.0348

[1]See Appendix, Tables 25, 26, and 27 for complete results

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

income (X_9) was inversely related to fertility rates. This was consistent with the hypotheses.

The relative prevalence of white rural-farm males who were farm laborers and farm foremen (X_5) was positively related to fertility rates in a community. However, the relative prevalence of farmers and farm managers was negatively related to fertility rates. The latter was inconsistent with the hypotheses.

The influence of large urban centers was negative and significant. Fertility rates of white women in rural-farm communities near large urban centers were lower than those of women in communities further removed from large cities. However, in equation (1) the regression coefficient of size-distance$_2$ was negative but non-significant. The size-distance$_1$ variable in equation (2) was the least important relative to the other significant variables.

In all three equations, the most important variables were education and median family income. The direction of their influence was negative as expected, and the regression coefficients were significant. The direction of influence of the other variables including those that were non-significant were consistent with expectations, with the exception of farmers and farm managers.

In summary, education and family income were of overwhelming importance in explaining fertility differentials in the West South Central division. A point to note is the consistency (with those expected) of the signs of all the variables, with the exception of farmers and farm managers.

The Southern Region

The results of the three equations for this region are summarized in Table 5.10. The complete results are presented in Tables 28, 29, and 30 of the Appendix. The coefficients of multiple determination for the three equations were almost identical (R_1^2 = .2354; R_2^2 = .2521; R_3^2 = .2451). However, equation (2) is discussed in detail as it has the highest coefficient and also the lowest standard error of estimate.

Median years of school completed by males and females (X_8) was the most important variable in explaining fertility differentials of white females among rural-farm communities in the southern region. The next most important was X_4 (farmers and farm managers), followed in declining importance by female employment (X_6), size-distance$_1$ (X_{13}), farm laborers and farm foremen (X_5), married females

TABLE 5.10

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

Southern Region

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4852	.5021	.4951
Standard Error of Estimate	338.5959	334.8846	336.4448
Independent Variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.0445		
Size-distance$_1$ (X_{13})		-.1640**	
Size-distance$_2$ (X_{14})			-.1338**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.2451[aa]	-.2436[aa]	-.2469[aa]
farm laborers and farm foremen (X_5)	.1458**	.1315**	.1522**
Percent of females, age 14 and over, in county, who are employed (X_6)	-.2130**	-.2320**	-.2215**
Median female personal income for county (X_7)	.0326	.0225	.0197
Median years of school completed by males and females age 25 and over (X_8)	-.2695**	-.2898**	-.2570**
Median family income (X_9)	-.1599**	-.0734**	-.0862**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.0786**	-.0774**	-.0862**
age 25-34 (X_{11})	.0376	.0338	.0324

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

age 15-24 (X_{10}) and family income (X_9). Median female income (X_7) and married females age 25-34 (X_{11}) were non-significant.

The negative direction of the influence of education was expected. A county with a high median of years of school completed would have a lower fertility rate than one with a lower median. This high importance of education was found for two of the three divisions of the southern region. The relative prevalence of farmers and farm managers had a negative influence on fertility rates. This was not expected. This negative relationship was also clearly shown in the three divisions of this region. It may be that a relative prevalence of farmers and farm managers in a county tends to depress fertility rates.

Female employment (X_6) was also an important factor affecting fertility rates. The regression coefficient of X_6 was negative as expected. Urban influence as measured by the size-distance$_1$ variable was inversely related to fertility rates. This relationship was expected. Although the size-distance$_1$ variable occupied a lower rank in importance, it emphasized the combined effects of both distance and size of the cities in fertility rates.

The coefficient of farm laborers and farm managers (X_5) was positive as expected. The coefficients of married females age 15-24 (X_{10}) and family income (X_9) were negative. These relationships were consistent with the hypotheses. A high intercorrelation was present only between female employment (X_6) and female income (X_7) ($r_{6.7} = .7010$).

The results of the analyses for the southern region show that in spite of the low percentage of variance explained by the variables, the relationship between these variables and fertility rates were consistent with those hypothesized. Of the nine variables, included in the analyses, seven were significantly related. Of these, the direction of influence of only one, (farmers and farm managers), was contrary to that expected.

The Western Region

The Mountain division and the Pacific division comprise the two divisions in the Western region. The Mountain division is constituted by eight states: Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada. The Pacific division contains Oregon, Washington, California, Hawaii, and Alaska. Alaska and Hawaii were omitted in this study.

The Mountain Division

Table 5.11 presents a summary of the results of this division. Table 31, 32, and 33 of the Appendix contain the complete results of the analyses for equations. The percent of variation in fertility rate explained by the variables was 26.51 in equation (1), 26.52 in equation (2) and 25.97 in equation (3). Although the percent of variation explained was not very much different from those of other divisions, the interpretation of the results was different.

Equation (2) is discussed in detail in this section, but the results of equation (1) and equation (3) were very similar. The important variables were married females age 15-24 (X_{10}), farmers and farm managers (X_4), and median family income (X_9), in that order. The rest of the variables had regression coefficients which were not significantly different from zero. The same variables were significant in equations (1) and (3) with the exception that in equation (1), female employment (X_6) was also significantly different from zero at the .05 level of confidence.

Married females age 15-24 (X_{10}) showed a negative relationship with fertility rates as expected. Married females age 25-34 (X_{11}) was also inversely related to fertility,

TABLE 5.11

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

Mountain Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5149	.5150	.5097
Standard Error of Estimate	402.3271	402.2858	403.7895
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.1051		
Size-distance$_1$ (X_{13})		-.1035	
Size-distance$_2$ (X_{14})			-.0672
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.2277[aa]	-.2781[aa]	-.2744[aa]
farm laborers and farm foremen (X_5)	-.0104	-.0325	-.0328
Percent of females, age 14 and over, in county, who are employed (X_6)	-.1466**	-.1340	-.1382
Median female personal income for county (X_7)	-.1236	-.1049	-.1092
Median years of school completed by males and females age 25 and over (X_8)	.0840	.0788	.0822
Median family income (X_9)	.1466[aa]	.1321[aa]	.1344[aa]
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.3985**	-.3744**	-.3838**
age 25-34 (X_{11})	-.0014	-.0025	-.0023

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

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

while family income (X_9)was directly related to fertility. The direction of the influence of farmers and farm managers and family income was contrary to expectations. Urban influence showed no significant relationship in any of the three equations.

The results of the analysis for this division does not bear out the hypothesized relationships between the variables and fertility rates. Of the three variables that had significant influences on fertility, only married females age 15-24 was related in the expected direction. The positive relationship between family income and fertility may be explained by the predominance of the adherents of the Mormon Church, especially in Idaho and Utah. Although the expected relationship between income and fertility may be negative, religious influence on fertility may be strong enough to create a positive relationship. Further, there is an element of pioneering in the people of this division which is consistent with high fertility.

The Pacific Division

Table 5.12 is a summary of the results of the three equations for this division. Tables 34, 35, and 36 in the Appendix contain the detailed results.

TABLE 5.12

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

Pacific Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5413	.5535	.5569
Standard Error of Estimate	224.2901	222.1728	221.5622
Independent Variables	Beta coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.0443		
Size-distance$_1$ (X_{13})		-.1850	
Size-distance$_2$ (X_{14})			-.1823**
Percent of male employed work force who are:			
farmers and farm managers (X_4)	-.0004	-.0472	-.0312
farm laborers and farm foremen (X_5)	.0644	.0796	.0718
Percent of females, age 14 and over, in county, who are employed (X_6)	.1236	.1088	.1242
Median female personal income for county (X_7)	-.1117	-.0847	-.0809
Median years of school completed by males and females age 25 and over (X_8)	-.3815**	-.3701**	-.3721**
Median family income (X_9)	-.3840**	-.2862**	-.3025**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.2611**	-.2565**	-.2658**
age 25-34 (X_{11})	-.0474	-.0446	-.0421

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

**Significant at .05 level

Equation (3) accounted for more variation in fertility rates than either of the other two equations (R_1^2 = .2930; R_2^2 = .3063; R_3^2 = .3101). In order of relative importance, the education variable (X_8) had the strongest influence on fertility rates, followed by family income (X_9), married females age 15-24 (X_{10}) and size-distance$_2$ (X_{14}). The rest of the variables did not show any significant relationship with fertility rates.

Education was inversely related to fertility rates. Counties with males and females age 14 and over who had a high median of years of school completed had lower fertility rates than those with a lower median. Family income was also inversely related to fertility rates. These relationships were also consistent with expectations. Both age groups of married females were inversely related to fertility, but only the group age 15-24 had a significant relationship. The influence of urban areas as measured by the size-distance$_2$ variable was inversely related to fertility. These relationships, too, were consistent with expectations. Among the variables that had no significant influence, only farmers and farm managers (X_4) and female employment (X_6) had signs contrary to those expected. Finally, although five of the variables were non-significant, the variations in the significant variables were strong enough to account for a third of the variation in fertility rates. The absolute values of the beta coefficients for the variables that were significant were much larger relative to the others. Education, family income, and married females age 15-24 had equal importance in their effects on fertility rates.

The Western Region

Table 5.13 is a summary of the results of the three equations. More complete results are presented in Tables 37, 38, and 39 of the Appendix. Equation (2) accounted for more variance than did any of the other equations (R_1^2 = .2162; R_2^2 = .2350; R_3^2 = .2237). Intercorrelation among the independent variables in this region was very low.

The percent of married females age 15-24 (X_{10}) was the most important variable in equation (2), followed in declining order of importance by size-distance$_1$ (X_{13}), median family income (X_9), farmers and farm managers (X_4), and median female income (X_7). The regression coefficients of the rest of the variables were not significantly different from zero.

TABLE 5.13

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

Western Region

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4650	.4848	.4730
Standard Error of Estimate	375.0500	370.5576	373.2605
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.0394		
Size-distance$_1$ (X_{13})		-.2158**	
Size-distance$_2$ (X_{14})			-.1748
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	-.0932	-.1532[aa]	-.1299[aa]
farm laborers and farm foremen (X_5)	.0378	.0359	.0329
Percent of females, age 14 and over, in county, who are employed (X_6)	-.0964	-.0987	-.0963
Median female personal income for county (X_7)	-.1705**	-.1247**	-.1370**
Median years of school completed by males and females age 25 and over (X_8)	-.0054	-.0181	-.0129
Median family income (X_9)	-.3254**	-.1941**	-.2666**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.2829**	-.2851**	-.2851**
age 25-34 (X_{11})	-.0179	-.0197	-.0181

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

** Significant at .05 level

[aa] Significant at .05 level but the relationship was opposite to that hypothesized.

The relative prevalence of married women in the age group 15-24 was inversely related to fertility rates of white females in this region. This relationship was consistent with expectations. The size-distance$_1$ variables showed the expected negative relationship with fertility rates. For this region, of the three variables measuring urban influence, only the size-distance$_1$ variable showed any significant relationship.

Median family income and female income were inversely related to fertility rates. A county with a higher median family income or female income tended to have a lower fertility rate than one with low medians. This inverse relationship between fertility rates and the income variables was consistent with expectations. Farmers and farm managers negatively affected the fertility rates in a county. This relationship was not expected.

In general, the results of the analyses for the Western region provide evidence in support of the hypothesized relationships between fertility rates and the variables included in the study. The direction of the influence of each variable was consistent with the hypothesized relationship except in the case of farmers and farm managers. The unexpected relationships of farmers and farm managers which has occurred throughout the analyses will be discussed in a later section. Finally, the regional equations for this region explained a lower percent of variance in fertility rates than did those for the individual divisions of this region.

The "Non-White Fertility Rates" Analysis

Equations were estimated for the non-white females for the divisions in the southern region and for the southern region as a whole. Twelve equations were estimated for the non-white fertility rates. Using the same criterion used for the "white fertility" equations, one equation was selected for discussion from the three equations estimated for each division and for the region.

The South Atlantic Division

Table 5.14 presents a summary of the three equations estimated for this division. Tables 40, 41, and 42 of the Appendix contain more complete results.

Equation (2) was selected for detailed discussion, as it had the highest coefficient of multiple determination (R_1^2 = .2732; R_2^2 = .2740; R_3^2 = .2711). The percent of married females age 15-24 (X_{10}) was the most important variable in explaining variations in fertility rates of non-white women

TABLE 5.14

Some of the Factors Influencing the Number of Children Ever Born to Married Non-White Females in 1960

South Atlantic Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5218	.5235	.5207
Standard Error of Estimate	545.5685	553.8758	555.0050
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.0528		
Size-distance$_1$ (X_{13})		-.1296	
Size-distance$_2$ (X_{14})			.0632
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	.0334	.0436	.0332
farm laborers and farm foremen (X_5)	.0956	.1034	.0887
Percent of females, age 14 and over, in county, who are employed (X_6)	.1345	.1301	.1379
Median female personal income for county (X_7)	-.1356	-.1217	-.1296
Median years of school completed by males and females age 25 and over (X_8)	-.2998**	-.2845**	-.3008**
Median family income (X_9)	-.2085**	-.0920	-.2498**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.4158**	-.4115**	-.4177**
age 25-34 (X_{11})	-.2355**	-.2479**	-.2394**

[1]See Appendix, Tables 40, 41, and 42 for complete results

**Significant at .05 level

in communities in this division. The next most important was education (X_8), followed by married females age 25-34 (X_{11}).

The relative prevalence of married women in the younger age groups (15-24 and 25-34) tended to lower the fertility rates of non-white females. This relationship was significant and was consistent with expectations. Family income was also an important factor which tended to influence fertility rates. The results show a clear inverse relationship between family income and fertility rates. The rest of the variables did not show significant results. However, with the exception of female employment, the rest of the variables affected fertility rates in directions as were expected. In equations (1) and (3), median family income had a significant influence on fertility rates. None of the measures of urban influence showed any significant relationship with fertility rates.

There was a high degree of intercorrelation among the variables in this division. Farmers and farm managers (X_4) correlated with farm laborers and farm foremen (X_5) and with female income (X_7) ($r_{4.5}$ = -.5212; $r_{4.7}$ = -.4271). Farm laborers and farm foremen (X_5) was correlated with female income (X_7) and education (X_8)($r_{5.7}$ = .4329; $r_{5.8}$= -.5752).

Female employment (X_6) was correlated with female income (X_7) ($r_{6.7}$= .6644). The two age group variables were correlated with each other ($r_{10.11}$ = -.4198). The size-distance$_1$ (X_{13}) was correlated with education and family income ($r_{13.8}$ = .4650; $r_{13.9}$ = .8415). These intercorrelations may have affected the significance of the regression coefficients of these variables.

The East South Central Division

Table 5.15 summarizes the results of the three equations for this division and Tables 43, 44, and 45 of the Appendix contain the complete results for the equations. Equation (2) explained most of the variance in non-white fertility rates than did the other two equations (R_1^2 = .2896; R_2^2 = .3216; R_3^2 = .2934).

In order of declining importance, married females age 15-24 (X_{10}) was the most important, followed by median family income (X_9), size-distance$_1$ (X_{13}) and married females age 25-34 (X_{11}). The other variables did not show significant relationships with fertility rates.

As in the South Atlantic division, the age-distribution of married females affected fertility rates significantly. The relative prevalence of married females in the

TABLE 5.15

Some of the Factors Influencing the Number of Children Ever Born to Married Non-White Females in 1960

East South Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.5382	.5671	.5417
Standard Error of Estimate	561.3958	548.5985	559.8786
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.9358		
Size-distance$_1$ (X_{13})		-.2301**	
Size-distance$_2$ (X_{14})			-.0662
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	-.0565	.0198	-.0707
farm laborers and farm foremen (X_5)	.0297	.1267	.0153
Percent of females, age 14 and over, in county, who are employed (X_6)	.0015	-.0135	-.0072
Median female personal income for county (X_7)	-.1776	-.1275	-.1570
Median years of school completed by males and females age 25 and over (X_8)	-.2065**	-.1261	-.2077**
Median family income (X_9)	-.3540**	-.2713**	-.3568**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.3417**	-.2965**	-.3361**
age 25-34 (X_{11})	-.2444**	-.1981**	-.2360**

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

**Significant at .05 level

younger age-groups tended to have a depressing influence on fertility rates. These relationships were consistent with the hypotheses.

Median family income was strongly related to fertility rates. The results indicated that a county with a high median family income tended to have a lower fertility rate than did those with lower median family income. In all three equations, median family income showed a significant relationship with fertility rates.

Urban influence, too, tended to depress fertility rates. The effect of urban influence was measured by the size-distance_1 variable, which took into account the distance of a rural community from the city as well as the size of the city itself. The results supported the hypothesis that cities extended their influence longer distances than was hypothesized by the size-distance_2 variable. Both the distance variable in equation (1) and size-distance (2) variable in equation (2), although the direction of their influence was consistent with the hypotheses, were non-significant.

Intercorrelation among the independent variables may have resulted in the regression coefficients of some of the variables being non-significant. Farmers and farm managers (X_4) was correlated with farm laborers and farm foremen (X_5), median female income (X_7) and education (X_8) ($r_{4.5}$ = .7603; $r_{4.7}$ = -.5404; $r_{4.8}$ = .4144). Farm laborers and farm foremen was correlated with female income and education ($r_{5.7}$ = .6878; $r_{5.8}$ = .4850) and female employment (X_6) was correlated with female income ($r_{6.7}$ = .6351). The positive correlation between education and farmers and farm managers may be rationalized on the grounds that, given the low median years of schooling of non-whites, farming constitutes a higher occupational group among the occupations available to non-whites.

The West South Central Division

A summary of the results for this division is presented in Table 5.16 and the complete results are presented in Tables 46, 47, and 48 of the Appendix.

The results of the analyses of non-white fertility rates for the West South Central division present a confusing picture. On the one hand, the coefficient of multiple correlation for any of the three equations was the highest relative to that for the same equation in any other division or region. On the other hand, only one variable (family income) had a significant effect on fertility rates.

TABLE 5.16

Some of the Factors Influencing the Number of Children Ever Born to Married Non-White Females in 1960

West South Central Division

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.6655	.6834	.6793
Standard Error of Estimate	579.2482	566.5324	569.5510
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA(X_{12})	-.0769		
Size-distance$_1$ (X_{13})		.1943	
Size-distance$_2$ (X_{14})			.1915
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	.1347	.1307	.1468
farm laborers and farm foremen (X_5)	.1049	.1081	.0815
Percent of females, age 14 and over, in county, who are employed (X_6)	-.1128	-.0448	.0731
Median female personal income for county (X_7)	.0852	.0793	.0864
Median years of school completed by males and females age 25 and over (X_8)	.0008	-.0578	.0129
Median family income (X_9)	-.6081**	-.6676**	-.7070**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.0989	-.1446	-.1337
age 25-34 (X_{11})	.0394	.0080	.0304

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

**Significant at .05 level

The percentage of variance explained by equation (1) was 44.28; by equation (2) was 46.70; and by equation (3) it was 46.14. There was no difference in the results of the three equations. In all three equations, only family income (X_9) was significant. It had the highest beta coefficient, the absolute value of which was very much larger than the others. Simple correlation between fertility rates and family income was high ($r_{y.9} = .6401$). The regression coefficients of the variables measuring urban influence were non-significant and had signs contrary to those expected. The regression coefficients of the other variables except that of female income and married females age 25-34 had signs consistent with expectations.

Intercorrelation, though low, was fairly widespread among the independent variables. Farmers and farm managers (X_4) was correlated with farm laborers and farm foremen (X_5), female employment (X_6) and female income (X_7) ($r_{4.5} = .4742$; $r_{4.6} = -.4414$; $r_{4.7} = -.6681$). Female employment was correlated with female income and family income ($r_{6.7} = .5586$; $r_{6.9} = .5240$).

In summary, although the variables in the study accounted for a high proportion of the variation in fertility rates in this division, as compared to other divisions, only family income was significantly related to fertility rates. Family income tended to be the most important and the only variable which had a significant influence on variations in fertility rates.

The Southern Region

Table 5.17 summarizes the results of the three equations for the southern region. The complete results are presented in Tables 49, 50, and 51 of the Appendix.

The percent of variance explained by the three equations were almost identical (R_1^2 = .2442; R_2^2 = .2458; R_3^2 = .2487). Equation (3) was chosen for detailed discussion.

The regression coefficients of four variables in equation (3) were significantly different from zero. They were, in order of declining importance, median family income (X_9), married females age 15-24 (X_{10}), education (X_8), and married females age 25-34 (X_{11}). The regression coefficients of the other variables were non-significant.

Family income was inversely related to fertility rates. The results showed that a county with a higher median family income tended to have a lower fertility rate than one with a lower median family income. A high median of years

TABLE 5.17

Some of the Factors Influencing the Number of Children Ever Born to Married Non-White Females in 1960

Southern Region

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.4942	.4958	.4987
Standard Error of Estimate	590.0039	89.4096	588.2745
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	-.0317		
Size-distance$_1$ (X_{13})		-.0753	
Size-distance$_2$ (X_{14})			.0995
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	-.0547	-.0513	-.0470
farm laborers and farm foremen (X_5)	-.0174	-.0168	-.1872
Percent of females, age 14 and over, in county, who are employed (X_6)	-.0639	-.0729	-.0545
Median female personal income for county (X_7)	-.0592	-.0440	-.0579
Median years of school completed by males and females, age 25 and over (X_8)	-.2188**	-.2016**	-.2282**
Median family income (X_9)	-.3574**	-.2973**	-.4175**
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.3045**	-.2925**	-.3165**
age 25-34 (X_{11})	-.1381**	-.1365**	-.1402**

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

**Significant at .05 level

of school completed by males and females also tended to depress fertility rates in a county. These relationships were consistent with those hypothesized.

The age distribution of married females affected the fertility rates inversely. This relationship was consistent with the hypothesis that the relative prevalence of married females in the younger age groups tended to depress the fertility rates in a county.

The regression coefficients of distance, size-distance$_1$, and size-distance$_2$ variables were all non-significant. These results are consistent with the statements made earlier that the effect of urban cultural influence on non-white attitudes towards fertility will be different to the extent that the non-white population react differently to the influence of largely white-dominated mass media.

There was correlation between the farmers and farm managers (X_4) and farm laborers and farm foremen (X_5) and female income (X_7) ($r_{4.5} = -.5789$; $r_{4.7} = -.5336$), between female employment (X_6) and female income (X_7) ($r_{6.7} = .5796$). Size-distance$_2$ and family income were also correlated ($r_{14.9} = .6590$).

Comparison of the white and non-white analyses in the South indicates differences in the importance of factors affecting fertility rates. For the white population, education was the most important factor followed in declining importance by occupation, urban influence, female employment, female income and the proportion of females age 15-44, who were 15-24. The proportion of females 15-44 who were 25-34 did not have any significant influence on white fertility rates in the South. In contrast, occupations, urban influence, female employment and female income did not have any significant influence on non-white fertility rates in the South. Education, family income and the age distribution of married females were the important factors affecting fertility rates.

In summary, the equations for the region explained a lower percentage of variance than those for the divisions in the southern region. In the equations chosen for discussion for the divisions as well as those for the regions, X_4 (farmers and farm managers), X_5 (farm laborers and farm foremen), X_6 (female employment), and X_7 (female income) showed no significant relationship with fertility rates. The effects of urban influence on fertility rates were important only in the East South Central division.

The Conterminous United States

Table 5.18 is a summary of the results of the equations for the conterminous United States. Tables 52, 53, and 54 of the Appendix contain the complete results per equation. The equations were estimated for the white population only.

The percent of variance in fertility rates explained by the equations was low. (R_1^2 = .1510; R_2^2 = .1656; R_3^2 = .1596). However, all the variables in equation (2), which was selected for discussion, were significantly related to fertility rates. The regression coefficients of all the variables were significantly different from zero at the .05 level of confidence. Intercorrelation among the independent variables was low with the exception of a relatively high intercorrelation between female employment (X_6) and female income (X_7) ($r_{6.7}$= .6759).

Education (X_8) had the most important influence on fertility rates of white rural-farm females in the conterminous United States, closely followed by urban influence (X_{13}). Median family income (X_9) was next most important, and ranked in order of declining importance were married females age 15-24 (X_{10}), farm laborers and farm foremen (X_5), female employment (X_6), median female personal income

TABLE 5.18

Some of the Factors Influencing the Number of Children Ever Born to Married White Females in 1960.

Conterminous United States

	Equation 1	Equation 2	Equation 3
Multiple Correlation Coefficient	.3886	.3996	.4070
Standard Error of Estimate	358.7741	355.3657	356.6103
Independent Variables	Beta Coefficients[1] (relative importance)		
Distance from nearest SMSA (X_{12})	.1912**		
Size-distance$_1$ (X_{13})		-.2540**	
Size-distance$_2$ (X_{14})			-.2359**
Percent of male employed work force, who are:			
farmers and farm managers (X_4)	-.0721	-.0511	-.0497[aa]
farm laborers and farm foremen (X_5)	.1476**	.1362**	.1543**
Percent of females, age 14 and over, in county, who are employed (X_6)	-.0744**	-.0925**	-.0794**
Median female personal income for county (X_7)	-.0804**	-.0709**	-.0866**
Median years of school completed by males and females age 25 and over (X_8)	-.2257**	-.2676**	-.2361**
Median family income (X_9)	.1058[aa]	.2292[aa]	.2210[aa]
Percent of ever married females, age 15-44, who are:			
age 15-24 (X_{10})	-.1876**	-.1903**	-.1913**
age 25-34 (X_{11})	.0608[aa]	.0599[aa]	.0633[aa]

[1]See Appendix, Tables 52, 53, and 54 for complete results

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized.

(X_7), married females age 25-34 (X_{11}), and farmers and farm managers (X_4).

Education was negatively related to fertility rates. The prevalence of males and females with a high median of years of school completed tended to depress fertility rates in a county. This relationship was consistent with expectations. Urban influence as measured by the size-distance$_1$ variable was inversely related to fertility rates. The combined effect of both distance of a county from the city, and the size of the city was important in measuring urban influence. The regression coefficients of distance in equation (1) and size-distance$_2$ in equation (3) were both significant at the .05 level of confidence, which indicated the overall importance of urban cultural influence on fertility rates.

Median family income was positively related to fertility rates. This relationship was unexpected. It could be that the equations estimated for the conterminous United States passed through the negative planes of the equations estimated for the regions. The relationship between family income and fertility rates was negative in the regions and divisions.

The negative relationship between married females age 15-24 and fertility rates was consistent with expectations. The relative prevalence of farmers and farm managers was positively related to fertility rates. Both female income and female employment were inversely related to fertility rates. These relationships were consistent with the hypothesis that women in the labor force and female income represented alternative opportunities. A high rate of female labor force participation and female income mean that women forego bearing and rearing children in order to work.

The positive relationship between married females age 25-34 and fertility rates was unexpected. Similarly, the negative relationship between fertility rates and farmers and farm managers was contrary to expectations.

In summary, although the percent of variation in white fertility rates explained by the variables was small, the relationships between the variables and fertility rates were significant. The direction of the influence of all the variables, with the exception of family income, married females age 25-34, and farmers and farm managers, were consistent with those hypothesized. In the next section, the relevance of the results to the hypotheses is discussed.

Consistent deviation of the direction of the influence of the variables is also discussed and explained.

Summary

Table 5.19 is a summary of the results of the total analysis. The table presents the rank and the sign of each variable by the selected equation for an area. Only the variables whose regression coefficients were significant at the .05 level of confidence are included. Broadly, certain uniform patterns of the influence of the variables included in the study on fertility rates can be indicated. For the whole analysis, no equation showed any significant relationship between fertility rates and the distance variable. However, fertility rates in most geographic areas were affected by urban influence as measured by either the size-distance$_1$ or size-distance$_2$ variables. The results indicated that urban influence on fertility rates was a joint function of both the distance of a rural community from a city and the size of the city from which the influence spreads.

Median family income, married females age 15-24, and education affected fertility rates in a majority of the areas discussed. Female employment and female income, and farm laborers, and farm foremen affected fertility rates in

TABLE 5.19

Summary of the Results of the Analysis of Fertility Rates, by Division, Region, and for the Conterminous United States, in Rural-Farm Counties, 1960.

Area	X_4		X_5		X_6		X_7		X_8	
	r*	s**	r	s	r	s	r	s	r	s
White Analysis......										
Conterminous United States	9	-	5	(+)	6	(-)	7	(-)	1	(-)
New England		(+)		(+)		+	1	(-)		(-)
Middle Atlantic	4	-	3	(+)		+	2	(-)		(-)
Northeast		-	3	(+)		+	2	(-)		(-)
East North Central	3	-	6	(+)	5	+	7	(-)	1	(-)
West North Central		-	2	(+)		+	5	(-)	1	(-)
North Central	5	-	4	(+)	7	+	6	(-)	1	(-)
South Atlantic	3	-	4	(+)		(-)		(-)	2	(-)
East South Central	2	-	3	(+)	1	(-)		+		(-)
West South Central	4	-	3	(+)		(-)		(-)	1	(-)
South	2	-	5	(+)	3	(-)		+	1	(-)
Mountain	2	-		-		(-)		(-)		+
Pacific		-		(+)		+		(-)	1	(-)
West	4	-		(+)		(-)	5	(-)		(-)
Non-White Analysis..										
South Atlantic		(+)		(+)		+		(-)	2	(-)
East South Central		(+)		(+)		(-)		(-)		(-)
West South Central		(+)		(+)		(-)		+		(+)
South		-		-		(-)		(-)	3	(-)

*Rank of variable as indicated by the beta coefficient. Only those variables whose regression coefficients were significant at the .05 level were ranked.

**Sign of the regression coefficient. Parentheses indicate consistency of sign with expectations.

X_4=Farmers & farm managers; X_5=Farm laborers & farm foremen; X_6=Female employment; X_7=Female income; X_8=Education; X_9=Family income; X_{10}=Married females, age 15-24; X_{11}=Married females, age 25-34; X_{12}=Distance; X_{13}=Size-distance$_1$; X_{14}=Size-distance$_2$.

TABLE 5.19--Continued

X_9		X_{10}		X_{11}		X_{12}		X_{13}		X_{14}	
r	s	r	s	r	s	r	s	r	s	r	s
3	+	4	(-)	8	+			2	(-)		
2	(-)		(-)		(-)		(-)				
	+		(-)		(-)					1	(-)
5	(-)	4	(-)		(-)					1	(-)
8	(-)	4	(-)		+					2	(-)
	(-)	3	(-)		+			4	(-)		
8	(-)	3	(-)		+			2	(-)		
5	(-)	6	(-)		+			1	(-)		
	(-)	4	(-)		(-)					5	(-)
2	(-)		(-)		(-)			5	(-)		
7	(-)	6	(-)		+			4	(-)		
3	(-)	1	(-)		(-)				(-)		
2	(-)	3	(-)		(-)					4	(-)
3	(-)	1	(-)		(-)			2	(-)		
	(-)	1	(-)	3	(-)				(-)		
2	(-)	1	(-)	4	(-)			3	(-)		
1	(-)		(-)		+				+		
1	(-)	2	(-)	4	(-)						+

a lesser number of areas. Married females age 25-34 showed any significant influence on fertility rates only for the non-white analysis and for the analysis of the conterminous United States. The direction of influence of these variables was consistent with that hypothesized with a few exceptions.

A major inconsistency, however, was the unexpected relationship between farmers and farm managers and fertility rates. In all the areas, where the regression coefficient of farmers and farm managers was significant, the results indicated a negative relationship between fertility rates and farmers and farm managers. Earlier, it was hypothesized that the relative prevalence of farmers and farm managers in a county was directly related to fertility rates.

The unexpected signs of the farmers and farm managers variable may be explained by the following arguments. While the prevalence of the population engaged in agricultural pursuits is positively correlated with fertility rates, there is also the observed inverse relationship between fertility rates and socio-economic status. Fertility rates are low for the professional and managerial occupational groups and high for those in the farming and unskilled occupation groups. In the rural-farm sector of the United States, the farmers and farm managers and farm laborers and farm foremen constituted

68 percent of the white male employed work force and 74 percent of the non-white male employed work force in 1960. For the regions of the United States, the percent of the work force in these two occupational categories for both white and non-white ranged from 61 in the Northeast regions to 73 in the North Central region. These figures do not include unpaid family workers who would have increased the proportion. The percent of professional, technical, and kindred workers in the white rural-farm labor force for the United States was 2.9; for the non-white, it was 2.7. Managers, officials and proprietors, excluding farms, constituted 2.9 percent for the white labor force and 3.8 for the non-white labor force. Thus it may be contended that as the upper occupation groups constitute a negligible proportion of the labor force, the rest of the occupations form a scale with farmers and farm managers at the top. Within this limited occupational scale, the inverse relationship between fertility rates and occupation holds, with the farmers and farm managers forming a select group with respect to fertility. Within a rural-farm county, given the high proportion of the work force in agriculture, farmers and farm managers are in a higher social scale than those in other occupations in agriculture. The above

observations provide a rational basis for the negative effects of the prevalence of farmers and farm managers upon the fertility rates of rural-farm women.

Finally, it was difficult to determine which of the equations; the divisional, the regional, or the national equations, represented the best relationships between fertility rates and independent variables. In general, the divisional equations explained a higher percentage of the variation in fertility rates than the equation for the relevant region. However, the divisional equations had a fewer number of variables that were significant than did the regional equations. The equation for the conterminous United States explained the least amount of variance relative to that for any division or region. But the variables in the equations for the conterminous United States were all significant. The significance of the regression coefficients may have been effected by the relative larger number of observations in the regional analyses than in the divisional analyses. However, it is difficult to state categorically that a divisional or regional equation was the most representative of the hypothesized relationships. In the next chapter, regional and divisional variations in the effects of the variables are discussed.

CHAPTER VI

COMPARISON OF THE RESULTS AMONG DIVISIONS AND REGIONS

Introduction

In this chapter, the results of the multiple comparison or contrast tests are presented and discussed. This test identifies significant differences among the regression coefficients of an independent variable. The regression coefficients of each independent variable were compared among all divisions and all regions for the "white fertility" equations and among the divisions of the southern regions for the "non-white fertility" equations. The test identified differences in the effects of all the variables included in the study with the exception of distance and size-distance$_2$ variables. The results of the multiple comparison tests among the divisions are presented in Table 6.1.

Comparison Among the Divisions: "White Fertility" Equations

In this section, the regression coefficients of each independent variable are compared among the nine divisions

TABLE 6.1

Summary of the Results of the Multiple Comparison Tests Among Divisions of the Conterminous United States

Divisions Compared	Independent Variables								
	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{13}
"White Fertility" Equations									
New England-Mid Atlantic	0	0	0	0	0	0	0	0	0
" -East North Central	0	0	0	0	0	0	0	0	0
" -West North Central	0	0	0	0	0	0	0	0	0
" -South Atlantic	0	0	0	0	0	0	0	0	0
" -East South Central	0	0	0	0	0	0	0	0	0
" -West South Central	0	0	0	0	0	0	0	0	0
" -Mountain	0	0	0	0	0	0	0	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
Mid Atlantic-									
East North Central	0	0	0	0	0	0	0	0	0
" -West North Central	0	0	0	0	0	0	0	0	0
" -South Atlantic	0	0	0	0	0	0	0	0	0
" -East South Central	0	0	0	0	0	0	0	0	0
" -West South Central	0	0	0	0	0	0	0	0	0
" -Mountain	0	0	0	0	0	0	0	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
East North Central-									
West North Central	0	0	0	0	0	0	0	0	0
" -South Atlantic	0	0	1	0	0	0	0	0	0
" -East South Central	0	0	1	0	0	0	0	0	0
" -West South Central	0	0	0	0	0	0	1	0	0
" -Mountain	0	0	1	0	1	0	0	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
West North Central-									
South Atlantic	0	0	0	0	0	0	1	0	0
" -Mountain	0	0	0	0	1	0	0	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
" East South Central	0	0	1	0	0	0	0	0	0
" -West South Central	0	0	0	0	0	1	1	0	0

TABLE 6.1--Continued

Divisions Compared	Independent Variables								
	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{13}
South Atlantic-									
East South Central	0	0	1	0	0	0	0	0	0
" -West South Central	0	0	0	0	0	1	0	0	0
" -Mountain	0	0	0	0	1	0	1	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
East South Central-									
West South Central	0	0	1	0	0	1	0	0	0
" -Mountain	0	0	0	0	0	0	0	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
West South Central-									
Mountain	0	0	0	0	1	1	1	0	0
" -Pacific	0	0	0	0	0	0	0	0	0
Mountain-Pacific	0	0	0	0	0	0	0	0	0
"Non-White Fertility" Equations									
South Atlantic-									
East South Central	0	0	0	0	0	1	0	0	0
" -West South Central	0	0	0	0	1	1	1	1	1
East South Central-									
West South Central	0	0	0	0	0	1	0	1	1

1 denotes that there were significant differences in the regression coefficients of the independent variable for the two divisions compared.

0 denotes that there were no significant differences between the two.

X_4=farmers & farm managers; X_5= farm laborers & farm foremen; X_6=female employment; X_7=female income; X_8=education; X_9=family income; X_{10}=married females age 15-24; X_{11}=married females age 24-35; X_{13}=size-distance$_1$.

for which white fertility rates were analyzed.

The effects of female employment on white fertility rates were different in the East North Central division and the East South Central division. Its effects in the East North Central division were different from those in the South Atlantic, East South Central, and Mountain divisions. It also had a different effect on the fertility rates in the East South Central division than it did in the West North Central, South Atlantic and West South Central divisions.

Reference to Table 5.19 in Chapter V will make these differences in the effects of the variables more clear. Female employment had a significant and positive effect on fertility rates in the East North Central division. In the East South Central division, the regression coefficient of female employment was negative and it ranked first, in relative importance, of the five significant variables in that division. It had no significant influence on fertility rates in the West North Central division, the South Atlantic division, and the Mountain division.

The effect of median years of school completed by males and females was different in the Mountain division. Comparisons between the divisions indicated that education had a different effect on white fertility rates in the Mountain division than it did in the East North Central, West North Central, South Atlantic, and West South Central divisions. In the Mountain division, the effect of education, though non-significant, was positive. In the East North Central, West North Central, South Atlantic, and West South Central divisions, education had a strong negative influence on fertility rates. It ranked first in relative importance in the East North Central, West North Central, and West South Central divisions, while in the South Atlantic division, it ranked second. Apparently, the weight of the Mormon population was felt in the results for the Mountain division. Although this division had a high level of education, the influence of the Mormon faith, which encourages large families, counteracted the negative influence of education on fertility rates. Hence high levels of education and high rates of fertility were characteristics of this division.

Family income had a different effect on fertility rates in the West South Central division than it did in the West North Central, the South Atlantic, the East South Central, and the Mountain divisions. In the West South Central division, family income was significant and negative. It ranked second in relative importance among the five significant variables in that division. In the South Atlantic division it ranked fifth in importance and was the least important in the Mountain division. Family income had no significant influence on fertility rates in the West North Central and East South Central divisions.

The relative prevalence of married females age 15-24 had different effects in the South Atlantic and West South Central divisions. Married females age 15-24 had a different effect on the fertility rates in the South Atlantic division than it did in the West North Central and Mountain divisions. In the South Atlantic division, married females age 15-24 was the least important variable, while it had no significant influence in the West South Central division. It ranked first in relative importance in the East North Central and West North Central divisions.

Farmers and farm managers, farm laborers and farm foremen, median female income, married females age 25-34, and size-distance$_1$ had similar effects on fertility rates in all divisions. The multiple comparison tests indicated the divisions among which the effects of the other variables were different. These differences in the effects were confined to the East North Central, West North Central, South Atlantic, East South Central, West South Central, and the

Mountain divisions.

"Non-White Fertility" Equations

Among the three divisions in the Southern region, the comparisons indicated that the effects of farmers and farm managers, farm laborers and farm foremen, female employment, and female income on non-white fertility rates were similar.

Education had a different effect on non-white fertility rates in the South Atlantic than it did in the West South Central division. Although the regression coefficient of education was not significant in either division, it was positive in the South Atlantic division and negative in the West South Central division.

The effect of family income on fertility rates in the South Atlantic division were different from those in the East South Central and West South Central divisions, and its effects in the East South Central division were different from those in the West South Central division. Family income did not have a significant influence on fertility rates in the South Atlantic division. It ranked second of the four significant variables in the East South Central division, and was the only important variable in the West South Central division. It should be noted that the equation estimated for non-white fertility rates for this division explained the highest percent of variance in fertility rates relative to that estimated for any other division, region, or the nation for the white fertility rates or for the other two divisions in the southern region and the southern region for the non-white fertility rates. However, variations in family income accounted for most of the variance in fertility rates in the West South Central division explained by the equation.

Married females age 15-24 had a different effect on fertility rates in the South Atlantic division than it did in the West South Central division. This variable ranked first in relative importance among the variables affecting fertility rates in the South Atlantic division, while it had no significant influence in the West South Central division. The effects of married females age 25-34 and size-distance$_1$ were different in the West South Central division compared to the South Atlantic and East South Central divisions. In the West South Central division the regression coefficient of married females age 25-34 was non-significant and positive, while it was significant and negative in the South Atlantic and East South Central divisions. Similarly, the regression coefficient of size-distance$_1$ was not

significant and positive in the West South Central division and negative in the other two divisions.

The results of the multiple comparison tests indicated that the effects of all the variables with the exception of family income were similar in the South Atlantic and East South Central divisions. The effects of most of the variables on non-white fertility rates in the West South Central division were different from those in the South Atlantic and East South Central divisions.

Comparisons Among Regions

The comparison of the regression coefficients of each independent variable was done for the estimated white fertility equations among the regions. Table 6.2 presents the results of the comparison among regions.

The results of the multiple comparison tests among the regions indicated that female employment affected fertility rates differently in the North Central region than it did in the Southern and Western regions. In the North Central region female employment had a significant and positive influence on fertility rates. It had a signigicant and negative influence in the Southern region and in the Western region the relationship, though not significant, was also negative.

TABLE 6.2

Summary of the Results of the Multiple Comparison Tests Among Regions of the Conterminous United States

Regions Compared	Independent Variables								
	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{13}
Northeast-North Central	0	0	0	0	1	1	0	0	0
" -South	0	0	0	0	1	0	0	0	0
" -West	0	0	0	0	0	0	0	0	0
North Central-South	0	0	1	1	0	1	1	0	0
" -West	0	0	1	0	1	1	0	0	0
South-West	0	0	0	0	1	0	1	0	0

1 denotes that there were significant differences in the regression coefficients of the independent variables, for the two divisions compared.

0 denotes that there were no significant differences between the two.

X_4=farmers & farm managers; X_5=farm laborers and farm foremen; X_6=female employment; X_7=female income; X_8=education; X_9=family income; X_{10}=married females age 15-24; X_{11}=females age 25-34; X_{13}=size-distance$_1$.

Female income affected fertility rates differently in the North Central and the southern regions. The relationship between fertility rates and female income was significant and negative in the North Central region, while in the southern region it was positive, though not significant. The effects of education on fertility rates was different in the North Central region as compared to the same regions. The influence of education was negative and significant in the North Central and southern regions. In these two regions, it ranked first in relative importance among the variables affecting fertility rates. In the Northeast and Western regions education had no significant influence on fertility rates.

Family income affected fertility rates differently in the North Central region than it did in the other three regions. In all the regions it had a significant and negative influence on fertility rates, but it was more important relative to other variables in the Northeast, southern, and western regions than in the North Central region, where it was the least important. Married females age 15-24 affected fertility rates differently in the southern region than it did in the North Central region, where it was the least important. Married females age 15-24 affected fertility rates differently in the southern region than it did in the North Central and western regions. Again, in these three regions, married females age 15-24 had a significant and negative influence on fertility rates. However, the relative importance of this variable relative to the others differed among the equations for the regions. It ranked first of the five significant variables in the western region and third of the eight significant variables in the North Central region. In the southern region, it ranked sixth of the seven significant variables in relative importance. The effects of farmers and farm managers, farm laborers and farm foremen, married females age 25-34, and size-distance$_1$ were similar in all the regions.

In summary, comparisons of the regression coefficients of the independent variables indicated that there were significant differences in the effects of female employment, education, family income, and married females age 15-24, especially between the divisions in the North Central region, the divisions in the southern region, and in the Mountain division. For the non-white analyses, there were significant differences in the effects of education, married females age 25-34, and size-distance$_1$ variables between the East South Central and West South Central divisions. The income variables, age distribution of married females and size-distance$_1$ affected non-white fertility rates differently in the South Atlantic division than they did in the West South Central division. Except for the effects of family income, the effects of the other variables on fertility rates in the South Atlantic and the East South Central divisions were similar. Among the regions, the effects of some of the variables were different between North Central region and the southern and western regions. The greatest differences were in the effects of female employment, female income, family income, and married females, age 15-24, between the North Central and the southern regions. There was no significant difference in the effects of these variables between the northern and western regions. These findings provided evidence in support of the hypothesis stated in Chapter III. It was hypothesized that fertility rates varied from community to community, in part due to differences in the divisions and regions in which the communities are located.

CHAPTER VII

SUMMARY AND CONCLUSIONS

This chapter is divided into two sections. In the first section, a general summary of the important conclusions, derived from the study, is presented along with the implications of the conclusions for public policy. In the second section, suggestions are made which may be considered in subsequent analyses of this nature and areas for future research are noted.

Summary of Findings and Their Implications for Policy

The importance of some of the factors affecting differences in fertility rates among rural-farm communities was studied for the white population as well as for the non-white population. The analysis of "white fertility" rates was conducted at the divisional, regional, and national levels. "Non-white fertility" rates were analyzed only for the three divisions in the South and for the southern region. The importance of some of the factors was indicated by the analyses.

The importance of the influence of some of the factors and the lack of any significant effect of others on the fertility rates of rural-farm communities in a geographic area was striking. Also striking was the consistency in the importance of some of the factors in influencing fertility rates among the divisions and among the regions. High medians of years of school completed by males and females age 25 or over, high median family incomes and the relative prevalence of married females age 15-24 tended to depress white fertility rates. The relative prevalence of farm laborers and farm foremen tended to increase fertility rates in rural-farm communities. Those communities which were located near large urban centers tended to have lower fertility rates than those located farther away.

Education was the most important variable which affected fertility rates in seven of the fourteen geographic areas in which white fertility rates were analyzed. In all these units, education was inversely related to fertility rates. Median family income was significantly related in eleven of the fourteen areas and urban influence, as measured either by the size-distance$_1$ or size-distance$_2$ variables affected fertility rates significantly in twelve of the fourteen areas, the only exceptions being, the New England and Mountain divisions.

Another important conclusion derived from the analyses was that the same factors also were important in their effects on non-white fertility rates. High family income, education and urban influence tended to lower non-white fertility rates. A relative prevalence of married females age 15-24 tended to raise fertility rates. The only exception was the significant influence of married females age 25-34 on non-white fertility rates. The study, therefore, clearly indicated the importance of education, income, and urban influence as factors tending to depress the fertility rates of both white and non-white females.

These findings raise important implications for public policy. Agriculture in the United States today suffers from the twin problems of surplus from products production and surplus people. Policies designed to cure one will necessarily have a bearing on the second problem.

The high fertility rates of the farm sector in the previous century helped the rural areas to provide a steady supply of labor to the cities. Agriculture was the dominant sector in the economy. The rapid industrialization of the economy in the twentieth century has reduced the importance of agriculture. Technological improvements have increased the productivity of inputs in agriculture greatly, but, due to the inelastic nature of the demand for farm products, the supply of farm products exceeds the demand for them at price levels acceptable to farmers. The resulting low prices and low incomes have to be bolstered with massive price supports. Along with these problems, is also the problem of poverty of certain agricultural areas. This poverty is not as much due to market conditions as to the climatic and topographical nature of the specific area itself. The industrial cities still absorb much of the excess population of the rural areas, but industrial choice of labor has become highly selective, requiring skill and education. The above is a much simplified view of the farm problem, but the discussion of it is common in the literature and needs no elaboration here.

The relevance of the economic problem in agriculture in this study stems from its importance to the fertility rates of the rural sector. The replacement index for the United States is 2.2 children per woman. Rural-farm women average 3.33 children, compared with 2.88 children for the rural-non-farm women, and 2.26 children for the urban women.[1]

---

[1]Population Bulletin, (Population Reference Bureau, Inc., XIX, No. 3, May, 1963), p. 54.

Thus, the high fertility rates of rural-farm women not only abet the rapid population growth of the nation, but also complicates the pressing need for the farm people to move out of agriculture. High fertility rates among rural-farm women are not undesirable, per se, but they do aggravate the low income problems in agriculture. It has long been observed that the rural-farm sector is characterized by low incomes and high fertility rates.

However, it is expected that policies designed to eradicate the problem of low incomes will have an effect on rural-farm fertility. Policies which are designed to increase income to a given minimum will not have any effect on fertility rates. Most programs of this nature tend to allocate the subsidies according to family size. Accordingly, a large family would receive a larger amount than a small family, and it may appeal for families to have more children. This reaction is observed among city families who are on relief.

Policies which are designed to eradicate low incomes through long-term plans would affect fertility rates. These policies may be education, movement of industry into rural areas, or maintenance of full employment in the non-farm economy to accelerate the outflow of the farm population.

It was noted earlier that education was an important factor depressing fertility rates of both whites and non-whites. Education not only enlarges the scope of employment, both in the rural community and in the city, but it also influences the response of people to the cultural influence of cities. The higher the educational level attained by the people in a community, the more likely they are to read newspapers, etc., of cities, and the more amenable they will be to changing their values regarding family limitation. Education, by enlarging the scope of opportunities available, will reduce those who seek employment as farm laborers and farm foremen, who were shown in the study to have a positive influence on fertility rates. Further, a farm laborer with a high education will be more susceptible to urban influences than one with less or no education. The enlarged scope of employment in higher paying jobs through education will accentuate the impact of education on fertility rates through higher family incomes.

Urban influence was also an important factor in depressing fertility. Policies designed to attract industry to hitherto rural areas and the growth of small cities into larger cities will have an effect on fertility rates. The spread of urban culture would be abetted by the movement of industry and growth of cities in rural areas. Policies designed to solve the problems of low incomes in agriculture also stress education and movement of industry into rural areas. It should be noted therefore, that such policies will have a dual effect of not only solving the income problems in the rural areas, but also of reducing fertility rates. Hence, in the long run, such public policies will help to solve both the economic and demographic problems of the farm population.

Evaluation of the Study

Least squares regression techniques were used to study the relationships between fertility rates of rural-farm women and sociological and economic variables. In accordance with the hypothesis that there were regional differences in the effects of these variables on fertility rates, equations were estimated for each division, region, and for the conterminous United States. The results of the analyses were presented and discussed by each division and region. In this section, improvements in subsequent analyses and suggestions for future research in fertility analyses are noted.

Although the percent of variance in fertility rates explained by the variables was low, most of the variables were significantly related to fertility rates. However, modification might be made in the specification of some of the variables in order to improve the results. Generally, intercorrelation among the independent variables was low, with the exception of that between female employment and female income. In all the equation, there was a high degree of intercorrelation between these two variables, which may have resulted in large standard errors of the regression coefficients and thus introduced an element of bias into the results. This could account for the few geographic areas where these variables were both significantly related to fertility rates. Omission of either one of these variables may yield better results.

The percent of variance explained by the variables was substantially more in the equations for a division than for the equation for the relevant region. The equation for the New England division explained 45.83 percent of the variance. Similarly, the equations for the majority of the divisions in a region explained a higher percent of the variance than that for the relevant region. The coefficient of multiple determination for the conterminous United States was the lowest in absolute value relative to that for any division or region. Cultural systems have a greater influence on the attitudes of a couple regarding the number of children they have, as compared to economic conditions. It is quite obvious that the population in a small geographic area such as a state or division is more homogenous than the population of a region or the United States. The percent of variance in fertility rates explained by a set of predominantly economic variables will be less in a culturally heterogenous community than in one which is culturally homogenous. Hence, the higher percent of variance explained by the analysis for the divisions than for the regions or for the nation, in the study. A useful area of research would be the analysis of fertility rates in culturally homogenous geographic areas, where economic variables would account for much of the variability in fertility rates.

A further step in the above process would be to analyze the influence of religion. In this study, the influence of religion was not studied. The United States Census does not enumerate data regarding religion. However, it is acknowledged that religious beliefs have an influence on the attitude of couples toward family limitation practices, etc. Some faiths do not allow the use of artificial devices to prevent conception, while others are tolerant of such practices. The use of a variable to represent the percent of the population who belong to a particular faith would enable the study of the effects of religious beliefs on fertility rates. The influence of religion could be anlyzed in a study where the data pertain to a small geographic area.

Finally, fertility rates were hypothesized to be linearly related to each of the independent variables. The equations estimated indicated variations in fertility rates as linear functions of the independent variables. However the functional relationships between fertility rates and some of the variables may be other than linear. It has been observed that high fertility rates are found among the lowest and highest income brackets. Similarly, the effects of education and urban influence on fertility rates may not be linear. The use of other functional forms, such as logarithmic, quadratic, or polynomial, may reflect the true relationship between these variables and fertility. Initial graphic analyses may show some indication of the nature of the relationships. If the true relationships are other than those hypothesized, a change in the functional form of the equations would yield a higher coefficient of multiple determination.

The above suggestions provide areas for further research. However, much of the suggested research rests on the availability of adequate data. The present study was made possible by the availability of census data in a form capable of analyses by a computer. The availability of census data in such a form is a necessary prerequisite not only for the analysis of fertility rates but also of other social and economic variables. The provision of data from future censuses on tapes ready for electronic computer processing will greatly facilitate the exploitation of the research potential in census data hitherto relatively untouched.

LITERATURE CITED

Adelman, I. "An Econometric Analysis of Population Growth," American Economic Review, Vol. LIII, No. 3, June, 1963, pp. 314-339.

Becker, G. S. "An Economic Analysis of Fertility," Demographic and Economic Change in Developed Countries. National Bureau of Economic Research, Princeton.

Bogue, D. J. The Structure of the Metropolitan Community. University of Michigan, Ann Arbor, 1949.

Brownlee, K. A. Statistical Theory and Methodology in Science and Engineering. New York: John Wiley and Sons, Inc., 1959.

Brunner, E. de S., and Kolb, J. H. Rural Social Trends. New York: McGraw-Hill Book Company, Inc., 1933.

Bryant, W. K. An Analysis of Inter-Community Income Differentials in Agriculture in the United States. Unpublished Ph. D. Dissertation. Department of Agri. Economics, Michigan State University, 1963.

Coale, A. J., and Hoover, E. M. Population Growth and Economic Development of Low-Income Countries; A Case Study of India. Princeton: Princeton University Press, 1958.

Duncan, O. J., and Reiss, A. J., Jr. Social Characteristics of Urban and Rural Families. A Volume in the Census Monograph Series. New York: John Wiley and Sons, Inc., 1956.

Easterlin, R. A. "The American Baby Boom in Historical Perspective," American Economic Review, Vol. LI, No. 5, December, 1961, pp. 869-911.

Ezekiel, M., and Fox, K. A. Methods of Correlation and Regression Analysis. 3rd ed., New York: John Wiley and Sons, Inc., 1959.

Foote, R. J. Analytical Tools for Studying Demand and Price Structures. USDA Agriculture Handbook 146, Washington, 1958.

Freedman, D. S. "Relation of Economic Status to Fertility," American Economic Review, Vol. LIII, No. 3, June, 1963, pp. 419-26.

Freedman, R. Family Planning Sterility and Population Growth. New York: McGraw-Hill Book Company, Inc., 1959.

Grabill, W. H. et. al. The Fertility of American Women, A volume in the Census Monograph Series. New York: John Wiley and Sons, Inc., 1958.

Kirk, D., and Nortman, D. L. "Business and Babies: The Influence of the Business Cycle on Birth Rates," Proceedings of the American Statistical Association, Social Statistics Section, 1958, pp. 151-160.

Kiser, C. V. "Differential Fertility in the United States," Demographic and Economic Change in Developed Countries, Princeton: Princeton University Press, 1960, pp. 77-112.

Kiser, C. V., and Whelpton, P. K. Social and Psychological Factors Affecting Fertility. New York: Midbank Memorial Fund. Vol. II, Part VI and Vol. IV, Part VIII.

Kiser, C. V., and Whelpton, P. K. "Summary of Chief Findings and Implications for Future Studies," Milbank Memorial Fund Quarterly, Vol. XXXVI, No. III, July, 1958.

Landis, Paul H. Population Problems - A Cultural Interpretation. 2nd ed. prepared by Paul K. Hall, New York: American Book Company. 1954.

Leibenstein, H. Economic Backwardness and Economic Growth. New York: John Wiley and Sons, Inc., 1957.

Ogburn, W. F., and Thomas, D. S. "The Influence of the Business Cycle on Certain Social Conditions," *Journal of the American Statistical Association*, Vol. XVIII, 1922, pp. 324-40.

Peterson, W., *Population*. New York: Macmillan Company, 1961.

Population Bulletin. (Population Reference Bureau, Inc.) Vol. XIX, No. 3, May, 1963.

Scheffe, H. *The Analysis of Variance*. New York: John Wiley and Sons, Inc., 1959.

Snedecor, G. W. *Statistical Methods*, 5th ed. Ames: Iowa State College Press, 1956.

Thomspon, W. S., and Jackson, W. E. "Fertility in Rural Areas in Relation to their Distance from the Cities," *Rural Sociology*, Vol. V., No. 2, June, 1940.

Thompson, W. S., *Population Problems*. New York: McGraw-Hill Book Company, 1942.

Thompson, W. S., and Whelpton, P. K. *Population Trends in the United States*. New York: McGraw Hill Book Company, Inc., 1933.

United Nations, *The Determinants and Consequences of Population Trends*. New York: United Nations, Department of Social Affairs, Population Division, 1953.

U. S. Bureau of Census. *U. S. Census of Population, 1960, United States Summary, General Social and Economic Characteristics*, P. C. (1) 1C.

U. S. Bureau of Census. *U. S. Census of Population 1950. IV Special Reports Part V. Chapter VI "Fertility"*.

U. S. Bureau of the Budget, *Standard Metropolitan Statistical Areas*. Washington: U. S. Government Printing Office, 1961.

Whelpton, P. K. "Geographic and Economic Differentials in Fertility," *Annals of the American Academy of Political and Social Science*, Vol. 118, November, 1936.

Whelpton, P. K. _Needed Population Research_. Lancaster: Science Press Printing Company, 1938.

Woofter, T. J. "Trends in Rural and Urban Fertility Rates," _Rural Sociology_, Vol. 13, No. 1, March, 1959.

APPENDIX

The results of the analysis of factors influencing the number of observed children ever born to ever married females age 15-44 per 1,000 ever married females age 15-44 per rural farm county in 1960.

TABLE 1

The Results of the Analysis of Factors Influencing The Number of Children Ever Born To Married White Females in 1960

New England Division

Multiple Correlation Coefficient	.6770
Standard Error of Estimate	284.1574

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients	Computed "t" values
Constant term	4481.3371		.6090
Distance from nearest SMSA (X_{12})	-33.0490	-.1421	-.5868
Percent of male employed work force who are farmers and farm managers (X_4)	.6747	.1379	.8350
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.3578	.2411	1.4186
Percent of females, age 14 and over, in county, who are employed (X_6)	2.1612	.3076	1.2657
Median female personal income for county (X_7)	-.1164	-.5152	-2.0192**
Median years of school completed by males and females age 25 and older (X_8)	-.8746	-.0248	-.1506
Median family income (X_9)	-.0515	-.4861	-2.5467**
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.1715	-.1546	-1.1871
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.6482	-.1392	-1.1451

**Significant at .05 level

TABLE 2

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

New England Division

Multiple Correlation Coefficient	.6743
Standard Error of Estimate	285.0873

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Computed "t" values
Constant term	3922.5037		3.5320**
Size-distance$_1$ (X_{13})	-1.4601	-.0319	-.1719
Percent of male employed work force who are farmers and farm managers (X_4)	.6223	.1272	.7663
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.2905	.2291	1.3337
Percent of females, age 14 and over, in county who are employed (X_6)	2.1307	.3032	1.2441
Median female personal income for county (X_7)	-.1054	-.4667	-1.8920**
Median years of school completed by males and females age 25 and older (X_8)	.5506	.0156	.1027
Median family income (X_9)	-.0404	-.3817	-2.1898**
Percent of ever married females, age 15-44, who are age 15-44 (X_{10})	-1.4286	-.1886	-1.4551
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.6372	-.1368	-1.1225

**Significant at .05 level

TABLE 3

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

New England Division

Multiple Correlation Coefficient	.6761
Standard Error of Estimate	284.4690

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients	Computed "t" values
Constant term	3682.0618		2.3451**
Size-distance$_2$ (X_{14})	-5.8597	-.0157	-.4884
Percent of male employed work force who are farmers and farm managers (X_4)	.5947	.1215	.7335
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.2089	.2146	1.2342
Percent of females, age 14 and over, in county who are employed (X_6)	2.2372	.3184	1.2992
Median female personal income for county (X_7)	-.1041	-.4609	-1.8781**
Median years of school completed by males and females age 25 and older (X_8)	1.0771	.0306	.1969
Median family income (X_9)	-.0346	-.3265	-1.6349
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.5394	-.2032	-1.5609
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.6602	-.1418	-1.1616

**Significant at .05 level

TABLE 4

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Middle Atlantic Division

Multiple Correlation Coefficient	.4263
Standard Error of Estimate	312.1851

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Computed "t" values
Constant term	3509.9077		.7012
Distance from nearest SMSA (X_{12})	134.6246	.3586	3.7856**
Percent of male employed work force who are farmers and farm managers (X_4)	-.2755	-.0606	-.6372
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.8840	.2624	2.4600**
Percent of females, age 14 & over, in county, who are employed (X_6)	.7360	.0919	.5671
Median female personal income for county (X_7)	-.0137	-.0623	-.3938
Median years of school completed by males and females age 25 and older (X_8)	-1.9907	-.0526	-.5961
Median family income (X_9)	-.0131	-.0216	-.2202
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.0802	-.1142	-1.1040
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.9100	-.1280	-1.3632

**Significant at .05 level

TABLE 5

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Middle Atlantic Division

Multiple Correlation Coefficient	.4793
Standard Error of Estimate	302.8961

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Computed "t" values
Constant term	3766.0854		5.1534**
Size-distance$_1$ (X_{13})	-23.8587	-.4766	-4.7444**
Percent of male employed work force who are farmers and farm managers (X_4)	-.6680	-.1469	-1.5264
Percent of male employed work force who are farm laborers and farm foremen (X_5)	-1.7997	.2506	-2.4200**
Percent of females, age 14 and over, in county who are employed (X_6)	1.1473	.1433	.9060
Median female personal income for county (X_7)	-.0541	-.2449	-1.5210
Median years of school completed by males and females age 25 and older (X_8)	-2.7303	-.0722	-.8401
Median family income (X_9)	-.0010	-.0017	-.0179
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.2630	-.1335	-1.3271
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.9698	-.1364	-1.4972

**Significant at .05 level

TABLE 6

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Middle Atlantic Division

Multiple Correlation Coefficient	.5309
Standard Error of Estimate	292.4568

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Computed "t" values
Constant term	1829.6769		1.9143**
Size-distance$_2$ (X_{14})	-36.2973	-.6019	-5.7138**
Percent of male employed work force who are farmers and farm managers (X_4)	-.9137	-.2009	-2.1205[aa]
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.7562	.2446	2.4456**
Percent of females, age 14 and over, in county who are employed (X_6)	1.1917	.1488	.9842
Median female personal income for county (X_7)	-.0594	-.2687	-1.7373**
Median years of school completed by males and females age 25 and older (X_8)	-4.7676	-.1261	-1.4969
Median family income (X_9)	.0496	.0820	.8587
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.3606	-.1438	-1.4802
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-1.0103	-.1421	-1.6160

**Significant at .05 level

[aa]Significant at .05 level but the relationship was opposite to that hypothesized

TABLE 7

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Northeast Region

Multiple Correlation Coefficient	.4910
Standard Error of Estimate	304.7671

Independent Variables	Partial Regression Coefficients	Beta Coeffi-cients	Computed "t" values
Constant term	3135.6082		.8262
Distance from nearest SMSA (X_{12})	90.9336	.3050	3.2865**
Percent of male employed work force who are farmers and farm managers (X_4)	.1094	.0248	.3097
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.6551	.2524	3.1142**
Percent of females, age 14 and over, in county who are employed (X_6)	.7781	.1053	.7794
Median female personal income for county (X_7)	-.0295	-.1518	-1.0767
Median years of school completed by males and females age 25 and older (X_8)	-.3401	-.0104	-.1291
Median family income (X_9)	-.0122	-.1325	-1.3193
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.3801	-.1589	-2.0719**
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.5679	-.0953	-1.3076

**Significant at .05 level

TABLE 8

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Northeast Region

Multiple Correlation Coefficient	.5318
Standard Error of Estimate	296.2525

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Computed "t" values
Constant term	4121.5466		7.5225**
Size-distance$_1$ (X_{13})	-18.0111	-.3692	-4.6513**
Percent of male employed work force who are farmers and farm managers (X_4)	-.2594	-.0590	-.7181
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.6875	.2573	3.2847**
Percent of females, age 14 and over, in county, who are employed (X_6)	1.0565	.1430	1.0867
Median female personal income for county (X_7)	-.0534	-.2743	-1.9817**
Median years of school completed by males and females age 25 and older (X_8)	-1.5400	-.0474	-.6071
Median family income (X_9)	-.0185	-.2014	-2.3909**
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.6277	-.1874	-2.4969**
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.6719	-.1128	-1.5874

**Significant at .05 level

TABLE 9

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

Northeast Region

Multiple Correlation Coefficient		.5538	
Standard Error of Estimate		291.2765	

Independent Variables	Partial Regression Coefficients	Beta Coeffi-cients	Con ' va
Constant term	3922.5534		5.
Size-distance$_2$ (X_{14})	-25.3799	-.4476	-5.
Percent of male employed work force who are farmers and farm managers (X_4)	-.4650	-.1057	-1.
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.5321	.2336	3.
Percent of females, age 14 and over, in county who are employed (X_6)	1.2730	.1723	1.
Median female personal income for county (X_7)	-.0564	-.2898	-2.
Median years of school completed by males and females age 25 and older (X_8)	-1.6610	-.0511	-.
Median family income (X_9)	-.0131	-.1427	-1.
Percent of ever married females, age 15-44, who are 15-24 (X_{10})	-1.6452	-.1894	-2.
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-.7381	-.1239	-1.

**Significant at .05 level

TABLE 10

The Results of the Analysis of Factors Influencin
The Number of Children Ever Born
To Married White Females in 1960

East North Central Division

Multiple Correlation Coefficient		.6001
Standard Error of Estimate		309.8051

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients
Constant term	4693.2001	
Distance from nearest SMSA (X_{12})	108.8512	.2567
Percent of male employed work force who are farmers and farm managers (X_4)	-.9423	-.2682
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.9071	.2007
Percent of females, age 14 and over, in county who are em- ployed (X_6)	2.2161	.2438
Median female personal income for county (X_7)	-.0694	-.1796
Median years of school com- pleted by males and females age 25 and older (X_8)	-10.2505	-.3042
Median family income (X_9)	-.0246	-.0472
Percent of ever married fe- males, age 15-44, who are age 15-24 (X_{10})	-2.4722	-.2154
Percent of ever married fe- males, age 15-44, who are age 25-34 (X_{11})	.2266	.0267

**Significant at .05 level

aaSignificant at .05 level but the relationship was
to that hypothesized

TABLE 11

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

East North Central Division

Multiple Correlation Coefficient	.5997
Standard Error of Estimate	309.9162

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients	Co v
Constant term	6375.6173		13
Size-distance$_1$ (X_{13})	-19.1639	-.2347	-5
Percent of male employed work force who are farmers and farm managers (X_4)	-.8768	-.2495	-5
Percent of male employed work force who are farm laborers and farm fore- men (X_5)	1.8456	.1942	4
Percent of females, age 14 and over, in county who are employed (X_6)	1.8620	.2049	3
Median female personal income for county (X_7)	-.0653	-.1692	-2
Median years of school com- pleted by males and females age 25 and older (X_8)	-10.6515	-.3161	-6
Median family income (X_9)	-.0516	-.0990	-2
Percent of ever married fe- males, age 15-44, who are age 15-24 (X_{10})	-2.5829	-.2251	-5
Percent of ever married fe- males, age 15-44, who are age 25-34 (X_{11})	.2026	.2393	

**Significant at .05 level

aaSignificant at .05 level but the relationship was op
to that hypothesized

TABLE 12

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

East North Central Division

Multiple Correlation Coefficient	.6121
Standard Error of Estimate	306.2579

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients	C
Constant term	6135.2305		1
Size-distance$_2$ (X_{14})	-21.0501	-.2648	-
Percent of male employed work force who are farmers and farm managers (X_4)	-.8038	-.2288	-5
Percent of male employed work force who are farm laborers and farm fore- men (X_5)	1.7217	.1812	3
Percent of females, age 14 and over, in county who are employed (X_6)	1.8483	.2033	3
Median female personal in- come for county (X_7)	-.0664	-.1720	-3
Median years of school com- pleted by males and females age 25 and older (X_8)	-10.2240	-.3034	-6
Median family income (X_9)	-.0503	-.0965	-2
Percent of ever married fe- males, age 15-44, who are age 15-24 (X_{10})	-2.6129	-.2277	-5
Percent of ever married fe- males, age 15-44, who are age 25-34 (X_{11})	.2491	.2942	

**Significant at .05 level

aaSignificant at .05 level but the relationship was op
to that hypothesized

TABLE 13

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

West North Central Division

Multiple Correlation Coefficient	.5673
Standard Error of Estimate	307.0689

Independent Variables	Partial Regression Coefficients	Beta Coeffi-cients	C
Constant term	3698.5026		
Distance from nearest SMSA (X_{12})	45.4846	.1786	
Percent of male employed work force who are farmers and farm managers (X_4)	.2218	.0694	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	2.1731	.3135	
Percent of females, age 14 and over, in county, who are employed (X_6)	.6179	.0838	
Median female personal income for county (X_7)	-.0658	-.1658	-
Median years of school completed by males and females age 25 and older (X_8)	-10.1053	-.3357	-
Median family income (X_9)	-.0050	-.0125	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.8224	-.3111	-
Percent of ever married females age 15-44, who are 25-34 (X_{11})	.1673	.0245	

**Significant at .05 level

aaSignificant at .05 level but the relationship was o
to that hypothesized

TABLE 14

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

West North Central Division

Multiple Correlation Coefficient	.5766
Standard Error of Estimate	304.6467

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients	C
Constant term	4818.9654		1
Size-distance$_1$ (X_{13})	-17.4058	-.2614	-
Percent of male employed work force who are farmers and farm managers (X_4)	-.0857	-.0268	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	2.1084	.3042	
Percent of females, age 14 and over, in county, who are employed (X_6)	.4616	.0626	
Median female personal income for county (X_7)	-.0594	-.1495	-3
Median years of school completed by males and females age 25 and older (X_8)	-11.6407	-.3868	10
Median family income (X_9)	-.0197	-.0493	-
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.6662	-.2939	-7
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.0594	.0087	

**Significant at .05 level

TABLE 15

The Results of the Analysis of Factors Influenci
The Number of Children Ever Born
To Married White Females in 1960

West North Central Division

Multiple Correlation Coefficient		.5470
Standard Error of Estimate		312.1350
Independent Variables	**Partial Regressions Coefficients**	**Beta Coefficients**
Constant term	3972.1069	
Size-distance$_2$ (X_{14})	-6.0640	-.0548
Percent of male employed work force who are farmers and farm managers (X_4)	.2623	.0821
Percent of male employed work force who are farm laborers and farm foremen (X_5)	2.3916	.3450
Percent of females, age 14 and over, in county who are employed (X_6)	.5934	.0805
Median female personal income for county (X_7)	-.0704	-.1772
Median years of school completed by males and females age 25 and older (X_8)	-10.5692	-.3512
Median family income (X_9)	-.0114	-.0285
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.5459	-.2807
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.2245	.0329

**Significant at .05 level

[aa]Significant at .05 level but the relationship was
to that hypothesized

TABLE 16

The Results of the Analysis of Factors Influenci
The Number of Children Ever Born
To Married White Females in 1960

North Central Region

Multiple Correlation Coefficient	.5511
Standard Error of Estimate	314.5378

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients
Constant term	3602.2467	
Distance from nearest SMSA (X_{12})	61.6676	.2280
Percent of male employed work force who are farmers and farm managers (X_4)	-.2273	-.0878
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.8063	.2356
Percent of females, age 14 and over, in county who are employed (X_6)	.9171	.1162
Median female personal income for county (X_7)	-.0662	-.1704
Median years of school completed by males and females age 25 and older (X_8)	-10.0826	-.3203
Median family income (X_9)	.0034	.0463
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.7406	-.2779
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.3039	.0424

**Significant at .05 level

aaSignificant at .05 level but the relationship was
to that hypothesized

TABLE 17

The Results of the Analysis of Factors Influencing
The Number of Children Ever Born
To Married White Females in 1960

North Central Region

Multiple Correlation Coefficient	.5650
Standard Error of Estimate	311.0129

Independent Variables	Partial Regression Coefficients	Beta Coefficients	Co v
Constant term	4083.5405		16
Size-distance$_1$ (X_{13})	-18.4918	-.3214	-8
Percent of male employed work force who are farmers and farm managers (X_4)	-.4286	-.1653	-4
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.9118	.2493	8.
Percent of females, age 14 and over, in county who are employed (X_6)	.7939	.1006	2.
Median female personal income for county (X_7)	-.0603	-.1552	-4.
Median years of school completed by males and females age 25 and older (X_8)	-11.3734	-.3614	-13
Median family income (X_9)	.0061	.0838	2
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.5796	-.2615	-9
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.2279	.0318	1

**Significant at .05 level

aaSignificant at .05 level but the relationship was op
to that hypothesized

TABLE 18

The Results of the Analysis of Factors Influenci
The Number of Children Ever Born
To Married White Females in 1960

North Central Region

Multiple Correlation Coefficient	.5456
Standard Error of Estimate	315.9007

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients
Constant term	3810.3413	
Size-distance$_2$ (X_{14})	-16.7763	-.2170
Percent of male employed work force who are farmers and farm managers (X_4)	-.2809	-.1085
Percent of male employed work force who are farm laborers and farm foremen (X_5)	2.0127	.2625
Percent of females, age 14 and over, in county who are employed (X_6)	.8628	.1093
Median female personal income for county (X_7)	-.0682	-.1756
Median years of school completed by males and females age 25 and older (X_8)	-10.8202	-.3438
Median family income (X_9)	.0043	.5938
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-2.4838	-.2518
Percent of ever married females, age 15-44, who are 25-34 (X_{11})	.3636	.5074

**Significant at .05 level

aaSignificant at .05 level but the relationship was
to that hypothesized

TABLE 19

The Results of the Analysis of Factors Influenci
The Number of Children Ever Born
To Married White Females in 1960

South Atlantic Division

Multiple Correlation Coefficient	.4011
Standard Error of Estimate	339.9806

Independent Variables	Partial Regression Coefficients	Beta Coeffi-cients
Constant term	4139.7692	
Distance from nearest SMSA (X_{12})	39.1581	.0810
Percent of male employed work force who are farmers and farm managers (X_4)	-.7026	-.2176
Percent of male employed work force who are farm laborers and farm foremen (X_5)	.8137	.1273
Percent of females, age 14 and over, in county who are employed (X_6)	-.4587	-.0884
Median female personal income for county (X_7)	-.0022	-.0095
Median years of school completed by males and females age 25 and older (X_8)	-9.7731	-.2796
Median family income (X_9)	-.0102	-.0922
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-.6761	-.0897
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.4116	.0708

[**]Significant at .05 level

[aa]Significant at .05 level but the relationship was
to that hypothesized

TABLE 20

The Results of the Analysis of Factors Influencin
The Number of Children Ever Born
To Married White Females in 1960

South Atlantic Division

Multiple Correlation Coefficient	.4490
Standard Error of Estimate	331.6208

Independent Variables	Partial Regression Coefficients	Beta Coeffi- cients
Constant term	3633.4022	
Size-distance$_1$ (X_{13})	-18.8976	-.3095
Percent of male employed work force who are farmers and farm managers (X_4)	-.7027	-.2177
Percent of male employed work force who are farm laborers and farm foremen (X_5)	.7825	.1224
Percent of females, age 14 and over, in county who are employed (X_6)	-.5515	-.1063
Median female personal income for county (X_7)	-.0088	-.0384
Median years of school completed by males and females age 25 and older (X_8)	-9.3691	-.2680
Median family income (X_9)	.0124	.1121
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-.7916	-.1050
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.4165	.0716

**Significant at .05 level

aaSignificatn at .05 level but the relationship was o
to that hypothesized

TABLE 21

The Results of the Analysis of Factors Inf
The Number of Children Ever Born
To Married White Females in 1960

South Atlantic Division

Multiple Correlation Coefficient	.4
Standard Error of Estimate	336.0

Independent Variables	Partial Regression Coefficients
Constant term	3748.6768
Size-distance$_2$ (X_{14})	-16.7195
Percent of male employed work force who are farmers and farm managers (X_4)	-.7270
Percent of male employed work force who are farm laborers and farm foremen (X_5)	.9280
Percent of females, age 14 and over, in county who are employed (X_6)	-.5331
Median female personal income for county (X_7)	-.0077
Median years of school completed by males and females age 25 and older (X_8)	-8.6771
Median family income (X_9)	.0041
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-.7914
Percent of ever married females age 15-44, who are age 25-34 (X_{11})	.3689

**Significant at .05 level

aaSignificant at .05 level but the relationshi
to that hypothesized

TABLE 22

The Results of the Analysis of Factors In
The Number of Children Ever Born
To Married White Females in 1960

East South Central Division

Multiple Correlation Coefficient	
Standard Error of Estimate	321

Independent Variables	Partial Regression Coefficients
Constant term	5143.3374
Distance from nearest SMSA (X_{12})	48.0974
Percent of male employed work force who are farmers and farm managers (X_4)	-1.1112
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.3997
Percent of females, age 14 and over, in county who are employed (X_6)	-2.7369
Median female personal income for county (X_7)	.0313
Median years of school completed by males and females age 25 and older (X_8)	-3.3285
Median family income (X_9)	-.0323
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.5493
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	.0517

**Significant at .05 level

[aa]Significant at .05 level but the relations
to that hypothesized

TABLE 23

The Results of the Analysis of Factors Ir
The Number of Children Ever Born
To Married White Females in 1960

East South Central Division

Multiple Correlation Coefficient
Standard Error of Estimate 321

Independent Variables	Partial Regression Coefficients
Constant term	4995.9436
Size-distance$_1$ (X_{13})	-12.5435
Percent of male employed work force who are farmers and farm managers (X_4)	-1.0416
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.4048
Percent of females, age 14 and over, in county, who are employed (X_6)	-2.8181
Median female personal income for county (X_7)	.0378
Median years of school completed by males and females age 25 and older (X_8)	-4.9511
Median family income (X_9)	-.0129
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.6121
Percent of ever married females, age 15-44, who are 25-34 (X_{11})	-.0799

**Significant at .05 level

aaSignificant at .05 level but the relations
to that hypothesized

TABLE 24

The Results of the Analysis of Factors
The Number of Children Ever Bo
To Married White Females in 196

East South Central Division

Multiple Correlation Coefficient	
Standard Error of Estimate	3

Independent Variables	Partial Regression Coefficient
Constant term	4828.2269
Size-distance$_2$ (X_{14})	-36.1566
Percent of male employed work force who are farmers and farm managers (X_4)	-1.0781
Percent of male employed work force who are farm laborers and farm foremen (X_5)	1.5432
Percent of females, age 14 and over, in county, who are employed (X_6)	-2.7645
Median female personal income for county (X_7)	.0376
Median years of school completed by males and females age 25 and older (X_8)	-3.4146
Median family income (X_9)	-.0132
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-1.7116
Percent of ever married females, age 15-44, who are 25-34 (X_{11})	-.0682

**Significant at .05 level

[aa]Significant at .05 level but the relatic
to that hypothesized.

TABLE 25

The Results of the Analysis of
The Number of Children
To Married White Female

West South Central D

Multiple Correlation Coefficient
Standard Error of Estimate

Independent Variables	P Re Coe
Constant term	754
Distance from nearest SMSA (X_{12})	-3
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	-
Median female personal income for county (X_7)	-
Median years of school completed by males and females age 25 and older (X_8)	-1
Median family income (X_9)	-
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	-

**Significant at .05 level

TABLE 26

The Results of the Analysis
The Number of Childr
To Married White Fem

West South Centra

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

[aa]Significant at .05 level but t
to that hypothesized

TABLE 27

The Results of the Analysis c
The Number of Childre
To Married White Fema

West South Central

Multiple Correlation Coefficient
Standard Error of Estimate

Independent Variables	C
Constant term	7
Size-distance$_2$ (X_{14})	
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

[aa]Significant at .05 level but t
to that hypothesized

TABLE 28

The Results of the Analysis of
The Number of Children
To Married White Femal

Southern Regio

Multiple Correlation Coefficient
Standard Error of Estimate

Independent Variables	P Re Coe
Constant term	458
Distance from nearest SMSA (X_{12})	2
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	-
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	-9
Median family income (X_9)	-
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	-
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

[aa]Significant at .05 level but the
to that hypothesized

TABLE 29

The Results of the Analysis
The Number of Childr
To Married White Fem

Southern Re

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level but
to that hypothesized

TABLE 30

The Results of the Analysis of
The Number of Children
To Married White Femal

Southern Regi

Multiple Correlation Coefficient
Standard Error of Estimate

Independent Variables	Re Coe
Constant term	444
Size distance$_2$ (X_{14})	-1
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	-
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	-
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

aaSignificant at .05 level but the
to that hypothesized

TABLE 31

The Results of the Analysis c
The Number of Childr€
To Married White Femą

Mountain Divi

Multiple Correlation Coefficient	
Standard Error of Estimate	

Independent Variables	(
Constant term	
Distance from nearest SMSA (X_{12})	
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county who are employed (X_6)	
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

[aa]Significant at .05 level
to that hypothesized

TABLE 3

The Results of the Analysis
The Number of Child
To Married White Fem

Mountain Div

Multiple Correlation Coefficien	
Standard Error of Estimate	

Independent Variables	
Constant term	
Size-distance$_1$ (X_{13})	
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are 25-34 (X_{11})	

**Significant at .05 level

aaSignificant at .05 level
to that hypothesized

TABLE 33

The Results of the Analysis
The Number of Childr
To Married White Fem

Mountain Div

Multiple Correlation Coefficien
Standard Error of Estimate
Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level
to that hypothesized

TABLE 34

The Results of the Analysis
The Number of Childr
To Married White Fem

Pacific Divi

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 35

The Results of the Analysis
The Number of Childr
To Married White Fem

Pacific Divi

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

TABLE 36

The Results of the Analysis
The Number of Childr
To Married White Fem

Pacific Divi

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 37

The Results of the Analysis
The Number of Childı
To Married White Fen

Western Reç

Multiple Correlation Coefficier
Standard Error of Estimate

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 38

The Results of the Analysis
The Number of Childr
To Married White Fem

Western Reg

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level
to that hypothesized

TABLE 39

The Results of the Analysis
The Number of Childr
To Married White Fem

Western Reg

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level
to that hypothesized

TABLE 40

The Results of the Analysis
The Number of Childr
To Married Non-White F

South Atlantic

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 41

The Results of the Analysis
The Number of Childr
To Married Non-White F

South Atlantic

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 42

The Results of the Analysis
The Number of Childr
To Married Non-White F

South Atlantic

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 4:

The Results of the Analysis
The Number of Child:
To Married Non-White]

East South Centr:

Multiple Correlation Coefficie	
Standard Error of Estimate	

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 44

The Results of the Analysis
The Number of Childr
To Married Non-White F

East South Centra

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 45

The Results of the Analysis
The Number of Childr
To Married Non-White F

East South Centra

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 46

The Results of the Analysis
The Number of Childr
To Married Non-White F

West South Centra

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

TABLE 47

The Results of the Analysis
The Number of Childr
To Married Non-White F

West South Centra

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_1$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

TABLE 48

The Results of the Analysis c
The Number of Childre
To Married Non-White Fe

West South Centra

Multiple Correlation Coefficient
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

TABLE 49

The Results of the Analysis
The Number of Childr
To Married Non-White F

Southern Re

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variable
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county, who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 50

The Results of the Analysis c
The Number of Childre
To Married Non-White Fe

Southern Reg

Multiple Correlation Coefficient
Standard error of Estimate

Independent Variables	C
Constant term	7
Size-distance$_1$ (X_{13})	
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

TABLE 5

The Results of the Analysis
The Number of Child
To Married Non-White

Southern Re

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{14})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

TABLE 5

The Results of the Analysis
The Number of Child
To Married White Fe

Conterminous Uni

Multiple Correlation Coefficie
Standard error of Estimate

Independent Variables
Constant term
Distance from nearest SMSA (X_{12})
Percent of male employed work force who are farmers and farm managers (X_4)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level but
to that hypothesized

TABLE 53

The Results of the Analysis
The Number of Childr
To Married White Fem

Conterminous Unit

Multiple Correlation Coefficien
Standard Error of Estimate

Independent Variables
Constant term
Size-distance$_2$ (X_{13})
Percent of male employed work force who are farmers and farm managers (X)
Percent of male employed work force who are farm laborers and farm foremen (X_5)
Percent of females, age 14 and over, in county who are employed (X_6)
Median female personal income for county (X_7)
Median years of school completed by males and females age 25 and older (X_8)
Median family income (X_9)
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})

**Significant at .05 level

aaSignificant at .05 level but
to that hypothesized

TABLE 54

The Results of the Analysis
The Number of Childr
To Married White Fem

Conterminous Unit

Multiple Correlation Coefficien	
Standard Error of Estimate	

Independent Variables	
Constant term	
Size-distance$_1$ (X_{14})	
Percent of male employed work force who are farmers and farm managers (X_4)	
Percent of male employed work force who are farm laborers and farm foremen (X_5)	
Percent of females, age 14 and over, in county, who are employed (X_6)	
Median female personal income for county (X_7)	
Median years of school completed by males and females age 25 and older (X_8)	
Median family income (X_9)	
Percent of ever married females, age 15-44, who are age 15-24 (X_{10})	
Percent of ever married females, age 15-44, who are age 25-34 (X_{11})	

**Significant at .05 level

aaSignificant at .05 level but
to that hypothesized