ABSTRACT

METROPOLITAN DOMINANCE AND THE PERSISTENCE OF THE URBAN-RURAL FERTILITY DIFFERENTIAL: A DISTRIBUTIVE APPROACH TO THE STUDY OF FACTORS AFFECTING URBAN-RURAL FERTILITY IN THE UNITED STATES, 1960

by Rodger R. Rice

This dissertation focuses on factors associated with the urban-rural fertility differential in the United States. The parameters of the problem are presented in the form of requisites for current differential fertility research. Differential fertility analysis requires a causal framework. Fertility is social group behavior explanable within an ecological framework. Prediction of convergence of urban-rural fertility levels does not necessitate termination of research on this differential but does indicate need for alternative approaches. Independent of convergence there remains variation <u>within</u> urban and rural fertility which requires explanation. Either a different set of factors affect urban and rural fertility or the same factors exert a different effect on urban and rural fertility. The traditional aggregative approach is rejected in favor of the distributive. Multiple regression analysis applied to intercommunity fertility variation permits a comparative analysis of residential differential fertility patterns.

A review of empirical studies provides evidence (1) that no previous study had implemented these requisites but (2) that contrasting patterns of differential fertility among residential categories are plausible. In view of this and the conclusion that urban dominance theory logically hypothesizes the blurring of urban-rural differences, urban dominance theory is rejected and metropolitan dominance theory accepted as the theoretical framework by which to explain contrasting patterns of differential fertility among residential categories and to generate hypotheses for testing. Seven hypotheses are derived from metropolitan dominance theory:

1. Community social structure is a function of metropolitan dominance; metropolitan dominance manifests a different impact on community social structure in urban and rural hinterlands.

2. Fertility is a function of community social structure and metropolitan dominance; community social structure and metropolitan dominance manifest a different impact on fertility in urban and rural hinterlands.

3. Urban and rural hinterland fertility is not only a function of metropolitan dominance, but also of conditions of its immediate locality.

4. Fertility is more a function of metropolitan dominance in the urban hinterland, but more a function of local community social structure in the rural hinterland.

5. Metropolitan dominance is more important in accounting for variation in community social structure and fertility in both urban and rural hinterlands in the more metropolitan geographic divisions compared with the less metropolitan geographic divisions.

6. In the more metropolitan geographic divisions metropolitan dominance is more important in accounting for variation in urban and rural hinterland fertility

than local community social structure; in less metropolitan geographic divisions local community social structure is more important in accounting for variation in fertility than metropolitan dominance.

7. The impact of community social structure and metropolitan dominance on fertility manifest fewer differences when comparing the same type of hinterland communities (urban or rural) on an interdivisional basis than when comparing different types of hinterland communities (urban vs. rural) on an intradivisional basis.

Basic unit of analysis is the residential component of a county. Fertility, the dependent variable, is operationalized as the cumulative fertility ratio. Operationalizing metropolitan dominance required deriving for all counties in the nation a numerical value reflecting distance from and size of a dominating metropolitan center. Community social structure is represented by eight empirical variables: employment of farmers and farm managers, farm laborers and foremen, education, family income, female income, female employment, ever-married females age 15-44 who were age 15-24 and 25-34. Analysis was limited to the white population of conterminous United States. A multiple regression analysis was performed for each of the residential categories at the national and nine divisional levels.

Analysis of statistical results provided confirmation of all hypotheses but the fourth. Confirmation of six of the hypotheses suggests the value of metropolitan dominance theory as a framework by which to explain the differential impact of factors in urban and rural hinterlands.

METROPOLITAN DOMINANCE AND THE PERSISTENCE OF THE URBAN-RURAL FERTILITY DIFFERENTIAL: A DISTRIBUTIVE APPROACH TO THE STUDY OF FACTORS AFFECTING URBAN-RURAL FERTILITY IN THE UNITED STATES, 1960

By

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PREFACE

Amateurs should be cautioned not to rush headlong into regression studies involving many variables. Some people think there is magic in the collection of vast amounts of data--that by some alchemy multiple regression will yield authentic information from careless measurements on heterogeneous material. The fact is that hazards increase with the extent and complexity of the investigation.... However, do not be deterred if you have well taken measurements on carefully chosen material, and if you have definite questions whose answers lie in the methods to be used. As compared to the labor of getting the data the calculation of regression statistics is easy.

George W. Snedecor, Statistical Methods (Ames: Iowa State University Press, 1956), p. 434.

ACKNOWLEDGMENTS

"Giving birth" is a universal human experience. Demographers treat it objectively, mothers live it subjectively. But "giving birth" is not the experience of mothers alone; it has happened to me. What mother could have ever survived a conception-parturition period of over five years? It happened to me. Intercourse, conception, "morning sickness," "depression," "labor pains," etc., they happened to me. I am not knocking mothers, believe me, for without them this study would not have been possible. Retrospection at this point, however, tells me that "giving birth" is an experience that takes on numerous forms in addition to childbirth. Producing a dissertation is one of these forms.

Yes, this is my baby, but many have contributed to its birth. Without them, an inevitable miscarriage. I wish to give special acknowledgment to Dr. J. Allan Beegle who served both as impregnator and obstetrician. An amazing feat? An amazing person, as many of my fellow graduate students (maternity mates?) do resound. I am appreciative of his fertile mind, his patience, his gentleness, and his untiring interest in my case. Indeed, he is a good father and a good doctor all rolled into one.

His professional staff is to be recognized and appreciated as well. I wish to thank the good doctors, J. W. Artis, Harvey Choldin, and Walter E. Freeman of the Department of Sociology and Charles Press, Chairman of the Department of Political Science, for their fruitful comments and maternal care. Without their professional concern, an inevitable stillbirth.

Finally, to my life-long midwife and handholder, Ruth, and to her cherubic attendants, Sheri and Mark, how can I repay you for your unrelinquished vigilance and perpetual anticipation? As birth ends with the renewing of family ties, I ask only that you become my family once again. (And thank you too, Babar, for your companionship. Our family circle will be smaller without you.)

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CHAPTER I

INTRODUCTION TO PROBLEM

Fertility as a Social Phenomenon

Fertility is a common but complex phenomenon. It affects many aspects of a society, is affected by the same, and captures the interest of many levels of society. It affects and is reflected in industrial manpower, family structure, educational facilities, housing, *ad nauseam*. Fundamentally it is society's recruitment process.

Its relevance is so extensive that no discipline can claim it in its entirety. Ryder has commented that "the fields of learning which have been most immediately concerned with and instrumental in the understanding of fertility are sociology, biology, and, to a lesser extent, economics, anthropology and psychology. No science concerned with man has ignored or could properly ignore the 'facts of life.'"[1]

In this study it will be argued that fertility is to a large extent a social phenomenon, i.e., though it is a

[1] N. B. Ryder, "Fertility," in Philip Hauser and Otis Dudley Duncan, *The Study of Population* (Chicago: University of Chicago Press, 1959), p. 400.

biological fact, social factors play a significant role in the determination of the biological result. Considering the absence of modern contraceptive devices and controls, it is quite likely that biological factors are more important in determining fertility levels in primitive and underdeveloped societies. However, Lorimer[2] and Davis and Blake[3] have suggested the possibility that even in underdeveloped areas fertility levels are influenced significantly by social and cultural factors. Davis and Blake write:

> A striking feature of underdeveloped areas is that virtually all of them exhibit a much higher fertility than do urban-industrial societies. This well-documented but insufficiently analyzed fact is known to be connected with profound differences in social organization as between the two types of society, and is, therefore, significant for the comparative sociology of reproduction. The clarity and importance of the contrast, however, should not be allowed to obscure the equally important fact that underdeveloped areas themselves differ markedly in social organization, and that these differences appear to bring about variations in fertility.[4]

Previously with respect to urban-industrial societies there was a "respectable body of opinion to the effect that group differences in fertility reflected differences in biological

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[2]Frank Lorimer, Culture and Human Fertility (New York: International Documents Service, Columbia University Press, 1955).

[3]Kingsley Davis and Judith Blake, "Social Structure and Fertility: An Analytical Framework," Economic Development and Cultural Change, Vol. IV (1956), pp. 211-35

[4]Ibid., p. 211 (italics mine).

capacity to reproduce,"[5] a view advocated as recently as the 1920's and 30's by such leading demographers as Gini[6] and Pearl.[7] This opinion has since subsided in the shadow of the sudden upsurge in fertility levels of urban populations.

Beginning with the Indianapolis Study many efforts have been made to relate psychological factors to fertility differences, but seemingly with little success. Kiser and Whelpton's own evaluation of the Indianapolis Study's effort in this direction suggests the insignificance of such factors.

> The Indianapolis Study presents a challenge to learn the reasons for the overriding influence of socio-economic status. There is good reason to believe that it is not socio-economic status *per se* but rather the underlying attitudes and psychological characteristics of these classes that account for the fertility behavior. And yet, whereas characteristic patterns of fertility differentials are found consistently in classifications by socio-economic status, most classifications by psychological characteristics *within socio-economic groups* fail to show such patterns.[8]

In a critical review of the Indianapolis Study, Hauser and Duncan assail the authors for not appearing "to entertain

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[5] Clyde V. Kiser, "Differential Fertility in the United States," in National Bureau of Economic Research, *Demographic and Economic Change in Developed Countries* (Princeton: Princeton University Press, 1960), p. 77.

[6] C. Gini, "The Cyclical Rise and Fall of Population," in *Population*, Harris Foundation Lectures (Chicago: University of Chicago Press, 1929).

[7] Raymond Pearl, *The Biology of Population Growth* (New York: Knopf, 1925).

[8] C. V. Kiser and P. K. Whelpton, "Resume of the Indianapolis Study of Social and Psychological Factors Affecting Fertility," *Population Studies*, Vol. VII (1953), p. 108.

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seriously the supposition that psycho-social variables actually are not very important or useful as explanatory factors. In fact, their own comments on their results provide a remarkable example of maintaining a hypothesis tenaciously in the face of rather consistently negative evidence."[9] Studies conducted since the Indianapolis Study have continued to discover consistently low correlations between psychological variables and fertility, even when fertility is measured as "desired size of family," a measure which would seem to be at a level more relevant to a psychological analysis.[10]

Another important consideration is the extent to which intentional family limitation practices explain differences in fertility levels of various subgroups of modern society. A United Nations publication in an extensive review of the economic and social factors affecting fertility

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[9] P. Hauser and O. D. Duncan, The Study of Population (Chicago: University of Chicago Press, 1959), p. 99.

[10] See as examples of such studies: R. Gutman and I. Bender, "Some Sources of Variation in Family Size of College Graduates," Milbank Memorial Fund Quarterly, XXXV (July, 1957), 287-301; C. F. Westoff, P. C. Sagi, and L. W. Kelly, "Fertility Through Twenty Years of Marriage," American Sociological Review, XXIII, No. 5 (October, 1958), 549-56; C. F. Westoff, R. G. Potter, Jr., P. C. Sagi, and E. G. Mishler, Family Growth in Metropolitan America (Princeton: Princeton University Press, 1961); C. F. Westoff, R. G. Potter, Jr., and P. C. Sagi, The Third Child (Princeton: Princeton University Press, 1963); and David Goldberg, "Some Recent Developments in American Fertility Research," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 137-51.

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reports that "in recent years, there is almost universal agreement that the major part, if not all (italics mine), of the decline in family size has been brought about by the practice of family limitation. . . . Another relevant finding of the existing studies is that the differences between the size of families of different socio-economic, religious and other groups can be explained largely by differences in the extent and effectiveness of family limitation."[11] While several studies, since the initial finding of the Indianapolis Study, have shown a direct relation between socio-economic status and family planning,[12] they have never found a one-to-one relationship, and quite often the correlation has been quite low. It is assumed here that family planning and limitation is essentially the equalization of number of children wanted to number of children born. A study of Westoff, Mishler, and Kelly demonstrated the difficulty of predicting actual fertility from responses of preferred family size at an individual level. They found that though

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[11] United Nations, The Determinants and Consequences of Population Trends (New York: United Nations Department of Social Affairs, Population Division, 1953), pp. 75-76.

[12] See, for example, C. V. Kiser and P. K. Whelpton, "Fertility Planning and Fertility Rates by Socio-Economic Status," Milbank Memorial Fund Quarterly, XXVII (April, 1949), 188-244; R. Freedman, P. K. Whelpton, and A. A. Campbell, Family Planning, Sterility and Population Growth (New York: McGraw-Hill, 1959) (GAF Study); also Westoff, Potter, Sagi, and Mishler, op. cit.; and Westoff, Potter, and Sagi, op. cit. (Princeton Study).

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the estimate from the initial response to number of children desired was fairly accurate in predicting the average number of children of the whole group twenty years later, the individual correlation between preferred and actual size of family is quite low. In view of the fact that the near equivalence of desires and behavior for the total group was a net result involving an averaging-out of various factors, the authors arrive at the conclusion that "completed fertility is a deceptively simple net result of an extremely complex series of antecedents which includes the process of family building itself."[13]

Furthermore, in connection with family limitation, the widespread use of contraceptive methods should be noted. In support of this Campbell has written concerning the Princeton Study results that:

> We have discovered from preliminary tabulations that the proportion of couples who have used contraception has increased during the past five years. In 1955, the proportion was 70 percent. In 1960, among comparable couples (metropolitan, white, wives 18 to 39 years old, husband present), it is about 80 percent. The proportion has increased for every age group. We think that this rise means that more couples have all or most of the children they want, and are using contraceptions to prevent or delay the births of additional children. We know that average number of children ever born has increased for each age group between 1955 and 1960. The rise in the proportion of contraceptors is probably a result of that increase . . . [and that] this increase

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[13]C. F. Westoff, E. G. Mishler and E. L. Kelly, "Preferences in Size of Family and Eventual Fertility Twenty Years After," American Journal of Sociology, LXII (March, 1957), 494.

> in average number of children is voluntary; it is not due to the failure to use contraception or to carelessness in its use.[14]

Considering the increasingly widespread use of contraceptives and the low correlation between preferred and actual size of family, it seems plausible that perhaps family limitation is not the only explanatory factor of fertility levels. That is, family limitation *per se* does not determine fertility levels but there are more ultimate causes which affect fertility perhaps indirectly through family limitation. Several studies have argued that such "causes" are attitudinal; however, this study will argue that fertility levels, with or without the use of contraceptives, are to be explained by social factors.

References in support of this approach are numerous. Only a few will be cited at this point to support the notion of the significance of fertility as a social phenomenon. Kitagawa and Hauser note the importance of the social in contrast with the biological and the consequent conjunction of demography with sociology. To them the study of fertility transcends matters of immediate demographic concern, since fertility is a function of the social milieu in which it occurs, even though it possesses important biological components. "This basic premise, which in a large measure

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[14]Arthur A. Campbell, "Design and Scope of the 1960 Study of Growth of American Families," in C. V. Kiser, *Research in Family Planning* (Princeton: Princeton University Press, 1960), pp. 176 and 182.

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accounts for the interest of the sociologist in demography and the capture by him in academic United States of most of the teaching and research in demography, is well supported by research findings--those dealt with here (in this study) and in other studies."[15] Finally, Hauser, in another article, shows concern over the fact that most efforts to understand fertility behavior have been restricted to consideration of demographic, personal, and social psychological variables, and have virtually ignored cultural and social organizational factors. In view of the fact that studies of human reproductive behavior, up to this time, have accounted for very low proportions of variance in birth rates or other measures of fertility, Hauser writes that:

> the failure of the above-mentioned studies to explain a greater proportion of variance in fertility is attributable to the fact that they have ignored the culturalogical in the sense in which Durkheim treated this subject. Durkheim's insistence that the "social fact" is anterior and exterior to the individual while exerting constraint upon his behavior may contain the clue to an important missing ingredient in fertility research. That is, the proposed design of research (which Hauser outlines in his article) is based on the assumption that fertility behavior is in large measure dependent upon the social milieu, and that changes in fertility behavior necessarily involve social change. Or, put in another way, knowledge of the person's attitudes, values, and motivation cannot be expected to account for differences in fertility behavior out of their cultural context; and consequently, changes in fertility behavior cannot be

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[15]Evelyn M. Kitagawa and Philip M. Hauser, "Trends in Differential Fertility and Mortality in a Metropolis--Chicago," in E. Burgess and D. Bogue, Contributions to Urban Sociology (Chicago: University of Chicago Press, 1964), p. 60.

> produced through efforts to change attitudes, values, or motivation, except in the context of changes in the social order.[16]

From such statements it seems legitimate to assume that fertility behavior is largely a social phenomenon. If the biological, psychological, or attitudinal are to be recognized at all within a sociological framework, they must be viewed as "intermediate" variables with respect to their influence on fertility. However, these variables are not considered essential to this research. In summary, this study is not concerned with biological factors as they affect fertility behavior. Nor is it a study of how psychological characteristics, such as feelings of economic insecurity, or attitudes, such as preferred number of children, impinge upon reproductive behavior. It appears that a fruitful and necessary approach is within the realm of the sociological. This is, then, a sociological study of fertility.

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[16] Philip M. Hauser, "On Design for Experiment and Research in Fertility Control," in C. V. Kiser, Research in Family Planning (Princeton: Princeton University Press, 1960), pp. 464-465.

Fertility as an Important Demographic Variable

Demographic analysis, according to Duncan and Hauser, is the study of the components of population change.[17] According to demographers, these basic components of population processes are fertility, mortality, and migration. Kingsley Davis comments, "it is clear that any factor influencing the number of people must operate through one or more of the variables mentioned. In no other way can a population be changed."[18] Fertility, then, is a very basic element to demography and a very important source of growth for any population.

In view of recent occurrences in fertility rates, there is an increasing realization that the problematic factor in population growth today is the fertility rate.[19] In discussing the relative importance of the "components of population change," Freedman indicates for the United States that:

> Migration, deaths, and births are vital factors determining the rate at which a country grows. It seems unlikely that immigration will be large enough in the

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[17] Philip M. Hauser and Otis Dudley Duncan, The Study of Population (Chicago: University of Chicago Press, 1959), p. 33.

[18] Kingsley Davis, The Human Society (New York: Macmillan, 1949), p. 552.

[19] Ronald Freedman, "The Sociology of Human Fertility," Current Sociology, X-XI, No. 2 (1961-62), 35; and W. H. Grabill, C. V. Kiser and P. K. Whelpton, The Fertility of American Women (New York: Wiley, 1958), p. 288.

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> next few decades to affect substantially America's population increase. Our death rate is already low and unlikely to vary greatly in the near future, unless there is a disastrous war or some other catastrophe. The dynamic force in our population growth is the birth rate.[20]

Before the "baby boom" of the 1940's, most demographers expected fertility rates to continue their decline and eventually stabilize at some low level. Such forecasts of a stationary population were refuted by the rebound in fertility following World War II. On this basis, it can be stated that of the three components of population change, fertility is perhaps the most volatile and least predictable. Consequently, "demographers have begun to turn to more broadly based social research on fertility for better predictions of this element in population growth."[21] The necessity of social research on fertility is further supported by Hutchinson, when he says, "my feeling of caution arises from a strong conviction that fertility is a variable quantity, capable of adjusting itself, and rather quickly, to changes in the socio-economic environment, rather than being ruled wholly by its own internal dynamics."[22] Similarly Davis

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[20]Ronald Freedman, P. K. Whelpton and A. A. Campbell, Family Planning, Sterility and Population Growth (New York: McGraw-Hill, 1959), p. 1 (italics mine).

[21]Ronald Freedman, "The Sociology of Human Fertility," op. cit., p. 35.

[22]Edward P. Hutchinson, "Comment on Ryder's Paper," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), p. 132.

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asserts that "whenever the demographer pushes his inquiry to the point of asking why the demographic processes behave as they do, he enters the social field."[23]

What is called for in these brief references, therefore, is the nexus of sociology and demography. While fertility is one of the primary cornerstones of demography, it is necessary to seek explanation of fertility variation within a sociological framework. This, then, is basically the design of this study. Whereas the dependent variable is fertility behavior, the independent or explanatory variables are essentially social structural in nature. In that this study attempts to establish connections between a demographic phenomenon and its social setting, its scope is both demographic and sociological.[24]

Differential Fertility

In the traditional sense, differential fertility refers simply to the unequal reproduction of subclasses of the population based on such variables as nativity, color, residence, income, occupation, education, etc. In a sense the problem confronted in this thesis is a continuation of

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[23] Kingsley Davis, *op. cit.*, p. 552.

[24] Wilbert Moore, "Sociology and Demography," in P. Hauser and O. D. Duncan, *The Study of Population*, *op. cit.*, pp. 832-51. Includes many good references to the social correlates of fertility.

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this traditional interest, although the nature of the problem is essentially different. Primarily, this study seeks answers to questions concerning differences in rural and urban fertility.

Since the urban-rural fertility differential is to be the central focus of this thesis, it is appropriate at this point to document past patterns and the current status of this differential. The best known and most soundly documented generalization for the United States with respect to differential fertility is the long-term continual decline of the magnitude of the urban-rural fertility differential.[25] Grabill, Kiser and Whelpton note that, while the urban-rural differential in fertility is among the oldest and best known of demographic phenomena, it has narrowed considerably in the United States. In commenting on the outlook for fertility differentials they state:

> It seems likely . . . that the long-range trend will be toward continued narrowing of group differences in fertility. The differences between rural and urban areas with respect to style of life are being lessened by

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[25] A few examples of this documentation are W. H. Grabill, C. V. Kiser, and P. K. Whelpton, <u>The Fertility of American Women</u>, <u>op. cit</u>.; W. H. Grabill, "The Fertility of the United States Population," in Donald J. Bogue, <u>The Population of the United States</u> (Glencoe: The Free Press, 1959), pp. 288-324; C. V. Kiser, "Differential Fertility in the United States," <u>op. cit</u>.; C. V. Kiser, "Changes in Fertility by Socio-Economic Status during 1940-50," <u>Milbank Memorial Fund Quarterly</u>, XXXIII (October, 1955), 393-429; C. F. Westoff, "Differential Fertility in the United States: 1900 to 1952," <u>American Sociological Review</u>, XIX (October, 1954), 549-61; and Bernard Okun, <u>Trends in Birth Rates in the United States Since 1870</u> (Baltimore: The Johns Hopkins Press, 1958).

> reduction in the relative size of the farm population, by improvements in highways and means or transportation, and by television, radio, and movies. . . . Selective factors alone probably will continue to account for appreciable urban-rural differences in fertility, but, in general, the outlook is for reduction in the magnitude of these differentials.[26]

Several plausible explanations have been proposed for the contraction of the traditional urban-rural fertility differential: (1) the spread of contraceptive practice through all strata of the population, thus, virtually eliminating the differential use of contraception as a basis for differential fertility; (2) the high degree of consensus of a large majority of Americans in an ideal family size ranging from two to four;[27] and (3) the blurring of class differences in the United States as the working class takes on many middle class characteristics and the function of

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[26] W. H. Grabill, C. V. Kiser, and P. Whelpton, The Fertility of American Women, op. cit., p. 378.

[27] Judith Blake, "Ideal Family Size Among White Americans: A Quarter of a Century of Evidence," Demography, III, No. 1 (1966), 154-73 (Blake says, "the two-to-four child range has encompassed the ideals of approximately 80 to 90 percent of men and women since the middle of the 1930's"). See also David Goldberg, "Fertility and Fertility Differentials: Some Observations on Recent Changes in the United States" in M. C. Sheps and J. C. Ridley, Public Health and Population Change (Pittsburgh: University of Pittsburgh Press, 1965), pp. 131-32; Ronald Freedman, David Goldberg, and Doris Slesinger, "Current Fertility Expectations of Married Couples in the United States," Population Index, XXIX (October, 1963), 366-91; and R. Freedman, D. Goldberg, and D. Slesinger, "Fertility Expectations in the United States: 1963," Population Index, XXX (April, 1964), 171-75.

children and the family become more similar in the different social strata of the population.[28]

With respect to urban-rural differences in general many sociologists and demographers have forecast the eventual demise of most urban-rural differences on the basis of which one can infer the eventual eclipse of the fertility differential. For example, Robin Williams asserts:

> Were it possible to make a systematic comparison of all major aspects of American social life in 1900 and in the 1960's, we would probably find a consistent decrease in the sharpness of differentiation between and among major social statuses, categories and collectivities. Rural-urban differences clearly are less. Class differentials are less obvious or sharp. Occupational status differences are blurred, especially between manual and non-manual jobs. . . . Regional distinctiveness, in spite of temporary resurgence in situations of conflict, gradually diminishes.[29]

Urban-rural disparities will disappear as our society becomes more dominantly urban as Comhaire and Cahnman comment:

> The industrial society in which we live is urban through and through, especially in the United States, where the farmer is a business man who keeps a sharp eye on domestic and world markets, applies scientific methods in

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[28] Kurt Mayer, "Fertility Changes and Population Forecasts in the United States," <u>Social Research</u>, XXVI, No. 3 (Autumn, 1959), 347-66.

[29] Robin M. Williams, Jr., "American Society in Transition: Trends and Emerging Development in Social and Cultural Systems," in James H. Copp, <u>Our Changing Rural Society: Perspectives and Trends</u> (Ames: Iowa State University Press, 1964), pp. 23-24. See also Norman Ryder, "Variability and Convergence in the American Population," <u>Phi Delta Kappan</u>, XLI (June, 1960), 379-383.

> seeding and feeding, owns a car and a television set, and has his wife and daughter dressed according to the latest fashion. . . . Ecologically speaking, the American farmer does not live in the city, yet his ways are citified. He is _of_ the city even though he is not _in_ the city.[30]

The question might be stirring in the reader's mind at this point whether it is even profitable to investigate further the urban-rural differential in fertility, whether it is profitable to proceed with this very study, given the inevitable convergence of urban-rural fertility levels? The answer must be affirmative, though certainly new approaches and techniques of analysis must be investigated and tried. Goldberg justifies the continuation of research in this area when he states:

> With the exception of certain types of historical data, American fertility patterns are probably better documentated than in any other country. _To document a pattern, however, does not explain it. On the whole, our understanding of fertility differentials is negligible._ Moreover, what we thought we knew in the past, the relationships we took for granted, are being seriously questioned by some recent research. In fact, the most exciting research on differentials during the past few years has either negated what was thought to be true in the past or has found differentials to be increasing precisely in those areas for which contraction had been predicted.[31]

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[30] Jean Comhaire and Werner J.Cahnman, _How Cities Grew_ (Madison, New Jersey: The Floram Park Press, 1959), p. 1.

[31] David Goldberg, "Fertility and Fertility Differentials: Some Observations on Recent Changes in the United States," _op. cit._, p. 120.

Fertility is a complex phenomenon. Convergence of fertility levels does not ring the death knell of differential fertility analysis, but understandably indicates that new relationships are perhaps developing. As fertility patterns change, our approach to analysis must also change. Old techniques are not adequate or sensitive enough to permit the intensive scrutiny necessary to sufficiently understand and explain complex fertility behavior. With near exhaustive documentation of fertility differentials past and current, we have discovered much in terms of fertility patterns, but more questions than answers have emerged. Attempts to explain fertility behavior must continue; new questions must be formulated; different approaches and techniques must be explored. Besides, urban-rural fertility differences still have not completely disappeared,[32] though the magnitude of the fertility differential is diminishing. Answering such questions as what factors are associated with urban fertility, what factors are associated with rural fertility, and are these sets of factors dissimilar, may help to better understand current urban and rural fertility levels and to judge more accurately the future status of the urban-rural fertility differential. To set the backdrop for

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[32]See Leo F. Schnore, "The Rural-Urban Variable: An Urbanite's Perspective," Rural Sociology, XXXI, No. 2 (June, 1966), 131-43; and J. Allan Beegle, "Social Structure and Changing Fertility of the Farm Population," Rural Sociology, XXXI, No. 4 (December, 1966), 415-27.

this attempt to investigate the why of residential fertility variation, let us ponder past and current trends of the urban-rural fertility differential within the United States.

Table 1 presents the trends in urban and rural fertility ratios, measured as the number of children under 5 years old per 1,000 white women 20 to 44 years old, for the period 1800 to 1960, for only the white population of the United States and its geographic divisions. The table indicates quite clearly that, although rural fertility ratios have persistently maintained a higher level than urban ratios, for the nation and all divisions the fertility ratios of the rural population have kept pace with those of the urban population in a pattern of gradual diminution. In fact, when measured in absolute decline, the rural population reveals the greater declines in fertility levels. On a national basis both the urban and rural ratios of children under 5 years old dropped between 1810 and 1840 by about 200 children per 1,000 women (rural 195; urban 199). Between 1840 and 1910, however, the decline amounted to 352 in the rural population and only 232 for the urban. Again between 1910 and 1940 the urban ratio fell by 158 children per 1,000 women, the rural ratio by 231. The divisions for these same periods reflect a similar pattern of greater absolute reduction of rural fertility ratios, although for the period 1910-1940 the more urban divisions (New England, Middle Atlantic, East North Central) reverse this pattern.

Table 1. Number and percentage change of children under 5 years old per 1,000 white women 20 to 44 years old, by nation and divisions, urban and rural: 1800 to 1840 and 1910 to 1960

	United States		New England		Middle Atlantic		East North Central		West North Central		South Atlantic		East South Central		West South Central		Mountain		Pacific	
Year	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
1960	747	636	755	636	720	574	783	647	816	699	681	589	707	609	736	680	859	742	751	633
1950	685	490	629	484	609	441	682	501	705	520	692	473	734	502	702	549	767	503	605	503
1950*	673	479	612	486	596	432	679	491	702	514	677	450	720	494	703	542	754	478	652	478
1940	551	311	443	321	457	286	533	326	538	324	596	305	648	333	591	342	643	404	466	283
1930	658	388	541	417	590	386	605	400	614	365	744	401	781	414	723	410	712	428	507	306
1920	744	471	602	500	680	501	668	485	711	416	851	458	846	441	823	445	807	470	603	344
1910	782	469	566	468	650	495	672	470	760	426	894	485	922	469	977	504	810	466	640	360
1840	1,134	701	800	592	1,006	711	1,291	841	1,481	705	1,185	770	1,424	859	1,495	846	...	...	...	...
1830	1,189	708	851	614	1,100	722	1,484	910	1,703	1,181	1,209	767	1,529	863	1,463	877	...	...	...	...
1820	1,276	831	952	764	1,235	842	1,616	1,059	1,685	...	1,310	881	1,635	1,089	1,522	866	...	...	...	...
1810	1,329	900	1,079	845	1,344	924	1,706	1,256	1,810	...	1,347	936	1,701	1,348	1,557	727	...	...	...	...
1800	1,319	845	1,126	827	1,339	852	1,840	...	...	...	1,365	861	1,799	...	...	...	...	...	...	...
	Percentage Change																			
1940-1960	33.6	104.5	70.4	98.1	57.5	100.7	46.9	106.7	51.7	115.7	14.3	93.1	9.1	82.9	24.5	98.8	33.6	83.7	61.2	123.7
1910-1940	-29.5	-32.7	-21.7	-31.4	-29.7	-42.2	-20.7	-30.6	-29.2	-23.9	-33.3	-37.1	-29.7	-29.0	-39.5	-32.1	-20.6	-13.3	-27.2	-21.4
1840-1910	-31.0	-33.1	-29.2	-20.0	-35.4	-30.4	-47.9	-44.1	-48.7	-39.6	-24.6	-37.0	-35.3	-45.4	-34.6	-40.4	...	...	...	...
1800-1840	-14.0	-17.0	-29.0	-28.4	-24.9	-10.5	-29.8	...	...	...	-13.2	-10.6	-20.8	...	...	...	...	...	...	...

*Based on old urban definition.

Source: Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States" (unpublished Ph.D. dissertation, Department of Sociology, University of Chicago, December, 1962), pp. 37-38.

In terms of percentage change, however, the urban population reflects a greater rate of decline since 1800. Table 1 indicates for the periods 1800-1840, 1840-1910, and 1910-1940 rates of decline nationally for the rural population of 14.0 percent, 31.0 percent, and 29.5 percent respectively and for the urban population 17.0 percent, 33.1 percent and 32.7 percent respectively. For the nation and its divisions, generally the period from 1800 to 1940 is one of long term decline for both rural and urban fertility, although Tables 2 and 3 reveal exceptions to this pattern in various divisions for specific decades. More will be said concerning these later, but here it is worth contrasting the percentage change in urban and rural fertility ratios in the geographic divisions for the two broad periods of 1840-1910 and 1910-1940 (see Table 1). For the former period, fertility of <u>rural</u> populations declined at faster rates than urban in the more urbanized divisions (New England, Middle Atlantic, East North Central, West North Central). The more rural divisions indicate an opposite trend. Between 1910 and 1940 in the more urbanized divisions, the <u>urban</u> fertility ratios dropped at a faster rate than the rural (New England, Middle Atlantic, East North Central, South Atlantic). The other divisions, becoming increasingly urban, resemble the pattern of the more urbanized divisions of the previous period, 1840-1910. This indicates an apparent lag on the part of the more rural divisions, but a rough sociation of

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association of urbanization and fertility decline obtains. These data suggest a pattern of cycles in terms of the expansion and contraction of urban-rural fertility levels. In early stages of urbanization rural fertility ratios decline faster than urban ratios, contracting the differential. As urbanization progresses, urban fertility ratios reduce faster than rural ratios, expanding the differential. The period 1940-60, a period of increasing fertility ratios for both urban and rural populations, indicates a contraction, but by urban fertility levels <u>increasing</u> faster than rural levels. Table 1 shows that in the more urbanized divisions (New England, Middle Atlantic, East North Central, West North Central, South Atlantic, Pacific) and for the nation as a whole, urban fertility levels increased at an extremely fast pace, closing the gap between urban-rural fertility. Table 6, which measures urban fertility ratios as a proportion of rural fertility ratios, reflects this pattern of expanding-contracting cycles for all divisions. As a result of the "baby boom" era of 1940-60, urban-rural fertility differentials for all divisions and the nation are closer to unity than ever before in their history. This pattern of varying rates of decline and increase for urban and rural fertility levels in the same division suggests that perhaps different sets of factors, in addition to urbanization, are operative in creating these fertility variations.

Sultan S. Hashmi to some extent has studied these same materials.[33] Although his focus was urban fertility, many of his findings and conclusions can be comparatively applied to rural fertility. For example, the introductory comment to his article says:

> This study undertakes to measure differences in fertility within the urban population and to learn what the major factors underlying the observed differences are. This has been a comparatively neglected aspect of demography. Usually urban fertility is contrasted with rural fertility, without appreciating that there may be great internal variations in rates of childbearing within urban and rural aggregates.[34]

Hashmi supports this proposal by proceeding to demonstrate that the correlation between fertility decline and progressive urbanization is only a very rough one. Tables 2 and 3 present rates of change in urban and rural white fertility ratios since 1800 by succeeding decades for the geographic divisions of the United States. Table 4 provides the percent urban of these divisional populations. A careful

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[33] Tables 1, 2, 3, and 4 were reproduced from Dr. Hashmi's unpublished Ph.D. dissertation: "Trends and Factors in Urban Fertility Differences in the United States" (Chicago: Department of Sociology, University of Chicago, 1962). This dissertation has also been published in abridged form under the title "Factors in Urban Fertility Differences in the United States," in Ernest W. Burgess and Donald J. Bogue, Contributions to Urban Sociology (Chicago: University of Chicago Press, 1964), pp. 42-58. I wish to express my appreciation here to Dr. Hashmi for the stimulating ideas he has presented from the reading of his dissertation and article. To a certain extent I consider my thesis a continuation of the investigation which Dr. Hashmi began.

[34] Sultan S. Hashmi, "Factors in Urban Fertility Differences in the United States," ibid., p. 42 (second italics mine).

Table 2. Percentage change of number of children under 5 years old per 1,000 white women 20 to 44 years old, by nation and divisions, urban: 1800 to 1840 and 1910 to 1960

Period	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1950-1960	29.8	31.4	30.2	34.5	34.4	24.5	21.3	23.9	24.7	25.8
1950-1960*	32.8	30.9	32.9	37.3	35.4	30.9	23.3	25.5	27.1	32.4
1940-1950	54.0	51.4	51.0	50.6	58.6	47.5	48.3	58.5	44.6	68.9
1930-1940	-19.8	-23.0	-25.9	-18.5	-11.2	-23.9	-19.6	-16.6	-5.6	-7.5
1920-1930	-17.6	-16.6	-23.0	-17.5	-12.3	-12.4	- 6.1	- 7.9	-8.9	-11.0
1910-1920	0.4	6.8	1.2	3.2	- 2.3	- 5.6	- 6.0	-11.7	0.9	- 4.4
1840-1910	-33.1	-20.9	-30.4	-44.1	-39.6	-37.0	-45.4	-40.4	...	...
1830-1840	- 1.0	- 3.6	- 1.5	- 7.6	-40.3	0.4	- 0.5	- 3.5	...	...
1820-1830	-14.8	-19.6	-14.3	-14.1	...	-12.9	-20.8	1.3	...	...
1810-1820	- 7.7	- 9.6	- 8.9	-15.7	...	- 5.9	-19.2	19.1	...	...
1800-1810	6.5	2.2	8.5	...	...	8.7	...	...	...	...

Table 3. Percentage change of number of children under 5 years old per 1,000 white women 20 to 44 years old, by nation and divisions, rural: 1800 to 1840 and 1910 to 1960

Period	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1950-1960	9.1	20.0	18.2	14.8	15.7	- 1.6	- 3.7	4.8	12.0	12.9
1950-1960*	11.0	23.4	20.8	15.3	16.2	0.6	- 1.8	4.7	13.9	15.2
1940-1950	22.1	38.1	30.4	27.4	30.5	13.6	11.1	19.0	17.3	39.9
1930-1940	-16.3	-18.1	-22.5	-11.9	-12.4	-19.9	-17.0	-18.3	- 9.7	- 8.1
1920-1930	-11.6	-10.1	-13.2	- 9.4	-13.6	-12.6	- 7.7	-12.2	-11.8	-15.9
1910-1920	- 4.9	6.4	4.6	- 0.6	- 6.4	- 4.8	- 8.2	-15.8	- 0.4	- 5.8
1840-1910	-31.0	-29.2	-35.4	-47.9	-48.7	-24.6	-35.3	-34.6	...	...
1830-1840	- 4.6	- 6.0	- 8.5	-13.0	-13.0	- 2.0	- 6.9	2.2	...	...
1820-1830	- 6.8	-10.6	-10.9	- 8.2	1.1	- 7.7	- 6.5	-10.4	...	...
1810-1820	- 4.0	-11.8	- 8.1	- 5.3	- 6.9	- 2.7	- 3.9	- 2.2	...	...
1800-1810	0.8	- 4.2	0.4	- 7.3	...	- 1.3	- 5.4	...	...	...

*Based on old urban definition.

Source: Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States" (unpublished Ph.D. dissertation, Department of Sociology, University of Chicago, 1962), Table 11, p. 38.

Table 4. Percentage of total population urban for conterminous United States and divisions: 1800 to 1840 and 1910 to 1960

Year	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1960	69.9	76.4	81.4	73.0	58.8	57.2	48.4	67.7	67.1	81.1
1950	64.0	76.2	80.5	69.7	52.0	49.1	39.1	55.6	54.9	74.4
1950*	59.6	74.8	75.6	66.3	49.9	43.8	35.5	53.1	49.2	63.3
1940	56.5	76.1	76.8	65.5	44.3	38.8	29.4	39.8	42.7	64.9
1930	56.2	77.3	77.7	66.4	41.8	36.1	28.1	36.4	39.4	66.6
1920	51.2	75.9	75.4	60.8	37.7	31.0	22.4	29.0	36.5	60.5
1910	45.7	73.3	71.2	52.7	33.2	25.4	18.7	22.3	35.9	55.0
1840	10.8	19.4	18.1	3.9	3.9	7.7	2.1	23.4	...	...
1830	8.8	14.0	14.2	2.5	3.5	6.2	1.5	18.7	...	...
1820	7.2	10.5	11.3	1.2	...	5.5	0.8	16.2	...	...
1810	7.3	10.1	11.5	0.9	...	4.5	0.6	22.2	...	...
1800	6.1	8.2	10.2	...	...	3.4	...	...	...	...

*Based on old urban definition.

Source: Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States" (unpublished Ph.D. dissertation, Department of Sociology, University of Chicago, 1962), Table 14.

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comparison of these tables will reveal certain irregularities in the usually hypothesized association of urbanization and fertility decline. The "baby boom" era of 1940-60 is perhaps the most obvious descrepancy. Urban and rural fertility ratios both have increased significantly since 1940, while the nation and all divisions have continued to become more urban. Likewise, between 1910 and 1920 there was very rapid urbanization of the population, but during this period there were slight increases in the urban fertility ratio of the nation and four divisions (New England, Middle Atlantic, East North Central, Mountain), and in the rural fertility ratios of two divisions (New England, Middle Atlantic). During some of the very early decades of the 1800's urban and rural fertility fell quite rapidly, even though the extent of urbanization was quite modest. Between 1810 and 1820 there was no increase in the proportion of urban population, rather there was a slight decrease, but both the urban and the rural fertility ratios decreased substantially. During the decade 1930-1940 little increase occurred in the proportion of the population urban, but declines in fertility ratios were quite significant for both urban and rural populations.

From the scrutiny of these figures the fact becomes clear that over the past century and a half in the nine geographic divisions of the nation there is not merely one pattern of the relationship of urbanization and fertility trends, but there is evidence of four. According to Hashmi

these are (1) fertility decrease with increasing urbanization, (2) fertility decrease with decreasing urbanization, (3) fertility increase with increasing urbanization and (4) fertility increase with decreasing urbanization.[35] The first of these patterns is the expected inverse relationship of fertility and urbanization. It is found frequently in both the urban and rural populations of the divisions. The second pattern is associated with the economic depression of the 1930's. With decreases in urbanization for 1930-1940, four divisions (New England, Middle Atlantic, East North Central, Pacific) indicate a parallel decrease in both urban and rural fertility ratios. This pattern occurred also for both ratios in the West South Central division between 1840-1910 and the Middle Atlantic between 1810-1820 and for the rural fertility ratio in the West South Central between 1810-1820. The third pattern is best exemplified by the "baby boom" period since 1940. The upsurge of both urban and rural fertility ratios in this period is a direct contradiction of the expected pattern of decreasing fertility with urbanization. A similar pattern, though less spectacular and widespread, occurred among some of the divisions during the 1910-1920 decade, again for both urban and rural fertility. Fertility levels indicate accretion during moderate urbanization between 1810-1820 in the urban population for

[35] *Ibid.*, p. 44.

the nation and New England, Middle Atlantic, and South Atlantic divisions and the rural population for the nation and Middle Atlantic division. In addition there were a few isolated cases which occurred in the 19th century for urban and rural fertility levels. The fourth pattern, decreasing fertility and increasing urbanization, is rare. Omitting cases which occurred between 1940 and 1950 because of the inadequacy of the old definition of urban leaves the single incident of urban fertility in the West South Central division for 1810-1820. On the basis of these findings Hashmi concludes that "urban fertility has not responded unilaterally to progressive urbanization at any time in the past."[36] As far as that goes, neither has rural fertility reflected a unilateral pattern of change with urbanization. These fluctuations in urban and rural fertility suggest that factors other than urbanization are operative within both populations. These other factors must be identified and investigated in order to better understand fertility variations and trends for both urban and rural areas.

Another line of analysis of the historical changes in the urban-rural fertility differential is to consider independently the magnitude of the gap between the fertility ratios of the residential populations. Are urban and rural fertility levels approaching unity and, if so, what has been

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[36] Ibid., p. 44.

the pattern of change in closing the gap and what is the current magnitude of this gap? One measure of this gap is obtained by considering the _absolute_ differences between urban and rural fertility levels at given points in time. Table 5 provides this information by decade for the nation and the geographical divisions. The table shows that for the nation as a whole there were greater urban-rural differences in fertility during the period 1800-1840 than in the periods 1910-1940 and 1940-1960. Although there was a widening trend from 1810 to 1830, as urban fertility ratios declined by more points than rural ratios, absolute differences in urban-rural fertility have narrowed considerably over the years. This trend continued through 1960 in spite of the increases in both urban and rural fertility ratios during the period 1940-1960. The largest gap between urban-rural fertility appears in 1830, an absolute difference of 481, and the smallest in 1960 with a gap of only 111.

The same pattern as found in the national figures applies also to the divisions, with some deviations, of course. Nevertheless all divisions but New England have reached the point of smallest absolute differences between urban and rural fertility ratios by 1960. Through 1940 New England and Middle Atlantic, the more progressively urbanizing divisions, maintained the lowest absolute differences between urban and rural fertility. By 1960 they represent the largest differences among the divisions, the other

Table 5. **Absolute differences in urban-rural number of children under 5 years old per 1,000 white women 20 to 44 years old, by nation and divisions:** 1800 to 1840 and 1910 to 1960

Year	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1960	111	119	146	109	117	92	98	56	117	99
1950	195	145	168	181	185	219	232	153	172	162
1950*	194	126	164	188	188	227	226	161	170	174
1940	240	122	171	207	214	291	315	249	239	183
1930	270	124	204	205	249	343	367	313	284	201
1920	273	102	179	183	295	393	405	378	337	259
1910	313	98	155	202	334	409	453	473	344	280
1840	433	208	295	450	776	415	565	649	...	...
1830	481	237	378	574	522	442	666	586	...	...
1820	445	188	393	557	...	429	546	656	...	...
1810	429	234	420	450	...	411	353	830	...	...
1800	474	299	487	...	...	504	...	...	...	...

Table 6. **Urban as a proportion** of rural number of children under 5 years old per 1,000 white women 20 to 44 years old, by nation and divisions: 1800 to 1840 and 1910 to 1960

Year	United States	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1960	.85	.84	.80	.86	.86	.86	.86	.92	.86	.84
1950	.72	.77	.72	.73	.74	.68	.68	.78	.66	.83
1950*	.71	.79	.72	.72	.73	.66	.69	.77	.63	.73
1940	.56	.72	.63	.61	.60	.51	.51	.58	.63	.61
1930	.59	.77	.65	.66	.59	.54	.53	.57	.60	.60
1920	.63	.83	.74	.73	.59	.54	.52	.54	.58	.57
1910	.60	.83	.76	.70	.56	.54	.51	.52	.58	.56
1840	.62	.74	.71	.65	.48	.65	.60	.57	...	...
1830	.60	.72	.66	.61	.69	.63	.56	.60	...	...
1820	.65	.80	.68	.66	...	.67	.67	.57	...	...
1810	.68	.78	.69	.74	...	.69	.79	.47	...	...
1800	.64	.73	.64	...	...	.63	...	...	...	...

*Based on old urban definition.

Source: Computation based on fertility ratios given in Table 1.

divisions having dwindled their differences to lower levels. Generally speaking, however, Table 5 tends to show clearly that during the 19th century there were larger urban-rural differences in the fertility ratios of the divisions and that these differences have gone through considerable declines. Even during the last two decades, when fertility ratios were increasing both in the urban as well as the rural populations, the absolute urban-rural fertility difference continued to decrease.

A slightly different picture, however, is obtained when one compares urban-rural fertility differences in terms of <u>relative proportions</u>. Table 6 reflects these differences by divisions since 1800 by the measurement of urban fertility as a proportion of rural fertility. For the nation as a whole early in the 19th century rural and urban fertility levels were much closer to unity than in the first four decades of the 20th century. In 1810 the urban ratio was 68 percent as large as the rural ratio and in 1940 the urban ratio (though much lower in actual level than in the 19th century) was only 56 percent as large as the rural ratio (which was also much lower than the 19th century levels). By 1960 the urban ratio has come closer to unity with the rural ratio than any previous decade. The same pattern applies to the various divisions. Formerly the more urban divisions (New England, Middle Atlantic, East North Central) maintained urban-rural fertility levels closer to unity than

the more rural divisions, though this has been reversed by 1960 (lowest proportions are now in New England, Middle Atlantic, Pacific).

In comparison with absolute differences of urban-rural fertility, which tends to reveal a straight-line pattern of decline from extremely large to extremely small differences, the pattern reflected by urban fertility as a proportion of rural fertility tends to be a U-shaped curve, with extremely large values appearing at both ends of the time period. The comparison of the results of these two methods of measuring the urban-rural fertility differential has something to say concerning the necessity of investigating factors determinative of urban and rural fertility independent of each other, i.e., the necessity of separate investigation of the internal variation of both urban and rural fertility levels.

Hashmi in his analysis considered only one measure of the magnitude of the urban-rural fertility differential: absolute differences. He concluded that the fact that this difference continued to decrease during the 1940-1960 fertility upsurge proves more or less "that urbanization alone does not determine either the level or the direction of change in fertility rates."[37] In order to support this proposition, I have attempted to extend the detail of his

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[37] *Ibid.*, p. 45.

analysis by the use of rank-order correlation. Table 7 presents two sets of rank-order correlations for the nation and its divisions. The first set of correlations indicates the level of association between changes in percent urban and the changes in absolute differences in urban-rural fertility ratios from 1800 to 1960. The second set of correlations indicates the level of association between percent urban and the magnitude of the urban-rural differential measured by relative proportion. Hashmi concluded that urbanization and the decline of absolute differences of urban and rural fertility ratios were highly related. Table 7 bears this conclusion out. The nation indicates a very high rank-order correlation of -.93 while all the divisions also show high negative correlations of varying degree. Hence, Hashmi is correct when he states that urbanization is only associated with the long-term decline of <u>absolute</u> differences between urban and rural fertility <u>but not the level or direction</u>. The measure of urban fertility as a proportion of rural fertility, it can be said, is more sensitive to the level and direction of fertility change. For example, this measure does respond to the change in direction of fertility levels during the 1940-1960 "baby boom." If, however, urban and rural fertility ratios had not increased for 1940-1960, but had declined, it would have been possible for the size of the absolute difference between the two ratios to remain the same, quite independent of the direction of change in the

Table 7. Rank order correlations of percentage of total population urban with absolute differences in urban-rural fertility ratios and urban to rural fertility ratios; for conterminous United States and divisions: 1800-1840 and 1910-1960

Area	rho of % Urban and Absolute Differences in Urban-Rural White Fertility Ratios	rho of % Urban and Urban As a Proportion of Rural White Fertility Ratios
United States	-.93	-.02
New England	-.68	+.27
Middle Atlantic	-.87	+.30
East North Central	-.83	+.30
West North Central	-.98	+.64
South Atlantic	-.94	-.05
East South Central	-.71	-.03
West South Central	-.92	+.55
Mountain	-1.00	+.99
Pacific	-1.00	+1.00

Computations of rank-order correlations based on Tables 4, 5 and 6. Formula used:

$$\text{rho} = 1 - \frac{6 \sum D^2}{N(N^2 - 1)} .$$

ratios themselves. In comparison the measure of relative proportion of urban to rural fertility ratios would have shown a lower value if both ratios had continued to decline regardless of the fact that absolute difference could have remained the same. Now looking at Table 7, it is to be noted that the rank order correlations between the relative proportion measure of the rural-urban fertility differential and percent urban are comparatively lower than correlations of absolute differences. For the nation as a whole the rank-order correlation is close to nil and even in the wrong direction when considering relative proportion. This second set of correlations suggests that urbanization determines mostly the absolute differences of urban-rural fertility, but is a poor predictor of the relative proportion that urban fertility is of rural fertility and, for that reason, a poor predictor of the level and direction of change in fertility rates. I have not contracted Hashmi's original proposition but merely added more weight to his argument. On the basis of these types of information, then, Hashmi concludes:

> This simple historical review of the fluctuations, divergences, and wide inter area . . . differences in urban fertility rather effectively contradicts the notion that urbanization *per se* is an important determinant of fertility. Instead, we should look upon urban fertility as a phenomenon which must be studied independently and explained by other variables. In other words, we must look *inside* it and try to isolate factors that have a more or less persistent relationship to fertility.[38]

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[38] *Ibid.*, p. 45.

Although Hashmi singles out only urban fertility for such study, this conclusion must equally apply to the study of rural fertility. It is possible that a different set of factors influence rural fertility than does urban fertility, or that the same factors have a different impact on rural fertility than on urban fertility. These are possibilities in spite of the probable convergence of urban and rural fertility levels. Fortunately there exists already some empirical support that, though levels of fertility are converging, the pattern of differential fertility within urban and rural populations is different. Goldberg, using data from the Indianapolis study of fertility, compared urbanites and farm migrants. He states:

> If the average number of children among farm migrants is about equal to that of urbanites, it does not necessarily follow that the differential fertility patterns of the migrants will be identical with or even similar to those of the urbanites. In Indianapolis we find that family size is the same for urbanites and couples with some farm background, but that within each of these groups there is a contrasting relationship between socio-economic variables and fertility.[39]

Though our study will deal with contrasting residence groups of the national population, while urban and rural fertility levels are nearly equal, it may be that within residence groups there exist "contrasting relationships between socio-economic variables and fertility," or for that matter

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[39] David Goldbert, "Another Look at the Indianapolis Fertility Data," Milbank Memorial Fund Quarterly, XXXVIII (January, 1960), 27 (italics mine).

contrasting relationships for other than socio-economic variables as well. The discussion of these conclusions concerning urban and rural fertility levels suggest clearly the necessity of a comparative study of factors associated with the internal variation of urban and rural fertility levels in the United States. Such a study would be one step beyond the contribution of Hashmi. The intent of my study, then, is to look at the internal differential fertility pattern of each residence group and to compare the patterns of each group for differences and similarities.

To this point we have concentrated on trends in the urban-rural fertility differential and some patterns of change have been established. Looking "within" the fertility differential pattern of each residence population, however, will not involve the explanation of trends but the explanation of variation of fertility within residential populations at one point in time. This one point in time for our present study will be 1960 for three reasons: (1) the difficulty of collecting comparable data for a historical or trend analysis of differential fertility, (2) the accessibility and wealth of data available from the 1960 Census and (3) the urgency of constantly increasing our understanding of current fertility. Though in our trend analysis of urban-rural fertility 1960 data were included, it is expedient to take a more detailed look at the urban-rural fertility differential for 1960. Table 8 presents for

Table 8. Number of children ever born per 1,000 ever-married white women by residence and age for conterminous United States and divisions, 1960

	Cumulative White Fertility Rate by Residence and Age									Percent Rural-Farm Rate Exceeds Urban			Percent Rural-Non-Farm Rate Exceeds Urban		
	Rural-Farm			Rural-Non-Farm			Urban								
	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44	15-24	25-34	35-44
United States	1,405	2,867	3,262	1,370	2,590	2,903	1,175	2,269	2,408	19.6	26.4	35.5	16.6	14.1	20.6
New England	1,506	2,995	3,266	1,328	2,486	2,696	1,156	2,260	2,481	30.3	32.5	31.6	14.9	10.0	8.7
Middle Atlantic	1,412	2,816	3,211	1,334	2,428	2,665	1,080	2,084	2,273	30.7	35.1	41.3	23.5	16.5	17.2
East North Central	1,430	2,937	3,253	1,430	2,673	2,915	1,213	2,354	2,484	17.9	24.8	31.0	17.9	13.6	17.4
West North Central	1,458	2,973	3,293	1,383	2,756	3,031	1,203	2,425	2,578	21.2	22.6	27.7	15.0	13.6	17.6
South Atlantic	1,239	2,598	3,208	1,269	2,428	2,854	1,083	2,122	2,278	14.4	22.4	40.8	17.2	14.4	25.3
East South Central	1,295	2,687	3,360	1,331	2,585	3,183	1,119	2,186	2,401	15.7	22.9	39.9	18.9	18.3	32.6
West South Central	1,485	2,866	3,223	1,429	2,756	3,116	1,224	2,400	2,537	21.3	19.4	27.0	16.7	14.8	22.8
Mountain	1,580	3,127	3,473	1,526	2,906	3,251	1,310	2,580	2,760	20.6	21.2	25.8	16.5	12.6	17.8
Pacific	1,520	2,904	3,023	1,469	2,703	2,821	1,233	2,298	2,330	23.3	26.4	29.7	19.1	17.6	21.1

Source: Dale Hathaway, J. Allan Beegle, and Keith Bryant, Rural America, Census Monograph in press.

the nation and its nine divisions in 1960 the cumulative white fertility rate, i.e., the number of children ever born per 1,000 ever-married white women, for all three residence categories (rural-farm, rural-nonfarm, urban) by broad age divisions of the women's reproductive period (15-24, 25-34, 35-44). In contrast with the trend analysis fertility data discussed previously, here we are (1) using a different measure of fertility, children ever born, which is actually a measure of average number of children per married white woman, (2) including data for fertility levels for three residential categories rather than the simple dichotomy of rural-urban, and (3) inserting a control for age of women. It is of special import to consider at this point cumulative fertility rates by division, residence and age categories for 1960, since these are the products of the differential fertility patterns which will be investigated in this study. When we consider internal variation of fertility levels for residence groups later, the cumulative fertility rate will be the measure employed.

Table 8 not only exhibits a consistent and substantial rural-urban fertility differential for 1960, but also sizeable intra-residence group differences among the divisions. Among all three age groups the number of children ever born per 1,000 ever-married rural-farm white women in the nation as a whole ranged from 20 to 36 percent above that for urban white women. For rural-nonfarm white women

this rate ranged from 14 to 21 percent above urban white women. In comparing rural-farm and rural-nonfarm white fertility rates, however, the differences are small (rural-farm rates ranging from 3 to 12 percent above rural-nonfarm fertility rates). The pattern for the nation, then, is one of high cumulative fertility rates for the rural-farm population, intermediate for rural-nonfarm, and low for urban. Furthermore, fertility rates are more similar for the two rural residence groups than either rural residence group is to the urban group. For white women ages 35 to 44 the difference in rural-farm and urban fertility rates is 854, rural-nonfarm and urban 495, and rural-farm and rural-nonfarm 359.

The pattern of high rural-farm, intermediate rural-nonfarm and low urban fertility is repeated with few exceptions by the nine divisions of the nation in 1960. The exceptions to this pattern are all instances where the rural-nonfarm fertility level exceeded the rural-farm, but in no case does the urban level exceed that of either rural population, farm or nonfarm. The magnitude of the fertility differential between white rural-farm and urban residence groups for women age 15 to 24 ranges from 14 percent in the South Atlantic divisions to 31 percent in the Middle Atlantic above the fertility rate for white urban women at this age. In this age group and women ages 25 to 34, there is some indication that the rural-farm and urban fertility

differential is largest in the more urban divisions and least in the less urban divisions. Rural-farm fertility levels for women 25 to 34 range in excess of urban fertility from a high of 35 percent in the Middle Atlantic to a low of 19 percent in the West South Central. For the age group of 35 to 44, an age group of women for whom childbearing is near completion and provides some indication of complete fertility levels for the population, rural-farm fertility exceeds urban fertility within a range of 41 percent for Middle Atlantic and South Atlantic to 26 percent in the Mountain division. To conclude this discussion on the rural-farm and urban differential, it might be said that insofar as the age groups of married women represent current and completed fertility, there is evidence of a continuation of shrinking differentials. However, considering that the more urban divisions reveal the largest gaps between rural-farm and urban fertility, as the nation becomes progressively more urban, the differential should expand rather than contract. This same pattern is supported by previously discussed trend data and the impact of upsurging fertility levels during 1940-1960 on the urban-rural differential.

The size of the fertility differential between rural-nonfarm and urban fertility, when compared among age cohorts of women, seems also to show a continuation toward convergence, although the variation among divisions is not as extreme as in the rural-farm populations of the divisions.

Three exceptions are New England, Middle Atlantic, and East North Central divisions which are highly urbanized. The differential seems to be expanding in these divisions. Rural-nonfarm fertility for women 15 to 24 ranges from 15 percent above the urban rate in New England and South Atlantic to 24 percent in the Middle Atlantic and for women 25 to 34 from a low of 10 percent above urban in New England to 18 percent in the East South Central. Rural-nonfarm fertility for women 35 to 44 exceeds the urban level by only 9 percent in New England and 33 percent in the East South Central division. With respect to the rural-nonfarm and urban populations it is more difficult to generalize that the more urban divisions reflect fertility differentials than the less urban divisions since the ranges are relatively small.

There is considerable amount of variation within residence groups when comparisons are made among divisions. White women residing in the Mountain division, for each age and residence group, show higher fertility levels than comparable white women in any other division. Within the rural-farm population the average number of children per white married woman 15 to 24 ranges from 1.6 in the Mountain division to 1.2 in the South Atlantic. This average for women 35 to 44 ranges from 3.5 in the Mountain division to 3.0 for Pacific. For rural-nonfarm women 15 to 24 the average number of children ranges from a low of 1.3 in South Atlantic to a high of 1.5. For women 35 to 44 New England

and Middle Atlantic divisions are low with an average of 2.7 children, Mountain is high at 3.3. For urban women 15 to 24 Middle Atlantic, South Atlantic and East South Central all have an average of 1.1 children per white married woman and Mountain has the high average of 1.3. Urban completed fertility levels range from a low of 2.3 for Middle Atlantic, South Atlantic, and Pacific, to a high of 2.8 in the Mountain division. Hence, not only is there continuing urban-rural fertility differential existing among all divisions of the United States, but there is also a considerable amount of variation in fertility levels within the same residence group among the various divisions due partially to the varying degrees of urbanization which exists among these divisions. These data suggest that if one is to investigate the internal variation of fertility within residence groups, the analysis should control for divisional variation of fertility levels at the same time.

The fact that this study intends to look "within" the fertility pattern of each residence group, for the nation and for each geographic division, raises the question of the homogeneity of fertility levels in each residence group. A look "within" assumes that there is variation of fertility levels to be explained or accounted for. If complete homogeneity existed within residence groups, i.e., if all rural-farm women produced very close to the same number of children within the same division, there could be no explanation of variation for the rural-farm population. However homogeneity does not exist for fertility levels of residence groups even when controlling for divisional effects. Table 9 is a rough attempt to portray and facilitate the visualization of variation that does exist among cumulative fertility levels (measured as number of children ever-born per 1,000 ever-married white women age 15 to 44) for residential parts of counties in conterminous United States and the nine divisions. The already established pattern of the tendency of high fertility levels in rural-farm areas, intermediate in rural-nonfarm, and low in urban areas is easily observed in the table, as well as the fact that among the various divisions there are considerable differences in the pattern and extent of variation of fertility levels within each of the residence groups. Nevertheless what this table attempts to establish is the fact that there is a significant amount of variation of fertility levels among residential parts of counties respectively even within each of the divisions. Although we are not using a specific measure of variation, percentage distributions can give a rough indication of clustering or scattering of fertility levels within rural-farm, rural-nonfarm and urban populations. An eyeball analysis of Table 9 tells us that fertility rates of urban parts of counties have a greater tendency to "bunch up" than rural-nonfarm and rural-farm rates. In other words, there is relatively less variation

Table 9. Percentage distribution of urban, rural-nonfarm, and rural-farm parts of counties by children ever born per 1,000 ever-married white women age 15-44 for conterminous United States and divisions: 1960

	Children Ever Born per 1,000 Ever-Married White Women 15-44											
	Less Than 2,000		2,000-2,499		2,500-2,999		3,000-3,499		3,500 or Over		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
URBAN												
United States	407	19.2	1,387	65.2	303	14.3	23	1.1	5	0.2	2,124	100
New England	0	0.0	55	93.2	4	6.8	0	0.0	0	0.0	59	100
Middle Atlantic	23	16.1	118	82.5	2	1.4	0	0.0	0	0.0	143	100
East North Central	21	5.7	286	77.5	60	16.3	2	0.5	0	0.0	369	100
West North Central	37	10.8	213	61.8	90	26.2	4	1.2	0	0.0	344	100
South Atlantic	152	40.6	217	58.1	5	1.3	0	0.0	0	0.0	374	100
East South Central	101	44.7	117	51.8	8	3.5	8	0.0	0	0.0	226	100
West South Central	66	19.1	215	62.1	55	15.9	6	1.7	4	1.2	346	100
Mountain	3	2.0	72	47.0	67	43.8	10	6.5	1	0.7	153	100
Pacific	4	3.6	94	85.5	12	10.9	0	0.0	0	0.0	110	100
RURAL-NONFARM												
United States	59	2.0	1,385	46.2	1,313	43.8	202	6.8	37	1.2	2,996	100
New England	0	0.0	40	60.6	24	36.4	1	1.5	1	1.5	66	100
Middle Atlantic	2	1.4	97	68.3	43	30.3	0	0.0	0	0.0	142	100
East North Central	2	0.5	182	41.8	236	54.3	15	3.4	0	0.0	435	100
West North Central	6	1.0	211	35.5	325	54.6	51	8.6	2	0.3	595	100
South Atlantic	27	4.9	358	65.5	138	25.2	24	4.4	0	0.0	547	100
East South Central	8	2.2	198	54.9	123	34.1	24	6.6	8	2.2	361	100
West South Central	6	1.3	187	41.0	223	48.9	29	6.4	11	2.4	456	100
Mountain	7	2.7	58	22.1	126	47.8	57	21.7	15	5.7	263	100
Pacific	1	0.8	54	41.2	75	57.2	1	0.8	0	0.0	131	100
RURAL-FARM												
United States	17	0.6	481	17.7	1,438	53.1	618	22.8	158	5.8	2,712	100
New England	0	0.0	12	20.7	27	46.6	18	31.0	1	1.7	58	100
Middle Atlantic	2	1.6	27	21.3	71	55.8	25	19.7	2	1.6	127	100
East North Central	0	0.0	53	12.7	225	53.8	106	25.4	34	8.1	418	100
West North Central	1	0.2	71	11.8	321	53.2	173	28.7	37	6.1	603	100
South Atlantic	8	1.8	127	28.1	238	52.7	63	13.9	16	3.5	452	100
East South Central	2	0.6	70	20.1	187	53.5	70	20.1	20	5.7	349	100
West South Central	2	0.5	88	22.2	202	50.8	86	21.7	19	4.8	397	100
Mountain	1	0.5	15	7.7	91	47.0	58	29.9	29	14.9	194	100
Pacific	1	0.9	18	15.8	76	66.6	19	16.7	0	0.0	114	100

to account for within urban fertility. In comparison, rural-farm fertility reveals the largest amount of relative variation among residence groups. It is interesting to note that even within the urban residence category, the divisions which have the smallest variation are those which are more urbanized. New England, Middle Atlantic and Pacific divisions have 93 percent, 83 percent, and 85 percent of their urban parts of counties respectively falling within the cumulative fertility range of 2,000 to 2,499. Over half (51 percent) of the urban parts of counties in the Mountain division have fertility rates of over 2,500. Although rural-farm fertility levels reveal the wider variation than each of the other residence groups, the distribution patterns for rural-farm fertility seems to be more consistent among the divisions than urban or rural-nonfarm fertility. Although the amount of variation may have something to say about the success of accounting for urban vis-a-vis rural-farm fertility fluctuations, given the same number of variables, the point to be stressed here is that there remains a considerable amount of variation to be accounted for within residence groups of the United States.

The Goldberg Hypothesis

In concluding this discussion of trends and current status of the urban-rural differential in fertility, it would not be complete without taking into account a confounding issue that has cropped up in recent studies.[40] We may call this the "Goldberg hypothesis," although others have contributed to the analysis of this problem as well. The Goldberg hypothesis emanates from the recent finding that "farm background" over and above the more traditional "current residence" variables (urban, rural-nonfarm, rural-farm) is a significant determinant of the rural-urban fertility differential. Briefly the hypothesis states that the inverse relationship of fertility and socio-economic status found in urban areas is the product of a large proportion of farm migrants which are disproportionately concentrated in the lower socio-economic status categories of the urban population. The Freedmans estimated that in 1952 more than

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[40]The major studies include David Goldberg, "The Fertility of Two Generation Urbanites," Population Studies, XII (March, 1959), 214-22; David Goldberg, "Another Look at the Indianapolis Fertility Data," op. cit.; Ronald Freedman and Deborah Freedman, "Farm-Related Elements in the Nonfarm Population," Rural Sociology, XXI (March, 1956), 50-61; Ronald Freedman and Doris P. Slesinger, "Fertility Differentials for the Indigenous Non-Farm Population of the United States," Population Studies, XV (November, 1961), 161-73; and Otis Dudley Duncan, "Farm Background and Differential Fertility," Demography, II (1965), 240-49. Also see a much earlier discussion of this problem in T. J. Woofter, "Trends in Rural and Urban Fertility Rates," Rural Sociology, XIII (March, 1948), 3-9.

twice as many farm-reared adults were living off the farm as on the farm in the United States and that one of every three adults living in a nonfarm place was reared on a farm.[41] With respect to a number of variables the Freedmans found that the farm-reared population revealed relatively distinct distribution patterns in comparison with persons of the nonfarm population with no farm experience and that "the farm-reared have come into the nonfarm economy relatively poorly prepared from an educational point of view . . . [and] have tended to fill relatively low-status jobs and to earn low incomes."[42] Goldberg argues that the study of urban fertility differentials based on current residence categories will be complicated by the presence of rural elements in the urban population. He finds that the inverse relationship of fertility and socio-economic status is characteristic only of the rural migrants in the urban population, but not of the indigenous urban population.[43] Fertility behavior of farm migrants, then, is much different than indigenous urbanites in that farm migrants on the average had a significantly larger number of children than indigenous

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[41]Ronald Freedman and Deborah Freedman, op. cit., p. 50.

[42]*Ibid*., p. 54.

[43]David Goldberg, "The Fertility of Two Generation Urbanites," op. cit., and "Another Look at the Indianapolis Fertility Data," op. cit.

urbanites. This finding suggests that even within the urban residence category there are urban-rural differences which may complicate or mask over the relationship potentially characteristic of an indigenous urban population.

These findings are especially relevant to our study which will attempt to investigate the differential fertility patterns existent within each of the residence groups. Basically what this implies is that the fertility differential patterns in the residence categories will not be as dissimilar as they potentially could be because of the confounding effect of rural migration to urban and rural-nonfarm areas. Except for special surveys, in studies based on census data, which is the case of our study, it is impossible to differentiate within the residence categories between farm and nonfarm background. Since no measure of farm background is available it will be impossible to control for the effects of migration between residence groups on internal fertility patterns.

However, this does not render the present study invaluable or unreliable. There are perhaps many controls which should be made in such a study but for which data are lacking. Furthermore, there are reservations which could be stated at this point concerning the hypothesized effects of migration between residence categories on fertility patterns. Hashmi criticized the Goldberg hypothesis on four counts: (1) two-generation urbanites have a very different religious,

nativity, ethnic and educational background than more recent migrants and these were not fully controlled in making his comparisons; (2) fertility rates have fallen in rural areas as rapidly and as far as in urban areas, lagging only by a decade or two behind their urban rates; (3) there is no sociological rationale for such a persistence; rural culture is neither homogeneous nor especially resistent to change; (4) the recent "baby boom" has not been shown to be an outbreak of rurality among urban populations, but something which has been most pronounced among the most urbanized segments of the population.[44] In addition, Grabill, Kiser and Whelpton provide some indication of the impact of the rural to urban shift of the population on the decline of national fertility levels from 1810 to 1940. Their table is reproduced here as Table 10. Generally for the nation the shift of the population to urban areas accounts for only 20 percent of the changes in national fertility and much less for changes in fertility levels of the divisions. This table seems to suggest that changes in urban and rural fertility _per se_ account for most of the change in national and divisional fertility levels, but what factors account for changes within rural and urban fertility? We have already established the necessity of considering the internal patterns of fertility within residence populations.

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[44] Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States," _op. cit_., p. 126.

Table 10. Urban-rural components of decline in number of children under 5 years old per 1,000 white women 20 to 44 years old, by divisions: 1810-1940

Area	Absolute Decline in Children Per 1,000 Women	Percent Distribution			
			Decline Due To		
		Total	Rural to Urban Shift of Population	Decline in Urban Ratio	Decline in Rural Ratio
United States[a]	890	100.0	20.2	23.8	56.0
New England	705	100.0	17.0	33.5	49.5
Middle Atlantic	969	100.0	20.4	30.7	48.9
E. N. Central	1,314	100.0	17.3	25.1	57.6
W. N. Central[b]	1,379	100.0	3.9	26.9	69.2
South Atlantic	861	100.0	16.3	18.6	65.1
E. S. Central	1,161	100.0	9.9	15.3	74.9
W. S. Central	909	100.0	15.4	14.4	70.2

[a]Includes the Mountain and Pacific Division in 1940 but not in 1810 when they were nonexistent.

[b]There was a nonexistent urban population in the West North Central Division in 1810 which of course had an indeterminate 0/0 ratio of children to women. It was necessary to assign some value to the ratio. The rural ratio was assigned.

Source: Wilson H. Grabill, Clyde V. Kiser, P. K. Whelpton, The Fertility of American Women (New York: John Wiley, 1958), p. 19.

In the same monograph Grabill, Kiser and Whelpton reproduce a table (Table 11) reflecting the fertility levels of the various types of migrants between residence categories for 1940. These authors conclude that "in general, among ever-married women the fertility ratios of migrants tend to be intermediate between the fertility ratios of nonmovers in the host area and the origin area."[45] A closer look at the table indicates that actually the migrants resemble the fertility level of the host area more than the area of origin. For example, rural-farm to urban migrants show a fertility ratio of 407, rural-farm nonmovers 587, and urban nonmovers 334. Rural-farm to urban migrants have a fertility ratio differing from urban nonmovers by only 73 points, but by a 180 point difference when compared with rural-farm nonmovers. This is true when considering rural-nonfarm to urban migrants and rural-farm to rural-nonfarm migrants. The Goldberg hypothesis, on the basis of these findings, should be altered to take into consideration the fact that rural migrants in urban areas do not closely resemble in fertility behavior the population of their migration origin. Since migrants tend to be selective in their fertility behavior, it might be concluded that rural migrants may have approached urban differential fertility patterns

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[45]Wilson H. Grabill, Clyde V. Kiser, and P. K. Whelpton, <u>op. cit</u>., p. 102.

Table 11. Urban-rural movement between 1935 and 1940 of native white women 15 to 49 years old, by marital status and number of own children under 5 years old in 1940

Area and Mobility Status	Ever Married Women 15 to 49 Years Old (000's)	Own Children Under 5 Per 1,000 Women Ever Married Standardized For Age
<u>Same House, 1935 and 1940</u>		
Urban in 1940	3,205	334
Rural nonfarm in 1940	1,368	457
Rural farm in 1940	1,677	587
<u>Intracounty Movers</u> (Interchange not tabulated)		
Urban in 1940	6,026	369
Rural nonfarm in 1940	1,958	501
Rural farm in 1940	1,583	643
<u>Migrants Between Counties</u>		
Urban to urban	1,358	314
Rural nonfarm to urban	345	344
Urban to rural nonfarm	553	400
Rural farm to urban	152	407
Rural nonfarm to rural nonfarm	273	464
Urban to rural farm	165	470
Rural farm to rural nonfarm	131	520
Rural nonfarm to rural farm	80	548
Rural farm to rural farm	294	659

Source: Wilson H. Grabill, Clyde V. Kiser, and P. K. Whelpton, <u>The Fertility of American Women</u> (New York: John Wiley, 1958), p. 101.

already previous to their actual migration to urban areas or that they acquired urban patterns soon after their arrival in urban areas. Furthermore, it might be inferred that due to a selective process in rural to urban migration the effect of this migration on urban fertility differentials may not be as great as hypothesized and that there still will be considerable differences in internal residential differential fertility patterns in spite of the employment of current residence categories.

Another consideration with respect to the impact of rural-urban migration on fertility patterns has to do with the magnitude of this migration by 1960 and thereafter. The massive farm-to-city migration of previous decades is no longer possible given the shrinking size of the rural, and especially the rural-farm, population of the United States. While farm to urban migration will no doubt continue, those with farm backgrounds can have little numerical significance in the future. Bogue speaking of farm migration and urban growth in 1950 said, "the rural population has diminished to a point where it can no longer be the major source of supply of urban growth. If cities are to grow in the future, natural increase probably must contribute by far the major share of the increase."[46] Hence, an "indigenous urban

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[46]Donald J. Bogue, "Urbanism in the United States, 1950," American Journal of Sociology, LX (March, 1955), 478.

population" may not be as far off as the Goldberg hypothesis seems to imply. Table 12 provides data for the percentage distribution of farm-born persons in the white farm and nonfarm populations 18 years of age and over for the United States in 1958. To me these data suggest that the size of the farm-born population in nonfarm areas is not considerably large, hence, nonfarm fertility patterns will not be greatly influenced by the presence of farm-born elements.

Table 12. Distribution of the white civilian population 18 years of age and over, by residence, farm or nonfarm birthplace, United States, 1958

Residence and Farm or Nonfarm Birthplace	Population	Percentage Distribution
<u>Total</u>	98,014,000	100.0
Farm-born	22,199,000	22.6
Nonfarm-born	74,743,000	76.3
Not reported	1,072,000	1.1
<u>Farm Residents</u>	10,621,000	100.0
Farm-born	8,109,000	76.4
Nonfarm-born	2,512,000	23.6
<u>Nonfarm Residents</u>	86,321,000	100.0
Farm-born	14,090,000	16.3
Nonfarm-born	72,231,000	83.7

Source: Leo Schnore, "The Rural-Urban Variable: An Urbanite's Perspective," <u>Rural Sociology</u>, XXXI, No. 2 (June, 1966), 138.

A final comment with respect to the Goldberg hypothesis pertains to the problem of investigating fertility behavior, which is the product of past experiences, by the use of variables which reflect only current status of the population. This is a significant contribution of the writers connected with the Goldberg hypothesis. However, the problem not only pertains to current versus past residence, but to other variables employed as well in differential fertility analysis. Duncan, who found that both farm background and educational attainment have a significant effect on fertility, points out that educational attainment (compared with such variables as income, occupation, and female labor force participation) is perhaps a more useful variable because it more accurately reflects the socioeconomic situation of the couple at or before the time family growth was in process.[47] It would be sound advice to attempt to build into the analysis of internal residential fertility variation, variables which tend to reflect past status rather current. This procedure could perhaps correct somewhat for the absence of a farm background variable in the analysis.

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[47]Otis Dudley Duncan, "Farm Background and Differential Fertility," op. cit., p. 242.

The Causal Approach to Differential Fertility

Westoff, in an article concerning the changing focus of differential fertility research,[48] classified the development of fertility differential studies along three lines. First is the descriptive empirical studies which attempt to establish the nature of the relationships and to confirm their stability. Repetition of these studies served to measure time trends. However, Westoff declares that "these descriptive studies have been indespensable in defining the subject but, nevertheless, are only preliminary to the equally important task of ascertaining the causal complexes involved."[49] The second line of focus is classified as the evaluative approach. This approach predicted that the so-called "best" elements in society would die out because of under-reproduction. The third line, the causal approach, is the attempt to establish causes for differential fertility. Westoff hails the Indianapolis Study as "the first major study to test empirically substantive hypotheses which raise the question 'why.'"[50] In spite of the fact that the Indianapolis Study tested constructed hypotheses, it is questionable that the study could be classified "causal," since "the

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[48]C. F. Westoff, "The Changing Focus of Differential Fertility Research: The Social Mobility Hypothesis," Milbank Memorial Fund Quarterly, XXXI (January, 1953), 24-38.

[49]Ibid., p. 25. [50]Ibid., p. 25.

twenty-three hypotheses of the Indianapolis Study were not bound together by an integrating theory or organizing principle."[51] Unfortunately, a majority of differential fertility studies fall within the "descriptive empirical" category, many of these drawing upon census data.

Considering the demand for the determination of the causal complexes of differential fertility, the present study is causal in scope, in that it will begin from a theoretical framework and will test hypotheses in spite of the fact that it will draw upon census data. The necessity of such a study takes its cue from comments directed by Robert Gutman toward a recent study of differential fertility.[52] Gutman sees a methodological deficiency in a good number of fertility differential studies, especially those based on census data, in that they tend to regard the groups whose fertility differences are being studied as "discrete universes of facts." Summary measures are computed to describe what is going on in each of these universes with regard to fertility and then these measures are compared. To correct this Gutman calls for an approach "based on the assumption that the different subgroups of the population are really

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[51] C. V. Kiser, "Methodological Lessons of the Indianapolis Fertility Study," Eugenics Quarterly, III (1956), 152-56; also see P. Hauser and O. D. Duncan, op. cit., p. 96.

[52] Robert Gutman, "Comment on Kiser's Paper," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 113-116.

samples drawn from a single universe of phenomena."[53] Gutman's expanded comments are as follows:

> It is only when we come to regard the study of differential fertility as a means of approaching the larger question of the causes of fertility variation in the population as a whole that the assumption of samples drawn from a single universe becomes relevant. For in order to answer this question, it is essential to know not only that there _are_ fertility differences by social group, but also to know the magnitude of these differences and the direction in which they are moving. What is really crucial for understanding the role of occupational, educational, nativity, residential, and racial factors as determinants of fertility is to ask _what proportion_ of the total variance of fertility is the result of the differences in fertility between particular groups.
>
> As I have indicated, there are studies in which the importance of this question has been recognized. But there are also many in which it has not, _especially studies based on census data_. . . . How often do we come across a statement which indicates the amount of the total variance which can be explained in terms of a particular coefficient of correlation? How often do we find statements which tell us what proportion of the total variance in a population is the consequence of group differences among the dimensions studied and what proportion is the result of differences within these groups? Even less often, and in the case of the numerous studies based on census data, never at all?[54]

In response to this justifiable indictment, the present study will apply multiple regression analysis to census data. Such application will not merely answer the charge of methodological deficiency, but consequently should supply a significant contribution to the analysis and explanation of differential fertility. A multiple regression analysis will not

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[53] _Ibid._, p. 113.

[54] _Ibid._, pp. 114-115 (italics mine).

only permit the determination of the proportion of variance in fertility levels explained by the independent variables, but also will determine the relative importance of the variables included in the analysis in explaining fertility variance.

In conventional differential fertility studies the researcher is limited with respect to the number of independent variables that can be related or cross-tabulated with the dependent variable. In the past, the researcher has usually correlated independent variables one at a time with fertility, although in some cases a limited number of control variables were inserted. For example, in the exhaustive study by Grabill, Kiser, and Whelpton[55] which appeared as recently as 1958, the authors investigate fertility differentials under individual chapters, such as, residence, occupation, education, and other socio-economic factors. The problem of the intercorrelation of the socio-economic factors frequently used in conventional differential fertility studies is described in the following quotation:

> In studying the various factors which differentiate the fertility of one group from another, it must be remembered that such factors are frequently closely inter-connected. For example, the variations of family size with income or occupation are closely linked because persons with high income are usually in certain occupational groups, and persons with small incomes with other occupational groups. Thus to say that fertility

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[55] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, The Fertility of American Women, op. cit.

> varies with income and with occupation is to some extent merely to describe the same phenomenon in two different ways.[56]

The employment of the statistical technique of multiple regression analysis, under certain assumptions, should minimize both the problem of inter-correlation and the limited number of independent variables which can be handled at one time. Essentially, multiple regression analysis permits the manipulation of several independent variables at the same time while holding constant the effects of all independent variables except the one which is of concern. Thus, this study is "causal" in its intent, makes use of census data, and employs multiple regression analysis.

Basic Design of the Study: Distributive Approach

The object of this study is the investigation of inter-community fertility differentials within the residential sectors of conterminous United States. From this will flow a comparative analysis of residential differential fertility patterns. The point to be emphasized is that the unit of analysis for this study is the "community," which when operationalized is equivalent to the residential component of a county. It is to be noted that this approach to the study of fertility is in complete contradistinction to the large-scale, contemporary studies of fertility which

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[56]United Nations, *op. cit.*, p. 85.

claim the individual respondent as their unit of analysis. A partial rationale for our approach is that fertility is largely a social phenomenon and that fertility measures are themselves group measures. Under such an assumption the level of analysis required must be sociological. In suggesting the need for comparative studies of "groups of people" rather than "person," Bogue asserts that:

> It would seem that procedures for making comparative studies of groups of people must constitute an important part of social science methodology. The fact is that this is a badly neglected aspect. Present concern is largely with studies designed to analyze data for individuals. Hence, it is essential that techniques for comparative group analysis be devised. This would include not only practicable solutions to the problems of data-handling, but also an appropriate point of view from which to design studies.[57]

In terms of definition, a community is both a social entity and a territorial entity. Hawley has defined the community as "the structure of relationships through which a localized population provides its daily requirements."[58] In this study community and community structure are to be considered interchangeable. Furthermore, it is assumed that the social environment of the community, or community structure, effects measurable influences on the behavioral patterns of the people interacting within that community.

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[57]Donald Bogue and D. Harris, Comparative Population and Urban Research via Multiple Regression and Covariance Analysis (Oxford, Ohio: Scripps Foundation, Miami University, 1954), p. 1 (italics mine).

[58]Amos Hawley, Human Ecology (New York: Ronald, 1950), p. 180.

In the design of this study the variables employed are to be considered indices of the social structure of the community.

To operationalize the concept of community, however, for the purposes of this study the census definitions of rural-farm, rural-nonfarm, and urban will be accepted. The census classifies the population of a county on the basis of residence in an urban place or in a rural area. Hence, the "urban community" constitutes all persons living within urban areas as defined by the census within a specific county. Persons living in the rural area of a county are further classified into rural-farm and rural-nonfarm. Rural residents to be classified as rural-farm must live on a place of 10 acres or more from which the sale of farm products amounted to $50 or more in 1959, or on places of less than 10 acres from which sales of farm products amounted to $250 or more in 1959. The rural-nonfarm population of a county, then, is a residual which remains only after the rural-farm and urban population have been identified.[59] Consequently, to accept these definitions is to admit one set of criticisms aimed at the validity of these concepts; but to further equate these definitions to respective

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[59]For a more detailed discussion of the definition of residence categories see U.S. Bureau of the Census, U.S. Census of Population: 1960. General and Social Economic Characteristics, United States Summary, Final Report PC (1)-1C (Washington, D.C.: Government Printing Office, 1962), pp. vii-viii.

"communities" must admit even another set of weaknesses. But, of course, it is difficult to find any operational definition of "community" without deficiencies. The problem is well stated by Jonassen when he says:

> Thus the student of communities in modern urban societies is faced with problems of delimitation and overlapping boundaries of community systems no matter _what type of community unit he chooses to analyze_. Recognizing that these problems cannot be completely resolved, the term "community" may be used as a generic term to designate types of social systems whose component parts are spatially contingent.[60]

The unit of analysis for this study, then, remains the residential part of a county. The spatial expression of this operationalized definition of community facilitates the application of the distributive approach in this study.

The urban-rural differential in fertility has been well-documented, almost to the point of contributional sterility, or at least monotony. Such documentation has lost any utility other than providing a description of the pattern of fertility trends, requiring simply the comparison of fertility levels measured at different points of time. The study of the urban-rural differential fertility, indeed the study of differential fertility in general, is in need of alterations in the conventional design of such studies. In short, the "aggregative" approach needs to be _complemented_

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[60]Christen T. Jonassen, "Functional Unities in Eighty-Eight Community Systems," _American Sociological Society_, XXVI (June, 1961), 400.

by studies based on the "distributive" approach. This is not to say that the "distributive" approach is a new approach. Rather, in view of the point of progress of urban-rural differential fertility research, it seems greater contributions will be made in future studies if a "distributive" design is employed. The present study employs a "distributive" design with hopes of illustrating this point.

The distributive approach is best understood when contrasted with the aggregative approach. Bogue, who is a leading promoter of this approach and has recognized the need to apply it to demographic data, differentiates the two basic approaches in the following manner:

> The population of a whole country may be studied in two ways--as the residents of a single area universe or as the residents of a single area universe or as the residents of a congeries of sub-universes of which each sub-universe has a particular location in space. The first approach, the "aggregative," emphasizes the whole; the second approach, the "distributive," emphasizes the parts. These two approaches are complementary, since each answers a class of questions that the other cannot.[61]

It is assumed in the distributive approach, when applied to the present study, that fertility rates vary among the areal subunits chosen. In this case, the subarea units are residential components of counties. The basic unit of analysis, therefore, is areal or spatial in nature. It may be said, then, that among urban parts of counties in the

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[61]Donald Bogue, "Population Distribution," in Hauser and Duncan, The Study of Population (Chicago: University of Chicago Press, 1959), p. 383.

United States some are relatively high, others low, and others intermediate. What initially was a single fertility rate for the nation is now the weighted average of the rates of the subareas, e.g., the urban parts of counties. Bogue labels this "internal diversity" or "place variance."[62] If this variation of fertility rates is nonrandom, i.e., persistently higher in some areas than in others, there must be ascertainable reasons for this diversity. It is assumed that explanation or interpretation of the particular distribution of a population event, such as the distribution of fertility levels among the urban, rural-nonfarm, or rural-farm components of counties in the United States, lies in the differential composition and/or the differential environmental conditions of the subarea population.

Explanation rather than description should be the objective of the distributive approach, although this has not been the case in many population distribution studies. Thus, such a study should not be directed toward the question of _how_ variations in fertility occur, but _why_ they occur in a sociological sense. To "break through" the descriptive phase Bogue suggests that:

> The factors that produce given population events can be ascertained only by a broad comparative analysis, such as observation of the variation of the events and attributes in a number of different areas and observation of which characteristics that vary among the areas covary with the population event. _This requires that a hypothesis be formulated about what specific aspects of the_

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[62] _Ibid._

> environment are related to the population events. If a given factor varies independently of the population event (does not covary with it), it may be presupposed not to be an explanatory factor for the deviation of the local area from the nation average.[63]

The present study, therefore, will attempt to devise hypotheses to determine why selected compositional and environmental factors should be found to systematically correlate with fertility variation among residential sectors of counties. Thus, the design of the distributive approach is "causal" only in the fact that causes are inferred from a theoretical framework, not from the discovery of a statistical relationship.

This statement is a brief discussion of the distributive approach to fertility. Interestingly, Bogue himself has presented an illustrative research program for a distributional analysis of fertility. In this brief illustration he states:

> It has been demonstrated that much interarea variation persists when age and color composition are controlled, and much work has been devoted to showing that fertility differentials exist among various occupational, income, religious, social and other groups. But as yet there has been no measure of how much variation in fertility each factor explains when all others are controlled or of how much variation remains when all these factors are considered simultaneously. . . . This would call for a multiple-variable distribution analysis of fertility measures for the white and nonwhite population separately, controlled for age and marital status.[64]

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[63] Ibid., p. 390 (italics mine).

[64] Ibid., p. 398.

In a limited sense, the present study attempts to perform this task with the use of multiple regression analysis. The analysis is focused only on the white population of the United States. Age is controlled by the inclusion of age variables as independent variables in the regression equation. Marital status is partially controlled in that the dependent variable, fertility measured as the number of children ever-born per 1,000 ever-married women age 15 to 44, is measured only for the ever-married segment of women of the child-bearing age span.

Limitations of the distributive approach are to be noted. First, the character of the subarea boundaries are arbitrary in one sense, but fixed in another sense. They are arbitrary in that there is an infinite variety of ways by which the subareas of a given territory, such as the United States, can be divided. They are fixed in that census data are collected from predetermined political boundaries, such as the county, which may not necessarily conform to "natural" boundaries.[65] There are two major schools of

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[65]This limitation is not only inherent in the distributive approach but also pertains to any correlation analysis employing demographic data for spatial units. Hagood and Price allude to this problem as well as four other problems associated with applying correlation analysis to demographic data: unequal size of units, choice of order of demographic unit, tendency for demographic characteristics not to be normally distributed, and lack of independence of observations. Margaret J. Hagood and Daniel O. Price, Statistics for Sociologists (rev. ed.; New York: Holt, Rinehart, and Winston, 1952), pp. 350-55.

thought among distribution analysts represented in the "homogeneous area" vs. the "nodal area" argument. It will be necessary only to distinguish the two schools inasmuch as they relate to this particular problem. The former maintains that the areal units should be of maximum internal homogeneity; the latter argues for the maximization of relationships and, therefore, that areas are to be delimited on the basis of functional interrelationships. This latter school is represented by metropolitan regionalism and the distance gradient is employed as a major device for studying the internal structure of nodal areas. Bogue calls for a distributional analysis which takes account of both concepts simultaneously.[66] The present study at a simplified level could be considered an attempt to include both notions. The influence of metropolitan regions is assumed by the inclusion of a measure of ecological distance from metropolitan centers as defined by the census. On the other hand, and without contradiction of the nodal area hypothesis, it is assumed that variation between counties with respect to residential sectors is greater than within counties. But, of course, a county is not necessarily a homogeneous unit, and, therefore, the criterion of maximizing internal homogeneity is not really carried out. The "nodal area" approach is emphasized by the employment of a metropolitan dominance framework.

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[66]Ibid., pp. 394-5.

A second limitation of the distributive approach is the contiguity problem. Briefly, this problem arises from the fact that areal units are not independent of each other but are contiguous. In other words, counties situated close to each other are more likely to be similar in their characteristics than are counties which are some distance apart or grouped together at random.[67] However, the problem may be somewhat resolved considering the number of variables employed in the multiple regression analysis. As Bogue states, "the error may be expected to decline as the number of variables considered simultaneously is increased."[68]

A third limitation of distributional analysis is the ecological correlation problem. Briefly, it is the inability to generalize from findings based on areal units of observation to the individuals contained in those areal units.[69] Responses to Robinson's criticisms have tended to reduce the severity of the problem by developing meaningful interpretations of ecological relationships.[70] Duncan hints at the

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[67]Otis D. Duncan, Ray P. Cuzzort, and Beverly Duncan, Statistical Geography (Glencoe, Illinois: Free Press, 1961), p. 129.

[68]Donald Bogue, op. cit., p. 397.

[69]W. S. Robinson, "Ecological Correlations and the Behavior of Individuals," American Sociological Review, XV, 1950, 351-57.

[70]Leo A. Goodman, "Some Alternatives to Ecological Correlation," American Sociological Review, LXIV, 1959, 610-25; Leo A. Goodman, "Ecological Regression and Behavior of Individuals," American Sociological Review, XVIII, 1953, 663-4; L. A. Goodman and W. H. Kruskal, "Measures of

potential contribution from a nexus of ecological and sociological analysis when he asserts that ". . . areal differentials are significant in their own right. There is even sociological basis for supporting that such differentials may reflect factors influencing demographic phenomenon that would not come to light in studying individual characteristics solely."[71]

In a recent study[72] Duncan illustrates the effect of ecological factors on fertility over and above the effects of socio-economic variables measured on an individual level. Applying multiple classification analysis to selected variables from the 1941 Indianapolis Household Survey, Duncan determined the net effect of median census tract rent, dwelling-unit rent of the couple, wife's education, husband's education, wife's age at marriage, spouses' region of birth, and tenure on fertility. The study concludes that (1) the areal classification of rent levels produces fertility variations which are partially independent of and additive to those due to the classification of individual dwelling

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Association for Cross-Classification," Journal of the American Statistical Association, XLIX, 1953, 732-64; and O. D. Duncan and Beverly Davis, "An Alternative to Ecological Correlation," American Sociological Review, XVIII, 1953, 665-66.

[71] Otis Dudley Duncan, "Human Ecology and Population Studies," in P. Hauser and O. D. Duncan, The Study of Population (Chicago: University of Chicago Press, 1959), p. 693.

[72] Otis Dudley Duncan, "Residential Areas and Differential Fertility," Eugenics Quarterly, XI, June, 1964, 82-89.

units by rent and that (2) analysis in which an areal classification is examined simultaneously with several individual classifications of socio-economic characteristics suggest that areal differentials in fertility may not be completely reducible to the areally clustered effects of some conventional individual variables. Hence, the analysis of the effects of ecological variables on fertility behavior is worthy of separate investigation as it contributes to additional understanding of fertility variation.

Hashmi, who employed the distributive approach to study fertility variation among census tracts in Chicago, also argues for the significance of ecological correlations in themselves in the following passage:

> For the present study, the criticisms of Robinson are only partially relevant. It should be remembered that a birth rate is an attribute of a population as a group and is intended to imply nothing about the behavior of individual couples within the population. In other words, a birth rate is an average of the behavior of groups having high or low fertility. In fact, it is exactly in this "ecological" sense that birth rates have been interpreted in the past. . . . The study of fertility rates within census tracts and a correlation of the social and economic tract characteristics that are associated with them is therefore of interest and fundamental importance for its own sake. . . . In fact, the total environmental "climate" or socio-economic context within which low or high fertility takes place may be a much more important goal of demographic research than the development of probability statements that apply to individual couples.[73]

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[73]Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States," op. cit., pp. 196-7.

Hashmi further argues that, nevertheless, inferences can be made from ecological correlation to the individual if interpreted properly and with due caution. A high ecological correlation does suggest that <u>on the average</u> individual couples tend to behave in the direction indicated by the ecological correlation, unless there are specific intervening variables operating. However, these unknown intervening variables can be controlled through partial correlation. Hence, by holding constant these disturbing factors, the probability of the conformity of the two levels of correlations is increased.[74] However it is to be emphasized that the present study will not attempt to "bridge the gap" between these levels of correlation analysis, since the ecological approach in nexus with the sociological will be quite sufficient to provide the interpretation of variation of fertility levels among residential components of counties. Since this study deals with a <u>group</u> measure as the dependent variable, it must likewise provide its analysis at the same level.

To summarize, the basic design of the present study is distributive in character. The variation in fertility that exists among residential sectors of counties in the United States will be explained by variation in selected social environmental or community structural factors.

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[74] <u>Ibid</u>., pp. 197-8.

Community and residential component of county are to be considered interchangeable in this study. Since interest lies in why fertility levels fluctuate among communities, hypotheses will be constructed concerning expected relationships between community attributes and community fertility levels. Color, age, and marital status will be controlled to some extent. Finally, this study will not stop merely with the intensive study of urban, rural-nonfarm, and rural-farm fertility. The eventual objective is to compare systematically the different fertility patterns of each residential sector. The distributive approach is not new and several distributive studies of fertility within residential groups have been completed.[75] However, these studies have tended to be highly descriptive, except for Hughes, Hashmi, and Andarawewa, and limited in scope in terms of the territory

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[75]Some examples of studies employing the distributive approach are E. de S. Brunner and J. H. Kolb, Rural Social Trends (New York: McGraw-Hill, 1933), Ch. V, "Rural and Urban Relationships," pp. 111-19; P. K. Whelpton, "Geographic and Economic Differentials in Fertility," Annals, CLXXXVIII (November, 1936), 37-55; W. S. Thompson and N. E. Jackson, "Fertility in Rural Areas in Relation to Their Distance from Cities, 1930," Rural Sociology, V (June, 1940), 143-62; C. M. Rosenquist and A. H. Schafft, "Differential Fertility in Rural Texas," Rural Sociology, XII (March, 1947), 21-26; O. D. Duncan, "Fertility of the Village Population in Pennsylvania, 1940," Social Forces, XXVIII (March, 1950), 304-9; R. B. Hughes, Jr., "Human Fertility Differentials: The Influence of Industrial-Urban Development on Birth Rates," Population Review, III (July, 1959), 58-69; S. S. Hashmi, op. cit.; and A. Andarawewa, "An Economic Analysis of Fertility Differentials among Rural-Farm Communities in the United States in 1960" (unpublished Ph.D. dissertation, Department of Agricultural Economics, Michigan State University, 1964).

on which the study focuses, except for the Andarawewa study, which is a sister study to the present one and has drawn upon the same data, though it focuses only on the rural-farm sector of the United States. Furthermore, not one of these studies has attempted a comparative analysis of all residence groups based upon the results of a distributive analysis. The characteristic of these studies has been to dwell only on one residence group where the distributive approach has been applied.

Summary: Requisites of Needed Research on the Urban-Rural Fertility Differential

In view of how much has been written to this point regarding the nature of the basic problem of this thesis, it might be profitable to recollect the main points of this chapter. The primary purpose of this chapter has been to specify in detail the type of research in differential fertility that is needed today. Indications have been scattered throughout the chapter, of course, of the optimistic expectation that this particular study will be able to meet these needs. In a sense, then, one may consider several of the points presented and supported in this chapter as providing the basic requisites of currently needed research on the urban-rural fertility differential. In another sense, however, one could view these requisites as a resumé of the definitive characteristics of the design of the present

study. These requisites presented in concise form are as follows:

1. Fertility is the problematic factor in population growth today and therefore requires intensive research.

2. Fertility is primarily social behavior, not attitude.

3. Fertility is a socio-demographic phenomenon in large measure dependent upon the social milieu.

4. The current approach to differential fertility is a causal approach, involving the testing of empirically substantive hypotheses which raise the question "why?"

5. Fertility is group behavior explanable at the ecological or areal level.

6. In spite of predictions of the eventual convergence of urban and rural fertility levels, urban and rural fertility must be studied independently with an eye toward looking inside each type of fertility behavior to isolate factors that have a determinative relationship to fertility.

7. The test must be made of the possibility that a different set of factors influence rural fertility vis-a-vis urban fertility or that the same factors have a different effect on rural fertility than on urban fertility.

8. There exists a considerable amount of variation in fertility levels of communities within all residence groups and such variation is explanable by variation of the socio-environmental attributes of communities.

9. Census data can and should be employed to facilitate the discovery of correlates of residential fertility variation because they lend themselves well to the construction of empirical measures and the application of statistical techniques of analysis on an interval scale.

10. Multiple regression is employed as a very useful statistical technique which can handle several variables simultaneously, determine the direction and relative importance of the independent variables in explaining fertility variation, and estimate the proportion of the variation in fertility explained by the independent variables.

11. The problem of determining correlates of residential fertility variation and the employment of multiple regression analysis are embraced within the broader scope of the distributive approach to fertility analysis as the major design of the present study. The distributive approach is cross-sectional rather than longitudinal.

12. The unit of analysis employed in this study is the residential component of a county, interchangeable with the term "community."

13. Controls are included for color, age, and marital status.

14. Since the study is basically comparative of the correlates of urban and rural fertility variation, there must be an attempt to systematically contrast the results of distributional analysis of the residential categories.

Origin and Organization of the Study

The present study is an outgrowth of a larger study conducted by Dr. J. Allan Beegle, Department of Sociology, and Dr. Dale E. Hathaway, Department of Agricultural Economics, at Michigan State University. The larger study will appear as one of the 1960 Census Monograph series. The data on which the larger study is based, as well as this thesis, are essentially drawn from the 1960 Census of Population statistics on social and economic characteristics of persons enumerated on the basis of a 25 percent sample of the population of the United States. A truncated version of the Census magnetic tape, from which the Bureau of Census published

its General Social and Economic Characteristics,[76] the third volume in the PC (1) series, was obtained for use in preparing the monograph by finances granted by the Social Science Research Council. The statistical analyses were carried out by the Armour Research Corporation of the Illinois Institute of Technology in Chicago on a Remington-Rand Univac 1105 Computer. All variables included in this study were also included in the original Census tape with the exception of the metropolitan dominance variable.[77]

Since in this chapter the nature of the problem of this dissertation has been established and the requisites of a design to study this problem have been posited, a brief description of the organization of what is to follow is now appropriate. Chapter II contains a systematic review of differential fertility studies. First, a broad overview of the range of differential fertility studies is presented followed by an intensive review of a select group of empirical studies. A list of criteria is employed to determine the studies out of an innumerable host of differential fertility studies which are considered most relevant to the

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[76]U.S. Bureau of the Census, United States Census of Population: 1960 General Social and Economic Characteristics, PC (1), 1C (Washington, D.C.: Government Printing Office, 1962).

[77]For details as to how this variable was operationalized for insertion on the original census tape see pp. 231-236 of this dissertation.

present study. This review attempts to summarize the findings of these selected empirical studies in terms of the relationships between fertility behavior and the independent variables. Chapter III establishes metropolitan dominance theory as the theoretical framework by which hypotheses are generated. Urban dominance theory is rejected in favor of metropolitan dominance theory as the more meaningful framework by which to investigate urban-rural fertility differential patterns. Chapter IV sets forth the methodological procedures employed to test the theoretical hypotheses derived from metropolitan dominance theory. Both the conceptual and statistical frameworks of this study are presented. Chapter V contains the main body of the study, the analysis of fertility data at two territorial levels: national and divisional. Finally, Chapter VI contains some reflections about the findings of the analysis chapter and implications for further research in the area of differential fertility.

CHAPTER II

REVIEW OF RELEVANT LITERATURE

Fertility has been and continues to be a popular object for empirical study, as the number of fertility studies would attest. The quantity of such studies renders impossible the task of a complete review of the literature dealing with fertility within the space of a single chapter. There are a few excellent sources to which the reader is directed for information concerning a general overview, codification, and/or evaluation of the development of the study of fertility.[1]

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[1]Charles Westoff, "The Changing Focus of Differential Fertility Research: The Social Mobility Hypothesis," Milbank Memorial Fund Quarterly, XXXI (January, 1953), 24-5. This article presents a simple, but historically oriented classification of differential fertility studies up to the Indianapolis Study. Several bibliographic references are cited for each category of his scheme. Bernard Okun, Trends in Birth Rates in the United States Since 1870 (Baltimore: Johns Hopkins Press, 1958), Part III. Okun suggests a six-fold classification of fertility studies on the basis of methodological approach with illustrations included. United Nations, Department of Social Affairs, The Determinants and Consequences of Population Trends (New York: United Nations, 1953), Ch. V, "Economic and Social Factors Affecting Fertility," pp. 71-97. This source gives a well documented review of factors which have been employed in studies of fertility trends and differentials. The references cited, however, have a very heavy international flavor. Ronald Freedman, "The Sociology of Human Fertility: A Trend Report and Bibliography," Current Sociology, X-XI, No. 2 (1961-62), pp. 35-119. Freedman offers a very thorough review of the study of fertility in the post-war period. The publication

Two functions of a review of literature of fertility studies are of immediate interest: (1) to assist the researcher in evaluating the contribution of his particular study to the study of fertility in general and (2) to provide a basis for the construction of meaningful propositions with respect to the problem at hand. In the first chapter we have considered the general problem of urban-rural fertility differences. It was established that there is considerable variation within urban and rural fertility which remains to be explained. Furthermore, it was asserted that a major question to be further investigated is whether fertility differentials within the urban and rural populations reflect different patterns. The objective of this chapter, then, is

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includes a 636 item bibliography. In addition, due to the appearance of several large-scale studies of factors affecting fertility beginning with the Indianapolis Study, numerous articles have appeared which take the form of either progress reports or evaluations of such studies. See especially David Goldberg, "Some Recent Developments in American Fertility Research," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 137-51; and Ronald Freedman, "American Studies of Family Planning and Fertility: A Review of Major Trends and Issues," in Clyde V. Kiser (ed.), Research in Family Planning (Princeton: Princeton University Press, 1962), pp. 211-27. A partial list of additional articles on the large-scale studies includes: C. V. Kiser, "Exploration of Possibilities for New Studies of Factors Affecting Size of Family," Milbank Memorial Fund Quarterly, XXXI (1953), 436-80; C. V. Kiser and P. K. Whelpton, "Resumé of the Indianapolis Study of Social and Psychological Factors Affecting Fertility," Population Studies, VII (1953), 95-110; C. V. Kiser, E. G. Mishler, C. F. Westoff, and R. G. Potter, Jr., "Development of Plans for a Social Psychological Study of the Fertility of Two-Child Families," Population Studies, X (July, 1956), 43-52; C. V. Kiser, "Methodological Lessons of the to determine whether there is any empirical support for the hypothesis of contrasting urban-rural fertility differential patterns. By reviewing several carefully selected empirical studies of fertility pertaining to the urban-rural contrast, empirical propositions can be extracted which will either support or reject the general hypothesis of contrasting urban-rural fertility differentials. If these propositions suggest the possibility of contrasting patterns, then we shall not only feel justified to continue the investigation of this problem, but such empirical propositions established by previous research will serve in addition as guidelines by which to consider theoretical frameworks which can increase

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Indianapolis Fertility Study," Eugenics Quarterly, III (September, 1956), 152-56; C. V. Kiser and P. K. Whelpton, "Social and Psychological Factors Affecting Fertility: XXXIII. Summary of Chief Findings and Implications for Future Studies," Milbank Memorial Fund Quarterly, XXXVI (July, 1958), 282-329; C. V. Kiser, W. H. Grabill, and J. Schacter, "Plans for the APHA Monograph on Fertility in the 1960 Census Period," in Emerging Techniques in Population Research (New York: Milbank Memorial Fund, 1963), pp. 82-101; Milbank Memorial Fund, Current Research in Human Fertility (New York: Milbank, 1955); Milbank Memorial Fund, Thirty Years of Research in Human Fertility: Retrospect and Prospect (New York: Milbank, 1959); P. K. Whelpton, "Fertility and Fecundity," in Needed Population Research (Lancaster: The Science Press Printing Company, 1938), pp. 40-62; P. K. Whelpton and R. Freedman, "A Study of the Growth of American Families," American Journal of Sociology, LXI (May, 1956), 595-601; C. F. Westoff, E. G. Mishler, R. G. Potter, Jr., and C. V. Kiser, "A New Study of American Fertility, Social and Psychological Factors," Eugenics Quarterly, II (December, 1955), 229-33; C. F. Westoff, R. G. Potter, Jr., and P. C. Sagi, "Some Selected Findings of the Princeton Fertility Study: 1963," Demography, I (1964), 130-35; and George F. Mair (ed.), Studies in Population (Princeton: Princeton University Press, 1949), especially Section V, "Future Course of Research in Fertility," pp. 143-69.

the depth of analysis of rural-urban differential fertility patterns.

Criteria Employed to Select Empirical Studies for Intensive Review

Not all fertility studies of an empirical nature bear on the particular problem considered in this thesis. Since the more parsimonious procedure would be to review only those studies which have immediate bearing upon the problem, I adopted six specific criteria by which to determine the relevancy of any given study to my problem. I decided that in the process of reviewing fertility studies, if a study failed to meet any one of the six criteria, it was to be omitted from further consideration. The six criteria which were adopted are:

1. The study must be _empirical_ in nature, i.e., must attempt to describe, establish, or explain the existence, direction, degree, and/or nature of the relationship of some independent variables with fertility behavior. In other words, it must attempt to explain fertility differences with reference to selected independent variables.

2. The study must use a measure of _fertility as the dependent variable(s)_. Studies which focus only on such measures as "expected fertility," "fertility planning," "desired size of family," etc., will not be included. Interest lies only in fertility _behavior_, not attitudes, values, aspiration, or expectations related to fertility. Studies which combine these two aspects of fertility in their general focus may be reviewed.

3. The study must employ _at least one_ of the following variables as the major independent (explanatory, causal, etc.) _variable_: occupation, female employment, education, income (family, female, etc.), age of women, ecological distance.

4. The study must employ data obtained for some areal segment(s), or at least representative of that areal segment, e.g., residence, region, areal sample, census tract, etc., and/or the entire population of the conterminous United States.

5. The study should add or contribute information regarding differences between rural and urban fertility levels.

6. The study must focus on primarily white fertility or total fertility where it can be assumed that the white population is a major component of the total population or sample.

The intention of the first criterion was to insure that the design of studies to be reviewed were comparable to that of the present study. It omitted articles dealing with the phenomenon of fertility which were not empirical. The first criterion also eliminated studies which employed fertility as an independent variable, or studies which dealt only with the major processes of population change, i.e., studies in formal demography, but which failed to relate any extraneous variables to these processes.

The second criterion tended to eliminate from consideration studies that did not treat fertility behavior as a dependent variable. Since the appearance of the Indianapolis Study there has appeared a new "twist" to fertility studies: the investigation of "family planning," desired family size," and the like, as the key to understanding

differential fertility.[2] These studies often employ fertility attitudes rather than fertility behavior as their dependent variable. These studies have been eliminated from review since the factors which affect attitudes toward fertility planning are not necessarily the same as those affecting actual fertility.

The third criterion was most effective in reducing the number of studies for review. The present study includes six general categories of explanatory variables to be related with fertility behavior. These categories, of course, were determined largely by the availability of types of census data included in the census tape. Nevertheless, the variables selected for analysis had been employed

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[2]A partial list of studies employing dependent variable of fertility attitudes, such as, "desired family size," "family planning," etc.: C. F. Westoff, E. G. Mishler, and E. L. Kelly, "Preferences in Size of Family and Eventual Fertility Twenty Years After," American Journal of Sociology, LXII (March, 1957), 491-97; C. F. Westoff, P. C. Sagi, and E. L. Kelly, "Fertility Through Twenty Years of Marriage; A Study in Predictive Possibilities," American Sociological Review, XXIII (October, 1958), 549-56; R. Freedman, P. K. Whelpton, and A. A. Campbell, Family Planning, Sterility and Population Growth (New York: McGraw-Hill, 1959); C. A. Yeracaris, "Differentials in the Relationship between Values and Practices in Fertility," Social Forces, XXXVIII (December, 1959), 153-58; C. F. Westoff, R. G. Potter, Jr., P. C. Sagi, and E. G. Mishler, Family Growth in Metropolitan America (Princeton: Princeton University Press, 1961); C. F. Westoff, R. G. Potter, Jr., and P. C. Sagi, The Third Child: A Study in Prediction of Fertility (Princeton: Princeton University Press, 1963); D. Goldberg, H. Sharp, and R. Freedman, "The Stability and Reliability of Expected Family Size Data," Milbank Memorial Fund Quarterly, XXXVII (October, 1959), 369-85; and Jeanne Ridley, "Number of Children Expected in Relation to Non-Familial Activities of the Wife," Milbank Memorial Fund Quarterly, XXXVII (July, 1959), 277-96.

traditionally in other fertility studies. In spite of this several fertility studies still failed to meet this criterion. For such studies not even one of the six classes of variables employed in the present study was also employed in that investigation.[3]

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[3]A partial list of studies omitted from review because of failure to meet the third criterion: D. G. Marshall, "The Decline in Farm Family Fertility and Its Relationship to Nationality and Religious Background," Rural Sociology, XV (March, 1950), 42-49; R. Freedman, P. K. Whelpton, and J. W. Smit, "Socio-Economic Factors in Religious Differentials in Fertility," American Sociological Review, XXVI (August, 1961), 608-14; Erich Rosenthal, "Jewish Fertility in the United States," Eugenics Quarterly, VIII (December, 1961), 198-217; H. E. Brooks and F. J. Henry, "An Empirical Study of the Relationships of Catholic Practice and Occupational Mobility to Fertility," Milbank Memorial Fund Quarterly, XXXVI (July, 1958), 222-81; P. C. Glick, "Inter-Marriage and Fertility Patterns among Persons in Major Religious Groups," Eugenics Quarterly, VII (March, 1960), 31-38; W. S. Thompson, "Differentials in Fertility and Levels of Living in the Rural Population of the U. S.," American Sociological Review, XIII (October, 1948), 516-34; Margaret Hagood, "Changing Fertility Differentials among Farm-Operator Families in Relation to Economic Size of Farm," Rural Sociology, XIII (December, 1948), 363-73; E. M. Kitagawa, "Differential Fertility in Chicago, 1920-1940," American Journal of Sociology, LVIII (March, 1953), 481-92; A. J. Mayer and C. Klapprodt, "Fertility Differentials in Detroit: 1920-50," Population Studies, IX (November, 1955), 148-58; E. G. Flittie, "Fertility and Mortality in the Rocky Mountain West," American Sociological Review, XXII (April, 1957), 189-93; H. Y. T'ien, "A Demographic Aspect of Interstate Variations in American Fertility, 1800-1860," Milbank Memorial Fund Quarterly, XXXVII (January, 1959), 49-59; W. Bash, "Changing Birth Rates in Developing America: New York State, 1840-1875," Milbank Memorial Fund Quarterly, XLI (April, 1963), 161-82; and Sidney Goldstein and Kurt Mayer, "Residence and Status Differences in Fertility," Milbank Memorial Fund Quarterly, XLIII (July, 1965), 291-310.

Since the design of the present study calls for the study of fertility differentials on an areal distribution basis, it was necessary for comparability that studies to be reviewed be based on or represent some areal segment(s) of the United States (Criterion 4). Thus, fertility studies based on samples which were representative of some distinguishable territory or areal unit, such as, a region, a city, a group of cities, etc., were acceptable. The fourth criterion tended to eliminate two types of studies: those based on data from survey samples which were not areal samples[4] and those based on data collected from populations outside conterminous United States.[5]

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[4]A partial list of studies based on non-areal samples or populations: R. Gutman and I. Bender, "Some Sources of Variation in Family Size of College Graduates," Milbank Memorial Fund Quarterly, XXXV (July, 1957), 287-301; C. F. Westoff, P. C. Sagi, and E. L. Kelly, "Fertility through Twenty Years of Marriage: A Study in Predictive Possibilities," American Sociological Review, XXIII (October, 1958), 549-56; P. Lauriat, "Marriage and Fertility Patterns of College Graduates," Eugenics Quarterly, VI (September, 1959), 171-79; G. S. Becker, "An Economic Analysis of Fertility," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 209-31; B. Pasamanick, S. Dinitz, and H. Knoblock, "Socio-Economic and Seasonal Variation in Birth Rates," Milbank Memorial Fund Quarterly, XXXVIII (July, 1960), 248-54; and E. D. Baltzell, "Social Mobility and Fertility within an Elite Group," Milbank Memorial Fund Quarterly, XXXI (October, 1953), 412-20.

[5]A partial list of studies based on populations outside conterminous United States: N. Keyfitz, "Differential Fertility in Ontario: Application of Factorial Design to Demographic Problem," Population Studies, VI (November, 1952), 123-34; J. Berent, "Relationship between Family Sizes of Two Successive Generations," Milbank Memorial Fund Quarterly, XXXI (January, 1953), 39-50; N. Keyfitz, "A Factorial

The fifth criterion was included to assure that the studies to be reviewed would provide at least some information on why urban and rural fertility levels differ, i.e., what in the community social structure of these residence groups produces differences in the level of fertility. Very few studies failed to meet this requirement since many studies make accidental or implicit recognition of residence in their designs and analyses. In a majority of cases the decision was arbitrary as to a study's contribution in this respect. Moreover, many studies have tended to focus on urban fertility, since, according to the transitional theory

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Arrangement of Comparisons of Family Size," American Journal of Sociology, LVIII (March, 1953), 470-80; R. McGinnis, "Similarity of Background Characteristics and Differential Fertility," Social Forces, XXXIV (October, 1955), 67-72; D. Wrong, "Trends in Class Fertility in Western Nations," Canadian Journal of Economics and Political Science, XXIV (May, 1958), 216-29; H. Y. T'ien, "The Social Mobility Fertility Hypothesis Reconsidered: An Empirical Study," American Sociological Review, XXVI (April, 1961), 247-57; I. Adelman, "An Econometric Analysis of Population Growth," American Economic Review, LIII (June, 1963), 314-339; H. Gille, "An International Survey of Recent Fertility Trends," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 17-34; R. Hill, J. M. Stycos and K. W. Back, The Family and Population Control (Chapel Hill: University of North Carolina Press, 1959); J. M. Stycos, Family and Fertility in Puerto Rico (New York: Columbia University Press, 1955); Paul Hatt, Backgrounds of Human Fertility in Puerto Rico (Princeton: Princeton University Press, 1952); W. Stys, "The Influence of Economic Conditions on the Fertility of Peasant Women," Population Studies, XI (November, 1957), 136-48; D. Wrong, "Class Fertility Differentials in England and Wales," Milbank Memorial Fund Quarterly, XXXVIII (January, 1960), 37-47; and David M. Heer and Elsa Turner, "Areal Difference in Latin American Fertility," Population Studies, XVIII (March, 1965), 279-82.

of fertility, urban fertility is the level and pattern toward which the fertility levels in the high fertility rural areas are moving. Thus, interest in fertility research has been directed mostly toward urban fertility, especially with respect to fertility planning among urban couples, rather than rural fertility.[6]

Finally, the sixth criterion eliminated from consideration studies dealing with nonwhite fertility.[7] In the case of studies contrasting white and nonwhite fertility, if they met all the previous criteria, only the white data were considered in the review.

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[6]For example, the following large-scale studies of urban fertility: R. Freedman, P. K. Whelpton, and A. A. Campbell, Family Planning, Sterility and Population Change (New York: McGraw-Hill, 1959); D. F. Westoff, R. G. Potter, Jr., P. C. Sagi, and E. G. Mishler, Family Growth in Metropolitan America (Princeton: Princeton University Press, 1961; C. V. Kiser, Group Differences in Urban Fertility (Baltimore: Williams and Wilkins, 1952); and C. Kiser and P. Whelpton, Social and Psychological Factors Affecting Fertility (New York: Milbank Memorial Fund, 1943-1954).

[7]J. E. Dodson, "The Differential Fertility of the Negro Population, Houston, Texas, 1940-1950," Milbank Memorial Fund Quarterly, XXXV (July, 1957), 266-79; C. V. Kiser, "Fertility Trends and Differentials among Nonwhites in the United States," Milbank Memorial Fund Quarterly, XXXVI (April, 1958), 149-97; A. Lee and E. Lee, "The Future Fertility of the American Negro," Social Forces, XXXVII (March, 1959), 228-31; E. Lee and A. Lee, "The Differential Fertility of the American Negro," American Sociological Review, XVII (August, 1952), 437-47; and J. S. Vandiver, "The Reproduction Pattern of the Rural Negroes of the Yazoo-Mississippi Delta," Social Forces, XXIX (October, 1950), 78-84.

Intensive Review of Selected List of Empirical Studies

It is the objective of this intensive review of empirical studies selected on the basis of the six criteria listed above to facilitate the construction of propositions relevant to our problem. Following an extensive survey of the literature dealing with fertility by which a sizeable bibliography was compiled, thirty-one empirical studies were selected upon the application of our criteria. These studies were thereupon submitted to a battery of questions by which specific characteristics and basic findings were abstracted from the body of the study. The format of this schedule is exhibited in Appendix B. Considering the now manageable number of studies to be reviewed, it was possible to transfer this information from the schedule to a summary table as presented in Tables 13 and 14.

The intensive review requires three stages. First, some general statements are made to indicate the range in characteristics of these selected studies. Second, consideration is granted to the designs of these studies as they compare with the design of this fertility study as proposed in the previous chapter. Finally, an attempt is made to summarize the findings of these 31 studies inasmuch as they are relevant to this particular study of fertility.

Table 13. Summary table of fertility studies selected for intensive review

Author(s)	Year Pub-lished	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
1. Sydenstricker and Notestein[a]	1930	Sample drawn from 1910 Census	1910	Urban and Rural	Urban: 33 northern cities 100,000 to 500,000 population Rural: 74 cos.	Aggre-gative	CEB per 100 wives, couple of native parents, white, once married, standard
2. Notestein and Sallume[b]	1936	Sample drawn from 1910 Census	1910	Urban	33 northern cities of 100,000 to 500,000	Aggre-gative	CEB to women under 50 per 1,000 years of married life, native-white par-ents once-married
3. Brunner and Kolb[c]	1933	Census	1930 (1920) (1910)	Urban RNF & RF	18 medium-size cities, only 3 less than 50,000; plus surrounding tiers of counties	Aggre-gative	Facundity ratio: Children under 10 per women 20-45; Effective birth rate: children under 1 per 1,000 pop. (RF & RNF)
4. Whelpton[d]	1936	Census: 1930 cen-sus tract data for selected cities	1930	Urban	8 northern cities	Distrib-utive	Children under 5 per 1,000 white women 15-44
5. Notestein[e]	1936	MMF field survey	1930	Urban	6 northern cities	Aggre-gative	CEB per 100 wives, un-broken marriage, husband and wife native parentage
6. Thompson and Jackson[f]	1940	Census	1930	Rural in relation to cities	16 areas, tiers of twps. around 11 large cities	Distrib-utive	Children under 5 per 1,000 persons 15-44

[a] Edgar S. Sydenstricker and Frank W. Notestein, "Differential Fertility According to Social Class," Journal of the American Statistical Association, XXV (March, 1930), 9-32.

[b] F. W. Notestein and X. Sallume, "The Fertility of Specific Occupation Groups in an Urban Population," Milbank Memorial Fund Quarterly, X (April, 1932), 120-30.

[c] E. de S. Brunner and J. H. Kolb, Rural Social Trends (New York: McGraw-Hill, 1933), Ch. V, "Rural and Urban Relation-ships," pp. 111-19.

[d] P. K. Whelpton, "Geographic and Economic Differentials in Fertility," Annals, CLXXXVIII (November, 1936), 37-55.

[e] F. W. Notestein, "Class Differences in Fertility," Annals, CLXXXVIII (November, 1936), 26-36.

[f] W. S. Thompson and N. E. Jackson, "Fertility in Rural Areas in Relation to Their Distance from Cities, 1930," Rural Sociology, V (June, 1940), 143-62.

Table 13--Continued

Author(s)	Year Published	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
7. Kiser[a]	1942	National Health Survey	1935	Urban, plus small rural sample	83 cities in 18 states repres. of urban U.S.; Rural: 23 cos. in 3 states	Aggregative	Live births per 1,000 wives 15-44 for year 1935, standard
8. Whelpton and Kiser[b]	1943	Indianapolis Household Survey	1941	Urban	Indianapolis	Distributive	CEB per 100 wives 15-44, standard, native-white, once-married, wife under 45
9. Rosenquist and Schafft[c]	1947	Census	1940	Rural-Farm	254 counties of Texas	Distributive	Children under 5 per 1,000 women 15-44
10. Kiser and Whelpton[d]	1949	Indianapolis Study Sample	1941	Urban	Indianapolis	Aggregative	CEB per 100 couples, native-white, Prot., married 1927-29, unbroken, wife under 30, husb. under 40 at marriage, resided in large city most married life, grammar sch. educ.
11. Duncan[e]	1950	Census	1940	Rural-Nonfarm	640 villages under 2,500 pop. in Penn. (1/3 vill. pop. of state)	Distributive	Children under 5 per 1,000 women 15-44

[a]Clyde V. Kiser, Group Differences in Urban Fertility (Baltimore: Williams and Wilkins, 1942).

[b]P. K. Whelpton and C. V. Kiser, "Social and Psychological Factors Affecting Fertility: I. Differential Fertility Among 41,498 Native-White Couples in Indianapolis," Milbank Memorial Fund Quarterly, XXI (July, 1943), 221-80.

[c]Carl M. Rosenquist and Alvin H. Schafft, "Differential Fertility in Rural Texas," Rural Sociology, XII (March, 1947), 21-26.

[d]C. V. Kiser and P. K. Whelpton, "Social and Psychological Factors Affecting Fertility: IX. Fertility Planning and Fertility Rates by Socio-Economic Status," Milbank Memorial Fund Quarterly, XXVII (April, 1949), 188-244.

[e]Otis Dudley Duncan, "Fertility of the Village Population in Pennsylvania, 1940," Social Forces, XXVIII (March, 1950), 304-9.

Table 13--Continued

Author(s)	Year Pub- lished	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
12. Kiser[a]	1952	Current Pop. Survey 1947, and Census	1949 1947 1940	Total U.S.: some impli- cation for rural	Total U.S.	Aggre- gative	Children under 5 per 1,000 married women 15-49 Occup: children under 5 per 1,000 employed men 20-59
13. Dinkel[b]	1952	Census	1940 1910	Urban-rural	4 regions of U.S.	Aggre- gative	CEB per 1,000 women 20-69 native-white, married one, husband present
14. Westoff[c]	1954	Current Pop. Survey; Census	1952 1947 1900-40	Urban-rural	United States	Aggre- gative	Occup: children under 5 per 1,000 women 15-44 (curr.), 45+ (completed) Educ.: children under 5 per 1,000 women 15-49
15. Bash[d]	1955	New York State Census	1865	Rural and "town"	Madison County, over 1/2 in agr. occups.	Aggre- gative	CEB per 100 wives, standardized to age 64, native-white
16. Kiser[e]	1955	Census: Special Pub. on Fertil- ity	1950 1940 1910	Urban, RNF, and RF	United States	Aggre- gative	CEB per 1,000 ever-married white women 15-49

[a] C. V. Kiser, "Fertility Trends and Differentials in the United States," Journal of the American Statistical Association, XLVII (March, 1956), 162-83.

[b] Robert M. Dinkel, "Occupation and Fertility in the United States," American Sociological Review, XVII (April, 1952), 178-83.

[c] Charles F. Westoff, "Differential Fertility in the United States: 1900 to 1952," American Sociological Review, XIX (October, 1954), 549-61.

[d] Wendell H. Bash, "Differential Fertility in Madison County, New York, 1865," Milbank Memorial Fund Quarterly, XXXIII (April, 1955), 161-86.

[e] C. V. Kiser, "Changes in Fertility by Socio-Economic Status during 1940-1950," Milbank Memorial Fund Quarterly, XXXII (October, 1955), 393-429.

Table 13--Continued

Author(s)	Year Pub-lished	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
17. Goldstein[a]	1955	Birth Records	1920-50	Urban	Norristown, burrough of Phila.	Aggregative	Average no. children born to women who had child in 3 yr. periods around yrs. 1920, 1930, 1940, 1950
18. Grabill, Kiser and Whelpton[b]	1958	Census Current Pop. Survey	1950 1940 1910 1952 1949	Urban, RNF, and RF	United States	Aggregative	Occup., Educ., & women in L.F.: CEB per 1,000 women 15-49, white, stand., once married, husb. pres.; income 1948: children under 5 per 1,000 women 15-49, married, inc. 1951: ratio children to men; & CEB standardized; Farm income: ratio children to women age 15-49
19. Grabill[c]	1959	Census Current Pop. Survey	1950 1949 1952	Urban-rural	United States	Aggregative	Occup.: CEB per 1,000 wives 15-44, Educ.: CEB per 1,000 women 45-49, Income 1949: own children under 5 per 1,000 women Income 1952: own children under 5 per 1,000 men
20. Freedman, Whelpton & Campbell[d]	1959	GAF sample survey	1955	Urban-farm	U.S. (rep. prob. sample)	Aggregative	Average number of births by 1955 (CEB)

[a] Sidney Goldstein, "Changing Patterns of Fertility in Norristown, Pennsylvania, 1920-1950," Social Forces, XXXIV (October, 1955), 72-76.

[b] Wilson H. Grabill, C. V. Kiser, and P. K. Whelpton, The Fertility of American Women (New York: Wiley, 1958)

[c] Wilson H. Grabill, "The Fertility of the United States Population," in Donald J. Bogue, The Population of the United States (Glencoe: The Free Press, 1959), pp. 288-324.

[d] Ronald Freedman, P. K. Whelpton, and A. A. Campbell, Family Planning, Sterilty and Population Growth (New York: McGraw-Hill, 1959), Ch. IX, "Family Size in Different Social and Economic Groups," pp. 272-319.

Table 13—Continued

Author(s)	Year Pub-lished	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
21. Goldberg[a]	1959	Area prob. sample of Metro. Detroit	1952-58	Urban (2-gen. urban vs farm migr.)	Metropolitan Detroit	Aggregative	Average number of children ever born, wife 40+, husband present
22. Hughes[b]	1959	Census Survey Sample	1950 1951	Total pop. and rural-farm	Tennessee (survey: Lincoln Co.)	Distributive	Census: children 0-5 per women 15-45; Survey: children ever born (live)
23. Kiser[c]	1960	Census Current Pop. Survey	1950 1940 1957 1952	Urban, RNF, RF	United States	Aggregative	Census: children under 5 per 1,000 wives 15-49 and CEB 15-49; Survey: CEB per 1,000 women 15-44
24. Ruggles[d]	1960	Census: special sample	1940	Urban	North Central States, urban	Aggregative	CEB per 1,000 women 40-70, urban, native, married once, husband present
25. Goldberg[e]	1960	Indianapolis Study Sample	1941	2 gen. urbanites vs farm background (migrants)	Indianapolis	Distributive	Average number of children per couple (CEB)
26. Freedman and Slesinger[f]	1961	GAF survey sample for U.S.	1955	Urban-farm migrants	United States	Aggregative	Average number of births, wife has ever had, white, married, 18-39, NF (CEB)

[a]David Goldberg, "The Fertility of Two-Generation Urbanites," Population Studies, XII (March, 1959), 214-22.

[b]Rufus B. Hughes, Jr., "Human Fertility Differentials: The Influence of Industrial-Urban Development on Birth Rates," Population Review, III (July, 1959), 58-69.

[c]C. V. Kiser, "Differential Fertility in the United States," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 77-113.

[d]Richard Ruggles and Nancy Ruggles, "Differential Fertility in the United States Census Data," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), pp. 155-206.

[e]David Goldberg, "Another Look at the Indianapolis Fertility Data," Milbank Memorial Fund Quarterly, XXXVIII (January, 1960), 23-36.

[f]Ronald Freedman and D. Slesinger, "Fertility Differentials for the Indigenous Non-Farm Population of the United States," Population Studies, XV (November, 1961), 161-73.

Table 13--Continued

Author(s)	Year Published	Source of Data	Year(s) Data Collected	Residence Group Emphasized	Areal Segments of U. S. Represented	Design	Dependent Variable: Fertility Measure
27. Hashmi[a]	1962	Census tract data for Chicago Metro Area	1950	Urban	Chicago Metro. Area	Distributive	Marriage-standardized gross reproduction rate
28. Freedman[b]	1963	GAF survey sample	1955	Urban	United States	Distributive	Number of live births by 1955 (CEB)
29. Kitagawa and Hauser[c]	1964	Census tract data	1920-50	Urban	Chicago	Aggregative	Total fert. rate: Births per 1,000 women 15-44; married, rate: births per 1,000 ever-married women 15-44, standard
30. Duncan[d]	1965	Current Pop. survey (6,000 coup.)	1962	Nonfarm-Farm (Farm Back.)	United States	Distributive	Children ever born per wife, age 42-61 (completed fertility)
31. Kunz[e]	1965	Census (5% national sample)	1960	Urbanized areas	Urbanized Areas of United States	Aggregative	Children ever born per white women, ages 35-44, married once, with husband present (completed fertility)

[a]Sultan S. Hashmi, "Trends and Factors in Urban Fertility Differences in the United States" (unpublished Ph.D. dissertation, Department of Sociology, University of Chicago, 1962). See also abridged version "Factors in Urban Fertility Differences in the United States," in E. Burgess and D. Bogue, Contributions to Urban Sociology (Chicago: University of Chicago Press, 1964), 42-58.

[b]Deborah Freedman, "The Relation of Economic Status to Fertility," American Economic Review, LIII (June, 1963), 414-26.

[c]E. M. Kitagawa and P. M. Hauser, "Trends in Differential Fertility and Mortality in a Metropolis--Chicago," in E. Burgess and D. Bogue, Contributions to Urban Sociology (Chicago: University of Chicago Press, 1964), pp. 59-85.

[d]Otis D. Duncan, "Farm Background and Differential Fertility," Demography, II (1965), 240-49.

[e]Phillip R. Kunz, "The Relation of Income and Fertility," Journal of Marriage and the Family, XXVII (November, 1965), 509-13.

General Characteristics of Studies

It is to be emphasized that the purpose of the elimination of studies from review was to focus concern upon studies most relevant to our problem. In spite of the reduction of studies, there remains a considerable range in certain characteristics of these studies. For example, publication dates range from 1930 to 1965 with some tendency to be proportionately more in the post-war period. It is felt that the more current studies based on contemporary data are more relevant to the present study based on 1960 census date. The range of the periods in which data were collected is perhaps of more importance than publication date. Eight studies are based on data collected before 1940, nine in the period 1940-49, eight within the 1950-54 period, four during 1955-59, and only two based on data collected since 1960. There are, of course, other studies of fertility based on data collected since 1960, but most of these have not met the criteria requirements of this review. If nothing more such information suggests the need for a more "up-to-date" differential fertility study based on the 1960 census.

With respect to variations in the source of data, of the thirty-one selected studies, 21 are analyses of data provided by census. However, three studies (Table 13:1,2,24) employed census data obtained from special samples. Six studies analyzed data from the intercensal Current Population Surveys (Table 13:12,14,18,19,23,30). Of the ten investigations not based on census data, nine are specially conducted sample surveys (Table 13:5,7,8,10,20,21,25,26,28) and one is based on collected birth records (Table 13:17). Since the present study is also an analysis of census data, it is favorable that a majority of the review investigations are census analyses.

Because of the nature of the sources of data available for differential fertility analysis, several overlappings occur in terms of the data employed. Two studies (Table 13:1,2) are based on the same special sample obtained from the 1910 census. The Indianapolis Study contributes three studies in this review (Table 13:8,10,25). Several studies analyzed data from the special census publications of 1940 and 1950 dealing with differential fertility (Table 13:12,13,14,16,18,19,23,24). The appearance of the results of the Current Population Surveys 1947, 1949, 1952, 1957 and 1962, contributed to a number of analyses (Table 13:12,14,18, 19,23,30). Three studies were outcomes of the Growth of American Families Study of 1955 (Table 13:20,26,28) and two analyses employed Chicago census tract data of 1950 (Table 13: 27,29). In spite of such "overlappings" studies based on the same source of data tended to vary with respect to the aspects of the data emphasized as well as other characteristics of the study. For example, there is a wide range of difference as to the areal segment of the United States represented by the data analyzed. The two most common areal unites in fertility analysis, however, are the national level and a city or metropolitan area level.

Finally, these studies vary with respect to the measure of fertility employed. Twenty of the 31 analyses endeavored to explain variation of children ever born or a cumulative birth rate measure, comparable to that employed in the present study. Among these studies, however, there is a vast difference in the details of the particular fertility measure. For example, some qualifications applied to cumulative fertility measure were "once married women," "husband present," variations in child-bearing age span, native-white women, standardization, etc. The second most frequently employed measure was the fertility ratio, at least some variation of it.

Study Design of Empirical Studies

The distinction of whether a study is "descriptive" or "causal" is sometimes a very thin line. Essentially if a study was designed to test specific hypotheses, it was considered "causal." Nine of the 31 studies were described as such (Table 13:15,21,22,25,26,27,28,30,31), and all of these have been published almost within the last decade.

Another distinction on study design is relevant: aggregative vs. distributive studies. There were nine studies employing a distributive approach to the analysis of fertility variation (Table 13:4,6,9,11,22,25,27,28,30). These studies generally applied correlation measures, simple, partial, and multiple, to the analysis of fertility. Interestingly there is not a one-to-one correlation of causal design and distributive design. The early distributive studies were largely descriptive (Table 13:4,6,9,11). If these two aspects of study design are correlated among the studies selected, there remain only five studies which apply both a causal design and a distributive framework (Table 13,22,25, 27,28,30) and of these only two employ an areal distributive approach (Table 13:22,27). These two analyses of fertility differentials, while they employ a design similar to that of the present study, are extremely limited as to the territorial scope they represent. Hughes concentrated on Tennessee's total population and rural farm population, employing the county as his unit of analysis; Hashmi focuses on the Chicago Metropolitan area, with the census tract as the unit of analysis. While Hashmi claims to explain "urban fertility differences in the United States," generalization from Chicago to the urban sector of the nation is quite tenuous. In view of these facts, an accurate assessment of the next step in the study of differential fertility should employ both a causal and areal distributive approach on a territorial level much more extensive than the state of metropolitan area. As has been stated, the present study will involve national and divisional analyses for residential categories.

Since this study focuses on fertility within residential sectors, a discussion of how the review studies treat the residence variable is appropriate. While studies were chosen partly on the basis of their contribution to the understanding of urban and rural fertility, there have appeared very few distributive studies which compare urban and rural fertility. There is a definite tendency among the studies selected to emphasize the investigation of urban fertility (Table 13:2,4,5,7,8,10,12,17,20,21,23,24,25,26,27,28, 29,31) and this is fairly representative of fertility studies in general. If the studies which equally emphasize urban and rural fertility are added (Table 13:1,3,13,14,16,18,19,30), there are 26 of the selected 31 studies which contribute to the understanding of urban fertility. Calculating in the same way, there are 18 studies which provide implications toward the understanding of rural fertility, although studies focusing on the rural components alone are relatively few (Table 13:6,9,11,15,22). It is unfortunate, however, that so many of these review studies in employing residential categories apply the aggregative approach rather than the distributive. As a result, most of the 31 review studies treat the residential populations as being homogeneous with respect to the variables related with a fertility measure. Relatively few studies provide insights as to the relationships one might find assuming variation within each residential group and how they might differ in this respect. In spite of this deficiency, it is hoped that the findings and insights of the review studies will provide enough information on the nature of comparative variations within residential groups to make proposition construction possible.

Summary of Findings, by Variable

With the assistance of Table 14 a systematic review of the relevant findings is made more complete. Each of the general independent variables is discussed under separate sections. Upon a quick glance at Table 14 it can be seen that the three primary measure of socio-economic status have been most frequently employed in the 31 selected analyses of factors affecting fertility. Education has been included in 21 of the 31 studies, occupation is second appearing in 20 studies, and income runs close behind, appearing in 18 of the studies. The remaining three variables have appeared in sporadic fashion. Both age distribution of women and female employment have been employed in six of our 31 fertility studies; measures of distance have appeared in only five of the studies represented in this review.

It must be mentioned that equal weight will not be granted to all studies reviewed. Studies which have investigated fertility differences within residence groups or have study designs comparable to this study, e.g., causal and distributive, will weigh heavily in the development of propositions. These studies tend to be those most current, such as, studies by Hashmi, Hughes, Goldberg, and Duncan, to name a few.

Let us now consider independently the pattern of association between fertility and the independent variables indicated in Table 14: distance, occupation, education, income, female employment, and age composition.

Table 14. Summary table of relationships of fertility to independent variables based on fertility studies selected for intensive review*

Author(s)	Distance	Occupation	Education	Income	Female Employment	Age Composition
1. Sydenstricker and Notestein		Urban: strong inverse relation, stronger than rural. Rural: strong inverse, agricultural occups. lower than urban				
2. Notestein & Sallume		Over all specific occups. no clear relationship; for 3 broad occup. groups, strong inverse				
3. Brunner & Kolb	Distance by tier of co.: tot. pop. & rural direct relation, RF clear direct but RNF not clear					
4. Whelpton		% of persons age 10+ in mfg.: positive relation (r's range .56 to .77)			% of women 10+ employed: inverse; most import. (r's range -.40 to -.86)	% women 15-44 age 20-34: 5 cities inverse, 2 N.S., 1 pos.
5. Notestein		Inverse relation, even within educ. classes	Husband: inverse relation in each broad occup. class	Family: inverse relation (only 3 categories)		
6. Thompson & Jackson	Distance of twp. from city direct 10 of 16 areas, 5 N.S. 1 inverse					

*References are same as cited in Table 13, pp. 90-96.

Table 14--Continued

Author(s)	Distance	Occupation	Education	Income	Female Employment	Age Composition
7. Kiser		Urban: inverse but in top classes direct relation; Rural: inverse for nonfarm occups., farmers lower fert. than farm labor; urban lowest in importance	Wife: urban inverse but coll. and H.S. small diff. only; rural: inverse clear; cross-class for urb. shows educ lower in importance	Family: urban inverse, but small in upper classes; rural not applied; cross-class shows income most important var. for urban		
8. Whelpton & Kiser			Wife: clearly inverse, even by age Husband: inverse but not clear for coll. levels. Couple: wife's educ. more important than hus.			
9. Rosenquist & Schafft	Metro. cities lowest fert. rates fall as move from urb. cos., not clear		Median sch. yrs. comp. for RF part of co.: inverse	Average per capita farm income, 1939: inverse, non-sign.		% women 15-44 age 25-29; non-significant
10. Kiser & Whelpton		Tendency toward inverse, but exceptions in top brackets toward direct; among planned couples, no relation	Husband: inverse Wife: inverse, stronger than husb. Couple: inverse except when both coll. fert. high; Planned: wife only inverse, others N.S.	Husband: inverse except upper levels Planned: no relationship		
11. Duncan	Direct relation lower fert., lower urbanity; not import. when control for rent & vill. size					% women 15-44 who are 25-34 of negligible importance
12. Kiser		1947 & 1949: no relation among all occup. groups but inverse for farmers and farm laborers	Wife: 1940 & 1947 both inverse	Total 1949 money income of family: inverse relation		

Table 14--Continued

Author(s)	Distance	Occupation	Education	Income	Female Employment	Age Composition
13. Dinkel		Nine occup. groups no clear relation, no consistent order for agr. occups.; Groups collapsed to 4: inverse relation				Controlled for age of wife: no relation, no add. info. yielded
14. Westoff		Inverse 1910, 1940, 1952, with exceptions; agricultural occups: farmer lower fert. than farm laborers	Wife: 1940 & 1947 show clear inverse relation in spite of contractions of diffs. among class.			
15. Bash		Inverse relation follows economic hierarchy; farmer lower fert. skilled, farm labor. lower fert. than unskilled				
16. Kiser		Inverse relation with exception of clerical in all res. groups; farmer lower fert. than farm laborers	Wife: inverse relation, all ages, all res. groups, in spite of positive relation % change to fert.; more important than occupation			
17. Goldstein		Total pop. inverse; native-white inverse				
18. Grabill, Kiser & Whelpton		Inverse in all residence groups, farm labor. higher fert. than farmers. Exception for cler. & service occups. More inverse in urban than RNF and RF	Wife: clear inverse in all res. groups Husband: inverse; Wife's more import. than husband's; cross-tab; occup. & educ. of equal imp.	Total money income family 1948: sharp inverse; Total money income of husband 1951: women over 45, inverse Farm oper. family income 1949: inverse	Fert. lower for women in labor force; when children over 5, women work more, esp. urban	
19. Grabill		No clear relation except low fert. among nonfarm occupations & high for farm	Wife: strong inverse	Family income 1948: inverse; Husband income 1951: no clear pattern		

Table 14--Continued

Author(s)	Distance	Occupation	Education	Income	Female Employment	Age Composition
20. Freedman, Whelpton, & Campbell		Little diff. among nonfarm groups; greatest inverse farm vs. nonfarm; farmer lower fert. than farm laborers.	Wife: inverse but coll. & H.S. same (control of husb. income). Husband: less important than wife	Husband: positive but nonsignificant Family: inverse, due to working wives	Employment of wife: inverse; one of most important	
21. Goldberg		No significant relation for urbanites or farm migrants	Wife: inverse, more important than income or occup. (both urbanites and farm migrants)	Head: all couples inverse, but N.S.; urbanites, inverse N.S.; also migrants		
22. Hughes			Males: median for age 25+, inverse in total pop., highest beta coeff. of 5; RF: highest beta of 5 and inverse	Family income: total pop. positive and sign., 2nd of 5 betas RF: neg. but N.S., 4th beta of five		
23. Kiser		Urban fert. ratio 1940 & 50, inverse age 15-24, direct age 25-49; CEB not clear; 1957 more inverse than 1952	Wife: urban fert. ratio inverse age 15-24, direct 25-49; CEB inverse all ages; 1957 inverse more than 1952	Husband: 1952 inverse except direct above $5,000; 1957 clear inverse		
24. Ruggles		Inverse except. upper levels	Wife's: inverse exc. coll. level; Husband: inverse but positive coll.	Husband: inverse, exc. upper levels		
25. Goldberg			Husband: all couples, migrants inverse, urbanites also but not as strong; Wife: inverse, migrants stronger relationship	Husband: all couples inverse, urbanites N.S., migrants inverse		
26. Freedman and Slesinger			Wife: inverse, exc. for college level for indigenous urban and migrants	Husband: direct relation for indigenous urban and migrants; Wife: inverse and significant		

Table 14--Continued

Author(s)	Distance	Occupation	Education	Income	Female Employment	Age Composition
27. Hashmi	Distance from center of city direct, control for income & educ.; 5th rel. import.	Mixed relations: % prof. & crafts, inverse; % labs. & serv. direct; cler. N.S. (holding constant inc. and educ.); little rel. import--6th	Males: % males 25+ sch. completed, strong inverse (even holding constant income); most rel. import. of all variables	Family: % income dist., direct relation (holding constant educ.) 2nd in rel. importance	% women 15+ employed: strong inverse (holding constant income and educ.; 3rd rel. import.	Generational compos: direct, higher % older age groups, higher fert., (contr. incom. & educ.); 4th rel. import.
28. Freedman			Wife: married 5-9 yrs, 5th beta in 14, 10+ yrs, 12th beta; Husband: 5-9 yrs., 11th beta in 14; 10+ yrs 14th beta; not very import. in both cases	Husband: married 5-9 yrs, N.S. in 6 betas; in 14 var. analysis: 5-9 yrs, 13th beta, 10+ yrs, 4th beta; Wife: inverse; in 5-9 yrs, 2nd beta of 6; 10+ yrs, 4th beta of 6; in 14 var. analysis: 5-9 yrs, 10th beta; 10+ yrs, 8th of 14	LF status of wife: married 5-9 yrs, 3rd beta in 6; 8th in 14 variables; married 10+ yrs: 5th beta in 6; 9th in 14 variables; inverse rel.	Wife's age: married 5-9 yrs, 4th beta of 14; married 10+ yrs, 11 of 14 vars.; not rel. import. except early yrs of marriage
29. Kitagawa and Hauser				Family: classes of median inc., total fert. rate shows inverse; marital fert. direct controlling for marital composition		
30. Duncan			Wife: pronounced inverse for farm res. and farm background; attenuated for NF. Husband: same inverse pattern but not as pronounced as wife		LF part. of wife: inverse relation, strongest in farm residence, least for nonfarm; slight rel. imp.	
31. Kunz		Inverse when wife married at ages 14-21; mixed when age 22+; agr. occups. omitted	Husband: inverse when wife married at ages 14-21, pos. when married at 22+	Husband: inverse when wife married at 14-21, pos. when at 22+; strong pos. rel. when control for educ., occup. & age at marriage		

Distance.--Studies which have related fertility to distance from urban areas are few, and even fewer from metropolitan centers. Thus, most of these studies place their findings in the realm of "urban influence." Nevertheless, these analyses of fertility have been highly descriptive, for want of a theoretical framework and a better comprehension of just what distance does measure. Often "urban dominance theory" is only an implicit theoretical framework underlying such studies. Let us review what the empirical studies of fertility declare overall to be the relationship between fertility and distance.

In Table 14 there are two early studies which employ data for no later than 1930. They have obtained fairly consistent results. Brunner and Kolb (Table 14:3) investigated fertility levels by tiers of counties from 18 large urban centers (all but three having populations over 50,000) and found a relatively clear positive association when considering total population and total rural population by county tiers. The contrast of rural-farm and rural-nonfarm by distance found some exceptions to the positive association of fertility and distance, but the pattern persisted. Thompson and Jackson (Table 14:6) focused on tiers of townships rather than counties and considered several other variables to denote economic conditions of rural communities. Distance and a measure of the percent of the rural population dwelling on farms were used as indices of the degree of isolation of a rural community from the influence of cities. Although exceptions appeared, the predominant relationship was a positive one. Thompson and Jackson, interestingly, noted the possibility that distance was merely reflecting variations in general economic status of communities and, in turn, economic conditions measured to some degree the isolation of rural communities.

Rosenquist and Schafft (Table 14:9) considered rural-farm parts of counties in Texas with respect to fertility. There was a tendency toward a positive relation, but it was not necessarily a clear, linear one. Duncan (Table 14:11) considered the location of villages (indicative of the rural-nonfarm population) in Pennsylvania with respect to metropolitan and urban centers in non-metropolitan counties. The location of villages was positively related with respect to fertility levels, but the effects of location were reduced to negligible proportions when rent and village size were held constant. As did Thompson and Jackson, Duncan's results hint the possibility of location actually reflecting differences in socio-economic status. Finally, Hashmi also found a positive association among census tracts of the Chicago metropolitan area, but this case does not pertain to our immediate problem, since his results focus on the pattern <u>within</u> a metropolitan center rather than between the metropolitan center and the hinterland counties.

Two possibilities appear in terms of interpretation of what distance measures. On the one hand, it may merely be a "conglomerate" variable which subsumes several latent factors highly correlated with distance. On the other hand, the conventional procedure is to couch the explanation in terms of metropolitan dominance, rural isolation, urban influence and the like. It is understood that influence wanes with increasing distance from the centers of influence. Two variations occur on this explanation and they take the form of the "homogeneous area" vs. "nodal area" issue discussed by Bogue and touched upon in the first chapter of this thesis of non-random distribution of certain attributes in space.[8] The "homogeneous" region stresses the internal homogeneity of delineated areas in contrast to comparable regions. The metropolitan community, or "nodal" region, stresses non-random distribution of attributes within the area along a continuum of distance from the central city. These two positions may be merged if homogeneity is understood to refer to the spread of dominance within the region, a notion directly opposed to the concept "urban influence" which is viewed as diminishing or "trailing off" with increasing distance. As a result, the entire metropolitan

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[8]Donald J. Bogue, "Population Distribution," in P. Hauser, and O. D. Duncan, The Study of Population (Chicago: University of Chicago, 1959), pp. 393-394. Discussion of this issue appears in this thesis on pp. 67-69.

region is considered dominated by the metropolitan center with equal force. Concern should not be so much for how far does the influence of the center extend but what is the impact of the centers influence on the structure of the region. Metropolitan regions may differ, then, in the extensiveness of dominance reflected by size of the metropolitan center, but the non-random distribution of attributes within the metropolitan region results from the prevading dominance within both the urban and rural hinterlands. This last ntion, in turn, absorbs the earlier comment that distance reflects a number of latent factors. On this basis, it is expected that fertility, as well as many other attributes of rural and urban communities within the metropolitan regions, will reflect a non-random pattern of distribution.

In view of the consistent positive relation between fertility and distance apparent in the empirical studies discussed above, <u>a strong positive relationship is also expected in our analysis; i.e., with increasing distance from a metropolitan center, an increase in fertility within all residence groups of the hinterland</u>. Furthermore, a measure to differentiate size of metropolitan center must be applied to the distance measure. Finally, considering the necessity of subordinating most attributes revealing non-random distributive patterns in the metropolitan region to dominance exerted by metropolitan centers, the distance measure as a "conglomerate" index must receive primary importance among all variables considered, again, for all residence groups. On the other hand, as some of the empirical studies indicate it may very well occur that the relative importance measure is reduced considerably when other variables are held constant, such as, education, income, etc. In such a case we would conclude that distance reflects differences in socio-economic status and, therefore, has no predictive value by itself. Hence, there remains the dilemma as to the relative importance of distance in predicting fertility levels. There must also be asserted, then, a contradictory proposition, that distance may also reflect a slight positive association with fertility and low relative importance in accounting for fertility variation in both urban and rural areas. This conclusion suggests the need for further research.

Occupation.--Occupational data have been available through census much longer than any other criterion of socio-economic status. This explains why the early studies of differential fertility, for the most part, selected occupational measures to relate with fertility (Table 14:1,2). Occupation was employed in these early studies as a measure of "social class" or "social status." Since that time, additional measures have been developed as indices of social status (education, income, monthly rent, etc.) to complement and at times replace an occupational measure.

Grabill, Kiser, and Whelpton have noted some inherent weaknesses in the use of occupational group of the

husband as an index of socio-economic status:[9] (1) wives do not describe their husbands' occupations with sufficient accuracy; (2) unlike educational attainment (but like income status), occupation is subject to change, and a previous occupation may be in some instances more influential with respect to fertility than the present; (3) whereas educational status and income are quantitative and continuous, occupational groups are more qualitative and discrete; (4) occupational group of husband, by definition cannot be applied to single women. In addition, the broad occupational groups themselves contain a wide variety of specific occupations and a wide range of social and economic gradation. It could be argued that, compared to the early studies, at present this variation within each of the broad occupational groups has widened because of the continuing diversification of occupational classifications. For these reasons occupation is probably a poor indicator of socio-economic status.

Whereas Sydenstricker and Notestein (Table 14:1) found for 1910 a clear inverse relation for broad occupational groups. Notestein and Sallume (Table 14:2), by investigating the variation of specific occupations constituting the broad occupational groups of urban areas, found no clear-cut relationship and much overlapping of variance.

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[9] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, *The Fertility of American Women* (New York: John Wiley, 1958), p. 116.

The relationship of fertility to broad occupational groups was persistently shown to be inverse (Table 14:1,2,4,5) until data from the 1930's began revealing a trend toward a direct relationship with fertility, at least among the upper classes of urban populations (Table 14:7). Other studies appeared which concurred with this finding, i.e., the establishment of an approximate "J" curve among the broad occupational groups (Table 14:10,14,16,18,24). It is interesting, however, that Kiser compared occupational data for 1952 and 1957 and discovered an indication of a reversal of this "J" curve pattern toward a stronger inverse relation.[10] These data, however, do not indicate a clear inverse relation nor are residential categories presented separately.

On the basis of the studies represented in Table 14, it must be concluded that there is no clear-cut pattern of relationship between fertility and occupational group, whether this be due to the occupational measure employed or the essence of the relationship itself. Four of the 20 studies considering the relationship found a clear inverse relationship, seven reported an inverse relationship with distortions in the upper brackets, and nine indicated no significant or inconsistent patterns of relationship.

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[10] C. V. Kiser, "Differential Fertility in the United States," in National Bureau of Economic Research, Demographic and Economic Change in Developed Countries (Princeton: Princeton University Press, 1960), p. 104.

Most studies of occupational groups and fertility have concentrated on urban areas. It can be concluded that this relationship in the rural components, especially the rural-farm, is a much more stable one. Sydenstricker and Notestein found a strong inverse relation among nonagricultural occupations in the rural areas. It appears, however, that the most persistent patterns within a residence group is that of higher fertility rates among farm laborers and lower for farmers, usually indicated only for the rural component (Table 14:1,7,12,14,15,16,18,20). Dinkel, who analyzed 1940 and 1910 census data by regions, was the only dissenter. He concluded that the rural occupational groups (farm owners and farm laborers) maintained no consistent order in their relative positions. In 1940 farm laboers exceeded farm owners in fertility only in the Western region with the other regions indicating mixed results among ten age groups.[11] In contrast, Westoff found that over the period 1910-1950 fertility had continued to increase among farm laborers and foremen and had decreased among farmers and farm managers. Differential fertility by occupation and contracted but the contraction was due wholly to change within the more exclusively urban occupations.[12] It appears

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[11] Robert M. Dinkel, "Occupation and Fertility in the United States," American Sociological Review, XVII (April, 1952), 181.

[12] C. F. Westoff, "Differential Fertility in the U.S.: 1910-1950," American Sociological Review, XIX (October, 1954), 659.

that among the agricultural occupations the trend is in the opposite direction than among urban occupations, i.e., in reverse of the "J" curve direction. This suggests the inverse relation among agricultural occupations may continue for some time.

Two problems should be noted with respect to occupational group within residence categories which may affect some of these relationships mentioned above. Occupational groups by definition separate the urban and rural-farm populations (agricultural vs. nonagricultural), whereas education and income do not directly do so. Rural people are more heavily weighted in the lower educational and income groups and, therefore, tend to enhance an inverse relation between these variables and fertility. On this basis, a strong inverse relationship is not as probable along the occupational dimension. Moreover, a look at fertility differentials within residential groups would tend to reduce these effects, although Goldberg finds that even within the urban component there is the rural migrant which tends to distort the real pattern of socio-economic differentials within the urban population.[13]

Another problem is the continuing decline of proportions of farmers and farm laborers reflected in the

[13]David Goldberg, "The Fertility of Two-Generation Urbanites," Population Studies, XII (March, 1959), 214-222.

diminishing proportion of wives of farmers and farm laborers. Grabill, Kiser, and Whelpton remark that

> marked changes took place during 1940 and 1950 in the distribution of women of childbearing age according to major occupation group of the husband. Most conspicuous . . . has been the reduction in the proportion of farmers and farm managers. In 1940, among native white women of child-bearing age, married once and husbands present, the proportion classified as wives of farmers and farm managers extended from about 12 percent at ages 20 to 24 and 25 to 29 to 22.5 percent at ages 45 to 49. In 1950, the range for total whites was from 8 percent at ages 20 to 24 to 12.5 percent at ages 45 to 49. A decline in the proportion of women whose husbands were farm laborers is found for the United States as a whole. Thus, among native white married women, the proportion classified as wives of farm laborers extended from 13.2 percent for wives 15 to 19 years old to 1.6 percent for wives 45 to 49 years old. In 1950, the comparable figures for white wives were 8.0 and 1.5 percent.[14]

These same data reflect also the different age distributions of wives of farmers and farm managers vis-a-vis farm laborers and foremen, which consequently may influence fertility differences between agricultural occupations.

The previous discussion in many cases points to factors which would tend to compound the relationship of occupational group with fertility and, consequently, to reduce the relative importance of occupational group in determining fertility levels as measured by a statistical relationship. Moreover, several studies have commented on the relative importance of occupational measures in determining fertility levels. Among urban occupations Notestein

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[14] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, *op. cit.*, pp. 118-19.

and Sallume (Table 14:2) found a wide range of variation in fertility left unexplained by specific occupations. Kiser found occupation less important than income in explaining urban fertility differences (Table 14:7) and occupation less important than educational attainment (Table 14:16). Freedman, on the other hand, concluded that occupation and income were of equal importance in both the urban and farm categories (Table 14:20). Hashmi, applying the distributive approach to Chicago, concluded that occupational group was of much less importance than income and education in influencing urban fertility levels.

In conclusion, depending upon the measure of occupation employed, it would seem that its relationship with fertility could range from a slight inverse or a non-significant to a moderately positive relationship. Furthermore, it would be expected not to rank relatively high in determining fertility levels in any residential category, although a strong inverse relationship is more likely to appear in the rural-farm sector than in the urban. Furthermore, employing separate measures for two broad agricultural occupational groups would produce results of an inverse relation with fertility for farm owners and farm managers and a direct relation for farm foremen and laborers. Such measures being more relevant to the rural-farm sector, would be of greater relative importance in the rural areas than urban. These two agricultural occupation groups constitute 68 percent of

the employed rural-farm labor force, 8 percent of the rural-nonfarm labor force, and only 1 percent of the urban labor force. One should recognize the possibility, however, that employment in agricultural occupations is an index of off-farm occupation employment and therefore may be a better reflector of the extent of urbanization of a population rather than the usual assumption that it reflects socio-economic status. In view of this possibility, agricultural employment may be of greater relative importance than suggested by the empirical studies, although again more so for rural than urban areas.

Education.--The availability of educational attainment data in the census is relatively recent compared with occupational information. Only in 1940 was an illiteracy question replaced by educational attainment. Before 1940 educational attainment information related with fertility could only be obtained via a sample survey (Table 14:5,7,8, 10). However, the popularity of educational attainment in fertility studies has increased and in many cases it has been quite successful as an explanatory variable. Among the 31 selected empirical studies, 21 include a measure of education for either the wife, the husband, or the couple. In contrast to occupation these studies have tended to appear in the more current studies.

There are perhaps certain inherent characteristics in the education measure which make it attractive and more readily correlated with fertility. In the first place, the

"highest grade of school completed" is a fairly stable attribute after a certain age is reached. Unlike occupation, then, fertility is more likely to take place while the woman is of the same educational class. Second, and in the same breath, education acts in many cases as a direct deterrent to fertility in that marriage is generally postponed for the sake of education. Of course, recent statistics on proportions marrying by educational level indicate a sizeable increase within the college level, thus slightly reducing the deterrent effect of educational attainment in relation to fertility. A third attribute is that educational attainment is more frequently measured for the wife and, therefore, more relevant to fertility levels measured also for the wife. However, interest has been directed in more recent studies to employment and income measures for the wife. Fourth, educational attainment is a quantitative measure, unlike occupational group data as has been employed in conventional studies.

Three measures of educational attainment are relevant to explaining fertility levels. It appears from Table 14 that wife's educational level is more popular in the empirical studies selected for review. Eighteen of the 21 studies employing one or more education measures used a measure for the wife. Only ten of these studies employed a husband's educational attainment measure (Table 14:4,8,10,18, 20,24,25,28,30,31) and all but two of these also employed a measure for the wife. Only three empirical studies used a

combined measure for both husband and wife's educational level (Table 14:8,9,10). Furthermore, in several studies it was concluded from the evidence of the results that wife's educational attainment level is much more influential than the husband's in predicting fertility (Table 14:8,10,18,20, 25,30). Because of this, the educational level of the couple always revealed the same relationship with fertility as that between wife's education and fertility.

Overall, educational attainment, by whatever measure, tends to show a persistent inverse relationship with fertility. For all three measures mentioned above, studies which reveal a clear inverse relationship far outnumber those which either found exceptions to the inverse relation, just as the "J" curve for occupational data, or found a relationship not statistically significant. In support of this observation it is to be noted that wife's educational attainment level maintained this strong inverse relationship with fertility during the period 1940-50, in spite of the fact that during this time the proportional increases in fertility were <u>directly</u> related to educational attainment.[15] This pattern occurred in all residence categories, although more pronounced in urban areas. Kiser later found educational differentials in fertility widened in 1950-57 (Table 14:23).

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[15] C. V. Kiser, "Changes in Fertility by Socio-Economic Status during 1940-1950," <u>Milbank Memorial Fund Quarterly</u>, XXXIII (October, 1955), 417.

Both Kiser and Grabill (Table 14:16,18) found a clear inverse relationship for wife's educational level within all age groups and residence groups. In an earlier study, Kiser (Table 14:7) found the relationship stronger in his rural sample. Rosenquist and Schafft with data of approximately the same period also found a relatively significant negative correlation for the rural-farm part of counties in Texas (Table 14:9). Hughes (Table 14:22) likewise found in Tennessee that for the rural-farm part of counties educational attainment (using a median as did Rosenquist and Schafft) has a strong inverse association with fertility (revealing the highest beta coefficient of the variables in the equation).

Goldberg in two important studies (Table 14:21,25) found that the usual inverse relationship of fertility to socio-economic variables is largely due to farm migrants in urban areas. It is worth noting, however, that he finds "only education survives as a status variable capable of differentiating levels of fertility among the two-generation urbanites."[16] Thus, among both the second-generation urbanites and the farm migrants education possesses much predictive power, whereas occupation and income do not. However, in this and a later study by Goldberg (Table 14:25), education indicated a stronger inverse relationship for the farm

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[16] David Goldberg, op. cit., p. 218.

migrants than for second-generation urbanites. Duncan (Table 14:30) supported this residential difference in finding that the inverse relationship of fertility and wife's education is more pronounced for wives of farm residence and farm background. A study of Freedman and Slesinger (Table 14: 26) concurred with the initial finding of Goldberg that education remains inversely associated with fertility in the "indigenous" nonfarm group, whereas income indicated a positive relationship. Finally, Hashmi's study (Table 14:27) focuses on a single urban area and concludes that education and income together are the most important factors in urban fertility, together accounting for 71 percent of fertility variance. Education in his study indicates a strong negative correlation with fertility, plus producing the higher beta coefficient over income.

In conclusion, these empirical studies strongly support the expectation of a strong inverse association in all residence groups, in fact, stronger than such socioeconomic status indicators as income and occupation. Moreover, the relative importance of this variable compared among residence groups is difficult to determine, primarily because the relative importance of educational attainment should be high in all categories of residence. Some empirical studies suggest that educational attainment is more important in the rural sectors (Table 14:21,22,25,26,30) in explaining variation in fertility levels.

Income.--Before discussion of the findings on income from the selected list of empirical studies, a review of the inherent characteristics of income as a variable is appropriate. In contrast to education, and like occupation, income is a changeable measure; but unlike occupation, it is quantitative. Second, the usual measures of income consider income only for the previous year. The sensitivity of such a measure, it would seem, is dependent upon events which have transpired in the immediate past. Education, in contrast, is a more cumulative index. It is, therefore, necessary to be cautious of results when applying income measures to the study of cumulative fertility. Kiser explained his conclusion of the importance of income over occupation and education in his study simply because income and fertility measures pertained to the previous year, whereas occupation and education did not.[17] Third, it would seem that there is a tendency for income to increase with advancing age. Similar to occupational group, a previous income level may have more influence on number of children ever born that current income. Finally, a measure of family income is confounded by working wives which tends to raise income level while simultaneously diminishing the fertility level.

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[17] C. V. Kiser, Group Differences in Urban Fertility (Baltimore: Williams and Wilkins, 1942), pp. 172-3.

Many indirect indices of income level have been devised, e.g., relative income, rental value, place of living, welfare, tax lists, etc., but our primary concern is with family income per se. The popularity of income as a measure of socio-economic status, like education, has increased in current studies. Three variables in measurement have been employed: family income, husband's (sometimes head of household) income, and wife's income (seldom used until recently). The relationships of these measures with fertility and among themselves are much more complex than for educational attainment measures. The confounding effects of husbands' and wives' educational level on the couples' educational attainment level are not as great as that for husbands' and wives' income levels and family income.

The relationship of income and fertility as expressed by empirical studies in Table 14 employing an income measure, is not clear. There are 18 of the 31 studies in the table which consider at least one measure of income level. Husband's and family income have been used in about the same number of cases. In an early study (Table 14:5) family income for urban areas exhibited an inverse relationship with fertility, but Kiser (Table 14:7) very early found the tendency for upper income classes to be directly related with fertility level. Succeeding research established a similar pattern of relationship (Table 14:10,23,24,31) primarily for urban areas, however.

Some provocative data on income and fertility appeared in the Current Population Surveys of 1949 and 1952 (Table 14:18,19). The 1949 Survey found a sharp inverse relation of number of own children under five per 1,000 married women 15-49 to total money income of families. The 1952 Survey, however, found no corresponding inverse relation between the number of own children under five per 1,000 married men 20-59 and money income of the man. In this same survey children ever born per 1,000 women, age 45 or older, married and husband present, was found to be inversely associated with husband's income, but for women age 15-44, no such relation was found. The difficulties of interpretation arise from the variety of measures used for fertility and income level as well as the failure to control for high fertility groups such as rural-farm and non-whites. These data raised the question, however, of a possible transition at least for urban areas toward a positive relationship of fertility to income level. The rural elements appeared to maintain the inverse pattern of relationship. In the same publication (Table 14:18) data were presented indicating an inverse relationship between farm operator family income in 1949 and fertility. Using 1950 county data for Tennessee, Hughes (Table 14:22) found a similar inverse association for the rural-farm parts of counties.

Hughes in the same source, however, established a positive relationship for income of the total population

among the counties of Tennessee. This correlation was strong with income second among five beta coefficients. Other indications of a positive association are available, employing relatively current data. The Growth of American Families Study (Table 14:20) uncovered a positive relation for husband's income, although it was not significant. The authors, however, explain that whereas "the average number of children born by 1955 was actually larger for the high-income groups than for those with low incomes . . . this differential is due to the influence of age--the higher income couples are older and so the wives had an opportunity to bear more children by the time of the interview."[18] The same study found a stronger inverse relation between <u>family income</u> and fertility. The authors, in addition, pose the following explanation as to why the relationship of fertility to income is somewhat stronger when family income rather than husband's income is used:

> It is because the couples with low family income are more likely to be those in which the wife does not work and has relatively many births, while the couples with high family incomes are more heavily weighted with those that include working wives who have relatively few children. Because the stronger relationship of fertility to family income is due primarily to the influence of the wife's employment status and not to the family income <u>per se</u>, we cannot say that family income alone has much influence on fertility.[19]

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[18] Ronald Freedman, P. K. Whelpton, and A. A. Campbell, <u>Family Planning, Sterility, and Population Growth</u> (New York: McGraw-Hill, 1959), pp. 296-7.

[19] <u>Ibid</u>., pp. 302-3.

Others have echoed this same explanation that wife's income strongly enhances the inverse relationship between family income and fertility (Table 14:7,18,26,27). The subsequent studies associated with the Growth of American Families Study, therefore, moved to relating husband's and wife's income separately with fertility. Using husband's income Goldberg (Table 14:21,25) found the relationship for second-generation urbanites tended toward the positive, whereas farm migrants indicated the traditional inverse relation. The investigation of wife's income and fertility is relatively recent, largely because the working wife has become such a common phenomenon today. Freedman and Slesinger (Table 14:26) found a consistent negative relation of fertility to wife's income, being strong in the first years of marriage, but a tendency toward the positive for husband's income. Deborah Freedman (Table 14:28) discovered a positive relation only when employing husband's "relative" income (the ratio of a man's actual income to the income customary in his socio-economic reference group). Kunz (Table 14:31) reinforces this with the discovery that controlling for education occupation, and age at marriage makes this positive relationship between fertility and husband's income even stronger. Surprisingly, Hashmi indicates a positive relation for an urban area even when employing family income (Table 14:27). Kitagawa (Table 14:29) employed family income for an urban area but found it related

inversely with total fertility, but positively when marital fertility was employed. This, apparently, was due to the tendency for women in the high-status groups to marry later than women in the lower-status groups.

In conclusion, on the basis of the above evidence, it would not be surprising to discover a moderate positive correlation between income and fertility in urban areas even when family income is applied. Rural areas will retain the more traditional inverse relationship. The income of women, on the other hand, would tend to consistently correlate inversely with fertility in both residence groups. In terms of relative importance of income variables, although the evidence has not been fully discussed, analyses of the empirical studies suggest that income would rank below educational attainment but above an occupational measure. The income of the wife, considering that little research has been done in this area, will not carry much weight in an analysis involving other major socio-economic variables. However, if family income is employed as the income measure, controlling for women's income as well as women employed in the labor force and age composition should reduce the relative importance of family income in accounting for fertility variance. Furthermore, since family income is perhaps a poor measure to apply to the rural-farm population, and wife's income is perhaps more of an urban phenomenon, it is expected

that <u>family income is relatively more important in the urban sector than the rural-farm</u>.

<u>Female employment</u>.--Interest in the effects of working women on fertility levels is very recent. Although Whelpton had employed this variable in an analysis of census tract data in eight northern cities in the 1930's and had found a strong inverse relation, as well as the fact that it was one of the most important variables in explaining fertility differences, most research using this variable is recent. Although Table 14 denotes that only six of the empirical studies (Table 14:4,18,20,27,28,30) have included a measure for female employment, the studies which have been conducted are quite intensive in dealing with this factor.

All six studies report a relatively strong inverse relation of fertility to women employed in the labor force. Whelpton (Table 14:4) was the first to point out the difficulty of specifying the direction of the cause-effect relationship regarding fertility and female employment. That is, do women work because they prefer it to marriage and childbearing or because of economic pressure of the family? A related question is whether women tend is whether women tend to keep the number of children low in order to work or does the fact that they are employed in the work force keep fertility low? It appears that a selective process may be the more logical explanation, i.e., the labor force tends to select women of low fertility than vice versa. Freedman

(Table 14:20) explains the relationship with reference to fecundity: for subfecund women the small family leaves the wife free to work, for the fecund, on the other hand, advantages of employment may influence working wives to limit their families.

Grabill finds that age of children, and not merely whether children are present, is very important to labor force participation of women (Table 14:18). This relationship is more pronounced when fertility is measured as "own children under five per married women," than "children ever born." Thus, after children reach an age when close supervision of the mother is not required, there is less interference with participation in the labor force. This pattern is distinctly different from an earlier pattern in which women tended to drop entirely out of the labor force to enter marriage and raise a family. A census publication describes a life pattern of married women which may act as a confounding factor in the relationship of fertility to labor force participation of women:

> In the last decade or so . . . 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.[20]

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[20] U. S. Bureau of Census, U. S. Census of Population: 1950, Vol. IV, Special Reports, Part 5, Chapter C, "Fertility," p. 11.

Such a pattern would tend to reduce the importance of labor force participation among women of long marriage duration. This is precisely what Freedman found in a recent study (Table 14:28). In the group of women married 5-9 years, wife's labor force status was negative and relatively important in predicting fertility; in the group married 10 or more years, no significant relationship was revealed.

Another factor which may compound results rests in whether marital status is considered in the measure of labor force participation. Grabill (Table 14:18) finds that children ever born per 1,000 ever-married women 15-49 is lower for women in the labor force, regardless of marital status, in all residence groups. If only ever-married women are considered in the measurement of labor force participation, omitting partially a segment of the female labor force which may be subfecund, the relationship of fertility and labor force participation would tend to be stronger. Thus, relating a measure of the participation of all women in the labor force would tend to reduce the predictive power of this independent variable in all residence categories.

A major share of the interest in female labor force participation and its effects on fertility has been focused on urban areas. This is understandable in view of the fact that in 1950 the proportion of white women age 18 to 49 employed in the labor force was 37 percent for the urban component of the nation, 26 percent for the rural-nonfarm, and only 17 percent for the rural-farm population. Women employed in the labor force is more largely an urban phenomenon. Hashmi (Table 14:27) found for Chicago census tracts that employment status of women ranked only below income and education in relative importance in determining fertility levels. Furthermore, Grabill speculates that:

> It seems possible that the employment opportunities for women in rural-farm areas may interfere less with household activities than is the case in urban and rural-nonfarm areas. It is also likely that by virtue of higher fertility and by virtue of a greater tendency to take parents and relatives into the household, the presence of children _per se_ does not tend to tie the mother to the home as much in rural-farm areas as in the other cases.[21]

If this is an accurate observation, it might be argued that women in the labor force would not affect fertility as much in rural areas as in urban areas. Thus, the stronger inverse relation should appear within the urban sector and the relative importance of women in the labor force should be greater in the urban population than the rural.

In conclusion, it is expected that female employment will reveal _a stronger negative relationship with fertility in urban than rural areas_. Female employment, because of confounding factors, will have _greater predictive power in urban areas than in rural areas_ and perhaps will be of less importance than educational attainment and family income, but above occupation and female income for urban areas.

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[21] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, _op. cit_., p. 265.

Age composition.--Age composition of women in the child bearing years has been dealt with in past studies as a secondary factor, generally in the form of standardizing the fertility rate. This procedure, it is suspected, is usually performed so automatically that the implications for the results of the analysis are not seriously considered. The fact that age is dealt with in this fashion implies that age is possibly a major disturbing factor in the relation of fertility to conventional socio-economic variables, although in many cases it is impossible or difficult to determine the effects of age.

Age not only bears heavily upon fertility because of its biological foundation, but essentially it provides benchmarks in the life cycle, and indirectly reflect such socio-economic variables as income, female employment, occupation, etc. Age is used simultaneously in qualifying, refining or isolating dependent and independent measures used in fertility analysis. As examples, it is customary to limit the measure of fertility only to the child-bearing ages of women; occupation is represented only for employed adult persons; educational attainment is limited to adults beyond college age, etc. The charge could be made that age has seldom been employed seriously as a primary variable in fertility analysis, with the exception of a handful of studies. Because of this fact, there seems to be very little evidence with respect to the explicit relationship of fertility to age.

In Table 14, six studies of fertility are listed for review that have employed some measure of age composition of women in the childbearing age span. Even in these studies the results on age either have been omitted, ignored, or dealt with lightly. The Whelpton study of the 1930's (Table 14:4) found fertility associated with the percentage of white women 15-44 who were age 20-34 in an inverse direction for five of the eight cities studied. Three later studies concluded that age of women had little to contribute to the explanation of fertility differences (Table 14:9,11, 13). Rosenquist and Schafft found no significant relationship among the rural-farm parts of counties in Texas when employing a measure of the percentage of women 15-44 in the age group 25-29. Duncan used the percentage of women 15-44 who were ages 25-34 ("the most fertile ages") in analyzing village population in Pennsylvania, but found the age factor of negligible importance. Dinkel controlled for age of wife in each broad occupational group by region but concluded that no additional information was yielded.

Two recent studies obtained more favorable results. Freedman (Table 14:28) included wife's age in a multiple regression analysis of fourteen variables. No direction of association is reported, but for the group married 5-9 years its beta coefficient ranked fourth in relative importance; for women married ten or more years, age of wife appeared unimportant. Assuming that women of the younger ages in the child-bearing period would tend to fall into the "married

5-9 years" group, the results suggest that proportions of women in the younger ages are more important in determining fertility levels. Hashmi (Table 14:27) recorded a very high positive association between the proportion of age groups and fertility, i.e., high proportions of older age groups correlated with high fertility levels or, translated, high proportions of younger age groups correlated with low fertility levels (an inverse association). For the metropolitan area of Chicago the relative importance of age composition ranked below education, income, and female employment and above occupation, distance, nativity, and ethnicity.

In conclusion, the review of empirical studies seems to lead to a consideration of age as a relatively unimportant factor in fertility analysis. It could be argued that age distribution of women of child-bearing age is probably very similar within residence groups, though admitting regional differences, largely due to a selective migration factor which would tend to reduce proportions of young women (largely single) in the rural-farm group and pad this age group in the urban and rural-nonfarm groups. Considering the well-documented fact that changes in fertility in the last few decades have been due largely to earlier marriage and the tendency to have children at younger ages, plus the ability of women to conceive being strongest between the ages 18 and 24,[22] it appears that the greatest fluctuation for _cumulative_ fertility is in the early ages of the childbearing period. In addition, consider the fact that age is not only an important factor _per se_, but also is highly related to other socio-economic variables. Finally, distribution of women by age could be expected to have a direct _limiting_ effect on fertility in the sense that children will not be born when the supply of mothers of the peak reproductive ages is relatively low. Upon consideration of these aspects, it seems reasonable to expect that age variation in proportions of women in the childbearing ages _would be relatively important in all residence groups_. Furthermore, on the basis of the two most recent studies reviewed above, _a strong inverse relationship will occur between proportions in the young childbearing ages_ (say ages 15-24) _and cumulative fertility, but will not be strong at later ages_ where fertility rates level off in the lager age groups of the reproduction age span.

Resumé of Empirical Propositions from Intensive Review of Empirical Studies

As mentioned at the beginning of this chapter, one function of a review of literature is the development and construction of a set of meaningful propositions. We are especially looking for urban-rural differences in the

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[22] _Ibid._, pp. 29-37.

association of independent variables and fertility. Several propositions have been asserted in the review of findings of the thirty-one empirical studies categorized by the six broad independent variables considered in this analysis. The resumé of propositions will follow the same order as presented above.

Distance

Although the studies reviewed above failed to treat the relationship of fertility to distance from cities in any way other than description, additional comments enable the extraction of more substantial propositions. Even among the studies considered, a direct relationship between fertility and distance is quite consistent for all residence groups. Since it is the intention of this study to consider an ecological framework as a theoretical position, it is assumed that distance is an overriding factor in all residence categories, and, therefore, a very important variable in predicting fertility levels, especially when size of the influencing metropolitan center is taken into account. It is possible, however, that controlling for several other variables, such as, income, education, etc., will reduce the relative importance of ecological distance as a predictor of fertility variation. The following are propositions for the distance measure:

1. Fertility is directly related to distance from metropolitan centers (differentiated by size) within both residence categories.

2. Distance from metropolitan centers (differentiated by size) ranges from high relative importance to low relative importance in determining fertility levels within both residence groups.

Agricultural Occupation

When considering measure of all occupations, it was found that relationships obtained varied from a clear inverse, in some cases, curvilinear or nonsignificant, to a slightly direct one. In general, it appears that measures of the complete broad occupational group distribution were relatively unimportant in accounting for variation in fertility, especially in urban areas. An inverse relation persisted in rural-farm population, especially among the two primary agricultural occupations: farmers and farm laborers. Although an inverse relation of fertility to proportions of farmers and direct relation to proportions of farm laborers should be persistent within rural areas, it is concluded they will not be as relevant in urban situations, nor will relative importance be very high. The following propositions for the agricultural occupations are extracted from the previous discussions on the occupation variable:

3. Fertility is inversely related to proportion of farmers and farm managers in the labor force within rural areas.

4. Fertility is directly related to proportion of farm laborers and farm foremen in the labor force within rural areas.

5. Fertility ranges from an inverse to a nonsignificant relation to proportion of farmers and farm managers in the labor force within the urban sector.

6. Fertility ranges from a direct to a nonsignificant relation to proportion of farm laborers and farm foremen in the labor force within the urban sector.

7. Agricultural occupations are of intermediate relative importance in accounting for rural-farm fertility variance.

8. Agricultural occupations are of low reletive importance in accounting for urban fertility variance.

Education

Wife's educational attainment level revealed a persistently strong inverse relationship with fertility. Because wife's educational level tended to be more important than the husband's in accounting for fertility differences, couple's educational attainment level follows the wife's lead and appears, then, as a compromise level of association between the husband's and wife's educational attainment, an association still strongly inverse, but weaker than wife's education. This relationship is inverse for both residence groups and adult educational attainment is relatively important in both residence groups. A list of extracted propositions follow for adult educational attainment level:

9. Fertility is inversely related to adult educational attainment level within both residence groups.

10. Adult educational attainment is of high relative importance in determining fertility levels in all residence groups, to a degree more within rural areas, and less within urban areas.

Income

Husband's income was shown to vary from a slight inverse, sometime curvilinear or nonsignificant, to a moderate direct association, more so in urban areas. Family income revealed a more consistent inverse relation with fertility, although tendencies toward a moderate direct relation is possible in urban areas. This difference is largely due to working wives. Controlling for female employment and female income would tend to reduce the importance of family income especially in urban areas. In addition, female income tended to exert a consistent but moderate inverse influence on fertility in both residence groups. Its relative importance is slight, but perhaps greater in urban areas contrasted with the rural. Propositions dealing with family income and female income are considered below:

11. Fertility is inversely related to family income within the rural population.

12. Fertility ranges from a slight inverse, perhaps non-significant, to a moderate positive relation to family income with the urban population.

13. Family income is of intermediate relative importance in accounting for fertility variance within both residence groups, of possibly higher importance within urban areas.

14. Fertility is inversely related to female income within the urban population.

15. Fertility ranges from a slightly inverse to a non-significant relation to female income within rural areas.

16. Female income is of intermediate relative importance in determining urban fertility.

17. Female income is of low relative importance in determining rural fertility.

Female Employment

A measure recognizing all women in the labor force, regardless of marital status, is a weaker factor than ever-married women in the labor force, but an inverse relation is nevertheless expected. Female employment accounts for a greater portion of fertility variations in urban areas than the rural. Extracted propositions for proportions of women employed in the labor force are presented as follows:

18. Fertility is inversely related to females employed in the labor force in urban areas.

19. Fertility ranges from an inverse to a nonsignificant relation to female employment within the rural population.

20. Female employment is of intermediate relative importance in accounting for urban fertility variance.

21. Female employment is of low relative importance in accounting for rural fertility variance.

Age Composition

Relative concentration of women of the child-bearing ages in the early segment of this span is much more important in predicting fertility levels than relative concentration in the later segments. A strong inverse association obtains for proportion of young women of childbearing age in both residence groups because of fluctuations in age of marriage in this period. Proportions of intermediate aged women in the childbearing age group varies from a possible slight inverse, in some cases nonsignificant, to a slight direct relation with fertility. Fluctuations in fertility level off sharply among this group, but the tendency for urban women to delay marriage suggests the possibility of this factor being slightly more important within the urban population. Propositions for these two factors are suggested as follows:

22. Fertility is inversely related to proportion of young women of childbearing age within both residence groups.

23. Proportion of young women of childbearing age is of intermediate relative importance in accounting for fertility variance within both residence groups.

24. Fertility ranges from a slight inverse, at times nonsignificant, to a slight direct relation to proportions of intermediate aged women of childbearing age within the urban population.

25. Fertility ranges from a nonsignificant to a slightly direct relation to proportion of intermediate aged women of childbearing age within the rural population.

26. Proportion of intermediate aged women of childbearing age is of low relative importance in both residence groups, although slightly higher for the urban population.

Conclusion

Table 15 provides a tabular summary of the expected results of an analysis of residential fertility variations (both expected direction of association and expected relative importance of the independent variable in accounting for variation within residential fertility) based upon the empirical propositions which have been constructed from the intensive review of thirty-one selected empirical studies. This table, it must be recalled, is not the product of

Table 15. Tabular summary of empirical propositions by independent variable and residence category: expected relationships of fertility to selected independent variables and expected relative importance of independent variables in determining fertility variation with residence groups

Independent Variables	Rural: Relationship Direction	Rural: Relative Importance	Urban: Relationship Direction	Urban: Relative Importance	Residence with Higher Relative Importance
1. Distance from metropolitan center (by size)	Direct (N.S.)*	High-Low	Direct (N.S.)	High-Low	Undetermined
2. Farmers & Farm Managers	Inverse	Intermediate	(Inverse) N.S.	Low	Rural
3. Farm Laborers & Foremen	Direct	Intermediate	(Direct) N.S.	Low	Rural
4. Adult Education	Inverse	High	Inverse	High	Rural
5. Family Income	Inverse	Intermediate	(Inverse) (N.S.) Direct	Intermediate to High	Urban
6. Female Income	(Inverse) N.S.	Low	Inverse	Intermediate	Urban
7. Female Employment	(Inverse) N.S.	Low	Inverse	Intermediate	Urban
8. Young women in childbearing ages	Inverse	Intermediate	Inverse	Intermediate	Undetermined
9. Intermediate aged women in childbearing ages	N.S. (Direct)	Low	(Inverse) (N.S.) Direct	Low	Urban

*Parentheses ( ) denote those expected relationships which are not as likely to occur as those not enclosed in parentheses.

theoretical considerations but of the consistency of findings from previous empirical studies. On the basis of what other researchers have found regarding differential fertility patterns within residence categories, then, these are the empirical relationships which one might expect to obtain in a study similar to the present one.

We may employ this summary table to reconsider some of the ideas presented in the previous chapter concerning urban and rural differential fertility patterns. Recall it was suggested that there might be discovered different patterns of differential fertility in each of the residence categories, thus, justifying the investigation of urban and rural populations separately. Table 15 indicates that we should expect some differences between residential categories, but these differences may not be extreme. This may be due to the difficulty of summarizing the findings of such diverse studies and/or the inability to differentiate finer distinctions with the categories employed, i.e., the use of "inverse" or "direct" to describe the direction of expected association and the terms "low," "intermediate," and "high" to indicate relative importance. Generally the independent variables which are expected to be most important in determining residential fertility reveal similar patterns in both residence groups, e.g., education, distance from metropolitan center, and proportion of young women in childbearing ages. Differences in patterns of relationship and relative importance are greater for independent variables which are

expected to reveal inconsistent, fluctuating relationships and are expected to have less influence in determining residential fertility, e.g., agricultural occupation, female income and female employment. Slight differences in direction of association with fertility are expected for six of the nine independent variables: agricultural occupations, family income, female income, female employment, and proportions of intermediate aged women in childbearing ages. The greater contrast in considering differential fertility patterns by residence seems to be for the relative importance of independent variables in accounting for fertility variation. This might suggest the possibility that, while the direction of association between fertility and related independent variables may actually remain the same within residence categories, the same independent variable may have a different impact on fertility in rural areas than in urban areas. This would still support the original hypothesis of contrasting differential fertility patterns within residence groups.

A distinction between rural-farm and rural-nonfarm fertility has not been established in Table 15. There did not appear enough evidence in the empirical studies reviewed to differentiate clearly enough the differential fertility patterns which one might expect in each of these populations. Similar to the discussion of Chapter I, we have treated "rural" as one category. Though it was impossible to construct empirical propositions for these two subcomponents

of the rural population, i.e., farm and nonfarm, it is expected that the rural-nonfarm fertility patterns will fall somewhere between the urban and rural-farm patterns, perhaps more approximating the rural-farm than the urban. In the major analysis of this thesis, all three residence categories will be considered. Hence, in terms of expected relationships, we would maintain that the patterns for the rural population as described in Table 15 would apply equally to the rural-farm and rural-nonfarm populations.

But the most important function this summary table of empirical propositions will perform in this study is as a guideline for direction in theoretical considerations. One could simply test these empirical propositions as presented, but what gain would this be considering the amoung of empirical descriptive documentation that has already been compiled? What theoretical contribution would this make to the explanation of differential fertility patterns? The intention in the next chapter is to review some theoretical frameworks relevant to the explanation of residential differential fertility, but then to use these empirical propositions to determine which theoretical framework has the greater probability of successfully predicting residential fertility patterns. This, it seems to me, is the proper use of past research findings. This is the method by which a science moves most efficiently from a descriptive to an explanatory level.

CHAPTER III

THEORETICAL FRAMEWORK FOR STUDY OF DIFFERENTIAL FERTILITY

In view of the fact that this study is primarily demographic in nature, this particular chapter dealing with a theoretical framework for the study of differential fertility has proven the most difficult to construct. One of the chief intentions of this thesis is to meet "head-on" some of the many criticisms which have been tossed at differential fertility investigations based on census data and to correct in the design of this study for the glaring deficiencies of past studies. Mention has been made in Chapter I of some of these criticisms and corrections have been proposed. However, those mentioned previously are primarily methodological. To be comprehensive and consistent, attention must now be focused toward solving theoretical criticisms and deficiencies. Indeed, it is a temptation to simply proceed to test the empirical propositions abstracted from relevant literature, a procedure which is normative for research in this area. However, it is felt working from a theoretical framework, however formidable and unwelcome the task, is necessary if this area of demographic research is to continue to make advances. Vance makes a more dramatic emphasis when he says, "Empirical operations without basic theory, no matter how carefully safeguarded, are now proved dangerous."[1]

The procedure for this chapter is, first, to consider the status of differential fertility theory (and population theory in general); second, to suggest critical guidelines for theoretical design which will correct for past weaknesses and deficiencies in the study of differential fertility; and, third, to construct a theoretical framework which can be used to provide adequate explanation of the patterns found in the empirical data of this study as well as can be considered a solid contribution to demographic theory, and, more specifically, differential fertility theory.

Status of Differential Fertility Theory

It is precisely the status of differential fertility theory, and for that matter population theory in general, that makes the inclusion of a chapter on theoretical framework in a demographic study so absurd. For, according to the experts, the keystone characteristic of this field and, hence, the most devastating criticism, is the lack of theory in demography and the paucity of theoretical activity produced by demographers.

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[1]Rupert Vance, "Is Theory for Demographers?" Social Forces, XXXI (1952), 13.

It was this situation which lead Vance to entitle his disturbing article "Is Theory for Demographers?" His answer to this question, of course, is affirmative, but his description of demographic theory it as a "wasteland."[2] Others have made exactly the same claim. Hauser asserts, "there is still too much of a tendency among population students to produce discrete, descriptive studies with little or no attention to theoretical framework as a basis for their research orientation or for the formulation of their conclusions."[3] Moore also makes note of this fact in comparing sociology and demography.

> If a standard complaint about sociology is that is has "too much" theory, a standard complaint about demography is that is has "too little." . . . What is generally meant in the case of demography is that a pervasive preoccupation with refinement of measurement and with ad hoc explanations for observations leads to an avoidance of the fundamental question, what do we want to know?[4]

Of special interest to this study is that in this same chapter Moore cites "the preoccupation of many demographers with the analysis of census data" as a partial foundation for the exaggerated charge that demography has "no" or "too little" theory, and in the same breath he asserts "the absence of

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[2] Ibid.

[3] Philip Hauser, "Present Status and Prospects of Research in Population," American Sociological Review, XIII (August, 1948), 377.

[4] Wilbert E. Moore, "Sociology and Demography," in P. Hauser and O. D. Duncan, The Study of Population (Chicago: The University of Chicago Press, 1959), p. 845.

any clear-cut theory of fertility differentials."[5] Though all sorts of answers have been presented in response to the charge that there is a dearth of demographic theory, one fact is sure, that there is a predominant tendency for demographers to prefer a raw empirical approach vis-a-vis a theoretically sophisticated approach in demographic research. The result is, as Davis states, "the tendency to initiate research either with no explicit hypotheses at all or with hypotheses pulled out of a hat."[6] Hence, regardless of the excuses put forth to explain the situation, it is true that differential fertility theory, and demographic theory in general, is "poverty stricken."

Critical Guidelines for a Theoretical Design for the Study of Differential Fertility

In response to this general charge against demographic theory, however, several demographers have proposed constructive points which could strengthen the theoretical condition of demography if effectively incorporated into basic research. There are a select number of such points which I wish to call upon for the purpose of providing "critical guidelines" for a theoretical design. There are four altogether.

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[5] Ibid., p. 849.

[6] Kingsley Davis, "The Sociology of Demographic Behavior," in R. K. Merton, L. Broom, and L. Cottrell, Sociology Today (New York: Basic Books, 1959), p. 323.

The first guideline flows from a criticism leveled at demographic studies that the "explanatory" function of theory has been neglected. After reviewing several examples of what demographers consider "theory," Hauser and Duncan make this their first "critical observation."

> . . . there is relatively little emphasis in the statements of demographers on the explanatory and predictive functions of theory. At least in the opinion of many writers on scientific method, what distinguishes propositions of a "theoretical" character from mere empirical generalizations is that the former state considerations as a consequence of which certain empirical regularities are expected to obtain and indicate conditions under which such regularities will hold, i.e., theories are supposed to "explain" and "predict" the facts at the command of a discipline. . . . If this crucial feature of scientific theory is neglected, it becomes possible to accept as "theories" various bodies of discourse which incorporate several of the ingredients of theory (such as concepts, definitions, and deductions) but which fail to perform the principal function of theory.[7]

Later in the same chapter Hauser and Duncan seem to provide a plausible explanation as to why demographers have neglected this function of theory. In a critical comment on "psycho-social theories of fertility" (primary reference is to the Indianapolis Study) they make the statement that:

> it may be, too, that they have hit on an issue of signal importance for population studies in general in stating an antithesis between testing a particular theory and the prediction of a concrete event. If, like most demographers, they prefer to attempt the prediction or explanation of concrete events, they seem prepared to sacrifice some of the elegance of an integrated theory.[8]

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[7]Philip Hauser and Otis Dudley Duncan, The Study of Population (Chicago: University of Chicago Press, 1957), pp. 84-5 (italics mine).

[8]*Ibid.*, p. 97.

Hence, theory development has been sacrificed for the narrow conception that the primary objective of any scientific research is the mere prediction of a concrete event. In view of such an objective, of course, the most appropriate and efficient research design is the "dragnet" approach (a continuous accumulation of independent variables until the dependent variable is satisfactorily "explained" to the neglect of any understanding of how all the employed variables fit together in an integrated, logical fashion). All too often it is this approach which has been found popular in past differential fertility studies. This must be altered.

To correct for past deficiencies, therefore, the first critical guideline requires that the "explanatory" function of theory be the foremost consideration in theory construction and that the nature of the problem contained in this thesis be discerned as "theory testing" rather than merely "predicting a concrete event." To follow this guideline, of course, is not going to be without its casualties. Vance skillfully describes the risks involved, but also the challenge:

> If there is room in demography for the timid souls, is there also room for the bold and audacious? In science as in poker, we realize we can play it one of two ways. We can play it close to the vest, that is, maximize description and minimize synthesis or we can play it for maximum gains of human knowledge. . . . Accordingly the closer one sticks to his data, the less vulnerable are his generalizations and ofttimes the less important. A loose thought system sacrifices accuracy for the sake of generalization.

> In science when one plays for double or nothing, he runs the risk of evolving a system of high generalizations and low validity. Obviously this represents high vulnerability and we are all cautious enough to dread the results. But we should remember there are two forms of maximum error: the first is a system that misses contact with the known facts at every point of observation. The second is no system at all. This is maximum error, for it equates with total ignorance. As a matter of fact, I am willing to make the claim that he who develops a theory capable of being proved invalid makes a contribution. In statistics the disproof of any hypothesis is accepted as a way station on the road to knowledge. Demographers should become brave enough to so state their hypotheses that they are capable of disproof.[9]

The second critical guideline follows from the criticism that demographers have maintained a limited conception of what constitutes the essential ingredients of theory and that demographers have not made full use of all these levels of ingredients. This criticism is not difficult to substantiate. Hauser and Duncan suggest this in making the following critical observation of demographic theory:

> It is not evident in the cited writings of demographers that "theories" may be stated at widely varying levels of generality and with greater or lesser scope of applicability. It is possible that some of the concern over lack of theory in population studies reflects a failure to recognize that the functions of theory can be performed at different levels of specificity and that each level is potentially significant for some purposes.[10]

As one might expect there exists the eternal question of what are the essential ingredients of theory? Though disagreement would be forthcoming upon whatever one

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[9] Rupert B. Vance, op. cit., p. 12.

[10] Philip Hauser and O. D. Duncan, op. cit., p. 85.

proposed as the "essential" ingredients, there is sufficient consensus concerning this question which will permit the assertion of a significant observation about demographic theory. For example, Gutman notes that while there is confusion in the meaning of the word "theory," in practice "generalizations on several different levels of abstraction with varying degrees of comprehensiveness are labeled population theory."[11] Though this list is not exhaustive, some of the ingredients of theory suggested by Gutman are "concepts,"[12] "general orientations toward substantive materials,"[13] "empirical generalizations,"[14] and "societal

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[11]Robert Gutman, "In Defense of Population Theory," American Sociological Review, XXV (June, 1960), 329.

[12]Gutman writes: "The term 'theory' has been used as a synonym for a great number of concepts used to organize population data. The task of analyzing the assumptions and implications of these concepts, and refining them, has been considered a kind of theoretical activity." Ibid., p. 329.

[13]Gutman uses Robert Merton's phrase to describe this ingredient: "Such orientations involve broad postulates which indicate types of variables which are somehow to be taken into account rather than specifying determinate relationships between particular variables." Ibid., p. 331.

[14]Of these Gutman writes: "Several theoretical keystones of contemporary population study are really empirical generalizations; that is to say, they describe 'a set of uniform conjunctions of traits repeatedly observed to exist, without any understanding of why the conjunction occurs; without a theory which states its rationale.' Transition theory and generalizations about the inverse relationship between fertility and socio-economic status probably belong in this category, even though demographers do have positive notions about why the demographic transition has taken place and the reasons which explain the higher fertility among the poor. But they are notions rather than carefully conceived and well-reasoned explanations." Ibid, p. 331 (italics mine).

laws."[15] Hauser and Duncan earlier attempted to synthesize selected demographic materials and concluded that the ingredients of theory according to demographers include:

> (a) concepts defined within a frame of reference; (b) empirical propositions, generalizations, or laws (which vary in generality and credibility); (c) propositions, hypotheses, or theorems deduced or constructed from other elements of theory, with these taking the form of (d) "necessary relations," "models" incorporating necessary and/or empirical relations, or "purely hypothetical constructions."[16]

Although Gutman makes a strong case that demographers have contributed more in the way of theory construction at the several levels of theory ingredients than what others are willing to credit them, he does not suggest the quite realistic possibility that demographers' contribution to theory-building has been to a large extent concentrated in the area of "empirical generalizations" (to use Gutman's phrase). Hence, while demographers should be commended for not entirely neglecting theory development in their discipline, it must be emphasized that any mass production of empirical propositions alone is not a sound approach to theory development. In such a case there is still too much wanting. Attempts to clearly spell out the variety of ingredients which constitute theory are intended to influence

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[15]According to Gutman "societal laws differ from empirical generalizations because they are derived from statements on a higher level of abstraction, and are the product of deduction rather than induction." Ibid., p. 332.

[16]Philip Hauser and O. D. Duncan, op. cit., p. 84.

the initiation of theoretical activity at many levels, not to encourage specialization tendencies in selected directions. In practice, then, demographers have not met this theoretical need.

As a result, and Gutman himself suggests this, the theoretical contributions of differential fertility studies employing socio-economic status variables fall mostly under the rubric of "empirical generalizations." But there is more to "theory" than just "empirical generalizations." Dinkel clearly reveals the inadequacies of such an approach in his criticism of a fertility study which he described as "another inheritor of the Indianapolis Study legacy." Dinkel writes:

> Even if correlations of high order were found and theoretical inconsistencies between supported and unsupported hypotheses were ironed out, the authors still would have the task of explaining the processes by which operation of the model yielded the correlations. <u>Correlations need to be buttressed by qualitative materials and logical connections that indicate the processes through which the independent variables are associated with fertility</u>.
>
> Physical scientists are more accustomed than social scientists to so finishing the job of research and not letting it stop with the obtaining of statistical association between the variables. In the physical sciences, of course, possession of more closely-reasoned theoretical models that are supported by much past research of an additive character makes more possible the crucial experiment from which results can be taken directly and fed back into the analytical structure; in other words, the explanation of quantitative associations found in the test are at hand before the test is made. <u>In the social sciences, on the other hand, it is necessary to backtrack from the correlations to other research and to</u>

> the conceptual framework in order to juggle the pieces together in a new whole.[17]

It is strongly felt that criticism such as this must not be written off as only an "interesting comment" which might be wisely considered by the designers of that particular study, but it can be legitimately and accurately extended to all demographic investigations which seem to proudly hail as their ultimate objective the empirical substantiation of a battery of disconnected hypotheses, implicitly or explicitly stated, which leads to the careless stockpiling of irrelevant empirical propositions. On the other hand, it must be noted that deploring this tendency in demographic studies does not in any fashion give full blessing to the type of "theorizing" which produces abstract propositions which are finally systematically and logically related but which have no empirical referents. We must concur with Davis when, in condemning this trend in the social sciences, he acclaims:

> In social science this term (theory), instead of meaning the widest body of rigorous reasoning about a set of observed relationships, has come to mean a long stretch of purely verbal analysis. If a publication contains any empirical evidence, particularly of a statistical kind, it is not theory; but if it contains only verbal generalizations, no matter how loosely connected, it is theory.[18]

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[17] Robert M. Dinkel, "Fertility in Mid-Century America," Eugenics Quarterly, III (March, 1956), 26 (italics mine).

[18] Kingsley Davis, "The Sociology of Demographic Behavior," *op. cit.*, p. 313.

There is an all too obvious solution by which the making of obeisance to either undesirable form of theoretical activity mentioned above can be avoided, and this introduces the statement of the second critical guideline for the theoretical design of this study. A reasonably sound approach to theory-building is the unending attempt to integrate all levels of theory ingredients into the same theoretical framework, especially empirically produced and theoretically deduced propositions. Hence, theorizing must take the form of bridging the gap between empirical propositions and theoretical hypotheses, of employing to the fullest extent possible all empirical propositions which have been established and all theoretical frameworks which are relevant. Obviously this guideline is not original, but it is felt the explicit statement of this research ideal will go far in correcting for mistakes made in past differential fertility studies.

The third critical guideline for the theoretical design of this study takes its cue from a plea by a number of demographers for the development of "theories of the middle range." In Robert Merton's own words, such theories are those "intermediate to the minor working hypotheses evolved in abundance during the day by day routines of research, and the all-inclusive speculations comprising a master conceptual scheme from which it is hoped to derive a very large number of empirically observed uniformities of social behavior."[19] In the eyes of these demographers "theories of the middle range" are viewed as the best and only answer to resolving the dearth-of-demographic-theory problem. Furthermore, it is speculated that in no other area of the social sciences than demography is the theoretical void at this level so noticeable and obstructive to the advancement of the discipline.

Hillery perceives a critical lacking of middle range theory in both sociology and demography, but foresees this type of theory as a significant key to the integration of both fields.[20] Like Hillery, Vance also makes a firm appeal for making middle range theorizing fashionable. Vance's hope expressed in his article was that a whole new era of demographic theory would now be possible because of this new directive. This means that demographic theory would now be constructed at a level that would permit a procedure of testing, disproving and refining. Now it would be possible to correct for another major deficiency of past population theories (to put it in the words of Hauser and Duncan):

> . . . that they are stated so generally or abstractly that they fail to "make contact" with the facts or with regularities which have thus far been established empirically or, what comes down to the same thing, that their

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[19] Robert K. Merton, Social Theory and Social Structure (Glencoe, Illinois: The Free Press, 1957), p. 9.

[20] George Hillery, Jr., "Toward a Conceptualization of Demography," Social Forces, XXXVII (October, 1958), 49-51.

> predictions are of such a general character that they are not readily refuted or confirmed by evidence now available or likely soon to become available.[21]

This is, indeed, a quite opposite criticism posited against demographic theory when the discussion of the second critical guideline presented above is considered. Both criticisms are valid, nevertheless, as Vance indicates in his article. Demographic theory has been guilty of "theorizing" too close to empirical data as well as "theorizing" out of contact with empirical data. Middle range theory is precisely what is needed to bridge the gap.

Though several years have passed since Vance wrote his article, the fact that his prediction that "when all the hypotheses of the Indianapolis Study are finally fused, population will have a healthy young theory of the middle range"[22] did not come true is perhaps indicative of the snail's pace at which demography has attempted to rise to Vance's request for the development of middle range theory. Nevertheless there are "sproutings" of middle range theory which are now developing in demographic fertility analysis and one shall have to consider these in any attempt to bring theory into contact with empirical data.

Finally the fourth critical guideline which will influence the theoretical design of this thesis is easier to

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[21] Philip Hauser and O. D. Duncan, _op. cit_., p. 85.

[22] Rupert Vance, _op. cit_., p. 90.

spell out than to operationalize. Mention was made above concerning the recent emergence of some middle range theories dealing with differential fertility. In one sense this is exactly what Dr. Vance had ordered, but from another point of view this places the researcher in direct confrontation with the sticky problem of choosing which middle range theoretical framework to employ in fertility research. The fact that none of these theories are what one might call "full-grown" theories, since all of them contain the usual gaps and lack repeated empirical substantiation, adds to the dilemmatic nature of the choice. This "pieces and patches" condition of fertility theory is perhaps the underlying reason why, quite subsequent to the classic Indianapolis Study, investigators have repeatedly rejected the scheme of selecting a particular theory to direct fertility analysis. Mishler and Westoff, principal investigators for the Princeton Study, reasoned that developing a particular theory is unwise because there are "insufficient grounds for selecting any particular 'theory' which would automatically restrict the types and ranges of data gathered."[23] The question can be raised, however, as to whether this was the only and wisest choice in the light of the status of fertility theory.

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[23]Elliot Mishler and Charles Westoff, "A Proposal for Research on Social Psychological Factors Affecting Fertility: Concepts and Hypotheses," in Current Research in Human Fertility (New York: Milbank Memorial Fund, 1955), p. 128.

Their choice was one of "no theory" or the hope that a unified theory would evolve from their efforts, as Hauser and Duncan describe this procedure:

> What the investigators do propose to use is a "conceptual framework or 'model' which (permits) the description of the major elements of the concrete situation within which the fertility event takes place." As expounded, this "conceptual framework" appears to amount to an a priori classification of "dependent variables" and "independent variables," whose use "entails a certain risk that the hypotheses which are formulated will form together less of a unified whole than would be the case if the study were developed in terms of a single body of theory."[24]

Ignoring existing theory is herewith rejected as an acceptable procedure for the present study. To make use of existing theory, however, considering the current status of fertility theory, it is felt that some rather untried procedure must be adopted. Casting about for instances of such a procedure, I find that Westie[25] most closely approaches the model in mind. Although "Westie's procedure" will not be replicated, the "spirit" of what is called for in this fourth critical guideline is captured in his introductory comments to his suggested procedure. He proposes the utilization of his procedure in areas of investigation where there exists "a high degree of theoretical incoherence," where "knowledge consists of numerous contradictory theories

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[24]Philip Hauser and O. D. Duncan, op. cit., p. 97.

[25]Frank R. Westie, "Toward Closer Relations Between Theory and Research: A Procedure and an Example," American Sociological Review, XXII (April, 1957), 149-54.

and fragments of theories that have been constructed to explain 'empirical relationships,' which may or may not exist."[26] His procedure is described as an alternative to procedures the researcher more customarily follows under "incoherent" theoretical conditions, such as:

> 1. He resorts to a rigid empiricism in which the "facts" (meaning the empirical findings) are seen to speak for themselves. . . .
> 2. He selects from among the many contradictory propositions already held in the field a particular proposition or set of propositions which are relevant to the problem at hand and which appear to make sense in terms of what the investigator already knows about the aspect of society under investigation.
> 3. He creates a new set of propositions of his own.[27]

Briefly his procedure proposes the utilization of all the theoretical propositions in the area of investigation as they exist, with all their contradictions and inadequacies. It involves "listing a comprehensive range of presupposed empirical relationships . . . which might possibly turn up in the research at hand and explicitly listing a range of interpretations . . . for each possible empirical finding." The relationships that are supported by empirical investigation are retained and the correct theoretical interpretations are selected from the array of contradictory though "plausible" interpretations attached to the empirical relationships that have survived the research test.

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[26] *Ibid.*, p. 149.

[27] *Ibid.*

It is not my intention to follow this procedure wholly, but Westie's suggestion that we begin testing contradictory theories and hypotheses against each other is promising for differential fertility analysis, given its current status and deficiencies. To meet this critical guideline I intend to consider two theoretical frameworks which have been employed in differential fertility analysis but which lead to contrasting hypotheses. These two theoretical frameworks are "urban dominance" theory (presently incorporated in the logical extensions of demographic transition theory) and "metropolitan dominance" theory. Empirical propositions have already been established by which to determine which of these frameworks leads to the more valid conclusions. In this manner Westie's suggestions (making up the fourth critical guideline) will be implemented. However, this procedure will also, I claim, face up to the other three critical guidelines established above. I consider both theories to be of the middle range variety. Furthermore, the design of this study will go far in bridging the gap between empirical propositions and theoretical hypotheses. All levels of theory ingredients will be employed. Finally, the explanatory function of theory is especially emphasized in this manner over against a narrow concern for prediction of concrete events.

Let us now turn to implementing these guidelines. Before contrasting the two theoretical frameworks and

generating hypotheses, however, an introduction to the implications of a distributive design for the theoretical framework is necessary.

Theoretical Framework

It has been stated in a previous discussion of the research design of this study that the distributive approach is to be employed to investigate comparatively variation in rural and urban fertility. This approach necessitates the study of a given population in terms of spatial patterns among designated areal subdivisions of its territory. Analysis involves the discovery of population characteristics of these areal units which covary with population characteristics of these same units. Explanation rather than description should be the objective of the distributive approach, but the discovery of a statistical relationship or the uncovering of factors that are nonrandomly related to population events cannot be interpreted as being causal. The distributive approach is only a particular type of research design, not a theoretical framework. Cause must be inferred from theoretical considerations. Hence, at this juncture a theoretical framework should be selected to complement the distributive approach as a basic research design of this study.

From the point of view of this study, an ecological framework is best suited to a situation wherein the distributive approach is employed and provides the best means for

ordering demographic data intelligibly. Noting that human ecology focuses on the impact of man's environment on human behavior, Bogue himself infers an ecological framework when he states that "population distribution studies are capable of contributing a great deal of indirect information about environmental factors that underlie population events."[28] The unit of analysis for human ecologists, however, is not merely a population aggregate, but a human population more or less circumscribed territorially. Though the community is not the only ecological unit of analysis that fits this description, it certainly has been a most frequently chosen unit of analysis in ecological research. Hawley himself, a leading contributor to ecological theory, argued that a community is "the basic unit of ecological investigation,[29] though others have questioned the expediency of this assertion.[30] Nevertheless, from an ecological point of view the community definitely maintains a territorial dimension, as suggested by Duncan and Reiss' definition of community: "The territorially oriented complex of human relationships through which a more or less ecological population meets its

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[28]Donald J. Bogue, "Population Distribution," in P. Hauser and O. D. Duncan, op. cit., p. 393.

[29]Amos Hawley, Human Ecology (New York: The Ronald Press, 1950), p. 180.

[30]O. D. Duncan, "Human Ecology and Population Studies," in P. Hauser and O. D. Duncan, op. cit., p. 684.

sustenance and residence requirements."[31] The unit of analysis for this study, as reported previously, is the residential part of a county and is to be considered an approximation of the ecological definition of community.

Given the community as the unit of analysis, the next logical consideration is inter-community variation. That communities vary one from another, even in the same geographical region, is common sense, but why communities vary must be answered by a theoretical framework, specifically ecological. When ecologists speak of community variation, they speak in terms of structural differentiation, variations in social structure or social organization. The social organization or structure of a community is viewed by ecologists as "a collective adaptation on the part of a population to its total environment (including other organized populations, as well as physical features), an adaptation that is strongly modified by the technological equipment in use and by certain 'purely' demographic attributes of the population itself, notably its size, rate of growth, and biological (age-sex) composition."[32] In this view of community social organization one can readily identify the four main referential concepts which human ecology embraces:

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[31] O. D. Duncan and A. J. Reiss, Jr., Social Characteristics of Urban and Rural Communities, 1950 (New York: John Wiley, 1956), p. xiii.

[32] Leo Schnore, "Social Morphology and Human Ecology," American Journal of Sociology, LXIII (May, 1958), 629.

population, environment, technology, and (social) organization. These are referred to collectively as the "ecological complex" or the "ecosystem."[33] To understand variation in community social organization or social structure, then, one must perceive it as a product or outcome of the unique demographic, technological, and environmental pressures which the community confronts, though one must not discount the interdependent relationship of the elements of the ecological complex and the reciprocal effects which social organization may bring to bear on the other elements. Community variation is not random or unexplicable, therefore, but reflects the operation of unique combinations of local conditions.

The dependent variable of this study, however, is not social organization but a population event, namely, fertility. In the same manner that we may consider social organization as a collective adaptation to unique demographic, technological, and environmental pressures which a community confronts, we may also view fertility, being a component of population growth, as a collective adaptation of a community to the influences of its peculiar organizational,

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[33] O. D. Duncan, "Human Ecology and Population Studies," op. cit., pp. 681-84; Leo Schnore, op. cit., p. 629; O. D. Duncan and Leo Schnore, "Cultural, Behavioral and Ecological Perspectives in the Study of Social Organization," American Journal of Sociology, XLV (September, 1959), 135-6; and O. D. Duncan, "From Social System to Ecosystem," Sociological Inquiry, XXXI (Spring, 1961), 140-9.

technological, and environmental (including other organized populations) conditions. Duncan himself suggests that one of the distinctively ecological contributions to the study of the vital processes (fertility and mortality) is the study of "vital rates as indexes of the adjustment of a population to its environment and investigation of the impact of variations in community structure and function on the vital processes."[34]

It is hypothesized, then, on the basis of an ecological framework, that community social structure or organization will play a significantly determinative role in fertility variation among communities. Discussions on the distributive design, human ecology and demography point to population composition as an excellent source for operationalizing indices of community social organization. Bogue asserts that the "study of how differential population composition leads to differential population behavior (in our case, fertility behavior) is one of two major aspects of distributional analysis."[35] Duncan states that "the principal interests of the human ecologist in the study of population composition are the exploitation of data on composition as

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[34] O. D. Duncan, "Human Ecology and Population Studies," op. cit., p. 698.

[35] Donald J. Bogue, "Population Distribution," op. cit., p. 384.

indicators of ecological organization."[36] Likewise, Schnore maintains that "a compositional view of population inevitably provides a proximate description of social structure. . . ."[37] Hence population composition indices operationalized on an areal basis at the community level reflect community social structure and may be expected to significantly influence fertility behavior. In commenting on aggregate social data for areal units as indices of social structure, Feldman and Tilly argue that

> . . . the residential area is one important context within which personal behavior takes place. Thus, the fact of living in an area with certain characteristics in income, education, race, and so on (in other words, various aspects of population composition), is sociologically relevant, whether or not the personal traits of residents are similar to the averages of the areal units in which they reside.[38]

Hence residential area is a significant context in which human behavior takes place. The importance of spatial relationships in ecological analysis is expressed by Duncan in three points:

> First, territoriality is a major factor giving unit character to populations. Second, space is simultaneously a

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[36] O. D. Duncan, "Human Ecology and Population Studies," op. cit., p. 693.

[37] Leo F. Schnore, "Social Mobility in Demographic Perspective," American Sociological Review, XXVI, No. 3 (June, 1961), 411.

[38] Arnold S. Feldman and Charles Tilly, "The Interaction of Social and Physical Space," American Sociological Review, XXV, No. 6 (December, 1960), 879. Statement in parentheses mine. For related comments on ecological correlation see pp. 69-72 of this thesis.

> requisite for the activities of any organizational unit and an obstacle which must be overcome in establishing interunit relationships. Finally, space--like time--furnishes a convenient and invariant set of reference points for observation, and observed spatio-temporal regularities and rhythms furnish convenient indicators of structural relationships.[39]

The conclusion from an ecological perspective is that fertility behavior, operationalized on a residential area basis, is a function of residential community social structure, operationalized in terms of various indices of population composition, as well as technological, environmental, and other demographic variables. For this study these independent variables include such indices as distance from a metropolitan center, employment in agricultural occupations, education, family income, female income and employment, and the age structure of women in the reproductive age period.[40]

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[39] O. D. Duncan and Leo F. Schnore, "Cultural, Behavioral, and Ecological Perspectives in the Study of Social Organization," op. cit., p. 136.

[40] It is difficult to classify these independent variables in terms of the four broad categories of the ecological complex, i.e., population, environmental, technological, and organizational, since several of these could fall into more than one category. To facilitate the discussion of these independent variables, however, we may group them in the following manner: urbanization (distance from a metropolitan center and employment in agricultural occupations, which is a reflection of off-farm employment), socio-economic status (education and family income), wife's opportunities alternative to child-bearing (female income and female employment), and demographic age structure (the distribution of women in age groups of the reproductive age period).

Since the primary concern of this study is a comparison of urban and rural fertility patterns, we must extend our ecological framework so that hypotheses can be generated dealing with the urban-rural comparison. Up to this point we may only assert that the general hypothesis of the covariance of community fertility behavior and community social structure applies both to urban and rural areas. Our ecological framework has not been developed far enough to establish hypotheses concerning the direction and nature of the relationships between fertility and community social structure or the comparative fertility patterns for urban and rural communities. Let us proceed to investigate ecological theory in more detail in order to establish such hypotheses.

At this juncture, however, there are two possible directions we could take in the ecological comparison of urban and rural community social structure and their influence on fertility behavior. These two theoretical directions may be designated as "urban dominance" or "urbanization" theory and "metropolitan dominance" theory. Both of these theories may be tested by a distributive research design, i.e., by an investigation of the association of the spatial distribution of fertility levels and community social structure. But each theory leads to a different, in fact, contradictory, set of hypotheses concerning the comparison of urban and rural fertility patterns. Urban dominance theory will be rejected in favor of metropolitan dominance theory as the most suitable theoretical framework for this study, but let us consider these two theories for a brief duration in order to fully explain the rejection of the one in favor of the other.

There seems to be in the literature of ecological and demographic research on urban and rural communities a subtle confusion as to the definition and differential effects of urbanization and metropolitanization, urban dominance and metropolitan dominance. Bogue, in his classic work on the metropolitan community, is quite insistent on distinguishing urbanism and metropolitanism, urban dominance and metropolitan dominance. Very simply Bogue states, "by urban we mean 'pertaining to all cities,' by metropolitan we mean 'pertaining to the metropolis.'"[41] Bogue also points out that his study "is an attempt to explore some aspects of the hypothesis that great cities, or metropolises, dominate the social and economic organization of technologically advanced societies."[42] Metropolitan dominance theory, it is mentioned, is "an extension and attempted refinement of the more general theory of urban dominance, that is, that cities in general are the foci about which life of modern nations is organized."[43] Likewise Vance and Smith differentiate

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[41]Donald J. Bogue, The Structure of the Metropolitan Community (Ann Arbor: Horace H. Rackham School of Graduate Studies, University of Michigan, 1950), p. 6.

[42]Ibid., p. 3.

[43]Ibid.

between urbanization and metropolitanism. They point out that metropolitanism is one aspect of the more general and broader process of urbanization. Urbanization is "the concentration of population and human activities at focal points in space. This concentration proceeds in two ways simultaneously: the multiplying of the points of concentration and the accompanying increase in the size of the individual concentrations."[44] Hence the emergence of exceptionally large cities is the process of metropolitanism. Let us consider first urban dominance theory with respect to the effect of urbanization on community social structure variation and its consequences for fertility behavior for both urban and rural areas.

Urban Dominance Theory

Earlier in this thesis we made reference to a cardinal proposition of urban dominance theory (though it was not called by this label): that urban and rural differences are disappearing as urban centers extend their influence further into rural areas. Comments were cited from Robin Williams[45]

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[44]Rupert B. Vance and Sara Smith, "Metropolitan Dominance and Integration," in R. B. Vance and N. J. Demerath (eds.), *The Urban South* (Chapel Hill: University of North Carolina Press, 1954), p. 114. Original statement in Hope Tisdale, "The Process of Urbanization," *Social Forces*, XX (1942), 311.

[45]Robin M. Williams, Jr ., "American Society in Transition: Trends and Emerging Development in Social and Cultural Systems," in J. H. Copp, *Our Changing Rural Society: Perspectives and Trends* (Ames: Iowas State University Press, 1964), 23-4.

and Comhaire and Cahnman.[46] These last authors conclude that American society is "urban through and through." Though others have eschewed the positing of such a bold pronouncement, implicitly or explicitly they assume an urban dominance framework and, on this basis, suggest that a near future outcome will be the vanishing of urban-rural differences. Ryder, a demographer, writes of urbanization as part of an overall tendency toward homogeneity in American society.

> . . . We are becoming more and more like one another all the time, more and more homogeneous as a society, more and more similar in big and little ways. . . .
>
> The contrast between past and present is equally striking in terms of where we live. It used to be that the population was sharply split between those who lived in sparsely settled rural areas and those in dense city concentrations. But now the farm population has been dwindling for some time, and will continue to do so; more and more farmers also have city jobs; and the urban ways of living have been exported out to the farmer. Meanwhile the urbanites are fleeing the city. The centers of our big metropolitan areas have pretty well stopped growing, and the city-dweller is transformed into a suburban commuter, with a setting as rural as he can afford. One other way in which the country and the city are merging is that we don't actually live in one place any more. We are the most mobile people ever to have lived on this planet, and our constant peregrinations are profound erasers of regional differences and provincial attitudes.[47]

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[46] Jean Comhaire and Werner J. Cahnman, How Cities Grow (Madison, New Jersey: The Floram Park Press, 1959), p. 1.

[47] N. B. Ryder, "Variability and Convergence in the American Population," Phi Delta Kappan, XLI (June, 1960), 381-2.

Hence regional differences, perhaps due to varying rates of urbanization, will also disappear. From this one concludes that the more urbanized a region, the more the rural population will approximate the urban.

Many studies of differential fertility have concluded the disappearance of urban and rural fertility differences on the basis of urban dominance theory. The theoretical framework frequently employed in such fertility studies goes by the label "the demographic transition theory," though one readily sees that this is a variant on urban dominance theory with a historical perspective on changing fertility levels between different groups in society. The pervading proposition underlying demographic transition theory is the inhibiting effect of urbanization on fertility.[48] Generally the theory hypothesizes an inverse relationship between fertility and urbanization. Accordingly populations manifest characteristic types of population growth dependent upon their stage of urbanization. Hence populations which are highly urbanized have low fertility and mortality rates; populations beginning the process of urbanization portray rapidly declining mortality rates

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[48] A. J. Jaffe, "Urbanization and Fertility," American Journal of Sociology, XLVIII (July, 1942), 48-60; and Warren C. Robinson, "Urbanization and Fertility: The Non-Western Experience," Milbank Memorial Fund Quarterly, XLI, No. 3 (July, 1963), 291-308.

but relatively high fertility rates; populations which have not begun the transition reveal both high fertility and high mortality levels.[49] Transition theory is traditionally extended to explain the phenomenon of the inverse fertility differentials found among the socio-economic and residential groups of populations undergoing and having undergone the transitional phase. Grabill, Kiser and Whelpton succinctly describe this process as follows:

> 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 is that the decline begins in the so-called "upper" occupational classes in urban areas. Later, the declines affect the so-called "middle" classes and finally the so-called "lower" occupational classes. In the meantime the declines spread outward to the rural areas and presumably the process runs the same type of course there.[50]

Abu-Lughod has proposed demographic transition theory as an analytical model which can be used to predict the

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[49] The theory was first stated by Warren S. Thompson, "Population," American Journal of Sociology, XXXI (May, 1929), 959-75; reformulated by Frank W. Notestein, "Population--The Long View," in T. W. Schultz, Food for the World (Chicago: University of Chicago Press, 1945). For other statements see: Kingsley Davis, "The World Demographic Transition," The Annals, CCXXXVII (January, 1945), 1-11; Kingsley Davis, Human Society (New York: Macmillan, 1949), pp. 603-8; Dennis Wrong, Population (New York: Random House, 1956); and Donald O. Cowgill, "Transition Theory as General Population Theory," Social Forces, XLI (March, 1963), 270-74.

[50] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, The Fertility of American Women (New York: John Wiley, 1958), p. 180. See also D. O. Cowgill, op. cit., propositions 6 and 7, p. 273.

presence (or absence) of urban-rural differentials at various stages of the transition.[51] In her introductory statement she says:

> Within Western industrialized countries certain differences have been noted in the demographic structures of urban and rural areas. Early in the present century, when these were first being probed, the observed variations were emphasized and urban areas were considered to differ *sui generis* from rural ones. More recently, as urban culture has spread out from the metropolitan centers to encompass more and more of the rural hinterlands, and as rural values, patterns, tastes, and standards tend increasingly to approximate those set in cities, many of the differentials hitherto considered inviolate have begun to blur. The wide spread between urban and rural fertility rates commonly observed several decades ago in the United States has been narrowing precipitously, and further diminution is anticipated.[52]

The traditional view of transition theory contains only three stages. Abu-Lughod proposes four phases: pre-industrial, semi-industrial (early transition), industrialized (transition proper), and post-industrial society. Though she does not state it explicitly, she implies that Western countries, including the United States, are moving into a new transition period, the "postindustrial society." During the transition proper period, urbanization first tends to exaggerate urban-rural differentials by increasing membership in classes likely to be experiencing fertility decline

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[51] Janet Abu-Lughod, "Urban-Rural Differences as a Function of the Demographic Transition: Egyptian Data and an Analytical Model," *American Journal of Sociology*, LXIX (March, 1964), 476-90.

[52] *Ibid.*, p. 476.

and reducing membership in classes least affected by the new fertility pattern. Hence the change in the percentage of the population engaged in non-agricultural pursuits results in "an increase in the number of persons 'exposed' to conditions and values favoring lowered fertility."[53] One significant change that occurs in industrial society affects the relationship between cities and their hinterlands. "With industrialization and more particularly with the proliferation of the transport and communication networks prerequisite to industrial growth comes a radical expansion in the city's sphere of influence that is manifested physically in the development of a transitional suburban ring and sociologically in the increased capacity of the city to affect economic conditions, aspirations, and ways of life in an ever widening hinterland."[54] Hence as city influence expands, urban-rural differences in fertility contract. The eventual outcome is post-industrial society. In speaking of this phase Abu-Lughod says:

> The basic characteristic of a postindustrial society is that urbanization and industrialization have become so pervasive that their presence or absence within any given geographic subarea is culturally "irrelevant." Just as preindustrial cites absorbed their dominant ethos from agrarianism, so postindustrial rural enclaves derive theirs from urbanism. In neither instance can simple criteria such as size of community, density of settlement, etc., serve as reliable indices to values or "ways of life." And just as preindustrial societies

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[53] Ibid., p. 488.

[54] Ibid., pp. 488-9.

maintained a relatively stable demographic balance in the absence of major urban-rural differences, the post-industrial society appears to develop its own equilibrium despite urban-rural uniformities.[55]

One of the essential elements of transitional theory is the differential diffusion of contraceptive knowledge and use from urban to rural areas. Some historical studies of the long-term fertility decline have criticized this differential diffusion hypothesis. They have found that there is little evidence of a delay in the reduction of rural fertility compared with urban fertility. Bash provides historical evidence for the United States that indicates the secular decline in birth rates was a simultaneous process for both urban and rural areas, though rural rates always appear higher than urban.[56] Bash tries to explain this inconsistency in transition theory by disregarding social structural features of urban and rural populations. He suggests the need to think of a "dominant value orientation" or some pervading cultural factors of American society which influenced simultaneously the secular decline of both urban and rural fertility. Bash suggests that:

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[55] Ibid., p. 489.

[56] Wendell Bash, "Differential Fertility in Madison County, New York, 1865," Milbank Memorial Fund Quarterly, XXXIII (April, 1955), 161-86; Wendell Bash, "Changing Birth Rates in Developing America: New York State, 1840-1875," Milbank Memorial Fund Quarterly, XLI (April, 1963), 161-82. See also Bernard Okun, "Trends in Birth Rates in the United States since 1870," The Johns Hopkins University Studies in Historical and Political Science, Series 76, No. 1, 1958; and W. H. Grabill, C. V. Kiser, and P. K. Whelpton, op. cit., pp. 16-19.

> . . . we should study more the culture within which a particular kind of urbanism emerged. Then we might find that changes in urban and rural birth rates, rather than being responses to different cultural values, are different responses to the same ones.[57]

Freedman, in commenting on this same finding, supplies another explanation based on a more structural rather than cultural analysis.

> The higher fertility of the rural population--and especially the farm sector--has been well documented for a long time. Recent analyses have added the important conclusion that the long-run secular decline occurred simultaneously in both the rural and urban sectors and was not primarily a direct consequence of the transfer of population between the sectors. Changes in the rural sector, although undoubtedly linked to changes in the urban sector, accounted for a large part of the long-run decline. Probably changes in the rural sector were produced by its involvement in a specialized market economy centered in the city. It suggests that the farmer need not go to the city to become urbanized. In various ways the city can come to him.[58]

It is difficult to accept Bash's proposal of a differential response to the same cultural values, but the notion of a differential response on the part of urban and rural populations is worth pursuing. It is puzzling as to why the urban-rural fertility differential could not be perceived as a differential response to structural factors

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[57]Wendell Bash, "Changing Birth Rates in Developing America: New York, 1840-1875," op. cit., p. 181.

[58]Ronald Freedman, "American Studies of Family Planning and Fertility: A Review of Major Trends and Issues," in C. V. Kiser, Research in Family Planning (Princeton: Princeton University Press, 1962), p. 213 (italics mine).

rather than cultural values. However, as it has been pointed out above, the more frequent interpretation is to perceive the process of urbanization as altering rural social structure similar to urban. When social structure becomes similar for both urban and rural areas, fertility levels will converge. As Freedman has suggested, the rural sector can become urbanized without becoming part of the city because of "its involvement in a specialized market economy centered in the city." Though this conclusion is in line with urban dominance theory, it is definitely incongruous with metropolitan dominance theory. Metropolitan dominance theory emphasizes the notion of "specialization" or differentiation. Hence the social structures within the area of influence of a metropolitan center will tend toward specialization, not uniformity. In contrast urban dominance theory hypothesizes that urbanization will affect rural social structure similar to urban social structure. Assuming that fertility behavior is an adaptation to community social structure, one concludes from urban dominance theory that urban and rural fertility should eventually converge. The desire of this thesis, however, is to suggest the possibility that urban and rural fertility are different responses to the same process, metropolitanization, not urbanization. Assuming again that fertility behavior is an adaptation to community social structure, we must conclude from metropolitan dominance theory that urban and rural fertility may never converge, because of the specialization effect that metropolitan centers have on the social structures of urban and rural communities in their sphere of influence. Abu-Lughod hints at this as a possible development in postindustrial society which is characterized by "relatively stable birth rates comparable in so-called urban and so-called rural areas, with significant intraregional variations due primarily to ecological specialization within the metropolitan complex."[59] However she fails to develop this idea further.

We must move away from the theoretical bias of urban dominance theory. Freedman himself has suggested that demographers and sociologists alike have shared this bias. He further states:

> This was the view that urbanization with its accompanying specialization and high rate of mobility inevitably would lead to a growth of secularism and rationality, to the declining influence of such traditional forces as religious faith, to a shattering of traditional family ties and other primary group influences, to a growth of individualism, and to the attachment of the individual to larger, impersonal, and rational organizations. . . . The dominant view among both demographers and sociologists was that as all of the population becomes closely involved in an urban society, family planning would become universal and the size of families planned would continue to decline. . . . A continuing revision of the older view of urban society since the war gives more weight to the persistence of religious and other traditional allegiances. There is growing emphasis on the persistence and even resurgence of the family and other primary groups as the channels through which the larger bureaucratic organizations reach the individual, in

[59]Janet Abu-Lughod, op. cit., p. 489 (italics mine).

> larger measure. Urbanization and industrialization are seen as leading to the reorganization of society in new forms rather than to inevitable disorganization and mass anomy.[60]

Urban dominance theory suggests the emergence of a mass society in which all traditional differences have disappeared. This is highly unlikely. As Freedman suggests, society is undergoing a reorganization and new patterns of differentiation will emerge. In fact, it is possible that some former differences will persist if maintained by the differentiating effects of metropolitan centers on their hinterland. It is proposed that the urban-rural fertility differential is one of these traditional differences that will persist.

We must avoid inaccurate interpretations of ecological data produced by this urban "bias" of urban dominance theory. One pitfall in ecological analysis that continually crops up is how to interpret the "gradient." The gradient principle is based upon the work of scholars who have emphasized the concentric zone and gradient effect of city influence on rural areas. The gradient principle is consistent with the concept of urban dominance.

> This principle holds that at any given moment of time urban characteristics are distributed in the satellite rural area so as to form gradients of decreasing incidence with distance from the city. In a dynamic sense the influences of the expanding urban center can be thought of as extending into the rural area in a gradient which declines in accord with diminishing communication and transportation facilities. Stated in brief form the

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[60] Ronald Freedman, op. cit., p. 215.

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gradient principle reads: the extent of urban-influenced changes in rural areas varies inversely with distance to the nearest city and directly with the size of that city.[61]

Though the gradient (essentially, then, a measure of distance from a city) invariantly reveals a difference between the urban and rural populations considered,[62] the underlying assumption as to what the gradient reflects is generally the extent to which the characteristics of the rural population resemble those of the urban population. Given time and progressive urbanization, these differences will disappear as the rural population approximates the urban. Duncan, after noting that the gradient of urban influence is more pronounced for the rural-farm than for the rural-nonfarm and that it is steeper in less urbanized geographic divisions, concludes that:

> Both these observations suggest that the effects of urbanization on the rural population will appear less pronounced, the more urbanized the national economy becomes. The distinction between rural and urban,

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[61]Walter T. Martin, "Ecological Change in Satellite Rural Areas," American Sociological Review, XXII (April, 1957). Reprinted in G. Theodorson, Studies in Human Ecology (Evanston: Row, Peterson, 1961), p. 610.

[62]See for example such studies as Warren S. Thompson and Nelle E. Jackson, "Fertility in Rural Areas in Relation to Their Distance from Cities, 1930," Rural Sociology, V (June, 1940), 143-62; E. T. Hiller, "Extensions of Urban Characteristics into Rural Areas," Rural Sociology, VI (September, 1941), 242-57; Edmund de S. Brunner and J. H. Kolb, Rural Social Trends (New York: McGraw-Hill, 1933), Ch. V; and O. D. Duncan, "Gradients of Urban Influence on the Rural Population," The Midwest Sociologist, XVIII (Winter, 1956), 27-30.

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though important, is blurred. Galpin, among others, saw this, when he proposed the neologism, "rurban community." The cross-sectional analysis here, together with a variety of supporting trend data, presents a prospect of still further blurring. Sorokin and Zimmerman, twenty-five years ago, concluded that in highly urbanized countries the magnitude of rural-urban differences had reached a peak and was due to diminish.[63]

Others have made this same conclusion from gradient data, even when using a metropolitan dominance framework, which suggests, of course, a lack of awareness on the part of such writers of the fact that urban dominance and metropolitan dominance theories lead to conflicting interpretations. Consider, for example, an article written several

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[63]O. D. Duncan, "Gradients of Urban Influence on the Rural Population," _op. cit._, p. 30. Duncan's reference to Sorokin and Zimmerman is from P. A. Sorokin and C. C. Zimmerman, _Principles of Rural-Urban Sociology_ (New York: Henry Holt, 1929), Ch. 27.

It is interesting that while Duncan calls upon Sorokin to support the urban dominance hypothesis of blurring urban-rural differences, he may also be called upon to support the metropolitan dominance hypothesis of continued differentiation. Sorokin said two years earlier: "_urbanization_" . . . _means only an approach of (the rural world's) characteristics to the characteristics of the urban world but does not mean a complete obliteration of all differences between them_. In order that such an obliteration become possible it is necessary for the urban and rural areas to have the same density of population, the same size of community, the same homogeneity or heterogeneity of population, the same occupational milieu and nature of the occupation, and the same intensity and character of the interaction system. Sorokin's statement from Pitrim A. Sorokin, _Social Mobility_ (New York: Harper, 1927), p. 624. Italics in original. Quotation taken from secondary source: Leo F. Schnore, "The Rural-Urban Variable: An Urbanite's Perspective," _Rural Sociology_, XXXI, No. 2 (June, 1966), 132.

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years ago by Firey, Loomis, and Beegle.[64] The authors use the metropolitan dominance concepts of "field" and "center" to distinguish rural and urban and also speak of the role of highways in bringing rural communities into an interdependent unity, a metropolitan community, in other words. They state:

> Briefly, highways are binding the field areas into organic, functioning unities and subunities which surround and tie in with centers and subcenters. Villages serve as centers for little towns; towns are centers for large fields; and cities function as centers for the largest fields. Each field, with its center, is successively subsumed into the next large one, in hierarchical fashion.
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> Thus there emerges a functional pyramid of field-center "organisms," all bound together by a network of highways. The height of the pyramid and the degree of its functional unity is directly contingent upon the number and layout of its sustaining highways.[65]

The authors use a metropolitan dominance framework and describe clearly the structure of a metropolitan community, but unfortunately conclude the convergence of urban and rural areas rather than differentiation. They continue:

> Such a pyramid implies interaction between rural and urban people, a reduction of their differences, a fusion of their interests. . . . In between these centers and subcenters, as well as out beyond them, in the areas more truly rural, are farm families, whose new proximity

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[64] Walter Firey, Charles P. Loomis, and J. Allan Beegle, "The Fusion of Urban and Rural," in Jean Labatat and Wheaton J. Lane, Highways in Our National Life: A Symposium (Princeton: Princeton University Press, 1950), pp. 154-63. Reprinted in P. K. Hatt and A. J. Reiss, Jr., Cities and Society (2nd ed.; Glencoe: The Free Press, 1957), pp. 214-22.

[65] Ibid., pp. 215-17.

> to the city, made possible by the highway, renders them a little less rural and a little more urban than they had been before.[66]

After noting the possibility of delineating with remarkable precision the gradients which urban cultural patterns take on in the rural areas contiguous to a city, they conclude by saying:

> Making due allowance for some exceptions and for some degree of variability in the centers, the general principle still seems to hold that rural areas, in direct proportion to their proximity to urban centers, are becoming culturally urbanized. Since proximity is contingent upon time-cost accessibility between country and city, itself a function of highways, the causative agent in this urbanization of rural culture must be evident. It is the highway that has brought city values, ideals, and standards to the country dweller. Notions about life objectives, about loyalties, about modes of living, about consumption tastes, about well-being--all of these are becoming more alike as between country and city. While all this perforce means the loss of quaint, rustic ruralisms, it means, too, the fuller integration of the American people around basic and historic ideals of the nation. More truly than ever before a homogeneous, internally consistent, and universally accepted value system, shared alike by urbanite and ruralite, is coming to characterize American society. The role of the highway in effecting this cultural rapproachement between country and city has been decisive.[67]

It seems that a too hasty conclusion has been posited by these writers: that increased _integration_ of the rural and urban populations necessitates homogeneity. But the notion of the metropolitan community contains the integration of _heterogeneous_ elements into an interdependent whole. Indeed, there are dynamic changes taking place between urban and

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[66] _Ibid._, p. 217 (italics mine).

[67] Ibid., p. 222.

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rural parts of the metropolitan community, but this is not necessarily a move toward the disappearence of urban and rural differences. A reorganization of society by metropolitanism suggests the emergence or persistence of differences in functional interdependence. Quinn, in his classic textbook on human ecology, points out that homogeneity and functional integration are two distinct bases for the classification of substantive areas. In distinguishing these he says:

> . . . a homogeneous area is characterized by similarity of differentiating attributes throughout its extent. For example, a region may be characterized by a hot, dry type of climate, by rugged topography, by a distinctive type of population, or by a characteristic culture. Whatever attributes have been selected for purposes of delimitation, these attributes must show sufficient similarity and importance throughout its entire extent to give character to the area, and at the same time sufficient difference from adjacent territory to mark it off as distinct. In contrast, the integrated area typically includes contrasting parts organized into a larger areal unit. For example, the diverse sub-areas of a metropolitan region, including the agricultural hinterland with its town, village, and farm communities, and the metropolis with its business center, factory districts, residential areas, and satellite suburbs, together constitute a functioning area unity. The chief attribute of such a metropolitan region is that of integration itself. The contrasting types of sub-areas are welded together in a complex where larger unity itself makes the metropolitan area distinguishable from adjacent territory.[68]

Finally, Bogue seems to suggest that urbanization, characterized by the emergence of a metropolitan economy, will not have the effect of diminishing geographic differences, but will actually enhance them. He asserts:

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[68] James A. Quinn, Human Ecology (New York: Prentice-Hall, 1950), p. 39 (italics mine).

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> . . . the notion that progressive urbanization and industrialization will cause these distinctive clusters to disappear cannot be supported either by theory or by observation. In fact, the contrary appears to be true. A market economy seems to cause places to seize upon whatever unique sites, location or physical characteristics they have that may provide the basis for profitable specialization. . . .
>
> Thus, instead of minimizing geographic differences, the modern metropolitan economy may emphasize them. In this process, interregional differences that once were large may disappear, while new differences may appear. Instead of becoming a homogeneous mass, industrialized populations tend to become a patchwork of specialized populations tied together by a geographic as well as intracommunity and intercommunity division of labor.[69]

In conclusion to our discussion of urban dominance theory, we must propose that urban-rural differences in community social structure will persist. Assuming the ecological principle established previously, that fertility is a function of community social structure, we must also insist that urban-rural fertility differences will persist. Urban dominance theory does not lead to this conclusion, since it must posit the eventual blurring of urban-rural differences. We must conclude also that fertility studies which assume an urban dominance theoretical framework do not have a sensitive research design essential to understanding possible differences which may exist in urban-rural fertility behavior. To understand why urban-rural differences will persist, we must move to a consideration of metropolitan dominance theory. Though much has already been said

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[69]Donald J. Bogue, "Population Distribution," *op. cit.*, p. 396 (italics mine).

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concerning metropolitan dominance theory in contrast to urban dominance theory, let us proceed to systematically consider the elements of the former as the preferred theoretical framework for the analysis of urban-rural fertility differences.

Metropolitan Dominance Theory

The metropolitan community (or region) is becoming an increasingly important form of organization in modern industrial society. We have established previously the expectation of an orderly spatial distribution of population characteristics within given geographical areas. An essential assumption in metropolitan dominance theory is that the metropolitan center is a primary organizing agent which produces the spatial distribution patterns of community social structure within the metropolitan region or the sphere of influence of the metropolitan center. The economy of the metropolitan community is viewed as "the characteristic and dominant type of modern social and economic organization."[70] It is assumed, then, that American society is a "metropolitanized" society. Our present day society operates in terms of, and is conditioned by, the metropolis. The metropolitan economy is the modern form of social organization by which man makes effective use of his advanced technology. The

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[70] Donald J. Bogue, The Structure of the Metropolitan Community, op. cit., p. 8.

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pervasive influence of metropolitan centers has spread to such an extent that "the entire area of the United States may be broken down into a series of areas, each of which is dominated by a metropolis."[71]

If we are to understand how the metropolitan center orders the spatial distribution of community social structures, we must understand first the nature of the metropolitan community. The general spatial structure of the metropolitan community was described by R. D. McKenzie some time ago:

> The metropolitan region thus considered is primarily a functional entity. Geographically it extends as far as the city exerts a dominant influence. It is essentially an extended pattern of local communal life based upon motor transportation. Structurally, this new metropolitan regionalism is axiate in form. The basic elements of its patterns are centers, routes and rims. The metropolitan region represents a constellation of centers, the interrelations of which are characterized by dominance and subordination. Every region is organized around a central city or focal point of dominance in which are located the institutions and services that cater to the region as a whole and integrate it with other regions. The business subcenters are rarely complete in their institutional or service structure. They depend upon the main center for the more specialized and integrating functions.[72]

As McKenzie suggests, the rise of the metropolitan community was made possible by the emergence of rapid transportation, especially motor transportation. Prior to the

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[71] *Ibid.*, p. 13.

[72] R. D. McKenzie, *The Metropolitan Community* (New York: McGraw-Hill, 1933), p. 70.

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development of modern highway systems, in the waterway and railroad eras, the city was in very large degree autonomous of its own rural hinterland. "But the highway has changed all of this. Because of the peculiar superiority of the automobile as a short-distance, small load carrier and as a 'free-agent' whose course and destination need not be confined by water ways or railroad tracks, the advent of highway transportation has meant, for the first time, intimate contact between a city and its hinterland."[73] Hence motor transportation has opened up the hinterland in such a way as to increase the interdependence between the central city and surrounding hinterland populations. Integration or interdependence, then, is the essence of the metropolitan community, i.e., <u>the functional interdependence of metropolitan center and hinterland</u>. As McKenzie states:

> The super community therefore absorbs varying numbers of separate local communities into its economic and cultural organization. In this pattern a dominant city--that is, dominant relative to surrounding settlement, functions as the integrating unit. . . . In other words, there is developing within the United States . . . a pattern of settlement which may be designated as city regionalism. This new city regionalism differs from the regionalism of former times in that it is a product of contact and division of labor rather than a mere geographic isolation.[74]

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[73] Walter Firey, Charles P. Loomis, and J. Allan Beegle, <u>op. cit</u>., p. 215.

[74] R. D. McKenzie, <u>op. cit</u>., p. 313.

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[75] Ibid

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But the notion of integration or interdependence of elements with the metropolitan community implies "a division of labor," i.e., a differentiation or specialization of function by place. "The modern metropolitan community, unlike the pre-motor city, obtains its unity through territorial differentiation of specialized functions rather than through mass participation in centrally located institutions."[75] Bogue, in describing the function of cities in the metropolitan community, differentiates between "metropolitan centers" and "hinterland cities." Commenting on the function of the metropolitan center he says:

> The metropolis is usually the largest and most complex (the farthest removed from the "average" city) of all the cities in the territory. Because it is able to assemble cheaply a varied array of raw materials and products from all parts of the world; because a larger number of specialized components and skills are required in the production of the goods required to sustain human beings at their present level of living; because up to a certain point machine production increases in efficiency with an increased scale of operations; and because certain mutual benefits appear to accrue to business enterprises from their location in proximity to each other, the large city is able to produce and distribute more varied goods and services than is a smaller city. The more specialized the goods, and the more the goods are amenable to mass production, the greater these industrial and commercial advantages of large cities seem to become. From these facts it has been concluded that the metropolis, or modern large and complex city, exercises an organizing and integrating influence on the social and economic life of a broad expanse of territory far beyond the civil boundaries, and thereby dominates all other communities within this area.[76]

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[75] *Ibid*., p. 71.

[76] Donald J. Bogue, *op. cit*., pp. 6-7 (italics mine).

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The metropolitan community, then, is really a network of smaller communities, rural and urban, distributed in a definite pattern around a dominant city, and bound together in a territorial division of labor through a dependence upon the activities of the dominant city. It is the metropolitan center, then, which is the organizing agent of inter-community differentiation. Communities lying in this region about the metropolitan city, drawn into a division of labor with this center, exchange for specialized goods and services of the metropolis such other products as can most effectively be produced from the resources in their immediate locality. All subordinate communities become dependent upon metropolitan markets, including farm operators who regulate their activities to produce those products which will yield them the greatest return in the metropolitan market.

But the metropolitan center is not just an economic center; nor does it influence only the economic activities of its hinterland communities. With the exchange of material goods there is also an exchange of ideas and human values. "The metropolis appears to have become the focal point not only of our material activities, but of much of our moral and intellectual life as well."[77] Bogue, in his attempt to demonstrate the pervading dominance of the

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[77] Donald J. Bogue, op. cit., p. 6.

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metropolis, concentrated on what he termed "human sustenance activities," viz., the functions of retail trade, wholesale trade, services, and manufacturing. Bogue does not deny, however, that dominance of an equally intense or identical pattern might operate in other human activities which are less clearly related to human sustenance. In fact he definitely feels that "many other conditions of life undoubtedly are subject to control or modification by the central city. The complete structure of the metropolitan community may include the functions of finance, government, education, religion, and innumerable other aspects of the institutional composition of the individual hinterland community."[78] Though the notion of metropolitan dominance in its original conception contains many economic overtones, it is clear that the theoretical framework can and must be employed to consider the organizing effect the metropolitan center has on all activities of hinterland communities. The all-inclusive nature of metropolitan dominance permits the assumption that almost any community activity is influenced by the metropolis. These comments suggest the need to consider the manner in which fertility behavior is influenced indirectly through the organizing effect the central city has on the social structure of communities which lie within the metropolitan region itself.

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[78]*Ibid*., p. 61.

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But metropolitan dominance cannot be understood only in terms of the function of the metropolitan center. The interdependence of central city and hinterland must also be recognized. The high density of population in the central city precludes the possibility that food stuffs for the population or raw materials for industry can be provided within the central city. It is impossible for the city to be self-sufficient, hence, the need to consider the function of the hinterland. Hawley assumes this distinction when he describes the community as "comprised of two generalized unit parts, the center and the adjoining outlying area. In the one are performed the processing and service functions, and in the other are carried on the raw-material producing functions. The two develop together, each presupposing the other."[79] Bogue in his investigation of the metropolitan community also emphasized the interdependent relationship of the central city and its hinterland:

> The one situational factor which Gras[80] holds to be absolutely essential for the development of a city aspirant to metropolitan status is the possession of a hinterland, "a tributary adjacent territory, rich in natural resources accompanied by a productive population and accessible by means of transportation." We are warned by Gras not to overemphasize either the metropolis or the hinterland in considering the metropolitan organization.
>
> It is true that in studying this organization we are inclined to emphasize the great metropolitan center, but

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[79] Amos Hawley, op. cit., p. 245.

[80] N. S. B. Gras, An Introduction to Economic History (New York: Harper, 1922), quotations from pp. 185-87.

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> to forget the large dependent district would be fatal to a correct understanding of the subject. Perhaps, indeed, it is somewhat incorrect to speak of the area as dependent upon the center, for though that is true, the center is also dependent upon the outlying area with its towns, villages, and scattered homesteads. Interdependence of parts is really the key to the whole thing.[81]

Though this caveat was voiced rather strongly by Gras and Bogue, there seems to be some evidence that it has not been adhered to rigorously by others. Grigg claims:

> The proponents of this position (the interdependency of central city and hinterland) emphasized one aspect of this principle of dominance--the function of the center--and have ignored the second--the hinterland. They have taken Gras's statement of the relationship of the two and have failed to consider the broader implications of his writings. Gras points out the necessity of a hinterland for the existence of a metropolitan center, but at the same time he insists that you cannot reify one at the expense of the other. Indeed, implied in the writing is the injunction that extent and degree of functional integration imposed on the hinterland by the metropolitan center is an empirical question wanting to be demonstrated rather than an *ad hoc* assumption to be treated as a reality. Thus, the ecologist finds himself in the position of stating dominance exists because metropolitan centers exist *ipso facto*; and the concept of the hinterland is dragged along behind, not because they (*sic*) exist, but because it is obvious that each metropolitan center must have a hinterland.[82]

Grigg calls for more intensive consideration of and possible refinement of the concept of hinterland in metropolitan dominance theory. It is essential that the hinterland be given due consideration not only because of its interdependence with a metropolitan center, but also because the

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[81]Donald J. Bogue, *op. cit*., pp. 7-8.

[82]Charles M. Grigg, "A Proposed Model for Measuring the Ecological Process of Dominance," *Social Forces*, XXXVI, No. 1 (December, 1957), 628.

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dominance of a metropolitan center is reflected in the organization of the hinterland and the hinterland itself may have some bearing on its own internal pattern of organization. We shall consider this point later.

At this juncture we may assert that the theory of metropolitan dominance states that the metropolitan center more and more controls the conditions of life of the population in the areas surrounding the central city. The hinterland populations, as a result, are spatially organized with reference to the metropolitan center. We should next consider the concept of _dominance_, the means by which the hinterland is controlled.

Bogue considered the concept of dominance to a great extent and suggested that "dominance, in its ecological meaning, is a special kind of control over a community of interfunctioning units."[83] Simply put, the metropolitan center establishes and controls the conditions of life which set limits to the activities of the other communities in its sphere of influence. The net effect is a multiple-community complex, a constellation of communities, which may be termed the metropolitan community in deference to its dominant central city. The social structure of each of these communities will be an adaptation to the conditions established by the metropolitan center.

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[83]Donald J. Bogue, _op. cit._, p. 10.

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This is the nature of dominance, but how does one operationalize it? Bogue suggests that if a definite non-random distribution of attributes can be demonstrated, patterned with respect to the metropolis, it can be inferred that the distribution of these attributes is "controlled" to some extent by factors associated with the metropolis.[84] But dominance is not to be considered a fixed attribute, but a variable. The amount of control exercised over the communities of the metropolitan region will vary with the _size_ of the dominating center and the _accessibility_ (_distance_) of the hinterland community to the dominating center.

Accessibility is assumed to be a variable which covaries with dominance. The task of delimiting areas of like degree of dominance is a problem of delimiting areas of like degree of accessibility. The metropolis is a metropolis because of its superior ability to serve and be served by the hinterland.

> In terms of time, cost, and expenditure of energy the entire area can enter more easily into a division of labor with a city located at a highly accessible point. Exchange and interaction with a city located at the most inaccessible point could be achieved only at a maximum expenditure of time, cost, and energy. Since time, cost, and energy are all elements of life which must be conserved in order to ensure most economical survival, it can be reasoned that, since these elements vary with accessibility, the following assumption can be made: _varying degrees of accessibility must represent varying degrees of interaction with the metropolitan center_.[85]

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[84] _Ibid_., pp. 14-15.

[85] _Ibid_., p. 21.

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Because of the importance of motor vehicle transportation in the development and establishment of dominant metropolitan centers, distance to be traveled may be expected to covary with accessibility. The distance to be traveled limits the opportunity to transport goods, services, and persons from hinterland communities to the metropolitan center. "One permanent requirement for changing the location of any object is the necessity of overcoming distance."[86] Hence, it is understood that varying distance of a hinterland community from a metropolitan center reflects varying degrees of dominance.

Size, as an attribute of the dominating center, is also an indicator of dominance. It is expected that the larger the metropolitan center, the greater will be its organizing influence on the hinterland, the closer the integration of the central city and its hinterland, and the larger will be the hinterland area which can be effectively influenced by the metropolitan center. Increases in the size of a population are related to the degree of specialization attainable by that population. Hawley points out that "population size imposes limits on both the extent of specialization and the number of different activities that may be carried on simultaneously. . . . In a small population the degree of specialization of activity is necessarily

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[86] _Ibid_.

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slight. On the other hand, every increment in size increases the extent to which specialization may be developed."[87] Bogue, in describing the metropolitan center, the largest city in the metropolitan region, emphasizes its greater capacity for specialization of activities. He then links this attribute of the metropolitan center to the organizing and integrative influence it exercises over the hinterland.[88] Hence the larger the metropolitan center, the greater its specialization powers, and the greater its integrative effect on the hinterland. Therefore in operationalizing the concept of metropolitan dominance both distance from the metropolitan center and size of the metropolitan center should be taken into consideration.

Now at this point we may briefly summarize by saying that the metropolitan center and its hinterland are functionally interdependent. But the metropolitan community is a network of communities, including both urban and rural populations, which are territorially differentiated by the dominant influence of the metropolitan center. The degree of dominance of the metropolitan center over its hinterland communities is a function of size and distance. We have also established the fact that the metropolitan center has a controlling influence, not only on the sustenance

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[87] Amos Hawley, op. cit., p. 122.

[88] Donald J. Bogue, op. cit., pp. 5-6.

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activities of hinterland communities, but on the entire social structure of such communities, and perhaps indirectly on the whole gamut of community activities. We must now reconsider the effect of the metropolitan center on its hinterland. What patterns of territorial differentiation of community social structural variables might we expect to accrue among hinterland communities?

The most common type of analysis of the influence of metropolitan centers on hinterland communities has been in terms of gradients (concentric zones) which extend out from the metropolitan center. In such studies it is usually hypothesized that the hinterland will be spatially organized with reference to the metropolis and that this organization will manifest itself in a series of gradients in the characteristics of the population along the dimension, distance from the metropolis. The fact that such gradients exist has been documented by numerous studies emphasizing a wide variety of indices of population characteristics.[89] Unfortunately

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[89] A selected list of such studies might include the following: Theodore R. Anderson and Jane Collier, "Metropolitan Dominance and the Rural Hinterland," Rural Sociology, XXI (June, 1956), 152-57; Edmund deS. Brunner and J. H. Kolb, Rural Social Trends (New York: McGraw-Hill, 1933), Ch. V; Otis D. Duncan and Albert J. Reiss, Jr., Social Characteristics of Urban and Rural Communities, 1950 (New York: John Wiley, 1956), Ch. XIII; O. D. Duncan, "Gradients of Urban Influence on the Rural Population," The Midwest Sociologist, XVIII, No. 1 (Winter, 1956), 27-30; O. D. Duncan, "Note on Farm Tenancy and Urbanization," Journal of Farm Economics, XXXVIII, No. 4 (November, 1956), 1043-47; John Stoeckel and J. Allan Beegle, "The Relationship between the Rural-Farm Age Structure and Distance from a Metropolitan Area," Rural

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the test of the gradient pattern in the hinterland of a metropolitan center is a test of only _part_ of the metropolitan dominance theory. In fact, the gradient test is a test for both metropolitan dominance and urban dominance theory, and does not differentiate between the two. Gradient studies usually conclude that the hinterland population manifests a pattern of decreasing (or increasing) incidence of population characteristics (depending upon which variables are employed), as one moves away from the central city. Empirical findings of gradient studies have been used to determine, for example, the territorial extent of the influence exerted by a central city, or the average of a number of central cities; the difference between rural populations located adjacent to cities and those removed from cities, with the amount of difference indicating how much the strength of urban influence is conditioned by distance; how the gradient of one particular characteristic may be different from that of another, with such differences suggesting the spheres where urban influence is most pronounced; or how much size conditions the amount of urban influence exerted

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Sociology, XXXI, No. 3 (September, 1966), 346-54; Harold F. Goldsmith and James H. Copp, "Metropolitan Dominance and Agriculture," _Rural Sociology_, XXIX, No. 4 (December, 1964), 385-95; E. T. Hiller, "Extension of Urban Characteristics into Rural Areas," _Rural Sociology_, VI (September, 1941), 242-57; and Warren S. Thompson and Nelle E. Jackson, "Fertility in Rural Areas in Relation to Their Distance from Cities, 1930," _Rural Sociology_, V (June, 1940), 143-62.

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on surrounding rural territory when gradients are examined in relation to the size of cities.

These studies tell as much of the gradient principle of metropolitan dominance theory (and urban dominance theory as well) but little in terms of the principle of differentiation, which is also an essential part of metropolitan dominance theory (but not of urban dominance theory). An excellent article by Martin[90] draws especial attention to this deficiency in metropolitan dominance research. This article is not an empirical study but an attempt to summarize and synthesize what research has been done dealing with ecological changes taking place in the rural sectors of satellite areas (hence, he does not consider the entire range of hinterland components of a metropolitan community). Martin uses the two broad principles of gradient and differentiation as "organizing devices" for ordering the results of recent studies. With respect to the gradient principle, "the extent of urban influenced changes in rural areas varies inversely with distance to the nearest city and directly with the size of that city,"[91] he finds a wealth

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[90]Walter T. Martin, "Ecological Change in Sattelite Rural Areas," American Sociological Review, XXII (April, 1957), 173-83. Also reprinted in George A. Theodorson, Studies in Human Ecology (Evanston: Row, Peterson, 1961), pp. 607-16.

[91]Ibid., p. 610.

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of empirical studies which document gradient patterns for the deconcentration of industry, population, and business activities, occupational composition, rural land values, nature of the farming enterprise, income, age and sex composition, fertility, educational achievement, and participation in urban activities. The second principle, differentiation, is to be considered complementary, rather than contradictory, of the gradient principle, although "the two are partially independent in the sense that demonstrated tenability of the gradient principle provides no basis for evaluating the differentiation principle; on the other hand, acceptance of the second indicates that the first holds true. . . ."[92] What Martin says of the principle of differentiation is crucial to this thesis:

> The second principle (differentiation) . . . holds that these influences are extended selectively rather than diffusing uniformily, and that the over all effect is to transform the homogeneity of the rural territory into an urban-like heterogeneity with specialization of labor, differentiation of subareas, and functional interdependency of parts. In spite of the almost complete lack of research concerned with this principle, it would seem to have as much or greater implication for changes occurring in rural areas than does the gradient principle, which has been dealt with so frequently. The differentiation principle concerns the dynamics of the relationship between the rural and urban sectors of the economy, and the increasing integration of rural areas into the great regional urban complexes. While this idea has been stressed by McKenzie and others, there is a surprising lack of empirical research.[93]

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[92] Ibid.

[93] Ibid., pp. 614-15.

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The point Martin makes, then, is that an important element of metropolitan dominance, i.e., the differentiating effect the metropolitan center exerts on the hinterland communities, even within the same distance zone from the central city, for both urban and rural communities, is in need of empirical testing. The crucial issue to consider at this stage of metropolitan dominance research, then, is not that metropolitan centers exert a controlling influence over hinterland communities or that its influence wanes as distance increases, but that the metropolitan center exerts a _differentiating_ influence, transforming both urban and rural communities into a functional interdependency of specialized parts. Studies using the gradient principle tend more toward a comparative study of the metropolitan center and its hinterland communities. The differentiation principle, on the other hand, requires a different dimension of comparison. If metropolitan centers do exert a differentiating influence on hinterland communities, then an important comparison to be made is _between different classes of hinterland communities_. Martin indicates that he is aware of only one study dealing with this problem. This study, by Kish, classified incorporated places by distance zones from the central city and demonstrated conclusively that for a variety of variables the cities of the distant zones made up a relatively homogeneous universe while those in the inner zones were highly dif

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highly differentiated on the same counts.[94] But Kish's study dealt only with incorporated places and excluded rural communities. Furthermore the incorporated places were those found only within the immediate metropolitan ring to the exclusion of those lying in the more outlying areas. In concluding his article Martin states that:

> . . . it seems highly probable that the rural sectors of the satellite areas, like the urban sectors, more and more consist of well differentiated subareas as the influence of the central city is extended increasingly throughout the larger metropolitan area. The changing patterns in population density, age and sex composition, occupational composition, and land values, to name a few characteristics, are societal adjustments in the satellite areas to the evolving spatial organization of the metropolitan community.[95]

Martin's comment clearly suggests that further comparisons of the differentiating effects of metropolitan centers must concentrate on the differences that accrue between urban and rural hinterland communities. Hence we should expect that metropolitan centers exert a different impact on urban hinterland communities than on rural hinterland communities. On the basis of these comments we should be able to formulate some hypotheses concerning the differentiating influence which metropolitan centers have on their respective hinterlands. Recall that earlier in this chapter

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[94]Leslie Kish, "Differentiation in Metropolitan Areas," American Sociological Review, XIX (August, 1954), 388-98.

[95]Walter T. Martin, op. cit., pp. 615-16.

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we accepted a major assumption of ecological analysis, that community social structure indicators will manifest a definite nonrandom distribution pattern in social space and that fertility behavior, operationalized on a residential area level, will be a function of community social structure in both urban and rural populations. With the introduction of metropolitan dominance theory, we now assume that this nonrandom distribution of community social structure indicators is due to the pervading influence of metropolitan centers in their respective hinterlands. Metropolitan centers, then, are the determining agents of the social and economic organizational makeup of both urban and rural hinterland communities. It is assumed that, given the differentiating effect of metropolitan centers, community social structure in the urban hinterland will manifest different patterns of specializing than the rural hinterland. Accepting distance and size as measures of the dominance of metropolitan centers, and the differentiating effect of metropolitan centers on their hinterlands, it is hypothesized that:

1. Community social structure is a function of distance and size of a dominating metropolitan center.

    a. Distance and size of a dominating metropolitan center will manifest a different impact on community social structures in the urban hinterland than in the rural hinterland.

2. Fertility behavior is a function of community social structure and distance and size of a dominating metropolitan center.

    a. Community social structure and distance and size of a dominating metropolitan center will manifest a different impact on fertility behavior in the urban hinterland than in the rural hinterland.

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To this point we have discussed various aspects of metropolitan dominance theory. Our hypotheses emphasize the differentiating effect of metropolitan dominance on urban and rural hinterlands. If our discussion of this theory is terminated at this point, we shall be in danger of violating the caveat expressed earlier, that of overemphasizing the role of the metropolitan center and overlooking the importance of the hinterland. Let us reconsider the place of the hinterland in metropolitan dominance theory.

If we return to Bogue's study of the structure of the metropolitan community, we will capture an important point often overlooked by other studies of metropolitan dominance. Many such studies grant the attribute of dominance only to the metropolitan center. Bogue, emphasizing the point that the metropolitan community is a "community of local communities," constituting a central city and several hinterland communities, recognized that "all local communities in the metropolitan community are considered to possess some degree of dominance over some portion of the hinterland."[96] For this reason he found it necessary to adopt as his unit of analysis the individual local community, since each community exercises some influence within the hinterland. In this connection he stated:

> The hinterland contains a great variety of communities, ranging from cities of more than 100,000 inhabitants to small villages and local farming communities.

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[96]Donald J. Bogue, op. cit., p. 30.

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> For this reason it cannot easily be assumed that the conditions set by the metropolis force one pattern of adjustment in all areas about the metropolis. Nor can it be assumed that all hinterland communities are oriented solely toward the metropolis. . . . This general observation makes it evident that some system of classifying the hinterland communities must be adopted, and that this classification must be in terms of amount of influence exercised by the principal hinterland communities.[97]

From this Bogue proceeded to propose a fourfold classification of hinterland communities corresponding to different steps in the dominance continuum:

Metropolitan centers	Dominants
Hinterland cities (urban) . . .	Subdominants
Rural-nonfarm populations (rural-nonfarm).	Influents
Rural-farm populations (rural-farm)	Subinfluents

It is understood that "decreasing values along this scale refer to two types of change in dominance: (1) decreasing range or area of dominance, and (2) decreasing number of functions over which dominance is exercised."[98] Although Bogue considered in his analysis only the first two levels of dominance to the neglect of the rural-nonfarm and rural-farm populations, it is essential for a comprehensive view of metropolitan dominance to take into consideration the potential influence of the metropolitan center on all three hinterland areas: urban, rural-nonfarm and rural-farm

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

[98]*Ibid*.

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hinterland communities.[99] The present study is considering all three types of hinterlands as well as the local community as its unit of analysis.[100]

Getting back to our problem, what are the implications of the observation that all local communities in the metropolitan community exert some degree, great or small, of dominance? If the metropolis cannot be expected to set the conditions for adjustment in all areas of the hinterland and if some hinterland communities are not solely oriented to the metropolitan center, what other source of influence is there operating in the hinterland to account for the nonrandom distribution of structural attributes in space? Furthermore, if the power of the metropolitan center to control the conditions of life, to which hinterland communities adjust, wanes with increasing distance, what other

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[99]Bogue's is the only study that I am aware of that visualizes the metropolitan community in four parts: metropolitan center, urban hinterland, rural-nonfarm hinterland, and rural-farm hinterland. Other metropolitan dominance studies employ a three-fold classification: metropolitan center, urban hinterland, and rural hinterland. See, for example, Lewis Jones, "The Hinterland Reconsidered," American Sociological Review, XX (February, 1955), 40-44; and Charles M. Grigg, "A Proposed Model for Measuring the Ecological Process of Dominance," Social Forces, XXXVI (December, 1957), 128-31. Some urban dominance studies use a three-fold classification also, but slightly different to fit the theory: urban centers (by metropolitan and nonmetropolitan status), rural-nonfarm and rural-farm. See, for example, O. D. Duncan, "Gradients for Urban Influence on the Rural Population," The Midwest Sociologist, XVIII (Winter, 1956), 27-30.

[100]See Chapter I, p. 62, for the specific definitions of urban, rural-nonfarm, and rural-farm communities. Census definitions are employed on a county basis.

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source of influence might there be in the outlying hinterland areas of the metropolitan region? These questions must be answered in order to maintain the basic assumption in ecological analysis, that there exists a non-random distribution of structural attributes in space. It is suggested that though metropolitan dominance is an important determinant of this non-random distribution of structural attributes, it is not capable of accounting for all the variation of structural attributes in hinterland communities.

Grigg has written two articles which have something to say concerning the problem under consideration.[101] In the later article Grigg and Vance attempt a synthesis of ecological (actually metropolitan dominance) studies and regional studies. Both approaches can be examined from the point of view of structure, process and content. The authors conclude, however, that structure is the only basis for synthesis.

> This leaves structure--the basic element in area study and the forte of both regionalist and ecologist--as a basis for synthesis. Somewhere in between intra-metropolitan ecology devoted to its mosaic of natural areas and the homogeneous region is found the analysis

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[101] Charles M. Grigg, "A Proposed Model for Measuring the Ecological Process of Dominance," Social Forces, XXXVI (December, 1957), 128-31; Charles M. Grigg and Rupert Vance, "Regionalism and Ecology: A Synthesis?" Florida State University Research Reports in Social Science, III, No. 2 (August, 1960), 1-11.

> of inter-community ecology. The regionalist can participate in this because he sees the region developing as a constellation of communities. The ecologist sees this as the study of inter-metropolitan dominance and integration--what R. D. McKenzie called the "new city regionalism."[102]

This "analysis of inter-community ecology" requires a consideration of the structure of the homogeneous and metropolitan region as a "constellation of communities," each with its own orbit of influence. After applying two models, one of homogeneous subregions and the other of metropolitan dominance, to rates of population change in the South, the authors conclude that

> . . . in an agricultural society the homogeneous subregion is the most appropriate spatial model to use. However, (with) the development of cities, the spatial model has to be modified to allow for the effect of large metropolitan centers on the region. The most appropriate model then is one which attempts to express the relationship between the center and its hinterland. This relationship can best be expressed in some measure of distance.[103]

This conclusion suggests that there is a dynamic change taking place in hinterland regions. Metropolitan centers are becoming more and more influential in ordering their hinterland in some consistent pattern along a continuum of distance. This conclusion also suggests, however, that in outlying hinterland areas where metropolitan dominance is not as influential, i.e., in the more rural areas of the hinterland, regional environmental factors may be operative in effecting inter-community ecological patterns.

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[102] *Ibid.*, p. 4. [103] *Ibid.*, p. 10.

The purpose of Grigg's earlier paper, in connection with the above comments, was to question the pervasiveness of metropolitan dominance in the United States.[104] Grigg raises the question as to whether it can be shown that other environmental factors rather than dominance can explain the nonrandom distribution of attributes in space. Grigg constructs a research design which attempts to answer this question.

> As any test of the hypotheses of metropolitan dominance would have to postulate other sources of non-random distribution, we will establish two additional sources other than the influence of the metropolitan center. These will be called rural patterns and urban patterns. Just as metropolitan dominance results in metropolitan structure, the rural and urban result in typical structures on non-random distributions.[105]

What Girgg's model assumes, then, is that all three elements of the metropolitan community (the metropolitan center, urban hinterland, and rural hinterland) may influence the nonrandom distribution of attributes in space. His finding that urban centers are chiefly responsible for nonrandom patterns of population change in the South suggests a type of dynamic model of urbanization. Remote agricultural areas may first be influenced by their natural environment. As urbanization continues, these areas come under the influence of urban centers, but as urbanization takes on the form of metropolitanism, metropolitan centers become the organizing

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[104]Charles M. Grigg, op. cit., p. 128.

[105]Ibid., p. 129.

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agents of the hinterland. The point to be made, however, is that hinterland communities themselves may have natural environmental conditions which on a broad scale determine the nonrandom distribution of structural attributes in outlying areas. The more distant the community from a metropolitan center and the less influence exerted on the hinterland community, the greater the possibility that environmental factors determine the nonrandom distribution of community structural characteristics. It is assumed that, given the tendency for urban populations to concentrate in close proximity to metropolitan centers and the tendency for the rural-farm population to be dispersed in the outlying areas,[106] rural hinterland communities will show the greater tendency to be influenced by local environmental factors than urban hinterland communities. These ideas are not new with Grigg, however. Anderson and Collier, in an article published earlier than Grigg's, employed a research design to test both metropolitan dominance and urban dominance theory. They concluded that:

> These findings tend to cast doubt on the hypothesis of metropolitan (as opposed to urban) dominance, and even cast some doubt on the notion of urban dominance over the rural hinterland. That is, when variations in the gradients were found (in connection with size of farm), the statistically explanatory factor which explained the variation proved to be a characteristic of the rural areas (type of farming) rather than a characteristic of urban areas. This finding seems to indicate that the gradients result from a variety of forces, only

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[106] Donald J. Bogue, *op. cit.*, p. 35.

> some of which can be said to be concentrated in the metropolis and hence contribute to the concept of metropolitan dominance.[107]

Hence it is possible that internal characteristics of the rural areas themselves may be an important factor in accounting for inter-community variation. Bogue said somewhat the same thing at even a much earlier time:

> Within this multiple-community complex, which may be called the metropolitan community in deference to its dominant species, the individual local community must occupy a subordinate position. The activities of the local community are a function not only of its immediate locality, but also of the relative ecological position with respect to the dominant metropolis.[108]

Thus Bogue recognized that the nonrandom distribution of community structural attributes is a function of both metropolitan dominance and conditions of the local community. This implies, then, that if the influence of the metropolitan center, in other words, if distance and size of the metropolitan center could be controlled, we should be able to measure the relative influence of the local hinterland community, urban or rural, in determining its own activity and structural patterns.

Now recalling our earlier hypothesis that community social structure is a function of distance and size of a dominating metropolitan center and that fertility behavior

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[107]Theodore R. Anderson and Jane Collier, "Metropolitan Dominance and the Rural Hinterland," Rural Sociology, XXI (June, 1956), 157.

[108]Ibid., p. 13.

is a function of both of these, it stands to reason that, if the influence of a dominating metropolitan center (i.e., its size and distance) can be controlled or held constant, then we should be able to measure the influence of local community conditions alone on fertility behavior. On the basis of this reasoning we may propose a third hypothesis:

3. Community fertility behavior in both urban and rural hinterlands is not only a function of the size and distance of a dominating metropolitan center, but also a function of conditions of its own immediate locality, since all local communities in the metropolitan region possess some degree of dominance over some portion of the hinterland.

Since urban hinterland communities tend to concentrate in closer proximity to metropolitan centers than rural hinterland communities, we should expect metropolitan centers to have a greater influence in ordering community social structural patterns in the urban hinterland than in the rural hinterland. A fourth hypothesis may be stated:

4. Community fertility behavior is more a function of distance and size of a dominating metropolitan center in the urban hinterland, but more a function of local community social structure in the rural hinterland, when distance and size of the dominating metropolitan center are controlled.

There is one final aspect to consider with respect to the dominance of metropolitan centers on their urban and rural hinterlands. We have established the fact that metropolitan centers vary with respect to the amount of dominance and extent of the area of dominance. It is also a fact that a considerable amount of difference exists among various geographic divisions of the nation with respect to the level

of development of the metropolitanization process. Although there are several ways by which one could demonstrate the intensity of metropolitanization within the geographic divisions, considering the distribution of population by metropolitan status does allow us an approximate measure of these differences. This information is provided in Table 16. Although the nation as a whole reflects almost two-thirds of its population residing in standard metropolitan statistical areas, the geographic divisions manifest a range from a high of 82 percent for the Middle Atlantic to a low of 36 percent for the East South Central. The geographic divisions of New England, Middle Atlantic, Pacific, and East North Central indicate metropolitanization levels greater than the nation; West North Central, Mountain, and all three Southern divisions lower than the nation.

The question now arises, how can metropolitan dominance theory cope with interdivisional variation with respect to the metropolitanization process? Several comments in the previous discussion of metropolitan dominance theory have described metropolitan dominance as an emerging pattern of organization for communities in the nation. The data of Table 16 merely indicate the possibility that in some geographic divisions compared with others metropolitan centers are perhaps more influential "organizing agents" of their hinterlands. If this is true, we would expect to find that the influence of metropolitan centers, measured in terms of tion in the

Table 16. Distribution of population in the United States and divisions, by metropolitan status: 1960 (numbers given in 000's)

United States and Division	Total Population	Inside SMSA's		Outside SMSA's		Rank by Metropolitanization
		Number	Percent	Number	Percent	
United States	179,323	112,885	63.0	66,438	37.0	..
New England	10,509	7,393	70.3	3,116	29.7	3
Middle Atlantic	34,168	27,954	81.8	6,215	18.2	1
East North Central	36,225	24,294	67.1	11,931	32.9	4
West North Central	15,394	6,666	43.3	8,728	56.7	8
South Atlantic	25,972	13,041	50.2	12,931	49.8	6
East South Central	12,050	4,344	36.0	7,706	64.0	9
West South Central	16,951	9,063	53.5	7,888	46.5	5
Mountain	6,855	3,348	48.8	3,507	51.2	7
Pacific	21,198	16,783	79.2	4,415	20.8	2

Source: U.S. Bureau of the Census, U. S. Census of Population: 1960. Number of Inhabitants, United States Summary, Final Report PC(1)-1A (Washington, D.C.: Government Printing Office, 1961), Table 18.

distance and size of the dominating metropolitan center, is more important in accounting for the spatial distribution of community social structural attributes, and as a result community fertility behavior, in both urban and rural hinterlands, in the more metropolitan geographic divisions compared with the less metropolitan divisions. On this basis we may formulate a fifth hypothesis:

> 5. In the more metropolitan geographic divisions compared with the less metropolitan geographic divisions, size and distance of a dominating metropolitan center are more important in accounting for variation in community social structure and fertility behavior in both urban and rural hinterland communities.

But there remains more to be said concerning the effects of emerging metropolitanization as the new mode of organization for hinterland communities. On the basis of a dynamic view of metropolitan dominance, one could predict that eventually all hinterland communities will come under the organizing influence of metropolitan centers, although this is not yet the case in the United States. As expressed above, metropolitan centers still compete with the effects of local community conditions, especially in the more remote hinterland areas of the metropolitan region. Hence, in the less metropolitanized geographic divisions of the nation, we should expect to find that local community characteristics which are the result of natural environmental processes are perhaps more influential in determining hinterland intercommunity variation than metropolitan centers. As a result, fertility in these communities will be more a product of local community conditions than metropolitan influence. This suggests a sixth hypothesis for testing:

6. In the more metropolitanized geographic divisions, size and distance of a dominating metropolitan center will be more important in accounting for variation in community fertility behavior, in both urban and rural hinterlands, than local community social structure, when controlling for the influence of metropolitan centers; in less metropolitanized geographic divisions, local community social structure will be more important in accounting for variation in community fertility behavior than size and distance of a dominating metropolitan center.

Considering the implications of inter-divisional variation for metropolitan dominance theory greatly expands the number of testable hypotheses and also enables us to consider metropolitan dominance as a dynamic process. We have hypothesized that as metropolitan centers continue to emerge, hinterland community variation will continue to fall more and more under the organizing influence of metropolitan centers. An inter-dependence of metropolitan center and hinterland communities will become the dominant characteristic of community organization. But in this dynamic view we must not commit the error of urban dominance theory. We must not think of urban and rural differences as diminishing while metropolitanization increases. An important point of metropolitan dominance theory predicts that differences will increase among hinterland communities under the dominance of the same metropolitan center. Bogue found that in considering inter-regional variation along with the effects of metropolitan dominance on the hinterland that "differences associated with dominance and subdominance within each region are greater than the average differences between regions."[109] This suggests that as metropolitan centers become more and more the organizing agent of hinterland communities in the nation, that the patterns they effect in the hinterlands will appear to be a universal pattern. Divisional differences will become less pronounced and differences between hinterland community types (urban and rural) will become more pronounced. Hence, given the fact that fertility is a function of community social structure, as community social structure becomes more and more influenced by metropolitan centers, the impact that community social structure has on fertility behavior in urban hinterlands, for example, will be more and more similar in all geographic divisions than its impact on fertility in rural hinterlands within the same geographic division. Metropolitan dominance theory emphasizes the differentiating effect of metropolitan centers on urban and rural hinterland community social structure, and, as a result, on urban and rural fertility behavior. A comparison of inter-divisional differences of the impact of community social structure on fertility behavior within the same class of hinterland communities (urban or rural) should reveal fewer differences than an intra-divisional comparison of the impact of community social

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[109] Ibid., p. 61.

structure on fertility behavior between different classes of hinterland communities (urban vs. rural). On the basis of these comments a final hypothesis may be formulated:

7. The impact of community social structure and metropolitan dominance on fertility behavior will manifest fewer differences when comparing the same type of hinterland communities (urban or rural) on an inter-divisional basis than when comparing different types of hinterland communities (urban vs. rural) on an intra-divisional basis.

Summary: Hypotheses Derived from Metropolitan Dominance Theory

In this chapter urban dominance theory and metropolitan dominance theory have been contrasted. It was decided that metropolitan dominance theory was the preferred theoretical framework from which to develop hypotheses pertaining to the explanation of urban-rural fertility differential patterns found in the United States. Seven basic hypotheses were derived and are summarized below.

1. Community social structure is a function of distance and size of a dominating metropolitan center.

    a. Distance and size of a dominating metropolitan center will manifest a different impact on community social structure in the urban hinterland than in the rural hinterland.

2. Fertility behavior is a function of community social structure and distance and size of a dominating metropolitan center.

    a. Community social structure and distance and size of a dominating metropolitan center will manifest a different impact on fertility behavior in the urban hinterland than in the rural hinterland.

3. Community fertility behavior in both urban and rural hinterlands is not only a function of the size and distance of a dominating metropolitan center, but

also a function of conditions of its own immediate locality, since all local communities in the metropolitan region possess some degree of dominance over some portion of the hinterland.

4. Community fertility behavior is more a function of distance and size of a dominating metropolitan center in the urban hinterland, but more a function of local community social structure in the rural hinterland, when distance and size of the dominating metropolitan center are controlled.

5. In the more metropolitan geographic divisions compared with the less metropolitan geographic divisions, the size and distance of a dominating metropolitan center are more important in accounting for variation in community social structure and fertility behavior in both urban and rural hinterland communities.

6. In the more metropolitan geographic divisions, size and distance of a dominating metropolitan center will be more important in accounting for variation in community fertility behavior, in both urban and rural hinterlands, than local community social structure, when controlling for the influence of metropolitan centers; in less metropolitan geographic divisions, local community social structure will be more important in accounting for variation in community fertility behavior than size and distance of a dominating metropolitan center.

7. The impact of community social structure and metropolitan dominance on fertility behavior will manifest fewer differences when comparing the same type of hinterland communities (urban or rural) on an inter-divisional basis than when comparing different types of hinterland communities (urban vs. rural) on an intra-divisional basis.

To test these hypotheses requires an altogether different research procedure than employed in most empirical studies of the urban-rural fertility differential. The review of fertility studies contained in Chapter II of this thesis makes this especially clear. Though the empirical propositions established in the previous chapter hint at the possibility of different fertility patterns in urban and rural communities of the United States, these propositions prove to be wholly inadequate to provide further direction in the testing of our theoretical hypotheses derived from metropolitan dominance theory. The theoretical framework of metropolitan dominance, then, has proved fruitful by generating new hypotheses and by extending the study of the urban-rural fertility differential into new areas. All four of the critical guidelines for theory design in the study of differential fertility have been answered in this chapter. Now we must consider the methodological procedures by which to test the theoretical hypotheses as well as the theory of metropolitan dominance itself.

CHAPTER IV

METHODOLOGICAL PROCEDURES

Seven hypotheses have emerged in our consideration of metropolitan dominance theory, each contributing to a furthering of our understanding of the expected patterns of community fertility behavior and what factors may be operative in determining those patterns. We are now confronted with the task of indicating how these hypotheses are to be tested. First, there appear to be several concepts used in these hypotheses which need to be translated into forms which will lend themselves to statistical testing. In other words, what empirical indices can be employed to reflect community social structure, metropolitan dominance, and community fertility behavior? Our first task, then, is to specify operational definitions for these concepts. Second, after the empirical variables are specified, we should review the statistical techniques which will be applied to the data to test our theoretical hypotheses.

Conceptual Framework: Specification of Variables

Two broad concepts have been suggested in our theoretical considerations as possible independent variables which are expected to account for variation in fertility behavior: community social structure and metropolitan dominance. The sole dependent variable of the analysis is community fertility behavior. Let us consider how these concepts might be reduced to the form of empirical variables.

Community Social Structure

A countless number of indicators have been employed in community studies for the purpose of representing community social structure. As in any study of this nature, variables must be carefully selected with fairly specific reasons in mind as the basis for the selection. For the purposes of this study indicators should be chosen on the basis of whether they can be expected to reflect significant internal characteristics of the organization of a community and whether they can be expected to be of special importance in explaining fertility behavior. In the preceding chapter it was suggested that the broad concept of community social structure should be broken down into four basic categories: urbanization, socio-economic status, wife's opportunities alternative to child-bearing, and demographic structure. It is felt that these categories, though greatly narrowing the range of possible indicators of community social structure, will greatly facilitate the search for empirical measures which should relate significantly to fertility behavior. To reflect the extent of urbanization within a community we should seek some measure of the amount of employment of males in agricultural occupations. Such a measure may be considered a function of the extent of employment in non-agricultural occupations and in this way be considered a possible indicator of the degree of urbanization of a community within a modern society.[1] Socio-economic status should be reflected in some measure of educational attainment and income level for a community. Wife's opportunities alternative to child-bearing within a given community should be reflected in the amount of employment opportunities for women and the amount of income a woman could obtain from employment. The demographic structure of a community should be represented by some measure of the distribution of women within the reproductive age span. For each of these four categories of community social structure, then, two empirical variables were employed and can be specifically defined as follows:

<u>Employment in Agricultural Occupations (Urbanization)</u>

1. Percent of the male labor force who are farmers and farm managers.
2. Percent of the male labor force who are farm laborers and farm foremen.

<u>Socio-Economic Status</u>

3. Median years of school completed by males and females, age 25 and over.
4. Median family income.

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[1] Janet Abu-Lughod, "Urban-Rural Differences as a Function of the Demographic Transition: Egyptian Data and an Analytical Model," <u>American Journal of Sociology</u>, LXIX (March, 1964), 488; Hope Tisdale, "The Process of Urbanization," <u>Social Forces</u>, XX (March, 1942), 311-16; and P. K. Hatt, N. L. Farr, and E. Weinstein, "Types of Population Balance," <u>American Sociological Review</u>, XX (February, 1950), 14-21.

<u>Wife's Alternative Opportunities</u>

5. Median female personal income.
6. Percent of females, age 14 and over, who are employed.

<u>Demographic Age Structure</u>

7. Percent of ever-married females, age 15-44, who are age 15-24.
8. Percent of ever-married females, age 15-44, who are age 25-34.

It should be noted that, because of the employment of census data in this study, the selection of variables to represent community social structure was limited by the types of information available on census tapes. It is felt, however, that, in spite of this limitation, the selection of adequate variables for the testing of our hypotheses is not hampered severely. It should also be pointed out that each of these variables (with the exception of female employment and income) were computed separately for the urban, rural-nonfarm, and rural-farm parts of every county in the nation. Furthermore, because of the complexities and confusion which could result from considering a fertility analysis for whites and nonwhites combined, it was decided to limit the present study only to the white population of the nation. Hence, each of the community social structure variables specified above apply only to the white population of the residential parts of counties.

Metropolitan Dominance

Metropolitan dominance is another independent variable to be included in accounting for variation in fertility behavior. Because of the theoretical framework employed in this study, the development of a measure of influence exerted by metropolitan centers on hinterland communities becomes very crucial. There are several possible measures of metropolitan dominance that could be used, but our theoretical consideration has suggested that the influence of a dominating metropolitan center on a hinterland community is a function of the distance that community is from the metropolitan center and the size of that center. The construction of such a variable requires the development of some classification scheme by which every county in the nation can be given some numerical designation which would approximate the amount of influence exerted on that county population by a dominating metropolitan center, dependent upon the distance from the metropolitan center and the size of the center combined. We may describe the procedure employed in operationalizing metropolitan dominance in the following manner.

It was decided to use the 1960 Census definition of Standard Metropolitan Statistical Areas to designate metropolitan centers. By definition

> . . . SMSA (Standard Metropolitan Statistical Area) is a county or group of contiguous counties which contain at least one city of 50,000 inhabitants or more or "twin cities" with a combined population of at least

> 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially integrated with the central city.[2]

Each SMSA designated by the 1960 Census was located on a map of the United States which outlined county boundaries. Each SMSA county was assigned a numerical value that was a linear function of the size of its popultaion. This value increased by 1 for each 100,000 population up to a population size of 2 million.[3] Thus each SMSA county was assigned a value within a range from 1 to 20. On this basis an SMSA county with a population of 2 million or more was assigned a value of 20, an SMSA of 1 million a value of 10, and an SMSA of 100,000 a value of 1. Any SMSA county with a population between 50,000 and 100,000 was also given a value of 1. Only whole integer numbers were employed to represent

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[2]U. S. Bureau of the Census, U.S. Census of Population: 1960, Number of Inhabitants, United States Summary, Final Report PC(1)-1A (Washington, D.C.: Government Printing Office, 1961), p. xxiv.

[3]The establishment of a maximum size value of 20 for all SMSA's with populations of 2 million or more is based on the speculation that at some point increases in population are merely duplications of technological functions and conditions that exist in areas having maximum population density. Thus, it was arbitrarily decided that any SMSA of 2 million or more population would possess similar technological bases and would exert the same influence over the same size hinterland area. See Dale Hathaway, J. Allan Beegle, and Keith Bryant, Rural America, Census Monograph, forthcoming, pp. 15-16. Furthermore, it might be stated that of the 212 SMSA's designated by the 1960 Census, only 10 have a population size of over 2 million: Boston, Chicago, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco-Oakland, and Washington.

the size of an SMSA. Hence an SMSA of 150,000 or more was assigned the next highest integer of 2. All counties of a given SMSA were treated as a unit and therefore were all given the same size value.

After SMSA counties were located and assigned values based on size, the next task was to assign values to all non-SMSA counties in the nation based on distance from a dominating metropolitan center and the size of that center. After determining a central point for each SMSA (the center of the SMSA county containing the central city), concentric circles were drawn radiating out from each SMSA. The first circle was given a radius of 50 miles, the second circle a radius of 100 miles, the third 150 miles, etc. This created a series of distance bands around each SMSA, each band being 50 miles in width. A county was not considered lying within a given distance band unless completely covered by the most distant boundary of the distance band. Because we assume that metropolitan dominance is related to both distance and size, each county was assigned a numerical value which was a combined function of the size of the influencing SMSA and of the distance from the SMSA. Each band, and consequently all counties covered by that band, was assigned a value that declined as a function of the number of 50 mile distance bands from the influencing SMSA. This decline was by a numerical value of 2. As a result all non-SMSA counties within the first 50 mile band from an SMSA were assigned a value 2 less than that assigned to the SMSA county or counties. Non-SMSA counties between 50 to 100 miles of an SMSA were assigned a value 2 less than the value assigned to counties within 50 miles of the SMSA. Hence, in the case of an SMSA of 2 million population, the SMSA counties received a value of 20, non-SMSA counties in the first 50 mile band a value of 18, the second band 16, etc. This procedure was followed until the value zero was reached or a competing SMSA determined the values for such counties. An implication of this scheme is that influence of a metropolitan center becomes negligible when the zero value is reached. Generally the larger the SMSA in population size, the larger the hinterland area; the smaller the SMSA, the smaller the hinterland area influenced by the metropolitan center. Because of the numerical scheme employed, we assume that a metropolitan center of 2 million or more can extend its influence up to a maximum of 450 miles, though with each distance band its influence is represented as gradually diminishing. SMSA's of smaller size would extend their influence less than this, in proportion to their population size.

With this scheme it was possible that a county would receive different values from different SMSA's. It was decided that the final value assigned to any county should always be the highest possible value obtainable through the methodological procedures employed above. Hence, where several bands overlapped the same non-SMSA county, the county was assigned the highest possible value and allocated to the hinterland of the metropolitan center which determined this value.

A further implication of a scheme which recognizes size of a dominating metropolitan center is the possibility that larger SMSA's may influence not only non-SMSA counties within their hinterlands, but also other smaller SMSA's within their hinterlands. To distinguish these smaller SMSA's from non-SMSA counties lying within the same distance band from a larger SMSA, it was decided that the value assigned these smaller SMSA's should be the value received from the distance band in which it was located <u>plus</u> the size value, determined on the basis of a numerical value of 1 for every 100,000 population in the smaller SMSA. Hence it was possible that an SMSA of 200,000 (with a size value of 2) lying within a distance band 400 miles from an SMSA of 20 million (receiving a distance value of 4 from that SMSA) could receive a total size-distance score of 6 as the highest possible value it could receive using the methods described above. It had to be assumed, however, that no SMSA county located within the sphere of influence of a larger SMSA could receive a total value (the sum of the size value and the distance value) larger than that assigned to the larger SMSA. As an example of this rule, suppose a county is designated as an SMSA county with a population of 1,100,000. Its size value is therefore 11. The counties included in the first

50 mile band from the SMSA are assigned the value of 9, the second band 7, etc. Suppose that an SMSA county with a population of 600,000 is located between 50 and 100 miles from the first SMSA. Using our addition rule, it should receive a distance value of 7 and a size value of 6, or a total value of 13. Since the influencing SMSA could obtain only a value of 11, the value of the smaller SMSA is limited to a value of 11 also. However, this occurred in few cases.

By this procedure all counties in the United States were assigned a single numerical value from a possible range of zero to twenty. Highest values reflect the greatest influence from metropolitan centers based on proximity and size, smallest values reflect least influence from metropolitan centers. All counties assigned the same numerical value are assumed to be equally affected by the organizing influence of a metropolitan center. Since our analysis required the breakdown of county populations into urban, rural-nonfarm, and rural-farm components, it was decided that each residential component of the same county should receive the same value representing metropolitan influence as assigned the whole county. It should be noted that these values assigned to the residential parts of counties were inserted on the census tapes. All other variables used in the analysis were able to be computed directly from the data included on the census tapes.

Community Fertility Behavior

The dependent variable of this study is community fertility behavior. Numerous measures of fertility behavior have been developed through the years by demographers.[4] Though no single measure of fertility can be considered the best overall measure, the choice of a fertility measure depends upon many factors, such as, purpose of the investigation and the source and nature of available data. The measure of fertility used in this study is a measure of cumulative fertility which is available on the 1960 Census tapes, the single source of data employed in this study. More specifically the dependent variable can be defined as: the number of white children ever-born to ever-married white females, age 15-44, per 1,000 ever married white females, age 15-44. Similar to all variables in this analysis, only the white population of the nation is considered. Also this

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[4] See discussions of various measures in George W. Barclay, Techniques of Population Analysis (New York: John Wiley, 1958), Ch. 6; John Hajnal, The Study of Fertility and Reproduction: A Survey of Thirty Years," in Thirty Years of Research in Human Fertility: Retrospect and Prospect (New York: Milbank Memorial Fund, 1959), pp. 11-37; N. D. Ryder, "Fertility," in P. M. Hauser and O. D. Duncan, The Study of Population (Chicago: The University of Chicago Press, 1959), pp. 400-36; Donald J. Bogue and James A. Palmore, "Some Empirical and Analytic Relations among Demographic Fertility Measures, with Regression Models for Fertility Estimation," Demography, I, No. 1 (1964), 316-38; and Ronald Freedman, "The Sociology of Human Fertility," Current Sociology, X/XI, No. 2 (1961-62), (Oxford, England: Basil Blackwell, 1963), pp. 43-46.

measure is computed for the three residential components of all counties in the nation.

The data on children ever born in the 1960 Census are based upon a 25 percent sample of the population and are derived from answers to the following question on the Household Questionnaire: "If this is a woman who has ever been married--How many babies has she ever had, not counting stillbirths? Do not count her stepchildren or adopted children."[5] The number of children ever born includes children born to the woman before her present marriage, children no longer living, and children away from home, as well as children borne by the women who were still living in the home. Although the question on children ever born was asked only of women reported as having been married, undoubtedly the number of children reported includes some illegitimate births. It is likely that many of the unwed mothers living with an illegitimate child reported themselves as having been married. Stepchildren, adopted children, and stillbirths, nevertheless, were not counted in this measure of fertility.

The measure of fertility used in this study, then, represents the cumulative fertility of married women until

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[5]U. S. Bureau of the Census, U.S. Census of Population: 1960, Subject Reports, Women by Number of Children Ever Born, Final Report PC(2)-3A (Washington, D.C.: Government Printing Office, 1964), p. x.

the time of the census, i.e., it represents their reproductive histories. One might also consider the measure as the "average number of children" per married woman or "average size of family." It should be noted, however, that this is not a measure of size of "completed family," since the number of children ever born is related to married women still within the reproductive period, ages 15-44. On the other hand, our measure of fertility cannot be likened to a measure of current fertility because past births are considered as well as current births, regardless of the time period in which they occurred. As do all measures of fertility, children ever born has its advantages and disadvantages. Unlike some measures of fertility, children evern born enumerated in the census are related to the actual group of women who produced them. In this sense, the children ever born measure is similar to cohort fertility. Since it is based on children born over a relatively long, unspecified period of time, the cumulative fertility rate will probably not be influenced greatly by temporal or short-time events, which can affect current fertility measures quite radically. Furthermore, mortality should not affect this measure, since all children ever born are to be recorded, although the measure may suffer from inaccurate reporting because of the dependency upon retrospection by the respondent. Birth overcounts and undercounts undoubtedly occur, though Grabill, Kiser and Whelpton, in commenting on the children ever born measure, assert that while overcounts of children ever born may occur almost as frequently as undercounts, "it is probable that the bulk of the reports on children ever born are complete and accurate, at least for whites."[6] The fact that marital status is incorporated in our measure of fertility greatly refines this measure, although perhaps accounting for age at marriage and marital duration would have contributed even more to the development of a better measure of fertility. It is very possible, however, that different distributions of married women within different age groups of the reproductive age span of 15-44 could greatly affect the fertility level of a given population. That is, a population with a disproportionately large number of married women in the ages, say, of 15-24 could produce a rather low level of fertility by this fact alone. This will be partly controlled, however, by the inclusion of age distribution measures as independent variables in the analysis.

Finally, because the number of children ever born represents a measure of cumulative fertility, it has a somewhat restricted value for an analysis of the comparison of urban and rural fertility. Goldstein and Mayer, in considering this particular problem, state that "the current place of residence of the mother does not necessarily indicate the

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[6] W. H. Grabill, C. V. Kiser, and P. K. Whelpton, The Fertility of American Women (New York: John Wiley, 1958), p. 402.

residence at the time of birth of children."[7] This resurrects the problem considered previously in this thesis concerning the effect of migration on fertility and the difficulty of relating community social structure characteristics of current residence to fertility events which may have occurred previous to current residence. However, Goldstein and Mayer, in considering whether suburban fertility measured as children ever born is a result of current residence or a selective migration process, conclude that suburban fertility is more a function of current residence than a consequence of migration.[8] Though such deficiencies may well be inherent in the measure of fertility employed in this study, we must accept our measure for what it is. By accepting children ever born as an adequate measure of community fertility behavior in comparing urban and rural communities, we assume that community social structure and metropolitan dominance do operate within the nation to determine to some extent the average size of family within the various residential communities.

Levels of Comparison

It is perhaps appropriate at this point to describe the levels of comparison required in our research design to

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[7]Sidney Goldstein and Kurt B. Mayer, "Residence and Status Differences in Fertility," Milbank Memorial Fund Quarterly, LXIII, No. 3 (July, 1965), 295-6.

[8]Ibid., p. 297.

test the theoretical hypotheses. Several references have already been made to the fact that comparisons are to be made only for the white population of the nation. This decision was made because of the greater inaccuracies in measuring fertility for nonwhites in the nation and because of the complexity that diverse patterns of racial composition of communities within different parts of the nation may inflict upon the analysis. Analysis of nonwhite fertility employing the same research design as this study may well be considered a greatly needed but necessarily separate study.

An important level of comparison for this study is the comparison of urban and rural fertility patterns. All variables, independent and dependent, are computed on the basis of urban, rural-nonfarm and rural-farm parts of counties. Our unit of analysis for this study, then, is the residential part of a county to be considered equivalent to a community. Because of a metropolitan dominance theoretical framework, we shall consider all urban parts of counties within the hinterland of a given metropolitan center as its "urban hinterland." Likewise, all rural-nonfarm parts of counties make up the "rural-nonfarm hinterland" and the rural-farm parts of counties the "rural-farm hinterland." Because it is expected that metropolitan centers will exert a different influence on rural-nonfarm than rural-farm communities, it is felt necessary to divide the "rural hinterland" into rural-nonfarm and rural-farm.

Though our analysis will consider the nation as a whole comprising a constellation of metropolitan communities, and the comparison of different patterns of how community social structure and metropolitan dominance influence fertility behavior will be carried out for the nation as a whole, theoretical considerations point out the necessity of investigating these patterns on a "regional" (actually divisional) basis, i.e., by large homogeneous subareas of the United States. It is suspected that metropolitanism is not a universal pattern spread over the entire nation but that differences in the proportion of divisional population residing in metropolitan areas indicate a differential rate of metropolitanism. The procedure of applying our problem to each of the nine geographic divisions in the nation does not necessarily prove that there are differences among divisions, but operating at a divisional level is a precaution which we can afford to take in order to more clearly observe the effects of metropolitan dominance and community social structure on fertility behavior. If our hypotheses dealing with possible variation of fertility patterns among the divisions are not supported, then we will gain some support of the notion that metropolitanism is a universal mode of organization throughout the nation. If variation among the geographic divisions of the nation is supported, however, we must conclude that perhaps the differential rate of metropolitanism is a process worthy to be considered in future studies and that the peculiar environmental conditions of the divisions themselves may also have some influence on creating variation in fertility patterns.

A basic level of comparison in this study, then, pertains to possible variations among divisions. This level of comparison is especially important with respect to the manner in which the influence of metropolitan centers on their residential hinterland areas is considered. Because of the time and labor that would be involved in attempting to apply our research design to each individual metropolitan community in the nation, it was decided to consider the combined effects of all metropolitan centers on their hinterlands, first for the nation and then for each division. This means that for any given division we will be considering the influence of the average metropolitan center on the average urban, rural-nonfarm or rural-farm hinterland. Bogue, who followed this same procedure in his analysis of the structure of the metropolitan community, points out that an investigation of individual metropolitan communities provides a study of deviations of individual metropolitan communities from a general pattern.[9] The approach of this study, then, is to consider what that general pattern is among metropolitan communities with respect to fertility

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[9] Donald J. Bogue, The Structure of the Metropolitan Community (Ann Arbor: Horace H. Rackham School of Graduate Studies, University of Michigan, 1950), p. 29.

pattern comparisons between rural and urban hinterlands. Even though divisional variations are permitted in our analysis, the research design of this study still allows us to consider this general pattern at the divisional level.

Statistical Framework: Specification of Statistical Techniques

Already in the first chapter of this thesis the need for the application of more rigorous statistical techniques to the study of differential fertility based on census data was pointed out. It was further stated that the traditional "aggregative" approach used in many past studies of differential fertility does not lend itself as well to the more high-powered statistical techniques currently available as much as the "distributive" approach. The "aggregative" approach suffers especially from the limited number of independent variables that can be simultaneously incorporated into an analysis of fertility behavior. The problem of this thesis, then, is how to relate simultaneously to fertility the several variables already presented above, *viz.*, metropolitan dominance and the various indicators of community social structure, all of which are assumed to have some influence on our dependent variable, community fertility behavior? We not only need some statistical measure of the degree of association of the independent variables to fertility behavior, but we need to know how important these variables are in accounting for variation of fertility behavior in comparison with each other. In addition, we should also seek an answer to whether these independent variables have different effects on fertility in urban and rural hinterland communities as well as within the different geographic divisions. It seems that the most appropriate approach to our problem is a distributive approach and it has been shown by Bogue and Harris that the distributive approach lends itself very well to a multiple regression analysis.[10]

Multiple Regression Model

Our analysis focuses on two levels: the nation (conterminous United States) and the nine geographic divisions. For the nation and each division a multiple regression equation was estimated for the three residential components: urban, rural-nonfarm, and rural-farm. The multiple regression equation may be written in the following general form:

$$Y_i = a + b_1 X_{i1} = b_2 X_{i2} + \ldots + b_9 X_{i9} + u_i$$

where

$i = 1, 2, \ldots\ldots N$
$j = 1, 2, \ldots\ldots 9$

and

Y_i is the *ith* observed value of the dependent variable;

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

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[10] Donald J. Bogue and Dorothy Harris, *Comparative Population and Urban Research Via Multiple Regression and Covariance Analysis* (Miami, Ohio: Scripps Foundation for Research in Population Problems, 1954).

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

a is the general constant term. This represents the value of Y which may be expected when each of the independent variables has a value of zero.

b_j is the partial regression coefficient of the jth independent variable. These coefficients show the average effect on Y of one unit change in the accompanying independent variable when allowance has been made for the other independent variables of the equation.

As in any regression analysis of this sort, it is necessary that the following conditions be assumed for the universe from which the data are drawn: (1) the deviations from regression are normally distributed about the regression; (2) the variance from regression is constant throughout the entire range of the independent variables; and (3) the regression is assumed to be of a linear form. The following variables were inserted in each of the regression equations:

The dependent variable:

Y measures the number of children ever born per 1,000 ever-married white females age 15-44 in the residence component of a county in 1960.

The independent variables:

X_1 was the value assigned the county by the size-distance measure developed to approximate metropolitan dominance for the residence component of a county in 1960.

X_2 measures the percent of the white male employed labor force who were farmers and farm managers in the residence component of a county in 1960.

X_3 measures the percent of the white male employed labor force who were farm laborers and farm foremen in the residence component of a county in 1960.

X_4 measures the median years of school completed by white males and females, age 25 and over, in the residence component of a county in 1960.

X_5 measures the median white family income in the residence component of a county in 1959.

X_6 measures the median white female personal income for a county in 1959.

X_7 measures the percent of white females, age 14 and over, who were employed in the county in 1960.

X_8 measures the percent of ever-married white females, age 15-44, who were age 15-24 in the residence component of a county in 1960.

X_9 measures the percent of ever-married white females, age 15-44, who were age 25-34 in the residence component of a county in 1960.

In the estimation of each of the prescribed regression equations the following statistics were computed: simple correlation coefficients between all variables, the estimated partial regression coefficients, the estimated standard error of the partial regression coefficients, the estimated standard partial regression coefficient (also referred to as beta coefficient or beta weight), the standard error of estimate, the multiple correlation coefficient, and the coefficient of multiple determination. Let us give special consideration to some of these statistics in terms of the nature of the statistic and how it will be employed in the analysis.

Beta Coefficients

In the testing of our hypothesis with respect to what independent variables influence fertility behavior, it is necessary that we be able to come to some conclusion as to how important an independent variable is compared with others in its relative ability to produce change in the dependent variable. Partial regression coefficients cannot be directly compared because they vary with the units in which they are measured. Comparison can be made, however, if each partial regression coefficient is expressed in terms of its own standard deviation. Beta coefficients, then, are partial regression coefficients expressed in standard measure. They state the average change in the dependent variable that may be expected per standard unit change in one of the independent variables. Beta coefficients are obtained by multiplying the partial regression coefficient by the ratio of the standard deviation of the independent variable to that of the dependent variable. The formula used to compute beta coefficients may be expressed as

$$B_j = b_j \frac{s_{x_j}}{s_y}$$

where

B_j is the beta coefficient of the <u>jth</u> independent variable;

b_j is the estimated partial regression coefficient of the <u>jth</u> independent variable;

s_{x_j} is the standard deviation of the <u>jth</u> independent variable;

s_y is the standard deviation of the dependent variable.

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Beta coefficients are pure numbers which take into account the variation in the independent variable relative to the dependent variable. The beta coefficients are summary measures of the relative importance of an independent variable in accounting for the variation in 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 used to compare the independent variables of metropolitan dominance and community social structure in their relative importance in determining community fertility levels.

Coefficient of Multiple Determination

In our analysis of differential fertility comparisons for urban and rural communities, we shall want to know how successful the combined effect of the independent variables is in determining fertility variation. The success of the multiple-variable estimating equation in accounting for the variation in the dependent variable may be summarized by the coefficient of determination (R^2) which is simply the multiple correlation coefficient (R) squared. In regression terms the square of the correlation coefficient is an estimate of the proportion of the variance in the dependent variable that is accounted for by the regression of the dependent variable on the independent variables inserted in the equation.

Zero-Order Correlation Coefficients

Zero-order correlation coefficients (Pearsonian r's) were computed in each of the regression equations to measure the association between each of the independent variables and the dependent variables as well as between each of the independent variables themselves. We shall consider the zero-order correlation coefficients between the independent variables and the dependent variable as a first step in the analysis to consider whether metropolitan dominance and community social structure variables do have a general association pattern with fertility. However we should also consider the possibility of intercorrelation of our independent variables to make some assessment as to whether high intercorrelation among the independent variables might diminish the success in accounting for a large portion of the variation in the dependent variable. As Blalock points out in his discussion of multiple correlation, "if we wish to explain as much variation in the dependent variable as possible, we should look for independent variables which are relatively unrelated to each other but which have at least moderately high correlations with the dependent variable."[11] This is an especially difficult task to perform in any sociological research. If high intercorrelations are discovered,

[11]Hubert M. Blalock, Jr., Social Statistics (New York: McGraw-Hill, 1960), p. 348.

we must admit to this deficiency and make some suggestions as to which variables would be more appropriate for explaining a larger proportion of fertility behavior for future study.[12] Nevertheless, we shall consider zero-order correlation only as a preliminary analysis of what factors may influence community fertility behavior and then move on to more rigorous measures of association, measures which will not only account for variation in the dependent variable by a single independent variable alone, but will also hold constant the influence that other independent variables may exert on the dependent variable.

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[12]Intercorrelations among the independent variables were generally low. The highest intercorrelations, of course, were found between the paired variables employed to reflect aspects of community social structure, such as, degree of urbanization, socio-economic status, wife's alternative opportunities, and demographic age structure. Lowest intercorrelations are found for the paired variables reflecting socio-economic status (education and family income) and demographic age structure (ever-married females, age 15-44, who were 15-24 or 25-34). Intercorrelations for family income and education for all divisions and the nation were mostly below a value of $\pm .20$; intercorrelations for demographic age structure variables were on the average slightly higher, although generally lower than -.30. Intercorrelations among variables reflecting employment in agricultural occupations were high in urban and rural-nonfarm areas but low in rural-farm areas for the nine divisions. For urban areas zero-order correlations ranged from .32 and .64; rural-nonfarm .24 to .79; rural-farm coefficients were generally below $\pm .14$. The most highly correlated paired variables occurred between female income and female employment. The coefficients ranged from .49 to .83. No attempt was made to remove highly correlated variables from the regression equations, though it would appear that overall there are low levels of intercorrelation among the independent variables.

Partial Correlation Coefficients

Partial correlation coefficients are measures of the degree of relationship between a dependent variable and a single independent variable, controlling for one or more other independent variables. These should not be confused with partial regression coefficients which are mentioned above in our discussion of the multiple regression equation. The formula for computing partial correlation coefficients may be expressed generally as

$$r_{ij.k} = \frac{r_{ij} - (r_{ik})(r_{jk})}{\sqrt{(1 - r_{ik}^2)(1 - r_{jk}^2)}}$$

Partial correlation coefficients will be computed directly from zero-order correlation coefficients. It should be noted that the square of the partial correlation coefficient represents the proportion of variation in the virst variable (dependent variable) left unexplained by the third variable, but which can be explained by the second variable. Partial correlation coefficients will be used sparingly in the analysis. As an example, we shall want to use partial correlation coefficients to consider the association between community social structure variables and fertility in urban and rural communities, holding constant the effects of metropolitan dominance. After considering such data, however, we shall want to move to more rigorous measures of association provided in the multiple regression analysis.

Multiple-Partial Correlation Coefficients

At certain points in the analysis it will be desirable to compute a multiple-partial correlation between a dependent variable and more than one independent variable, controlling for one or more other independent variables. The multiple-partial correlation coefficient has not been used very frequently in sociological research,[13] but it can be used at times to handle both multiple and partial correlation problems simultaneously. The general formula for determining the multiple-partial may be expressed as

$$r^2_{i(jklm).n} = \frac{R^2_{i.jklmn} - r^2_{in}}{1 - r^2_{in}}$$

or

$$r^2_{i(jklm).no} = \frac{R^2_{i.jklmno} - R^2_{i.no}}{1 - R^2_{i.no}}$$

The square of the multiple-partial correlation coefficient may be interpreted as that part of the variation in the dependent variable not explained by the control variable(s) which is accounted for by the independent variables enclosed in parentheses. This measure can be used in evaluating the relative importance in predicting the dependent variable of a select number of independent variables from the original

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[13]Hubert M. Blalock, Jr., op. cit., p. 351.

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multiple regression equation, controlling for the effects of the remaining independent variable(s). For example, in comparing the importance of community social structure variables with metropolitan dominance, we may wish to determine the amount of variation explained by the independent variables reflecting community social structure of the original variation explained by all independent variables (R^2), controlling for metropolitan dominance. Actually any combination of independent variables from the original multiple regression equation may be used. The second term of both numerator and denominator includes only the dependent variable and those independent variables being held constant. The independent variables being correlated with the dependent variable are left out of the second term of both numerator and denominator. The first term of the numerator always includes the entire battery of variables employed in the original multiple regression equation.[14] Multiple-partial correlation coefficients compared with the beta coefficients give us a more flexible approach to considering the relative importance of independent variables in accounting for variation in fertility behavior because sets rather than individual variables are considered simultaneously in

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[14]For a comparison of the multiple-partial with the partial correlation coefficient, see C. Horace Hamilton, "Population Pressure and Other Factors Affecting Net Rural-Urban Migration," Social Forces, XXX, No. 2 (December, 1951), 213-14.

the statistic. Beta coefficients measure the relative importance always for a single independent variable in predicting the dependent variable, controlling for all other independent variables included in the regression equation. Multiple-partial coefficients are especially useful in problems containing variables which may be highly intercorrelated because the combined effects of independent variables are taken into account. Because beta coefficients are not independently additive, they are not the best indicators of the relative importance contributed by two or more, perhaps highly correlated, independent variables.

Statistical Tests

Differences of opinion seem to exist among social statisticians as to whether tests of significance should be employed when all units in a limited universe have been observed (a 100 percent sample) and what the interpretation should be of these tests of significance when they are applied.[15] Though we shall follow Bogue and Harris' advice

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[15]This seems to be a very common problem confronted by almost any researcher using demographic data. Bogue and Harris suggest that no tests of significance are needed with a 100 percent sample if there is no attempt to generalize to a larger universe in time or space. See Donald Bogue and Dorothy Harris, op. cit., p. 12. Hagood and Price suggest that such total populations be considered as "samples from still larger hypothetical universes of possibilities." See Margaret J. Hagood and Daniel O. Price, Statistics for Sociologists (Rev. ed.; New York: Holt, Rinehart and Winston, 1952), pp. 286-94. Selvin points out, however, that one must recognize that sampling error is only one type of random error. "Even where there is no sampling in the usual sense,

and not wish to generalize the findings of this study to a larger universe than for the counties of the nation in 1960, we shall proceed to apply tests of significance for the statistics employed in this study due to possible random error in response and processing as well as in sampling, since the census data employed in this study were collected on the basis of a 25 percent sample. However, it should be emphasized that the main concern of this thesis is locating and partitioning sources of variation in a dependent variable, hence the use of correlation statistics. Tests of significance are of minor importance and will be used only to urge caution when small statistical differences are discovered.

The "t" test was used to ascertain whether zero-order correlation coefficients were significantly different from zero. The chosen level of significance was .05. The statistic

$$t = \frac{r \sqrt{N - 2}}{\sqrt{1 - r^2}}$$

has "Student's" distribution with N-2 degrees of freedom.

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discrepancies between the true situation and the observed results may be produced by random errors of response or processing. It might seem, therefore, that tests of significance could be used to compare total populations, if the tests are interpreted as dealing with random errors of response or processing." See Hanan C. Selvin, "A Critique of Tests of Significance in Survey Research," <u>American Sociological Review</u>, XXII (October, 1957), 525.

The "F" test was used to determine the significance of the partial correlation coefficients, multiple-partial correlation coefficients, and multiple correlation coefficients. With respect to partial correlation coefficients we tested the hypothesis that the coefficient was significantly different from zero at the .05 level. The general formula for testing the partial $r_{ij.kl}$ is

$$F_{1,N-k-1} = \frac{r^2_{ij.kl}}{1 - r^2_{ij.kl}} (N - k - 1)$$

where the total number of variables is k + 1 and N is the total number of observations. This same formula may also be used to test whether the multiple-partial correlation coefficient is significantly different from zero. The .05 level of significance is used in this test also. The general formula employed to test the null hypothesis that the multiple correlation coefficient (R) is not significantly different from zero may be expressed as

$$F_{k,N-k-1} = \frac{R^2}{1 - R^2} \; \frac{N - k - 1}{k}$$

where k represents the number of independent variables and N the number of observations.

The "t" test was also used to ascertain whether the estimated regression coefficients were significantly different from zero. Again the level of significance chosen was the .05 level. The form of the "t" test used was

$$t = \frac{b_j - 0}{s_{b_j}}$$

which has N - k - 1 degrees of freedom and where

b_j is the estimated partial regression coefficient of the jth independent variable;

s_{b_j} is the estimated standard deviation of b_j.

A final statistical test, the multiple comparison test, was employed to determine whether there were differences in the effects of the independent variables on the dependent variable between residential parts of counties (intra-divisional) and between geographic divisions (inter-divisional) for the same residential parts of counties. This involves testing the equality of partial regression coefficients between the various multiple regression equations. The question which is asked in this test is whether the respective independent variables have the same impact on fertility in all residential classifications: urban, rural-nonfarm and rural farm. The question was also asked whether the respective independent variables had the same effect on fertility in all the geographic divisions. Recall that our final theoretical hypothesis predicts that differential impact will be found largely between residential communities within the same division and that a comparison of the same type of residential communities interdivisionally will reveal simularities rather than dissimilarities of impact.

The test used was the multiple comparison test of Scheffé.[16] As an example of the test suppose we have k equations and we wish to test the equality of the regression coefficients of variable X_j in the k equations.

Let:

b_j^k be the estimated partial regression coefficient of X_j in the equation k ($k = 1, \ldots, u, \ldots, v, \ldots, k$);

c_{jj}^k be the jth diagonal element of the $(X'X)^{-1}$ matrix of equation k;

SSU^k be the sum of squares of residuals from equation k;

Q^k be the degrees of freedom from equation k ($Q^k = N^k - p^k$, when N^k is the number of observations and p^k the number of parameters in equation k).

To test:

$$H_o:\ B_j^u - B_j^v = 0$$

$$H_1:\ B_j^u - B_j^v \neq 0,$$

form:

$$(b_j^u - b_j^v)^2 \,/\, (c_{jj}^u + c_{jj}^v) = SSD_{uv},$$

and

$$\sum_{k=1}^{k} SSU^k = SSU.$$

Then the test statistic

$$\frac{SSD_{uv} \,/\, (k - 1)}{SSU \,/\, \sum_{k=1}^{k} Q^k}$$

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[16] See K. A. Brownlee, Statistical Theory and Methodology in Science and Engineering (New York: John Wiley, 1960), pp. 316ff.

follows the F distribution with k - 1 and $\sum_{k=1}^{k} Q^k$ degrees of freedom. The chosen level of significance of the test was .05. One assumption which must be met for the test to be valid is that the residual variances in the k equations be equal; that is,

$$\sigma_1^2 = \sigma_2^2 = \ldots\ldots = \sigma_k^2 .$$ [17]

This chapter has presented a discussion of the conceptual and the statistical frameworks employed in this thesis. Concepts from the theoretical framework were transformed into empirical measures, each based on an interval scale. Also discussed have been the multiple regression model employed, the additional statistics considered necessary for the analysis, as well as the statistical tests performed. In the following chapter the results of the analysis will be presented, interpreted and discussed.

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[17] Bartlett's test of homogeneity of variance was used to test the validity of this assumption. See G. W. Snedecor, Statistical Methods (5th ed.; Ames: Iowa State University Press, 1956), p. 285.

CHAPTER V

ANALYSIS OF DATA: NATION AND DIVISION

In this chapter the results of our regression analyses will be employed to test the seven hypotheses which were developed in the chapter dealing with the theoretical framework of this study. The theoretical framework which is used to explain rural and urban differential fertility patterns for the nation and the geographic divisions of the nation is metropolitan dominance theory. The basic proposition running through this study is that different patterns of urban and rural fertility variation are associated with the emergence of metropolitan centers as organizing agents of hinterland communities. The test of differential urban and rural fertility patterns, then, is also a test of metropolitan dominance theory in general. The organization of this chapter will be provided by the seven hypotheses. Each hypothesis will be individually introduced followed by a presentation and discussion of the types of data available from our regression analyses which are most relevant to the testing of the particular hypothesis.

Hypothesis 1

> Community social structure is a function of distance and size of a dominating metropolitan center.

a. Distance and size of a dominating metropolitan center will manifest a different impact on community social structures in the urban hinterland than in the rural hinterland.

To test this hypothesis we shall consider the zero-order correlation coefficients which reflect the degree and direction of association between metropolitan dominance and the various indices of community social structure. If metropolitan centers are organizing agents of their respective urban and rural hinterlands, we should expect to find significant correlations between distance from metropolitan centers by size and community social structure characteristics. Table 17 presents the zero-order correlation coefficients for metropolitan dominance and employment in agricultural occupations, measures which are assumed to reflect urbanization. Generally the coefficients are rather moderate in size. Overall there appears to be a negative correlation of distance from metropolitan centers by size and employment in agricultural occupations, such as farmers and farm managers, farm laborers and foremen. Employment in these occupations diminishes as one approaches a metropolitan center. Metropolitan centers seem to have more of an influence on employment of farmers and farm managers than on farm laborers and foremen.

In comparing urban and rural areas, there appears to be little difference in direction of association, however, with respect to degree of association correlations of farmers and farm managers seem to be slightly higher in the

Table 17. Zero-order correlation of metropolitan dominance and employment in agricultural occupations (urbanization) for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Metropolitan Dominance and Farmers and Farm Managers			Correlation of Metropolitan Dominance and Farm Laborers and Foremen		
	Urb r_{12}	RNF r_{12}	RF r_{12}	Urb r_{13}	RNF r_{13}	RF r_{13}
UNITED STATES	-.348*	-.390*	-.287*	-.218*	-.273*	-.133*
New England	-.376*	-.401*	-.399*	-.368*	-.407*	-.288*
Middle Atlantic	-.176*	-.372*	-.428*	-.378*	-.392*	-.287*
E. N. Central	-.116*	-.119*	-.207*	-.151*	-.122*	-.096
W. N. Central	-.387*	-.484*	-.609*	-.292*	-.276*	-.219*
South Atlantic	-.309*	-.219*	-.127*	-.191*	-.158*	.045
E. S. Central	-.095	-.014	.160*	.112	.052	.174*
W. S. Central	-.322*	-.089	-.272*	-.273*	-.261*	-.283*
Mountain	-.249*	-.246*	-.205*	-.189*	-.100	.021
Pacific	-.094	-.253*	-.429*	-.025	.087	.211*

*Significantly different from zero at the .05 level.

X_1 Metropolitan dominance (distance and size of metropolitan center).

X_2 Percent of male labor force who are employed as farmers and farm managers.

X_3 Percent of male labor force who are employed as farm laborers and foremen.

rural hinterland than the urban. In West North Central, e.g., 37 percent of the variation in employment of farmers and farm managers is explained by metropolitan dominance among rural-farm communities, 23 percent among rural-nonfarm communities, but only 15 percent among urban hinterland communities. This pattern persists also for five other divisions, especially the more metropolitan ones. For employment of farm laborers and foremen correlations are much lower and there appears to be a reversal of pattern in terms of the significance of metropolitan dominance in determining the pattern of variation among urban and rural hinterland communities, i.e., coefficients appear highest in urban areas.

Table 18 provides the zero-order correlation coefficients between metropolitan dominance and socio-economic status characteristics of urban and rural hinterland communities. The coefficients for education are surprisingly low, suggesting that metropolitan centers have little influence on education levels of hinterland communities, although coefficients tend to be higher among both rural-nonfarm and rural-farm communities than among urban. The direction of association is not consistent among the divisions, although for rural-nonfarm areas the greater tendency is for educational levels of communities to increase as one approaches metropolitan centers.

Table 18. Zero-order correlation of metropolitan dominance and socio-economic status for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Metropolitan Dominance and Education			Correlation of Metropolitan Dominance and Family Income		
	Urb 4_{14}	RNF r_{14}	RF r_{14}	Urb r_{15}	RNF r_{15}	RF r_{15}
UNITED STATES	-.046*	.075*	-.046*	.414*	.472*	.408*
New England	-.127	.286*	.283*	.812*	.772*	.705*
Middle Atlantic	-.035	.299*	-.075	.297*	.098	.364*
E. N. Central	.105	.359*	.194*	.015	.043	-.026
W. N. Central	-.296*	-.258*	-.306*	-.109*	.312*	-.017
South Atlantic	-.017	.095*	.063	.703*	.744*	.706*
E. S. Central	-.375*	-.266*	-.294*	-.312*	-.045	.362*
W. S. Central	.071	-.181*	-.329*	.107	-.020	.001
Mountain	.161*	.200*	-.039	.283*	-.094	-.074
Pacific	.053	.107	-.160	.668*	.636*	.652*

*Significantly different from zero at the .05 level.

X_1 Metropolitan dominance (distance and size of metropolitan center).

X_4 Median years of school completed by males and females, age 25 and over.

X_5 Median family income in 1959.

Of all the measures of community social structure employed in this study, metropolitan centers seem to have the greatest influence on family income levels in both urban and rural hinterland communities, when comparing zero-order correlation coefficients. The direction of association in most cases is positive so that the greater the proximity of a community to a metropolitan center, the higher will be its composite level of family income. There is a high positive correlation of metropolitan dominance and family income for New England, South Atlantic, and Pacific divisions, but among these there is no consistent pattern as to whether in the urban or rural hinterland metropolitan dominance has more influence in determining family income.

Table 19 considers the influence of metropolitan dominance on wife's alternative opportunities in a community. Female personal income is generally positively related to distance from metropolitan centers by size. Female employment reflects the same association pattern although the direction of association is more mixed. Correlation coefficients are relatively low, although metropolitan dominance seems to influence female personal income levels more than the female employment rate. In the comparison of urban and rural hinterland communities, nationally metropolitan dominance is relatively more important in accounting for female personal income and female employment levels in urban areas than rural, though among divisions this pattern is mixed.

Table 19.

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Table 19. Zero-order correlation of metropolitan dominance and wife's alternative opportunities for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Metropolitan Dominance and Female Personal Income			Correlation of Metropolitan Dominance and Female Employment		
	Urb r_{16}	RNF r_{16}	RF r_{16}	Urb r_{17}	RNF r_{17}	RF r_{17}
UNITED STATES	.232*	.191*	.195*	.177*	-.131*	.139*
New England	.352*	.373*	.457*	.350*	.379*	.413*
Middle Atlantic	-.094	-.218*	-.227*	.051	-.024	-.067
E. N. Central	.155*	.143*	.105*	.217*	.241*	.183*
W. N. Central	.258*	.266*	.277*	.048	.037	.069
South Atlantic	.067	-.203*	-.223*	-.033	-.177*	-.182*
E. S. Central	-.069	-.066	-.078	-.157*	-.209*	-.192*
W. S. Central	.237*	.204*	.200*	.061	-.017	-.004
Mountain	.478*	.382*	.215*	.418*	.331*	.209*
Pacific	.301*	.240*	.277*	.177	.135	.161

*Significantly different from zero at the .05 level.

X_1 Metropolitan dominance (distance and size of metropolitan center).

X_2 Median female personal income in 1959.

X_3 Percent females, age 14 and over, who are employed.

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In New England, for example, metropolitan dominance accounts for 21 percent of variation in female income and 17 percent of female employment in rural-farm communities, but 12 percent for both cases in urban communities. For the Mountain division percent of variation accounted for by metropolitan dominance is greater for urban than rural-farm or rural non-farm communities.

Table 20 portrays the relationship of metropolitan dominance to the demographic age structure of women in the reproductive age span of urban and rural hinterland communities. Distance from a metropolitan center by size is generally negatively associated with ever-married females ages 15-24 but the pattern is mixed for ever-married females ages 25-34. Metropolitan dominance nationally is more influential in determining the distribution of females ages 15-24 in urban communities than rural, especially in the more metropolitan divisions, but for females ages 25-34 the influence of metropolitan dominance is rather insignificant.

In summarizing these tables we might conclude that community social structure is only slightly a function of metropolitan dominance. The amount of variation in community social structure characteristics accounted for by distance from metropolitan centers by size is highest for family income, employment of farmers and farm managers, and ever-married females ages 15-24. Family income is positively associated with metropolitan dominance while employment of farmers and farm managers and ever-married females ages

Table 20

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X_8 age 15-24.

X_9 age 25-34.

Table 20. Zero-order correlation of metropolitan dominance and demographic age structure for onterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Metropolitan Dominance and Females, Ages 15-24			Correlation of Metropolitan Dominance and Females, Ages 25-34		
	Urb r_{18}	RNF r_{18}	RF r_{18}	Urb r_{19}	RNF r_{19}	RF r_{19}
UNITED STATES	-.320	-.241	-.127	.004	.081	-.095
New England	-.447	-.697	-.268	-.201	.306	.002
Middle Atlantic	-.522	-.511	-.219	.356	.162	-.082
E. N. Central	-.159	-.152	.025	.152	.127	-.015
W. N. Central	-.076	.103	-.134	-.067	-.097	-.377
South Atlantic	-.165	-.297	-.005	.039	.094	.047
E. S. Central	.011	-.001	.125	-.088	-.054	-.096
W. S. Central	-.042	-.081	-.173	-.065	.025	-.121
Mountain	-.172	-.087	.139	.061	.020	-.139
Pacific	-.333	-.144	-.008	.157	-.066	-.104

*Significantly different from zero at the .05 level.

X_1 Metropolitan dominance (distance and size of metropolitan center).

X_8 Percent ever-married females, ages 15-44, who are age 15-24.

X_9 Percent ever-married females, ages 15-44, who are age 25-34.

15-24 are negatively associated. We cannot conclude that metropolitan centers have a more determinative influence on any single broad dimension of community social structure, such as employment in agricultural occupations, socio-economic status, wife's alternative opportunities, or demographic age structure, since in each of these pairs of variables one of the variables stands above the other in terms of its degree of association with metropolitan dominance. The data included in these tables have suggested only slight differences in the impact of metropolitan dominance on urban vs. rural community social structures. For employment of farmers and farm managers and education, metropolitan dominance seems to be more influential in rural communities, but for female personal income and ever-married females ages 15-24, metropolitan dominance seems to be more important in urban communities. However, the more obvious conclusion from the zero-order correlation coefficients seems to be the similarity of impact that metropolitan dominance exerts on urban and rural communities. In other words, among the various divisions, where coefficients were relatively large, they were large for both urban and rural areas, and where low or nonsignificant, they were for both urban and rural communities. This pattern also is true when considering the direction of association. Generally the data suggest that the influence of metropolitan centers is not as pervasive as one might expect from the theory. This suggests further

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further that additional factors to be considered are differences among the divisions due to differential rates of metropolitanization as well as the influence of local community conditions in determining urban and rural patterns, especially differential fertility patterns.

Hypothesis 2

> Fertility behavior is a function of community social structure and distance and size of a dominating metropolitan center.
>
> a. Community social structure and distance and size of a dominating metropolitan center will manifest a different impact on fertility behavior in the urban hinterland than in the rural hinterland.

To test this hypothesis let us consider again zero-order correlation coefficients, but we shift to a consideration of fertility as the dependent variable. Is community fertility behavior a function of both metropolitan dominance and community social structure, regardless of whether community social structure is a reflection of metropolitan dominance or its own local environment? In considering this hypothesis we are interested in the existence and direction of association of fertility with metropolitan dominance and community social structure indices as well as the impact or importance each independent variable represents in accounting for intercommunity variation of fertility levels in urban and rural hinterlands.

Table 21 offers the zero-order correlation coefficients of fertility and metropolitan dominance for each division

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Table 21. Zero-order correlation of fertility and metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Metropolitan Dominance		
	Urb r_{Y1}	RNF r_{Y1}	RF r_{Y1}
UNITED STATES	-.211*	-.268*	-.160*
New England	-.490*	-.676*	-.451*
Middle Atlantic	-.397*	-.539*	-.394*
East North Central	-.285*	-.319*	-.247*
West North Central	-.255*	-.165*	-.194*
South Atlantic	-.264*	-.213*	-.182*
East South Central	-.038	-.031	-.047
West South Central	-.294*	-.122*	-.014
Mountain	-.309*	-.372*	-.159*
Pacific	-.426*	-.395*	-.275*

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

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and the nation. All divisions with the exception of East South Central indicate the existence of a significant association of fertility and metropolitan dominance. In all cases, urban and rural fertility is negatively related to distance and size of a dominating metropolitan center. Especially in the more metropolitan divisions metropolitan dominance is significant in accounting for fertility variation. In New England, for example, 24 percent of fertility variation among urban communities is accounted for by metropolitan dominance, 46 percent among rural-nonfarm, and 20 percent among rural-farm communities. Lowest coefficients appear in the least metropolitan divisions such as East and West South Central. Unexpectedly, while urban correlation coefficients for the most part exceed rural-farm coefficients, the rural-nonfarm sector reflects a tendency to exceed the other two sectors. There is enough evidence to suggest that metropolitan dominance does have a differential impact on fertility among the different types of residential hinterland communities, though the direction of association is the same throughout and the predominance of rural-nonfarm coefficients is unexpected.

Table 22 contains the zero-order correlation coefficients for fertility and employment in agricultural occupations. Looking first at the association between fertility and employment of farmers and farm managers, slightly over half the coefficients are significant in the residential hinterlands. The direction of association among the

Table 22. Zero-order correlation of fertility and employment in agricultural occupations (urbanization) for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Farmers and Farm Managers			Correlation of Fertility and Farm Laborers and Foremen		
	Urb r_{Y2}	RNF r_{Y2}	RF r_{Y2}	Urb r_{Y3}	RNF r_{Y3}	RF r_{Y3}
UNITED STATES	.200*	.172*	.007	.358*	.298*	.129*
New England	.149	.504*	.463*	.407*	.674*	.407*
Middle Atlantic	.095	.236*	.103	.143	.291*	.255*
E. N. Central	-.013	-.129*	-.127*	-.061	-.026	.185*
W. N. Central	.139*	.076	.083	.074	.045	.269*
South Atlantic	.201*	.166*	-.139*	.216*	.229*	.066
E. S. Central	-.050	-.028	-.314*	-.176*	.131*	.081
W. S. Central	.179*	-.025	-.254*	.654*	.524*	.126*
Mountain	.340*	.303*	-.166*	.216*	.220*	-.108
Pacific	.347*	.087	-.097	.307*	.282*	-.097

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_2 Percent of male labor force who are employed as farmers and farm managers.

X_3 Percent of male labor force who are employed as farm laborers and foremen.

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significant coefficients of urban areas tends toward the positive while in rural areas, especially the rural-farm, the relationship tends toward the negative among the significant coefficients. We might make reference here to Table 15 (in Chapter II) which summarized the expected relationships of fertility to the independent variables established on the basis of previous research on differential fertility. This table proposed an inverse association in rural areas and a nonsignificant association in urban areas, but our findings suggest the greater contrast of negative in the rural and positive in the urban. It does hold, however, that correlation coefficients are larger in the rural communities, suggesting that employment of farmers and farm managers is more determinant of rural than urban fertility levels.

With respect to employment of farm laborers and foremen, on the basis of the empirical propositions established in Table 15 of Chapter II, it was expected that it be positively associated with fertility in rural areas but nonsignificant in urban areas. Only three of the urban coefficients are nonsignificant, however, whereas four of the rural-farm coefficients are nonsignificant. According to the data of Table 22 the positive relationship holds generally in both urban and rural areas. However in the Northeastern and North Central divisions the rural coefficients are larger than urban, but for the divisions in the South

and West the urban coefficients appear to be more important in accounting for fertility variation. For example, employment of farm laborers and foremen accounts for 17 percent of rural-farm fertility, 45 percent of rural-nonfarm and 17 percent of urban in New England, but in the West South Central fertility variation is accounted for by this independent variable 43 percent in urban communities, 27 percent rural-nonfarm, and only 2 percent rural-farm. On the basis of these findings we conclude that employment in agricultural occupations as an index of community social structure does have a different impact on fertility in urban than in rural hinterlands, though the pattern is not consistent for farm laborers and foremen.

In Table 23 are given the values for the zero-order correlation coefficients for fertility and socio-economic status. Education is for the most part negatively correlated with fertility, although moreso in the rural residential areas than urban. Education is not a significant predictor of fertility levels in all residential sectors of the Middle Atlantic division. For the urban hinterland of the more metropolitan divisions, i.e., New England, Middle Atlantic, and East North Central, the coefficients are positive and nonsignificant. Generally education is more influential in determining fertility levels in the rural hinterland communities, except in the case of the West South Central and Mountain divisions where education accounts for

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Table 23. Zero-order correlation of fertility and socio-economic status for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Education			Correlation of Fertility and Family Income		
	Urb r_{Y4}	RNF r_{Y4}	RF r_{Y4}	Urb r_{Y5}	RNF r_{Y5}	RF r_{Y5}
UNITED STATES	-.177*	-.236*	-.159*	-.032	-.052*	.042*
New England	.095	-.443*	-.247	-.473*	-.666*	-.443*
Middle Atlantic	.092	-.160	.014	-.272*	-.037	-.137
E. N. Central	.027	-.272*	-.426*	.279*	-.272*	-.234*
W. N. Central	-.086	-.222*	-.318*	-.283*	-.216*	-.091*
South Atlantic	-.263*	-.395*	-.274*	-.265*	-.059	-.043
E. S. Central	-.162*	-.374*	-.222*	-.024	-.169*	-.027
W. S. Central	-.621*	-.528*	-.464*	.017	-.095*	-.289*
Mountain	-.507*	-.455*	.013	.047	-.230*	.064
Pacific	-.434*	-.586*	-.294*	-.311*	-.318*	-.353*

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_4 Median years of school completed by males and females, age 25 and over.

X_5 Median family income in 1959.

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39 percent and 26 percent of fertility variation in the urban hinterland communities. These findings are in general agreement with the empirical propositions established in Chapter II in terms of direction of association and differential impact of the importance of education in accounting for fertility level variation in rural and urban areas.

Family income, the second index of socio-economic status of communities, is also negatively associated with fertility, although moreso in rural than urban areas. Family income is especially significantly related to fertility in the more metropolitan divisions. The empirical propositions from Chapter II relating to this variable suggested the possibility of a positive association of family income and fertility in the urban hinterland, but this is not supported by the zero-order correlation coefficient presented here. Furthermore, on the basis of the empirical propositions established in Chapter II, it was expected that family income coefficients would be higher in urban than rural sectors, but this is supported only in the case of four divisions: Middle Atlantic, East North Central, West North Central and South Atlantic. Hence the differential impact of family income on urban and rural fertility is not as clear as education. Family income appears to be a better predictor of fertility levels in the urban hinterlands of the more metropolitan divisions and education a better predictor in the urban hinterlands of the less metropolitan divisions, while both education and family income are moderate predictors of fertility in the rural sectors of most divisions, education being relatively more important than family income.

Correlation coefficients of fertility and wife's alternative opportunities are listed in Table 24. In the case of both female personal income and female employment there is a negative association with fertility. This is again in agreement with the empirical propositions of Chapter II. It was expected, however, since working women is more an urban characteristic than rural, that the indices of wife's alternative opportunities would be nonsignificant in rural areas but significant in urban areas. With respect to female personal income this does not appear to be the case except for Middle Atlantic. Generally the coefficients indicate that female personal income is significantly related to fertility in all residential sectors. In six divisions, however, female personal income in the urban hinterland does exceed either of the rural hinterlands in accounting for variation in fertility and they are Middle Atlantic, West North Central, South Atlantic, West South Central, Mountain, and Pacific. Hence one might argue that the impact of female personal income on fertility is slightly different, i.e., greater, in the urban hinterland than the rural. In the case of female employment, on the other hand, five of the rural-farm coefficients among the divisions are nonsignificant and, hence, concur with the empirical

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Table 24. Zero-order correlation of fertility and wife's alternative opportunities for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Female Personal Income			Correlation of Fertility and Female Employment		
	Urb r_{Y6}	RNF r_{Y6}	RF r_{Y6}	Urb r_{Y7}	RNF r_{Y7}	RF r_{Y7}
UNITED STATES	-.269*	-.245*	-.172*	-.210*	-.301*	-.163*
New England	-.248	-.490*	-.417*	-.231	-.388*	-.252
Middle Atlantic	-.286*	-.097	-.011	-.239*	-.235*	-.008
E. N. Central	-.195*	-.229*	-.134*	-.088	-.182*	-.039
W. N. Central	-.387*	-.150*	-.244*	-.172*	-.044	-.036
South Atlantic	-.301*	-.233*	-.131*	-.227*	-.355*	-.183*
E. S. Central	-.185*	-.208*	-.199*	-.320*	-.510*	-.413*
W. S. Central	-.288*	-.169*	-.196*	-.157*	-.194*	-.205*
Mountain	-.458*	-.343*	-.199*	-.522*	-.466*	-.237*
Pacific	-.454*	-.201*	-.066	-.240*	-.133	-.063

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_6 Median female personal income in 1959.

X_7 Percent females, age 14 and over, who are employed.

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propositions of Chapter II. West North Central and Pacific reveal both rural-farm and rural-nonfarm coefficients as nonsignificant. However female employment does not appear to be as important in predicting urban fertility as expected. Furthermore female employment in rural-nonfarm hinterland communities often reveals a greater amount of fertility variation explained than in urban communities. While there is indication of a differential impact of female personal income on urban and rural fertility, female employment does not suggest a clear pattern.

Table 25 contains the zero-order correlation coefficients of fertility and demographic age distribution of women in the child-bearing period. Generally the tendency is toward a negative association of fertility and the prevalence of ever-married females ages 15-24 and a positive association of fertility and ever-married females ages 25-34. This concurs with the empirical propositions of Chapter II. With respect to ever-married females ages 15-24 there seem to be exceptions to the expectation that it would be a better predictor of fertility levels in the urban than the rural hinterland, and these exceptions appear in three highly metropolitanized divisions: New England, Middle Atlantic, and Pacific. In these three divisions the urban coefficient is not significant. Generally, however, females ages 15-24 is more frequently a significant variable in determining fertility levels for urban than rural areas. Though most of the coefficients for ever-married females

Table 25. Zero-order correlation of fertility and demographic age structure for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Females, Ages 15-24			Correlation of Fertility and Females, Ages 25-34		
	Urb r_{Y8}	RNF r_{Y8}	RF r_{Y8}	Urb r_{Y9}	RNF r_{Y9}	RF r_{Y9}
UNITED STATES	-.271*	-.055*	-.113*	.203*	-.004	.110*
New England	.106	.619*	-.073	.190	-.244*	.065
Middle Atlantic	.081	.308*	.073	.032	-.163	-.016
E. N. Central	-.455*	-.125*	-.269*	.129*	.021	.028
W. N. Central	-.478*	-.269*	-.133*	.238*	.110*	.155*
South Atlantic	-.290*	-.027	-.069	.169*	-.116*	.089
E. S. Central	-.454*	-.039	-.019	.174*	-.101	-.009
W. S. Central	-.282*	-.042	.051	.349*	.133*	.036
Mountain	-.291*	-.074	-.368*	.047	-.009	.036
Pacific	-.127	-.044	-.199*	.164	.070	.023

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_8 Percent ever-married females, ages 15-44, who are age 15-24.

X_9 Percent ever-married females, ages 15-44, who are age 25-34.

ages 25-34 are relatively small and especially nonsignificant in the rural hinterlands, the pattern seems to be a positive relationship to fertility in the urban hinterlands and a positive but nonsignificant relationship in the rural sectors. These coefficients seem to support the expectations based on the empirical propositions of Chapter II with ever-married females ages 25-34 accounting for more of urban fertility variation than rural. It is not as significant a variable, however, as the prevalence of ever-married females ages 15-24. The differential impact of demographic age structure on urban and rural fertility is not clear. These variables, however, are more significant in urban hinterlands than rural in determining fertility levels.

Before proceeding to a consideration of additional data let us summarize what has been discovered to this point. With respect to metropolitan dominance there is a consistently significant negative association with fertility. It is especially important in the more metropolitan divisions. A differential impact on urban and rural fertility is supported, in that urban coefficients exceed rural-farm, but rural-nonfarm coefficients were found to exceed both. With respect to employment in agricultural occupations, farmers and farm managers are negatively correlated with fertility in rural areas but positively in urban areas. The differential impact hypothesis is supported in direction of association and importance of the variable in that rural coefficients excee

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exceed urban. Farm laborers and foremen are positively associated with fertility in urban and rural communities and the size of coefficients vary randomly among the residential sectors which suggests no consistent difference in impact of the variable on fertility. Both measures of socio-economic status, education and family income, are negatively associated with fertility, moreso among rural than urban communities. A differential impact of education is supported by the fact that coefficients are larger in rural areas. Family income reflects a differential impact on fertility in the more metropolitan divisions in that urban coefficients are larger than rural. With respect to wife's alternative opportunities both female personal income and female employment are negatively associated with fertility for urban and rural communities. Female income has a differential impact on urban and rural fertility in that urban coefficients tend to exceed rural. For female employment, however, the differential impact is not clear. Urban coefficients exceed rural-farm coefficients, which are mostly nonsignificant, but highest coefficients appear for rural-nonfarm communities. Finally considering the demographic age structure of communities, the prevalence of ever-married females ages 15-24 is negatively related to fertility but for those ages 25-34 there is a positive association. The differential impact of ever-married females ages 15-24 on urban and rural fertility is partially supported by the occurrence of higher coefficients in urban areas, but mostly for the less metropolitan

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divisions. Urban coefficients of the more metropolitan divisions are significant but coefficients in rural areas are quite frequently nonsignificant. Ever-married females ages 25-34 reflects a clearer pattern of differential impact on fertility in that the urban coefficients exceed the rural. To conclude this summary it is asserted that fertility is a function of metropolitan dominance and community social structure. For the most part many of the empirical propositions established in Chapter II were supported. Differential impact of the independent variables on fertility by residential type of hinterland, as suggested already in Chapter II, is to be discovered more in the importance of variables in accounting for fertility variation than in the existence or direction of association.

To further test the hypothesis of the existence of an association and a differential impact of community social structure and metropolitan dominance on fertility, let us consider coefficients of multiple determination (R^2) which will demonstrate the relative importance of the combined effects of the independent variables on fertility. We shall review only the total correlation of the combined effects of all independent variables on fertility.

Table 26 displays the coefficients of multiple determination which indicate the amount of variation explained in fertility by all independent variables, metropolitan dominance and community social structure. In all cases the coefficient

Table 26. Coefficients of multiple determination (R^2) of fertility and variables in multiple regression equations for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	$R^2_{Y.123456789}$ Urb	RNF	RF
UNITED STATES	.3376*	.2715*	.1657*
New England	.4588*	.7307*	.4548*
Middle Atlantic	.3751*	.3832*	.2297*
East North Central	.4097*	.2815*	.3597*
West North Central	.4212*	.1912*	.3325*
South Atlantic	.3966*	.3634*	.2017*
East South Central	.3409*	.3955*	.3389*
West South Central	.6598*	.4687*	.3433*
Mountain	.5738*	.4237*	.2653*
Pacific	.6270*	.5728*	.3064*
Average Value	.4736	.4234	.3136

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

is significantly different from zero. For urban hinterlands among the divisions the amount of variation accounted for by the independent variables ranges from a low of 34 percent for East South Central to a high of 60 percent for West South Central. For the rural-nonfarm sector the range is from a low of 19 percent to a high of 73 percent for West North Central and New England, respectively. The range in the rural-farm sector is from a low of 20 percent in South Atlantic to a high of 45 percent in New England. Nationally the independent variables account for more variation in fertility levels among urban communities than rural-farm, with rural-nonfarm intermediate. If we consider the average values of the coefficients among the divisions the pattern remains the same, with urban coefficients explaining an average of 47 percent of the variation in fertility, rural-nonfarm 42 percent, and rural-farm only 32 percent. The combined effects of the independent variables on fertility is in all divisions greater in the urban sector than the rural-farm. This suggests that fertility is a function of community social structure and metropolitan dominance combined and that these factors exert different effects on urban fertility than rural-farm fertility. But the rural-nonfarm coefficients are not consistently intermediate between urban and rural-nonfarm. The coefficient of multiple determination in the rural-nonfarm sector exceeds the urban coefficient in three divisions: New England, Middle

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Atlantic, and East South Central. More frequently, however, the rural-nonfarm coefficient is less than the urban. Hence with some reservation, it is concluded that the hypothesis of a differential effect by the independent variables on urban and rural fertility is supported.

Hypothesis 3

> Community fertility behavior in both urban and rural hinterlands is not only a function of the size and distance of a dominating metropolitan center, but also a function of conditions of its own immediate locality, since all local communities in the metropolitan region possess some degree of dominance over some portion of the hinterland.

In order to test this hypothesis what is required is to determine the direction and degree of association between fertility and the various indices of community social structure, holding constant the influence of metropolitan dominance. In other words, if fertility continues to be significantly related to community social structure variables after the influence of a dominating metropolitan center has been controlled, then we must conclude that this hypothesis is supported. It is assumed, of course, that the association of fertility and the indices of community social structure, after partialling out the effects that may be due to metropolitan dominance, is a reflection of the influence of local community conditions alone. The types of statistics which can be employed to test this hypothesis are (1) first-order partial correlation coefficients for fertility and the various indices of community social structure controlling for

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distance and size of a dominating metropolitan center and (2) multiple-partial correlation coefficients for fertility and combinations of the variables reflecting community social structure again controlling for metropolitan dominance.

The partial correlation coefficients are contained in the Appendix (Tables 49-52) and are only briefly discussed at this point. Generally the partials portray the same patterns as the zero-order correlation coefficients. The partials indicate that the statistical association between community social structure variables and fertility is not wholly due to the influence of metropolitan centers on their hinterlands. Even after metropolitan dominance is controlled, the first-order partials reflect for the most part a significant relationship between fertility and community social structure. Some significant patterns among the partials are worth mentioning. For employment of farmers and farm managers only three urban coefficients among the divisions reflect a significant association with fertility and these are positive. Highest coefficients are found in the rural-farm hinterland and these are mostly significant and negative in direction. The pattern for employment of farm laborers and foremen remains inconsistent. The direction of association and significance of the relationships remain almost unchanged also for the indices of socioeconomic status as well as wife's alternative opportunities. With respect to the distribution of ever-married females in the child-bearing ages, by partialling out the effects of

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metropolitan dominance, the tendency for urban coefficients for both ever-married females ages 15-24 and 25-34 to exceed the rural coefficients is increased.

Additional evidence of the existence of an indigenous relationship between fertility and local community conditions, extraneous to metropolitan dominance, is obtained from a review of multiple-partial correlation coefficients controlling for distance and size of a dominating metropolitan center. Table 27 arrays the multiple-partial correlation coefficients (r^2) which indicate the proportion of variation in fertility explained by the combined effects of all community social structure variables after metropolitan dominance has been partialled out. All coefficients are significantly different from zero, hence, it is assumed that fertility is a function of the local conditions of rural and urban hinterland communities apart from the dominance of metropolitan centers. Urban coefficients, however, exceed both rural sectors in seven of the nine divisions. Tables 28 through 31 provide the multiple-partial correlation coefficients of fertility and the paired variables which represent the four broad dimensions of community social structure, each coefficient controlled for the influence of the metropolitan dominance variable. These tables indicate further that the combined effect of these paired variables reflecting community social structure exert a significant influence on fertility over and above metropolitan

Table 27. Comparison of coefficient of multi...

Table 27. Comparison of coefficient of multiple determination (R^2) and multiple-partial correlation coefficients (r^2) of fertility and community social structure controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Urban			Rural-Nonfarm			Rural-Farm		
	R^2	$r^2_{Y(2..9).1}$	D**	R^2	$r^2_{Y(2..9).1}$	D**	R^2	$r^2_{Y(2..9).1}$	D**
UNITED STATES	.338*	.307*	.031	.272*	.215*	.057	.166*	.144*	.022
New England	.459*	.287*	.172	.731*	.504*	.227	.455*	.316*	.139
Middle Atlantic	.375*	.258*	.117	.383*	.131*	.252	.230*	.088*	.142
East North Central	.410*	.358*	.052	.282*	.200*	.082	.360*	.318*	.042
West North Central	.421*	.381*	.040	.191*	.169*	.022	.333*	.307*	.026
South Atlantic	.397*	.351*	.046	.363*	.333*	.030	.202*	.174*	.028
East South Central	.341*	.340*	.001	.396*	.395*	.001	.339*	.337*	.002
West South Central	.660*	.628*	.032	.469*	.461*	.008	.343*	.343*	.000
Mountain	.574*	.529*	.045	.424*	.331*	.093	.265*	.246*	.019
Pacific	.627*	.545*	.082	.573*	.494*	.079	.306*	.250*	.056
Average Value	.474	.409	.065	.423	.335	.088	.314	.264	.050

*Significantly different from zero at the .05 level.

**Difference between coefficient of multiple determination and multiple-partial correlation coefficient.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

Table 28. Comparison of coefficient of multiple determinati... 2
correlation coefficient (r^2)...
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Table 28. Comparison of coefficient of multiple determination (R^2) and multiple-partial correlation coefficient (r^2) of fertility and employment in agricultural occupations (urbanization) controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conerminous United States and Divisions	Urban			Rural-Nonfarm			Rural-Farm		
	R^2**	$r^2_{Y(23).1}$	D***	R^2**	$r^2_{Y(23).1}$	D***	R^2**	$r^2_{Y(23).1}$	D***
UNITED STATES	.147*	.107*	.040	.127*	.059*	.068	.039*	.014*	.025
New England	.348*	.141*	.207	.648*	.352*	.296	.317*	.142*	.175
Middle Atlantic	.159*	.001	.158	.299*	.013	.286	.192*	.044*	.148
East North Central	.092*	.012*	.080	.132*	.034*	.098	.164*	.110*	.054
West North Central	.068*	.003	.065	.027*	.000	.027	.092*	.056*	.036
South Atlantic	.104*	.037*	.067	.087*	.044*	.043	.056*	.023*	.033
East South Central	.031*	.030*	.001	.039*	.038*	.001	.118*	.116*	.002
West South Central	.446*	.394*	.052	.297*	.286*	.011	.082*	.082*	.000
Mountain	.170*	.083*	.087	.205*	.077*	.128	.090*	.067*	.023
Pacific	.309*	.156*	.153	.287*	.156*	.131	.132*	.061*	.071
Average Value	.192	.095	.097	.225	.111	.113	.138	.078	.060

*Significantly different from zero at the .05 level.

**$R^2_{Y.123}$

***Difference between coefficient of multiple determination and multiple-partial correlation coefficient.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

Table 29. Comparison of coefficient of multiple determination (R^2) and multiple [illegible] correlation coefficient (r^2) of fertility [illegible]

Table 29. Comparison of coefficient of multiple determination (R^2) and multiple-partial correlation coefficient (r^2) of fertility and socio-economic status controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Urban			Rural-Nonfarm			Rural-Farm		
	R^2**	$r^2_{Y(45).1}$	D***	R^2**	$r^2_{Y(45).1}$	D***	R^2**	$r^2_{Y(45).1}$	D***
UNITED STATES	.089*	.046*	.043	.151*	.085*	.066	.102*	.078*	.024
New England	.257*	.022	.235	.584*	.235*	.349	.268*	.081*	.187
Middle Atlantic	.192*	.040*	.152	.291*	.001	.290	.156*	.000	.156
East North Central	.166*	.093*	.073	.182*	.090*	.092	.216*	.165*	.051
West North Central	.181*	.123*	.058	.121*	.097*	.024	.201*	.169*	.032
South Atlantic	.168*	.105*	.063	.195*	.157*	.038	.112*	.081*	.031
East South Central	.040*	.038*	.002	.160*	.159*	.001	.064*	.062*	.002
West South Central	.449*	.396*	.053	.330*	.320*	.010	.293*	.293*	.000
Mountain	.318*	.246*	.072	.340*	.234*	.106	.028*	.003	.025
Pacific	.352*	.208*	.144	.480*	.385*	.095	.248*	.187*	.061
Average Value	.236	.141	.095	.298	.186	.112	.176	.116	.061

*Significantly different from zero at the .05 level.

**$R^2_{Y.145}$

***Difference between coefficient of multiple determination and multiple-partial correlation coefficient.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

Table 30. Comparison of coefficient of multiple determination (R^2) and multi[illegible]
correlation coefficient (r^2) of fertili[illegible]

Table 30. Comparison of coefficient of multiple determination (R^2) and multiple-partial correlation coefficient (r^2) of fertility and wife's alternative opportunities controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Urban			Rural-Nonfarm			Rural-Farm		
	R^2**	$r^2_{Y(67).1}$	D***	R^2**	$r^2_{Y(67).1}$	D***	R^2**	$r^2_{Y(67).1}$	D***
UNITED STATES	.096*	.054*	.042	.145*	.078*	.067	.050*	.025*	.025
New England	.247*	.007	.240	.529*	.133*	.396	.296*	.116*	.180
Middle Atlantic	.269*	.132*	.137	.353*	.088*	.265	.175*	.023	.152
East North Central	.119*	.041*	.078	.137*	.039*	.098	.086*	.027*	.059
West North Central	.185*	.128*	.057	.041*	.014*	.027	.089*	.054*	.035
South Atlantic	.152*	.088*	.064	.205*	.167*	.038	.082*	.051*	.031
East South Central	.115*	.114*	.001	.307*	.307*	.000	.196*	.194*	.002
West South Central	.138*	.056*	.082	.056*	.042*	.014	.054*	.053*	.001
Mountain	.293*	.218*	.075	.270*	.153*	.117	.072*	.048*	.024
Pacific	.302*	.148*	.154	.168*	.014	.154	.077*	.001	.076
Average Value	.202	.104	.099	.230	.106	.123	.125	.063	.062

*Significantly different from zero at the .05 level.

**$R^2_{Y.167}$

***Difference between coefficient of multiple determination and multiple-partial correlation coefficient.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

Table 31. Comparison of Coeffici

Table 31. Comparison of coefficient of multiple determination (R^2) and multiple-partial correlation coefficient (r^2) of fertility and demographic age structure controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Urban			Rural-Nonfarm			Rural-Farm		
	R^2**	$r^2_{Y(89).1}$	D***	R^2**	$r^2_{Y(89).1}$	D***	R^2**	$r^2_{Y(89).1}$	D***
UNITED STATES	.186*	.148*	.038	.100*	.030*	.070	.048*	.023*	.025
New England	.262*	.029	.233	.500*	.079*	.421	.244*	.051	.193
Middle Atlantic	.206*	.057*	.149	.297*	.010	.287	.159*	.004	.155
East North Central	.343*	.285*	.058	.134*	.036*	.098	.131*	.074*	.057
West North Central	.318*	.270*	.048	.092*	.067*	.025	.069*	.033*	.036
South Atlantic	.202*	.142*	.060	.068*	.024*	.044	.045*	.012*	.033
East South Central	.208*	.207*	.001	.018*	.017*	.001	.003	.001	.002
West South Central	.232*	.159*	.073	.034*	.020*	.014	.004	.004	.000
Mountain	.219*	.137*	.082	.150*	.014	.136	.152*	.130*	.022
Pacific	.289*	.131*	.158	.167*	.013	.154	.118*	.046*	.072
Average Value	.253	.157	.096	.162	.031	.131	.103	.039	.063

*Significantly different from zero at the .05 level.

**$R^2_{Y.189}$

***Difference between coefficient of multiple determination and multiple-partial correlation coefficient.

Y Cumulative fertility ratio.

X_1 Metropolitan dominance (distance and size of metropolitan center).

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dominance. Employment in agricultural occupations is statistically significant, especially in the rural-farm hinterlands. Higher coefficients are found in the rural sectors than the urban except for the West South Central, Mountain, and Pacific divisions. Socio-economic status is also significant in most cases with rural coefficients exceeding the urban with exception of the Middle Atlantic, West South Central, and Mountain divisions. Wife's alternative opportunities and demographic age structure coefficients are clearly higher in the urban hinterland than the rural. Coefficients are significant in most cases except for the demographic age structure variables in rural-farm areas which tend toward being nonsignificant. These data suggest the support of the hypothesis that fertility is also a function of the conditions of the local community as well as metropolitan dominance. This finding raises some doubt, then, as to the pervasive influence of metropolitan centers as organizing agents of characteristics of hinterland communities. This finding lends support to the ideas expressed in the articles by Grigg and by Anderson and Collier.[1] In other words, if metropolitan dominance was the primary determinant of intercommunity variation in urban and rural hinterlands, one would

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[1]Charles M. Grigg, "A Proposed Model for Measuring the Ecological Process of Dominance," Social Forces, XXXVI (December, 1957), 128-31; and Theodore R. Anderson and Jane Collier, "Metropolitan Dominance and the Rural Hinterland," Rural Sociology, XXI (June, 1956), 157.

expect that coefficients, controlling for metropolitan dominance, would prove to be nonsignificant. This is not the case with respect to the influence of internal community characteristics on fertility behavior.

Hypothesis 4

> Community fertility behavior is more a function of distance and size of a dominating metropolitan center in the urban hinterland, but more a function of local community social structure in the rural hinterland, when distance and size of the dominating metropolitan center are controlled.

We have established that community social structure is partially determined by metropolitan dominance and that community fertility behavior is a function of both metropolitan dominance and the indigenous characteristics of local hinterland communities. The question which is raised by this fourth hypothesis is whether fertility levels of urban communities is more a function of metropolitan dominance than the fertility of rural communities? This hypothesis is based on the fact that urban hinterland communities tend to concentrate in closer proximity to metropolitan centers than rural hinterland communities. It is assumed that as distance increases from metropolitan centers, the ordering influence of metropolitan centers diminishes and the influence of local community conditions increases.

To test this hypothesis two types of statistics will be employed: (1) multiple-partial correlation coefficients of fertility and community social structure controlling for

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metropolitan dominance and (2) the standard partial regression coefficients (beta coefficients) of each of the independent variables estimated from the multiple regression equations. The multiple-partials will indicate the amount of variation in fertility explained by community social structure over and above metropolitan dominance. The beta coefficients, on the other hand, will reflect the relative importance of each of the independent variables in accounting for fertility variation, holding constant the effects of all other independent variables. With respect to the multiple-partials, the combined effects of more than one variable on fertility is considered, holding constant only one variable, viz., metropolitan dominance. On the other hand, with respect to the beta coefficients, only the effect of one independent variable is estimated, holding constant several other variables, including metropolitan dominance as well as other community social structure variables. By ranking the beta coefficients in each regression equation in terms of their relative size, we can come to some conclusion as to which single variables are relatively more important in determining fertility levels. In comparing these rankings for urban and rural areas, we would expect to find metropolitan dominance as one of the most important determinants of urban fertility, but for rural fertility we would expect that some or all of the single variables reflecting community social structure would be more important than metropolitan

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dominance. With respect to the multiple-partial correlation coefficients, our expectation is that controlling for metropolitan dominance will reduce the correlation of fertility and community structure to such an extent in urban areas that coefficients in the rural areas would be considerably larger. Obviously because of the fact that two different types of statistics are employed to test the same hypothesis, it might occur that the results of the two analyses will not be the same. Although both types of statistics actually test the hypothesis, it is assumed that the analyses of beta coefficients will be the better test because of the fact that more variables are being controlled. In the multiple-partial analysis only the effect of metropolitan dominance on fertility is controlled for each coefficient. Furthermore, we can already at this point expect some difficulty in supporting this hypothesis because of the fact that on the basis of the preceding analyses wife's alternative opportunities and demographic age structure were found to have coefficients larger in urban areas than rural, even when metropolitan dominance was controlled. For this reason, the beta coefficients are expected to be the better test of the hypothesis.

First, then, let us consider the multiple-partial correlation coefficients of community social structure and fertility. Does the elimination of the effects of metropolitan dominance reduce urban coefficients to levels below rural coefficients? Table 27 provides the multiple-partial

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coefficients of fertility and community social structure variables combined, controlling for metropolitan dominance. In all divisions but two, New England and East South Central, the urban coefficient exceeds the rural. The average value of the multiple-partials for urban areas is .409, for rural-nonfarm .335 and rural-farm .264. The hypothesis is not supported by these data. This same table, however, provides a comparison of the multiple-partial and the coefficient of multiple determination for each division and residential sector. The difference between these two coefficients indicates the proportion of explained variation of fertility which is lost when metropolitan dominance is partialled out. For most of the divisions this value (the difference between the coefficient of multiple determination and the multiple-partial) is higher in the urban areas than the rural-farm, but in the case of four divisions rural-nonfarm exceeds the urban, and these are in three highly metropolitanized divisions (New England, Middle Atlantic, and East North Central) and the Mountain division. Actually, on the basis of average size of the difference between the coefficients of multiple determination and the multiple-partials, the rural-nonfarm sector shows the greatest amount of loss doe to the partialling of metropolitan dominance.

Tables 28 through 31 compare the multiple-partial correlation coefficients involving fertility and paired variables of community social structure, controlling for metropolitan dominance, and the coefficients of multiple u

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determination for the three variables on fertility. For the variables measuring employment in agricultural occupations (Table 28) the multiple-partial correlations tend to be greater for rural areas, with the exception of West South Central, Mountain, and Pacific divisions. The average value of the multiple-partial coefficients is largest for rural-nonfarm sectors, but lowest for rural-farm. Although the urban difference between the multiple-partial and the coefficient of multiple determination is almost always greater than the rural-farm difference, and sometimes greater than the rural-nonfarm, the proportion lost in urban areas due to the partialling of metropolitan dominance is not enough to reduce the multiple-partial coefficients clearly below the level of rural-farm and rural-nonfarm coefficients. It should be noted, however, that whereas for the coefficients of multiple determination four of the divisions revealed urban coefficients higher than either rural coefficients, for the multiple-partial only two urban coefficients exceed either rural sectors. Hence, for employment in agricultural occupations the hypothesis is partially supported.

Socio-economic status (Table 29) similarly indicates more frequently higher multiple-partial coefficients in either rural-nonfarm or rural-farm areas. But again, the highest average value is found in the rural-nonfarm areas and the lowest the rural-farm rather than urban. But this pattern is also true for the coefficients of multiple determination where metropolitan dominance is allowed to influence

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fertility. In fact, for the total correlation the urban coefficient is larger than either rural coefficient only for West South Central. For the multiple-partials three divisions are found to have urban coefficients exceeding either rural coefficient (Middle Atlantic, West South Central and Mountain). In the case of the urban sector of four divisions, in comparing the multiple-partial and coefficient of multiple determination, a greater proportion of fertility variation explained is lost by partialling out metropolitan dominance, but it is not enough to reduce the urban multiple-partials below the rural. Hence the hypothesis is only partially supported by the socio-economic status dimension of community social structure.

Table 30 compares the multiple-partial correlation coefficients and coefficients of multiple determination for wife's alternative opportunities. With respect to the latter coefficient four of the divisions have urban coefficients larger than the rural sectors, but partialling metropolitan dominance seems to affect the rural-nonfarm coefficients more than the urban. With respect to the multiple-partials six of the divisions have urban coefficients larger than the rural. The average value of the multiple-partial is still highest for rural-nonfarm and lowest for rural-farm rather than urban. While rural-farm coefficients lose relatively little (6 percent) of the variation in fertility explained by controlling metropolitan dominance, the urban coefficients are not significantly reduced from the level of s

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coefficients of multiple determination to bring them below rural-farm levels. The hypothesis is not supported in the case of wife's alternative opportunities.

With respect to demographic age structure of women of childbearing age (Table 31), the coefficients of multiple determination are much too high and the effects of metropolitan dominance too little to alter the basic pattern of highest coefficients in the urban hinterlands of the divisions. Eight divisions indicate urban coefficients of multiple determination exceeding either rural coefficients and, when metropolitan dominance is partialled, nine divisions have urban coefficients higher than the rural. The hypothesis is not supported by demographic age structure. Of the four broad categories of community social structure, only employment in agricultural occupations and socioeconomic status tend to indicate some support of the hypothesis. In fact the evidence seems to suggest that the rural-nonfarm hinterland is more affected by the partialling of metropolitan dominance than the urban since for all four categories of community social structure the greatest proportions of explained fertility variation are lost in this sector.

A more sensitive test of the relative importance of metropolitan dominance and community social structure in each of the residential types of hinterlands, however, is provided by the beta coefficients. The relative size of the beta coefficients compared with the size of the beta

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coefficients for all other independent variables employed in the same multiple regression equation is indicative of the relative importance of that particular independent variable in accounting for variation in the dependent variable, fertility. According to the hypothesis, then, we should expect to find a tendency for metropolitan dominance to be ranked first in determining fertility levels for urban hinterland communities, whereas the community social structure variables should tend to be ranked above metropolitan dominance for rural hinterland communities.

Let us consider the rankings of beta coefficients for each division, comparing the urban and rural patterns. In this manner we use the results for each division as a test case of the hypothesis. After considering each division separately we shall attempt to summarize the patterns among the divisions with the use of average rank values for each independent variable. Tables 32 through 40 contain the beta coefficients and rankings by residential hinterland for each division.

According to Table 32 New England is a poor fit of our expectations. Though metropolitan dominance is relatively more important in urban than rural-farm areas, none of the coefficients are statistically significant for the three residential sectors. For urban and rural-nonfarm communities in New England four social structure variables are more important than metropolitan dominance and in rural-farm areas seven social structure variables exceed metropolitan

Table 32. Beta coefficient (B...

Table 32. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for New England division, by residence: 1960

Independent Variable	New England					
	Urban		Rural-Nonfarm		Rural-Farm	
	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.228	5	-.120	5	-.032	8
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	-.420	3	.039	8	.127	7
Farm Laborers and Foremen (X_3)	.579*	1	.366*	2	.229	4
Socio-Economic Status						
Education (X_4)	.031	8	-.083	6	.016	9
Family Income (X_5)	-.443*	2	-.452*	1	-.382*	2
Wife's Alternative Opportunities						
Female Income (X_6)	-.048	7	-.232*	3	-.467*	1
Female Employment (X_7)	-.004	9	.134	4	.303	3
Demographic Age Structure						
Females age 15-24 (X_8)	-.360*	4	-.044	7	-.189	5
Females age 25-34 (X_9)	-.069	6	-.039	9	-.137	6

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

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dominance in accounting for fertility variation. Family income and farm laborers and foremen are consistently more important than metropolitan dominance in all three residential hinterland communities. Metropolitan dominance in New England appears to have relatively little influence in determining fertility levels. New England, then, does not support the hypothesis.

The beta coefficients and rankings for Middle Atlantic division are given in Table 33. In contrast with New England, for Middle Atlantic metropolitan dominance is extremely important in determining fertility levels. In all residential sectors metropolitan dominance ranks first. However, this pattern does not support our hypothesis either, since there are no community social structure variables in the rural areas which are more important than metropolitan dominance.

Table 34 presents the results for East North Central division. Metropolitan dominance is again significant in accounting for fertility variation and in all three residential sectors, although it is ranked first in rural-nonfarm, second urban, and third rural-farm. The hypothesis, then, is partially supported in the contrast of urban and rural-farm areas, but not in the comparison of urban and rural-nonfarm. In rural-farm areas two social structure variables are more important than metropolitan dominance: education and employment of farmers and farm managers. For urban

Table 33. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for Middle Atlantic division, by residence: 1960

Table 33. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for Middle Atlantic division, by residence: 1960

	Middle Atlantic					
	Urban		Rural-Nonfarm		Rural-Farm	
Independent Variable	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.473*	1	-.514*	1	-.477*	1
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	.013	9	-.045	6	-.147	4
Farm Laborers and Foremen (X_3)	-.027	7	.216*	3	.251*	2
Socio-Economic Status						
Education (X_4)	.016	8	.090	4	-.072	8
Family Income (X_5)	-.295*	3	-.049	5	-.002	9
Wife's Alternative Opportunities						
Female Income (X_6)	-.466*	2	-.022	9	-.245	3
Female Employment (X_7)	.060	6	-.293*	2	.143	5
Demographic Age Structure						
Females age 15-24 (X_8)	-.159*	4	-.025	7	-.134	7
Females age 25-34 (X_9)	.074	5	-.023	8	-.136	6

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

Table 34. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for East North Central ...
residence: 19...

Table 34. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for East North Central division, by residence: 1960

Independent Variable	East North Central					
	Urban		Rural-Nonfarm		Rural-Farm	
	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.369*	2	-.288*	1	-.235*	3
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	-.024	9	-.238*	2	-.250*	2
Farm Laborers and Foremen (X_3)	-.053	6	.069	8	.194*	6
Socio-Economic Status						
Education (X_4)	.162*	5	-.178*	5	-.316*	1
Family Income (X_5)	.200*	3	-.230*	3	-.099	8
Wife's Alternative Opportunities						
Female Income (X_6)	-.188*	4	-.187*	4	-.169*	7
Female Employment (X_7)	.026	8	.074	7	.205*	5
Demographic Age Structure						
Females age 15-24 (X_8)	-.410*	1	-.154*	6	-.225*	4
Females age 25-34 (X_9)	.043	7	.065	9	.024	9

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

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socio-areas the percent of ever-married females in the ages 15-24, as a reflection of local community conditions, is more important than metropolitan dominance in accounting for fertility variation. Hence the case of East North Central division only hints at the support of the hypothesis.

Table 35 compares the urban and rural beta coefficients for West North Central division. In this case, though there are community social structure variables in the rural sectors which are more important than metropolitan dominance, metropolitan dominance in urban areas as well is exceeded by the relative importance of two variables: ever-married females ages 15-24 and female income. In both rural sectors education and ever-married females ages 15-24 are more influential in determining fertility levels than metropolitan dominance. The case of West North Central suggests only a tendency to support the hypothesis.

The relative importance of the independent variables for South Atlantic are indicated in Table 36. In this case the observed pattern for the relative importance of metropolitan dominance in affecting fertility among the residential sectors is opposite the expected. Metropolitan dominance is very important in rural-farm and rural-nonfarm areas, but relatively unimportant for urban. For urban communities the social structure variables which seem to influence fertility more than metropolitan dominance are females ages 15-24, socio-economic status, and wife's alternative opportunities.

Table 35. *Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for West North Central division, by residence: 1960*

Table 35. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for West North Central division, by residence: 1960

	West North Central					
	Urban		Rural-Nonfarm		Rural-Farm	
Independent Variable	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.268*	3	-.174*	3	-.261*	4
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	-.019	9	-.087*	5	-.027	8
Farm Laborers and Foremen (X_3)	.022	8	.036	9	.304*	2
Socio-Economic Status						
Education (X_4)	-.098*	6	-.269*	1	-.387*	1
Family Income (X_5)	-.200*	4	-.145*	4	-.049	7
Wife's Alternative Opportunities						
Female Income (X_6)	-.287*	2	-.079	6	-.150*	5
Female Employment (X_7)	.139*	5	.072	7	.063	6
Demographic Age Structure						
Females age 15-24 (X_8)	-.403*	1	-.230*	2	-.294*	3
Females age 25-34 (X_9)	.037	7	.046	8	.009	9

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

Table 36. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting f...

Table 36. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for South Atlantic division, by residence: 1960

	South Atlantic					
	Urban		Rural-Nonfarm		Rural-Farm	
Independent Variable	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.102*	6	-.311*	3	-.310*	1
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	.064	8	-.003	9	-.218	3
Farm Laborers and Foremen (X_3)	.049	9	.113*	5	.122*	4
Socio-Economic Status						
Education (X_4)	-.311*	2	-.357*	1	-.268*	2
Family Income (X_5)	-.266*	3	.016	7	.112*	5
Wife's Alternative Opportunities						
Female Income (X_6)	-.188*	4	-.056	6	-.038	9
Female Employment (X_7)	-.109*	5	-.315*	2	-.106	6
Demographic Age Structure						
Females age 15-24 (X_8)	-.328*	1	-.241*	4	-.105*	7
Females age 25-34 (X_9)	.102*	7	-.004	8	.072	8

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

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Education is consistently important in both rural sectors. However, again the hypothesis is not substantiated by the data for the division.

Table 37 relates to the relative importance of the independent variables in accounting for fertility levels in the East South Central division. Metropolitan dominance does not rank first for rural areas, but this is the case also for urban areas. Education is in both rural hinterland types more important than metropolitan dominance. However in urban areas four social structure variables exceed metropolitan dominance in influencing fertility levels. The hypothesis is again not supported.

The beta coefficients and relative importance by rank are provided for the West South Central division in Table 38. In this case metropolitan dominance is unimportant in the rural sectors and superceded by social structure variables, specifically employment of farm laborers and foremen and the socio-economic status variables. However metropolitan dominance is not important in determining urban fertility levels either, since four social structure variables exceed metropolitan dominance. Both education and employment of farm laborers and foremen are consistently important in all residential sectors. The hypothesis again fails to be verified.

With respect to the Mountain division (Table 39) metropolitan dominance again fails to be ranked as the most

Table 37. Beta coefficient (B_j) and rank of independent variable by relative importance in ... fertility for East South Central division, by

Table 37. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for East South Central division, by residence: 1960

Independent Variable	East South Central					
	Urban		Rural-Nonfarm		Rural-Farm	
	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.115*	5	-.210*	2	-.116*	5
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	-.015	9	-.159*	7	-.325*	2
Farm Laborers and Foremen (X_3)	-.137*	4	.170*	6	.205*	3
Socio-Economic Status						
Education (X_4)	-.184*	3	-.178*	5	-.114*	6
Family Income (X_5)	.044	8	-.076*	8	-.033	8
Wife's Alternative Opportunities						
Female Income (X_6)	.111	6	.182*	4	.091	7
Female Employment (X_7)	-.349*	2	-.609*	1	-.506*	1
Demographic Age Structure						
Females age 15-24 (X_8)	-.402*	1	-.203*	3	-.196*	4
Females age 25-34 (X_9)	.054	7	-.024	9	-.011	9

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

Table 38. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for

Table 38. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for West South Central division, by residence: 1960

Independent Variable	West South Central					
	Urban		Rural-Nonfarm		Rural-Farm	
	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.144*	5	-.087*	7	-.124*	5
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	-.066*	7	-.109*	6	-.126*	4
Farm Laborers and Foremen (X_3)	.390*	1	.434*	1	.215*	3
Socio-Economic Status						
Education (X_4)	-.361*	2	-.328*	2	-.408*	1
Family Income (X_5)	-.065*	8	-.129*	3	-.281*	2
Wife's Alternative Opportunities						
Female Income (X_6)	-.105*	6	-.032	9	-.042	6
Female Employment (X_7)	-.039	9	-.078*	8	-.033	9
Demographic Age Structure						
Females age 15-24 (X_8)	-.147*	4	-.109*	5	-.039	7
Females age 25-34 (X_9)	.244*	3	.110*	4	-.035	8

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

Table 39. Beta coefficient (B_j) and rank of independent variable by relative importance

Table 39. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for Mountain division, by residence: 1960

Independent Variable	Mountain					
	Urban		Rural-Nonfarm		Rural-Farm	
	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.136*	5	-.228*	2	-.104	6
<u>Employment in Agricultural Occupations</u>						
Farmers and Farm Managers (X_2)	.297*	3	.189*	5	-.278*	2
Farm Laborers and Foremen (X_3)	.010	9	-.008	7	-.033	8
<u>Socio-Economic Status</u>						
Education (X_4)	-.388*	1	-.303*	1	.079	7
Family Income (X_5)	.107*	7	-.181*	4	.132*	4
<u>Wife's Alternative Opportunities</u>						
Female Income (X_6)	-.132	6	.002	9	-.105	5
Female Employment (X_7)	-.141	4	-.210*	3	-.134	3
<u>Demographic Age Structure</u>						
Females age 15-24 (X_8)	-.308*	2	-.130*	6	-.374*	1
Females age 25-34 (X_9)	.077	8	-.002	8	-.003	9

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

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important variable in determining urban fertility levels. It is surpassed by four other variables reflecting community social structure. While metropolitan dominance is also relatively unimportant in rural-farm areas, for the rural-nonfarm communities it ranks second.

The Pacific division (Table 40) is the only case among the divisions which indicates that metropolitan dominance is relatively more important in determining fertility levels in urban areas than rural-farm or rural-nonfarm. But even in this case there are community social structure variables which surpass metropolitan dominance in relative importance. In urban areas of the Pacific division metropolitan dominance is overshadowed by education and female income and in both rural sectors, education, family income and ever-married females ages 15-24 are more important predictors of fertility than metropolitan dominance. Though this suggests the support of the hypothesis, again it does not follow exactly the expected pattern.

Overall it appears that where the hypothesis fails is too great an expectation for metropolitan dominance as a relatively important variable in determining urban fertility levels compared with community social structure variables. In several divisions metropolitan dominance ranks below several community social structure variables for both rural sectors, but generally in these same cases metropolitan dominance did not prove to be the most important variable in

Table 40. Beta coefficient (B_j) and rank of independent variable by relative importance in accounting for variation in fertility for Pacific division, by residence: 1960

	Pacific					
	Urban		Rural-Nonfarm		Rural-Farm	
Independent Variable	B_j	R**	B_j	R**	B_j	R**
Metropolitan dominance (X_1)	-.387*	3	-.204*	5	-.185	4
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	.281*	5	-.028	9	-.047	8
Farm Laborers and Foremen (X_3)	-.008	8	.135	7	.080	7
Socio-Economic Status						
Education (X_4)	-.395*	2	-.594*	1	-.370*	1
Family Income (X_5)	-.008	9	-.245*	3	-.286*	2
Wife's Alternative Opportunities						
Female Income (X_6)	-.451*	1	-.208*	4	-.085	6
Female Employment (X_7)	.248*	6	.193*	6	.109	5
Demographic Age Structure						
Females age 15-24 (X_8)	-.287*	4	-.258*	2	-.257*	3
Females age 25-34 (X_9)	.068	7	.055	8	-.045	9

*Significantly different from zero at the .05 level.

**Rank of independent variable by relative importance in accounting for variation in fertility compared with all other independent variables included in particular multiple regression equation.

accounting for urban fertility. Where metropolitan dominance proved to be an important variable in urban areas, it was also important in the rural sectors. Although there were tendencies among the divisions to support the hypothesis, generally the hypothesis failed to be substantiated.

Another way of looking at the pattern of rank order of the independent variables in determining fertility levels within urban, rural-nonfarm, and rural-farm areas, however, is to consider the average rank received by each independent variable among all the divisions. It is difficult to summarize the patterns which are found among the divisions when considered individually, and the use of average rank value provides at least a summary measure by which we may consider the comparison of relative importance of metropolitan dominance and community social structure together. Table 41 provides the average rank values of each independent variable among the divisions. While these data indicate that on the average metropolitan dominance is a relatively important variable in determining fertility levels, this is true for all three residential hinterland types. On the average metropolitan dominance is more important in rural-nonfarm areas than urban and more important in urban areas than rural-farm. However, as the table indicates, in no residential sector is metropolitan dominance on the average ranked first among the independent variables. In urban areas ever-married females ages 15-24 exceeds metropolitan dominance in average rank value and in both rural sectors education exceeds it.

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Table 41. Average rank among divisions of relative importance of independent variables in accounting for variation in fertility measured by beta coefficients, by residence: 1960

Independent Variable	Average Rank of Beta Coefficients: Urban	Rural-Nonfarm	Rural-Farm
Metropolitan dominance (X_1)	3.9	3.2	4.1
Employment in Agricultural Occup.			
Farmers and Farm Managers (X_2)	6.9	6.3	4.4
Farm Laborers and Foremen (X_3)	5.9	5.3	4.3
Socio-Economic Status			
Education (X_4)	4.1	2.9	4.0
Family Income (X_5)	5.2	4.2	5.2
Wife's Alternative Opportunities			
Female Income (X_6)	4.2	6.0	5.4
Female Employment (X_7)	6.0	4.4	4.8
Demographic Age Structure			
Females age 15-24 (X_8)	2.4	4.7	4.6
Females age 25-34 (X_9)	6.3	7.9	8.1

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On the basis of the data provided by the multiple-partial correlation coefficients and the beta coefficients we must conclude that the fourth hypothesis is not substantiated. With both types of statistics it was shown that in rural <u>and</u> urban hinterlands community social structure variables are more important than metropolitan dominance in determining fertility levels. These data also concur in suggesting that metropolitan dominance is most influential in rural-nonfarm hinterland communities and not urban. These data further cast some doubt on metropolitan dominance as a pervasive influence and organizing process throughout all hinterland areas vis-a-vis the influence that local hinterland communities themselves exert in determining inter-community spatial variation. In contrasting urban and rural hinterland communities, however, in terms of the impact that each type of hinterland community exerts on fertility behavior, these data seem to suggest that of the community social structure variables which are found to influence community fertility behavior, employment in agricultural occupations and socio-economic status are more important in rural areas whereas wife's alternative opportunities and demographic age structure are more influential in urban hinterland areas.

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Hypothesis 5

> In the more metropolitan geographic divisions compared with the less metropolitan geographic divisions, the size and distance of a dominating metropolitan center is more important in accounting for variation in community social structure and fertility behavior in both urban and rural hinterland communities.

This hypothesis, of course, stems from a consideration of the different rates of metropolitanization which exist among the various divisions. To this point we have not considered the effect that differential rates of metropolitanization may have upon the pattern of hinterland community variation as well as community fertility variation. It is assumed that the nation is moving toward a situation in which metropolitan centers become the chief "organizing" influence on intercommunity variation. Those divisions, therefore, which indicate higher levels of metropolitanization may be considered prototypes of intercommunity variation patterns which will eventually emerge as the dominant pattern for all geographic divisions. Upon subdividing the nine geographic divisions into two categories, i.e., those divisions which indicate metropolitanization levels above the national average and those divisions below, we should expect to find intercommunity variation patterns more clearly the result of the "organizing" effect of metropolitan centers in the more metropolitan divisions. In the less metropolitan divisions, the effect of metropolitan centers should not be as clear. The expected pattern in the more metropolitan divisions is spelled out in the hypothesis

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presented above. In other words, for the more metropolitan divisions size and distance of metropolitan centers should exert greater influence on community social structure as well as community fertility behavior compared with the same variable in the less metropolitan divisions. This pattern, of course, is anticipated similarly for all residential hinterland types.

Tables 42 through 44 provide a test of the importance of metropolitan dominance in determining community social structure variation in the more and less metropolitan divisions for urban, rural-nonfarm, and rural-farm hinterland areas respectively. Table 42 provides the zero-order correlation squared (an estimate of the proportion of variation in the dependent variable explained by the independent variable, which in this case is metropolitan dominance) between metropolitan dominance and each of the eight individual indicators of community social structure for the urban communities in each of the nine geographic divisions. The divisions are ordered according to percent of their population residing in metropolitan areas. To facilitate the difficult task of making comparisons for such data, an average value of the squared correlation coefficient for each community social structure variable is also provided for the two categories of divisions. For urban coefficients we see that for five of the average values, the more metropolitan divisions exceed the less metropolitan divisions,

Table 42. Zero-order correlation coefficients (r^2) of metropolitan dominance and community social structure for divisions by level of metropolitanization, urban, 1960

Table 42. Zero-order correlation coefficients (r^2) of metropolitan dominance and community social structure for divisions by level of metropolitanization, urban: 1960

Divisions by Level of Metropolitanization	% Metro.	Urban							
		r^2_{12}	r^2_{13}	r^2_{14}	r^2_{15}	r^2_{16}	r^2_{17}	r^2_{18}	r^2_{19}
More Metropolitan									
Middle Atlantic	81.8	.031*	.143*	.001	.088*	.009	.003	.272*	.127*
Pacific	79.2	.009	.001	.003	.446*	.091*	.031	.111*	.025
New England	70.3	.141*	.135*	.016	.659*	.124*	.123*	.200*	.040
East North Central	67.1	.013*	.023*	.011	.000	.024*	.047*	.025*	.023*
Average Value	74.6	.049	.076	.008	.298	.062	.051	.152	.054
Less Metropolitan									
West South Central	53.5	.104*	.074*	.005	.011	.056*	.004	.002	.004
South Atlantic	50.2	.095*	.036*	.000	.494*	.004	.001	.027*	.002
Mountain	48.8	.062*	.036*	.026*	.080*	.228*	.175*	.030*	.004
West North Central	43.3	.150*	.085*	.088*	.012*	.067*	.002	.006	.004
East South Central	36.0	.009	.013	.141*	.097*	.005	.025*	.000	.008
Average Value	46.4	.084	.049	.052	.139	.072	.041	.013	.004

*Significantly different from zero at the .05 level.

but for three average values the pattern is reversed. On the average, then, metropolitan dominance is more important in accounting for variation in employment of farm laborers and foremen, family income, female employment and ever-married females ages 15-24 and 25-34, in the more metropolitan divisions than in the less metropolitan divisions. For employment of farmers and farm managers, education, and female income the pattern is reversed. Average differences in coefficient size are especially large for family income and ever-married females ages 15-24. In the more metropolitan divisions, metropolitan dominance explains on the average 30 percent of family income variation and 15 percent of variation for ever-married females ages 15-24, whereas for the less metropolitan divisions the average percentages are 14 and 1 respectively. Of course, using an average value for comparison does gross over several inconsistencies in the data. In several cases the coefficients of the more metropolitan divisions fall below the highest coefficients of the less metropolitan divisions, and this especially occurs for East North Central and Pacific divisions. Furthermore, it should be pointed out that the difference between the average values for the two categories of divisions is often very slight. Nevertheless on the average metropolitan dominance appears more frequently to be more important in determining community social structure variation in the more metropolitan divisions than the less metropo

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metropolitan divisions. Hence we conclude that the hypothesis is supported to some extent by the urban sector.

The hypothesis is more consistently supported by the rural-nonfarm and rural-farm average coefficients as indicated in Tables 43 and 44. The average value of rural-nonfarm coefficients for the more metropolitan divisions consistently exceeds those for the less metropolitan divisions, whereas in the case of rural-farm coefficient averages six of the eight comparisons are consistent with the hypothesis. In the case of rural-nonfarm average coefficient values, again the largest difference appears for family income and ever-married females ages 15-24. On the average metropolitan dominance in the more metropolitan divisions explains 25 percent of the variation in family income and 20 percent of the variation in ever-married females ages 15-24. In the less metropolitan divisions the percentages are 13 and 2 respectively. In the case of rural-farm average coefficients, only family income seems to manifest a large difference. As in urban areas, so in the rural-nonfarm and rural-farm, the two divisions which seem to push the average value for the more metropolitan divisions above the less metropolitan divisions are Middle Atlantic and New England. Though again one must point out that differences between the two levels of average values are slight and that several inconsistencies occur among indivisual divisions, it must be granted that the data seem to support the hypothesis that

Table 43. Zero-order correlation coefficients (r^2) of metropolitan dominance and community social structure for divisions by level of metropolitanization, rural-nonfarm: 1960

Divisions by Level of Metropolitanization	% Metro.	Rural-Nonfarm							
		r^2_{12}	r^2_{13}	r^2_{14}	r^2_{15}	r^2_{16}	r^2_{17}	r^2_{18}	r^2_{19}
<u>More Metropolitan</u>									
Middle Atlantic	81.8	.138*	.154*	.089*	.010	.048*	.001	.261*	.026
Pacific	79.2	.064*	.008	.011	.404*	.058*	.018	.021	.004
New England	70.3	.161*	.166*	.082*	.596*	.139*	.144*	.486*	.094*
East North Central	67.1	.014*	.015*	.129*	.002	.020*	.058*	.023*	.016*
Average Value	74.6	.094	.086	.078	.253	.066	.055	.198	.035
<u>Less Metropolitan</u>									
West South Central	53.5	.008	.068*	.033*	.000	.042*	.000	.007	.001
South Atlantic	50.2	.048*	.025*	.009*	.554*	.041*	.031	.088*	.009*
Mountain	48.8	.061*	.010	.040*	.009	.146*	.110*	.008	.000
West North Central	43.3	.234*	.076*	.067*	.097*	.071*	.001	.011*	.009*
East South Central	36.0	.000	.003	.071*	.002	.004	.044*	.000	.003
Average Value	46.4	.070	.036	.044	.132	.061	.037	.023	.004

*Significantly different from zero at the .05 level.

Table 44. Zero-order correlation coefficients (r^2) of metropolitan dominance and

Table 44. Zero-order correlation coefficients (r^2) of metropolitan dominance and community social structure for divisions by level of metropolitanization, rural-farm: 1960

Divisions by Level of Metropolitanization	% Metro.	Rural-Farm							
		r^2_{12}	r^2_{13}	r^2_{14}	r^2_{15}	r^2_{16}	r^2_{17}	r^2_{18}	r^2_{19}
More Metropolitan									
Middle Atlantic	81.8	.183*	.082*	.006	.132*	.052*	.004	.048*	.007
Pacific	79.2	.184*	.045*	.026	.425*	.077*	.026	.000	.011
New England	70.3	.159*	.083*	.080*	.497*	.209*	.171*	.072*	.000
East North Central	67.1	.043*	.009*	.038*	.001	.011*	.033*	.001	.000
Average Value	74.6	.142	.055	.038	.264	.087	.059	.030	.005
Less Metropolitan									
West South Central	53.5	.074*	.080*	.108*	.000	.040*	.000	.030*	.015*
South Atlantic	50.2	.016*	.002	.004	.498*	.050*	.033*	.000	.002
Mountain	48.8	.042*	.000	.002	.005	.046*	.044*	.019	.019
West North Central	43.3	.371*	.048*	.094*	.000	.077*	.005	.018*	.142*
East South Central	36.0	.026*	.030*	.086*	.131*	.006	.037*	.016*	.009
Average Value	46.4	.106	.032	.059	.127	.044	.024	.017	.037

*Significantly different from zero at the .05 level.

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metropolitan dominance is a more important determinant of community social structure variation in the more metropolitan divisions than the less metropolitan divisions.

But to conclude the testing of this hypothesis, we must also consider the relative importance of metropolitan dominance in determining fertility behavior by the extent of metropolitan development among the divisions. Table 45 contains two sets of data to test the relative importance of metropolitan dominance in determining community fertility behavior: rankings of the beta coefficients from the estimated multiple regression equations and the squared zero-order correlation coefficients of fertility and metropolitan dominance. For both sets of statistics the hypothesized pattern is supported for urban, rural-nonfarm and rural-farm areas, although the pattern is clearer using the zero-order correlation coefficients than the beta coefficients. Compared with the influence of metropolitan dominance on community social structure, metropolitan dominance seems to have a greater effect on fertility. On the average metropolitan dominance explains 17 percent of the variation in fertility in urban areas of the more metropolitan divisions, 25 percent in the rural-nonfarm areas, and 12 percent in the rural-farm areas. In the less metropolitan divisions the average coefficient values are 6, 5, and 2 percent respectively. For the comparison of the beta coefficients, again the average values of ranks for metropolitan dominance

Table 45. Rank of metropolitan dominance by relative importance in accounting for variation in fertility based on beta coefficients and zero-order correlation coefficient of metropolitan dominance and fertility for divisions by level of metropolitanization, by residence: 1960

Divisions by Level of Metropolitanization	% Metro.	Rank of Metropolitan Dominance by Beta Coef.			r^2_{1Y}		
		Urb	RNF	RF	Urb	RNF	RF
More Metropolitan							
Middle Atlantic	81.8	1	1	1	.158*	.291*	.155*
Pacific	79.2	3	5	4	.181*	.156*	.076*
New England	70.3	5	5	8	.240*	.457*	.203*
E. N. Central	67.1	2	1	3	.081*	.102*	.061*
Average Value	74.6	2.8	3.0	4.0	.165	.252	.124
Less Metropolitan							
W. S. Central	53.5	5	7	5	.086*	.015*	.000
South Atlantic	50.2	6	3	1	.070*	.045*	.033*
Mountain	48.8	5	2	6	.095*	.138*	.025*
W. N. Central	43.3	3	3	4	.065*	.027*	.038*
E. S. Central	36.0	5	2	5	.001	.001	.002
Average Value	46.4	4.8	3.4	4.2	.063	.045	.020

*Significantly different from zero at the .05 level.

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indicate that it is on the average a more important variable in determining fertility variation among the more metropolitan divisions than the less metropolitan divisions. The average rank of metropolitan dominance in urban areas is 2.8, rural-nonfarm 3.0, and rural-farm 4.0 for the more metropolitan divisions, and 4.8, 3.4, and 4.2 respectively for the less metropolitan divisions. There are inconsistencies, of course, when individual divisions are compared rather than average values of the two categories of divisions. Furthermore, the two sets of data, beta and zero-order correlation coefficients, do not portray the same patterns. For example, the zero-order correlation coefficients for New England are highest among the divisions, but in terms of the rankings by beta coefficients metropolitan dominance is relatively less important for New England compared with the other more metropolitan divisions. Beta coefficients reflect the effect of metropolitan dominance on fertility with the influence of the other independent variables partialled. The zero-order correlation coefficients, of course, do not control for other variables. Hence this difference perhaps explains the inconsistency for the two types of data. Nevertheless on the average the hypothesis is supported so that we may conclude that metropolitan dominance is relatively more important in the more metropolitan divisions in accounting for fertility variation, as well as community social structure, in both rural and urban areas, than in the less metropolitan divisions.

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Hypothesis 6

> In the more metropolitan geographic divisions, size and distance of a dominating metropolitan center will be more important in accounting for variation in community fertility behavior, in both urban and rural hinterlands, than local community social structure, when controlling for the influence of metropolitan centers; in less metropolitan geographic divisions, local community social structure will be more important in accounting for variation in community fertility behavior than size and distance of a dominating metropolitan center.

We have considered previously the competing influence of metropolitan dominance and local community conditions in determining intercommunity variation in fertility behavior, but this consideration did not include the effects of differential levels of metropolitanization among the divisions. The comparison in a previous hypothesis was primarily among the residential hinterland types, i.e., urban vs. rural. It was anticipated that metropolitan dominance would be more important in determining fertility levels in urban hinterland communities than local community conditions, but less important in rural communities. The hypothesis was not supported. The comparison being made in this section, however, is inter-divisional rather than inter-residential. In the previous hypothesis it was found that metropolitan dominance is more important in determining urban and rural fertility behavior in the more metropolitan divisions. But is metropolitan dominance so important in these divisions that it overshadows the effects of local community social structure? Furthermore in the less metropolitan divisions is metropolitan dominance so low in importance that local community social structure exceeds it in determining fertility variation in urban and rural hinterland communities?

According to the average rank values of the beta coefficients for each of the independent variables presented in Table 46, the hypothesis seems to be true. Comparing the urban hinterlands of the two categories of divisions, metropolitan dominance on the average is more important in accounting for fertility variation than community social structure in the more metropolitan divisions, but exceeded in the less metropolitan divisions by ever-married females ages 15-24 and education. The average rank of metropolitan dominance in urban areas for the more metropolitan divisions is 2.8, but only 4.8 for the less metropolitan divisions. Comparing rural-nonfarm areas, metropolitan dominance shares first place in relative importance with family income for the more metropolitan divisions but is exceeded by education in the less metropolitan divisions. For rural-farm areas, though the average rank values of metropolitan dominance are very similar for the two categories of divisions, in the more metropolitan divisions on the average metropolitan dominance is more important in determining fertility variation but in the less metropolitan divisions it is exceeded by education, employment of farmers and farm managers, and employment of farm laborers and foremen. The consistency of education as a more important determinant of intercommunity fertility

Table 46. Average rank of independent variables by relative importance in accounting for variation in fertility measured by Beta coefficients by level of metropolitanization of divisions and by residence: 1960

Independent Variables	More Metropolitan* Divisions Average Rank of Beta Coefficient			Less Metropolitan** Divisions Average Rank of Beta Coefficient		
	Urb	RNF	RF	Urb	RNF	RF
Metropolitan Dominance (X_1)	2.8	3.0	4.0	4.8	3.4	4.2
Employment in Agricultural Occupations						
Farmers and Farm Managers (X_2)	6.5	6.3	5.3	7.2	6.4	3.8
Farm Laborers and Foremen (X_3)	5.5	5.0	4.8	6.2	5.6	4.0
Socio-Economic Status						
Education (X_4)	5.8	4.0	4.8	2.8	2.0	3.4
Family Income (X_5)	4.3	3.0	5.3	6.0	5.2	5.2
Wife's Alternative Opportunities						
Female Income (X_6)	3.5	5.0	4.3	4.8	6.8	6.4
Female Employment (X_7)	7.3	4.8	4.5	5.0	4.2	5.0
Demographic Age Structure						
Females age 15-24 (X_8)	3.3	5.5	4.8	2.3	4.0	4.4
Females age 25-34 (X_9)	6.3	8.5	7.5	6.4	7.4	8.6

*More metropolitan divisions include New England, Middle Atlantic, East North Central, and Pacific.

**Less metropolitan divisions include West North Central, South Atlantic, East South Central, West South Central, and Mountain.

variation in all three residential sectors of the less metropolitan divisions is to be especially noted, whereas for the more metropolitan divisions the most important determinant is distance and size of a dominating metropolitan center.

Hypothesis 7

> The impact of community social structure and metropolitan dominance on fertility behavior will manifest fewer differences when comparing the same type of hinterland communities (urban or rural) on an inter-divisional basis than when comparing different types of hinterland communities (urban vs. rural) on an intra-divisional basis.

The basic theoretical assumption underlying this hypothesis is that metropolitan centers exert a differential impact on the different residential hinterland communities within their metropolitan regions. As metropolitanization continues to emerge as a key process in the determination of intercommunity variation patterns, we should expect to find that differences will increase among residential hinterland communities. Though our analysis focuses primarily on factors which influence fertility behavior, it is possible to test this differential impact hypothesis by statistical testing. We have estimated multiple regression equations for each of the residential sectors of all geographic divisions of the nation. In each equation fertility is the dependent variable and indices of metropolitan dominance and community social structure are the independent varibles. By means of the multiple comparison test it is possible to determine whether each of the independent variables has the same effect on fertility in the different resiential sectors of each of the divisions. An example of the kind of question posed in the application of the multiple comparison test is whether the effect of metropolitan dominance upon fertility is the same for the rural-farm communities as for the urban communities of a given division. The multiple comparison test involves the comparison of the effects of the partial regression coefficients on fertility in two different multiple regression equations. Hence the test can be employed to determine whether there is a statistically significant difference between only two partial regression coefficients at a time. For each independent variable represented in the multiple regression equation we may for any division make comparisons of rural-farm vs. rural-nonfarm, rural-farm vs. urban, and rural-nonfarm vs. urban. If the hypothesis is at all true, i.e., if metropolitan centers do exert a differential impact on the residential hinterland communities, we should expect to find significant differences between residential sectors for most of the partial regression coefficients reflecting the effects of the independent variables on fertility behavior. Furthermore, given different rates of metropolitanization among the divisions, a significant difference should be found between partial regression coefficients more frequently for the more metropolitan divisions.

In addition, however, the multiple comparison test can be employed to determine whether the independent variables exert a differential impact on fertility among the geographic divisions of the nation. An example of the kind of question posed by this test would be whether the effect of metropolitan dominance on fertility is the same for the urban communities of one division as for the urban communities of another division. In contrast to the first comparison described above, i.e., an inter-residential comparison for a given division, the comparison called for here is an inter-divisional one within the same residential sector. The theoretical framework of this study suggests that as metropolitanization emerges as a dominant process within the nation, that divisional differences will disappear while residential differences will be enhanced. If this observation is valid, after applying the multiple comparison test at the two levels suggested above, i.e., inter-divisional and inter-residential, we should expect to find a pattern of significant differences for the inter-residential comparisons but homogeneity for the inter-divisional comparisons. Hence this test is a test of the differentiating effects of metropolitan centers on residential hinterland communities.

First, let us consider the results of the multiple comparison tests between residential sectors. The results of these statistical tests are given in Table 47. Overall it appears that there is enough evidence to assert that there

Table 47. Summary of results for multiple comparison tests among residential sectors of conterminous United States and divisions

Residential Sectors Compared for Nation and Divisions	Independent Variables								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
UNITED STATES									
Rural-Farm vs. Rural-Nonfarm	0	0	1	1	1	1	1	1	0
Rural-Farm vs. Urban	1	0	1	1	1	0	1	1	1
Rural-Nonfarm vs. Urban	1	0	1	1	1	1	1	1	1
New England									
Rural-Farm vs. Rural-Nonfarm	0	0	1	1	0	1	1	1	0
Rural-Farm vs. Urban	0	1	1	0	0	1	1	0	0
Rural-Nonfarm vs. Urban	0	1	1	1	0	1	1	1	0
Middle Atlantic									
Rural-Farm vs. Rural-Nonfarm	1	1	1	1	0	1	1	0	1
Rural-Farm vs. Urban	1	0	1	1	0	0	1	0	1
Rural-Nonfarm vs. Urban	1	1	1	1	1	1	1	1	1
East North Central									
Rural-Farm vs. Rural-Nonfarm	1	1	0	1	0	0	1	1	0
Rural-Farm vs. Urban	0	0	1	1	1	0	1	0	0
Rural-Nonfarm vs. Urban	1	1	1	1	1	0	0	1	0
West North Central									
Rural-Farm vs. Rural-Nonfarm	1	1	1	1	0	0	0	1	1
Rural-Farm vs. Urban	0	0	0	1	0	0	0	0	0
Rural-Nonfarm vs. Urban	0	0	0	1	0	1	0	1	1
South Atlantic									
Rural-Farm vs. Rural-Nonfarm	0	1	0	0	0	0	1	1	1
Rural-Farm vs. Urban	1	1	0	1	1	0	0	1	0
Rural-Nonfarm vs. Urban	0	1	0	1	1	0	1	0	1
East South Central									
Rural-Farm vs. Rural-Nonfarm	0	0	0	1	0	0	0	1	1
Rural-Farm vs. Urban	0	0	1	0	0	0	1	0	0
Rural-Nonfarm vs. Urban	1	0	1	0	0	1	1	0	0
West South Central									
Rural-Farm vs. Rural-Nonfarm	0	0	1	1	1	0	0	0	1
Rural-Farm vs. Urban	0	0	1	1	1	0	0	1	1
Rural-Nonfarm vs. Urban	0	0	1	0	0	0	1	1	1
Mountain									
Rural-Farm vs. Rural-Nonfarm	0	1	0	1	1	0	0	1	0
Rural-Farm vs. Urban	0	1	0	1	0	0	0	1	0
Rural-Nonfarm vs. Urban	1	1	0	0	0	0	1	1	0
Pacific									
Rural-Farm vs. Rural-Nonfarm	0	0	0	0	0	0	0	0	0
Rural-Farm vs. Urban	0	1	0	0	1	1	0	0	0
Rural-Nonfarm vs. Urban	1	1	0	0	1	1	0	0	0

"1" denotes that there is a significant difference between the regression coefficients of the independent variable for the two sectors compared.

"0" denotes that there is no significant difference between the regression coefficients.

X_1 Metropolitan dominance.

X_2 Percent male labor force employed as farmers and farm managers.

X_3 Percent male labor force employed as farm laborers and foremen.

X_4 Median years school completed by males and females, age 25 and over.

X_5 Median family income in 1959.

X_6 Median female personal income in 1959.

X_7 Percent females, age 14 and over, employed.

X_8 Percent ever-married females, ages 15-44, who are age 15-24.

X_9 Percent ever-married females, ages 15-44, who are age 25-34.

are consistently significant differences among the residential sectors to support the hypothesis. Differential effects for <u>all</u> three comparisons occur frequently among the various divisions: farm laborers and foremen, female income, and female employment in New England; metropolitan dominance, farm laborers and foremen, education, female employment and females ages 25-34 in Middle Atlantic; education in East North Central and West North Central; farmers and farm managers in South Atlantic and Mountain; farm laborers and foremen in West South Central. Few differences occur in East South Central, the least metropolitan division, and unexpectantly in Pacific, a highly metropolitan division. Education shows the most frequent occurrence of a significant differential impact in comparing the residential sectors, followed by females ages 15-24, farmers and farm managers, farm laborers and foremen, and female employment.

It is difficult to conclude which residential hinterland contrast indicates the more frequent significant comparisons. It appears to be the comparison of the rural-nonfarm and urban sectors. Interestingly for this comparison, the differences seem to concentrate more consistently in the more metropolitan divisions, which more accurately is an urban-suburban comparison rather than a rural-urban comparison. For the rural-farm vs. urban comparison education indicates most frequently a substantiation of the differential effects hypothesis while metropolitan dominance, female emp

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employment and females ages 25-34 least frequently reveal significant differences of their effects on fertility. For the rural-nonfarm vs. urban comparison the independent variables which most often indicate differential effects on fertility are farmers and farm managers, female employment, and females ages 15-24. In the case of comparing the rural sectors the variables most frequently revealing a significant difference in their impact on fertility are education and females ages 15-24. Family income, female income, and metropolitan dominance indicate few significant differences for this residential comparison.

To summarize, the differential impact of the independent variables on fertility between residential hinterland areas is substantial. These differences are especially pronounced among the more metropolitan divisions, although of these divisions one exception seems to be the Pacific. For this division the rural sectors appear to be quite homogeneous with respect to the impact of the independent variables on fertility. Greater contrasts for this division are primarily rural vs. urban. It could be in the case of the Pacific division that the percentage of population residing in metropolitan areas is deceptive of its actual level of metropolitanization.

Let us at this point turn to the inter-divisional comparisons within the residential sectors. The results of the multiple comparison tests between divisions are provided in

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in Table 48. It is obvious from a quick perusal of this table that the independent variables reveal relatively similar effects on fertility among the divisions. In comparing these results with the inter-residential comparisons we conclude immediately that the seventh hypothesis of this chapter is substantiated. The more significant evidence of differentiation, then, is among residential hinterlands, not among divisions. Interestingly most of the significant cases of differential impact of the independent variables occur within the urban areas. The differences exist mostly for the socio-economic status variables of education and family income. The few cases of significant differential effects in the rural sectors appear to be female employment and metropolitan dominance in rural-nonfarm areas and female employment and females ages 15-24 in rural-farm areas. Interestingly relatively few differences between independent variables occur in the comparisons of the more metropolitan divisions. More frequently the significant contrasts occur when comparing the impact of the independent variables on fertility among the less metropolitan divisions and as well between the less and more metropolitan divisions.

Our conclusion for this hypothesis, then, is one of confirmation. In accord with metropolitan dominance theory, divisional differences are disappearing while residential hinterland differences are becoming prominent. This is further supported when considering the results of the multiple

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Table 48. Summary of results for multiple comparison tests between divisions of conterminous United States by residential sector

Divisions Compared for Residential Sectors	Independent Variables								
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
URBAN									
New England vs. Middle Atlantic	0	0	1	0	0	0	0	0	0
New England vs. East North Central	0	0	0	0	0	0	0	0	0
New England vs. West North Central	0	0	1	0	0	0	0	0	0
New England vs. South Atlantic	0	1	0	0	0	0	0	0	0
New England vs. East South Central	0	0	1	0	0	0	0	0	0
New England vs. West South Central	0	0	1	0	0	0	0	0	0
New England vs. Mountain	0	1	1	1	0	0	0	0	0
New England vs. Pacific	0	1	1	0	0	0	0	0	0
Middle Atlantic vs. East North Central	0	0	0	0	1	0	0	1	0
Middle Atlantic vs. West North Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. South Atlantic	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. East South Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. West South Central	0	0	0	1	0	0	0	0	0
Middle Atlantic vs. Mountain	0	0	0	1	1	0	0	0	0
Middle Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0
East North Central vs. West North Central	0	0	0	1	1	0	0	0	0
East North Central vs. South Atlantic	1	0	0	1	1	0	0	1	0
East North Central vs. East South Central	0	0	0	1	0	0	0	0	0
East North Central vs. West South Central	0	0	0	1	0	0	0	1	1
East North Central vs. Mountain	0	0	0	1	0	0	0	0	0
East North Central vs. Pacific	0	0	0	1	0	0	0	0	0
West North Central vs. South Atlantic	1	0	0	0	0	1	0	1	0
West North Central vs. East South Central	0	0	0	0	1	1	1	0	0
West North Central vs. West South Central	0	0	0	1	0	0	0	1	1
West North Central vs. Mountain	0	0	0	1	1	0	0	0	0
West North Central vs. Pacific	0	0	0	0	0	0	0	0	0
South Atlantic vs. East South Central	0	0	0	0	0	0	0	0	0
South Atlantic vs. West South Central	0	0	0	0	0	0	0	0	1
South Atlantic vs. Mountain	0	0	0	1	1	0	0	0	0
South Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0
East South Central vs. West South Central	0	0	0	1	0	0	1	0	1
East South Central vs. Mountain	0	0	0	1	0	0	0	0	0
East South Central vs. Pacific	0	0	0	0	0	1	1	0	0
West South Central vs. Mountain	0	0	0	0	0	0	0	0	0
West South Central vs. Pacific	0	0	0	0	0	0	0	0	0
Mountain vs. Pacific	0	0	0	0	0	0	0	0	0
RURAL-NONFARM									
New England vs. Middle Atlantic	0	0	0	0	0	0	0	0	0
New England vs. East North Central	0	0	0	0	0	0	0	0	0
New England vs. West North Central	0	0	0	0	0	0	0	0	0
New England vs. South Atlantic	0	0	0	0	0	0	0	0	0
New England vs. East South Central	0	0	0	0	0	0	0	0	0
New England vs. West South Central	0	0	0	0	0	0	0	0	0
New England vs. Mountain	1	0	0	0	0	0	0	0	0
New England vs. Pacific	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. East North Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. West North Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. South Atlantic	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. East South Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. West South Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. Mountain	0	0	0	1	0	0	0	0	0
Middle Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0

Table 48--Continued

Divisions Compared for Residential Sectors	Independent Variables X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
East North Central vs. West North Central	0	0	0	0	0	0	0	0	0
East North Central vs. South Atlantic	0	0	0	0	1	0	0	0	0
East North Central vs. East South Central	0	0	0	0	0	1	1	0	0
East North Central vs. West South Central	0	0	0	0	0	0	0	0	0
East North Central vs. Mountain	0	0	0	0	0	0	0	0	0
East North Central vs. Pacific	0	0	0	0	0	0	0	0	0
West North Central vs. South Atlantic	0	0	0	0	0	0	1	0	0
West North Central vs. East South Central	0	0	0	0	0	1	1	0	0
West North Central vs. West South Central	0	0	0	0	0	0	0	0	0
West North Central vs. Mountain	1	0	0	0	0	0	1	0	0
West North Central vs. Pacific	0	0	0	0	0	0	0	0	0
South Atlantic vs. East South Central	0	0	0	0	0	0	1	0	0
South Atlantic vs. West South Central	0	0	0	0	0	0	0	0	0
South Atlantic vs. Mountain	0	0	0	0	1	0	0	0	0
South Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0
East South Central vs. West South Central	0	0	0	0	0	0	1	0	0
East South Central vs. Mountain	0	0	0	0	0	0	0	0	0
East South Central vs. Pacific	0	0	0	0	0	0	1	0	0
West South Central vs. Mountain	1	0	0	0	0	0	0	0	0
West South Central vs. Pacific	0	0	0	0	0	0	0	0	0
Mountain vs. Pacific	1	0	0	0	0	0	0	0	0
<u>RURAL-FARM</u>									
New England vs. Middle Atlantic	0	0	0	0	0	0	0	0	0
New England vs. East North Central	0	0	0	0	0	0	0	0	0
New England vs. West North Central	0	0	0	0	0	0	0	0	0
New England vs. South Atlantic	0	0	0	0	0	0	0	0	0
New England vs. East South Central	0	0	0	0	0	0	0	0	0
New England vs. West South Central	0	0	0	0	0	0	0	0	0
New England vs. Mountain	0	0	0	0	0	0	0	0	0
New England vs. Pacific	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. East North Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. West North Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. South Atlantic	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. East South Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. West South Central	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. Mountain	0	0	0	0	0	0	0	0	0
Middle Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0
East North Central vs. West North Central	0	0	0	0	0	0	0	0	0
East North Central vs. South Atlantic	0	0	0	0	0	0	1	0	0
East North Central vs. East South Central	0	0	0	0	0	0	1	0	0
East North Central vs. West South Central	0	0	0	0	0	0	0	1	0
East North Central vs. Mountain	0	0	0	1	0	0	1	0	0
East North Central vs. Pacific	0	0	0	0	0	0	0	0	0
West North Central vs. South Atlantic	0	0	0	0	0	0	0	1	0
West North Central vs. East South Central	0	0	0	0	0	0	1	0	0
West North Central vs. West South Central	0	0	0	0	1	0	0	1	0
West North Central vs. Mountain	0	0	0	1	0	0	0	0	0
West North Central vs. Pacific	0	0	0	0	0	0	0	0	0

Table 48--Continued

Divisions Compared for Residential Sectors	Independent Variables X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
South Atlantic vs. East South Central	0	0	0	0	0	0	1	0	0
South Atlantic vs. West South Central	0	0	0	0	1	0	0	0	0
South Atlantic vs. Mountain	0	0	0	1	0	0	0	1	0
South Atlantic vs. Pacific	0	0	0	0	0	0	0	0	0
East South Central vs. West South Central	0	0	0	0	1	0	1	0	0
East South Central vs. Mountain	0	0	0	0	0	0	[illegible]	[illegible]	0
East South Central vs. Pacific	0	0	0	0	0	0	0	0	0
West South Central vs. Mountain	0	0	0	1	1	0	0	1	0
West South Central vs. Pacific	0	0	0	0	0	0	0	0	0
Mountain vs. Pacific	0	0	0	0	0	0	0	0	0

"1" denotes that there is a significant difference between the regression coefficients of the independent variable for the two divisions compared.

"0" denotes that there is no significant difference between the regression coefficients.

X_1 Metropolitan dominance.

X_2 Percent male labor force employed as farmers and farm managers.

X_3 Percent male labor force employed as farm laborers and foremen.

X_4 Median years school completed by males and females, age 25 and over.

X_5 Median family income in 1959.

X_6 Median female personal income in 1959.

X_7 Percent females, age 14 and over, employed.

X_8 Percent ever-married females, ages 15-44, who are age 15-24.

X_9 Percent ever-married females, ages 15-44, who are age 25-34.

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comparison tests for only the more metropolitan divisions, the divisions which may be considered the models for all divisions of the nation as metropolitanization becomes a prevailing mode of organization. Divisional differences will be superceded by differences among the residential hinterland sectors effected primarily by the differentiating influences of metropolitan centers.

Summary of Findings

Seven basic hypotheses, each emanating from a metropolitan dominance theoretical framework, have been tested against various types of data. Of these seven hypotheses, six have been substantiated and one rejected. Let us review the results of the testing of these seven hypotheses very briefly.

It has been determined that community social structure is a function of distance and size of a dominating metropolitan center. Community social structure variables highly influenced by metropolitan dominance are family income, employment of farmers and farm managers, and ever-married females ages 15-24, although significant correlations were also found for employment of farm laborers and foremen, education, and female employment. Differential impact of metropolitan dominance is supported more by the existence and degree of association with the community social structure variables than by direction of association. For education and employment of farmers and farm managers, metropolitan dominance is more influential in rural hinterland communities, but for female personal income and ever-married females ages 15-24, metropolitan dominance is more influential in urban hinterland communities. The size of the correlation coefficients suggests, however, that metropolitan dominance is not as pervasive in determining intercommunity variation of social structure as expected.

It has also been shown that fertility behavior is a function of both metropolitan dominance and community social structure. Differential impact of metropolitan dominance is supported only by the degree of association within the residential sectors. In all sectors it is negatively associated with fertility. The only community social structure variable which supports a differential impact with respect to direction of association is employment of farmers and farm managers. In terms of degree of association, community social structure variables which are more determinate of urban fertility are family income, female income, ever-married females ages 15-24 and 25-34. Community social structure variables highly influential in rural areas are employment of farmers and farm managers and education. Combined, however, the community social structure variables and metropolitan dominance reflect greatest influence in determining fertility variation in urban areas, lowest in rural-farm areas, and intermediate in rural-nonfarm.

The third hypothesis, which was also supported, was tested by means of partial and multiple-partial correlation coefficients. It was found that fertility behavior continues to be significantly related to community social structure after the influence of metropolitan centers has been controlled. Employment in agricultural occupations and socio-economic status were especially important in determining fertility levels in rural hinterland communities while wife's alternative opportunities and demographic age structure tend to be more influential in urban hinterland communities. The fact that the correlation coefficients of fertility and community social structure variables remained statistically significant for the most part, after metropolitan dominance had been partialled, provides additional evidence by which to doubt the pervasiveness of metropolitan dominance in determining inter-community fertility variation. Fertility levels in urban and rural areas are the product of both metropolitan dominance and local community conditions.

The fourth hypothesis of this study was not supported by the data employed. On the basis of the development of a metropolitan dominance theoretical framework it was proposed that community fertility behavior would be more a function of metropolitan dominance in urban hinterland communities, but more a function of local community social structure in rural hinterland communities. Both multiple-partial correlation coefficients and beta coefficients were employed to determine the relative importance of metropolitan dominance and community social structure in determining urban and rural fertility variation. For urban areas it was expected that metropolitan dominance would reveal coefficients exceeding those for community social structure variables in determining fertility variation, but that community social structure coefficients would be more prominent in rural areas. The data indicated no consistent pattern in this respect. Even when considering the average rank values of the independent variables among the divisions in determining urban and rural fertility levels, it was discovered that in all residential sectors a community social structure variable exceeded metropolitan dominance for relative importance in determining fertility variation. The most important community social structure variable in urban areas was ever-married females ages 15-24 and in both rural sectors, education.

The fifth and sixth hypotheses are similar to the previous hypotheses but different in that they considered the possibility that patterns of association among the dependent and independent variables were blurred by the existence of different levels of metropolitanization among the divisions of the nation. In the testing of these two hypotheses some control over the differential metropolitanization of the divisions was attempted by subdividing the divisions into two categories: (1) those indicating a percentage of population residing in metropolitan areas above the level of the nation and (2) those with percentage metropolitan below the level of the nation. It was expected, then, that the patterns predicted on the basis of metropolitan dominance theory would hold true more for the more metropolitan divisions than the less metropolitan divisions. It was determined that metropolitan dominance is a more important determinant of community social structure in the more metropolitan divisions than the less metropolitan divisions in all three residential sectors. On the average correlation coefficients between metropolitan dominance and community social structure were higher for the more metropolitan divisions. This pattern was true for all the average coefficients in the rural-nonfarm sector, six of the eight coefficients in the rural-farm, and five of the eight in the urban sector. The pattern of more relative importance of metropolitan dominance in the more metropolitan divisions was much stronger when considering the influence of metropolitan dominance on urban, rural-nonfarm, and rural-farm fertility levels. Though inconsistencies in the predicted pattern do occur in the comparison of individual divisions by level of metropolitanization, it appears that a universal metropolitan dominance pattern has not as yet emerged among all divisions of the nation and, therefore, level of metropolitanization is a significant factor to consider in exploring further hypotheses derived from metropolitan dominance theory.

The sixth hypothesis attempted to test a more specific pattern in the dominating influence of metropolitan centers on their hinterlands. This hypothesis is a repeat of the fourth hypothesis, which was rejected, but with the added factor of level of metropolitanization among the divisions somewhat controlled. The finding of this test indicates that in all residential sectors metropolitan dominance is on the average more important in determining fertility levels than community social structure in the more metropolitan divisions, but superceded in the less metropolitan divisions by various community social structure variables. Though previous results suggested the questioning of the pervasiveness of metropolitan centers as organizing agents of hinterland inter-community variation for the nation, the finding here suggests the reinstatement of this pattern particularly for the divisions of the nation which are more advanced in the development of metropolitanization. The data indicated that hinterlands of all three residential types do come more under the dominance of metropolitan centers than the influence of local conditions in the more metropolitan divisions. Apparently in the less metropolitan divisions local community conditions still exert a considerable impact in determining inter-community variation in urban, rural-nonfarm, and rural-farm hinterlands compared with metropolitan dominance.

Finally the verification of the seventh and last hypothesis of this study also adds considerably to the support of metropolitan dominance theory. In the chapter dealing with the theoretical framework of this study, it was mentioned that one of the primary points which distinguishes urban dominance and metropolitan dominance theory has to do with the pattern of effects exerted by cities upon their hinterland region. Urban dominance theory predicts the disappearance of urban and rural residential differences on the basis of the assumption that cities exert a homogeneous impact on hinterland communities. Metropolitan dominance theory, on the other hand, leads to the conclusion that urban-rural differences will persist primarily due to the differential impact of metropolitan centers upon hinterland communities. By means of the multiple comparison test it was possible to test whether the differential effects pattern among residential sectors of metropolitan hinterland regions was true with respect to the comparison of the effects of the independent variables employed in the multiple regression equation on fertility variation. It was found that among the divisions of the nation, the independent variables in many cases do exert differential effects on fertility in comparing the residential sectors. Hence we conclude that fertility differences do exist between the residential areas of the divisions, though these differences were shown to be in terms of the pattern of association of the independent variables in determining fertility levels themselves. In other words, this means that a factor, such as education, has a significantly different effect on fertility in urban areas than rural areas. It is suggested, then, that the chief cause of this pattern of differential effects is the influence of metropolitan centers on the different types of residential hinterlands. The fact that the pattern of differential effects between residential sectors was found to be more pronounced in the more metropolitan divisions provides added support to this particular hypothesis derived from metropolitan dominance theory. Furthermore, the finding that few differences exist for the effect of the independent variables on fertility in the comparison of the divisions also adds support to the metropolitan dominance theory. What this implies, of course, is that divisional and regional differences, which were formerly significant sources of areal differences within the nation are giving way in the face of the increasingly greater influence of metropolitan centers in determining inter-community and interareal variation in the nation. This is supported by the finding that similarity of effects on fertility by the independent variables is to be found more clearly among the more metropolitan divisions, the divisions in which the most support for the differential impact among residential sectors was expected to be found.

In conclusion, we have found that fertility behavior is influenced both by distance and size of a dominating metropolitan center and community social structure. In speaking of community social structure, we have in mind the influence of local conditions indigenous to the respective hinterland communities, since inter-community social structure variation produced by the influence of metropolitan centers had been partialled. Among all the divisions it appeared that local community conditions exert a considerable influence on fertility behavior in all residential sectors, more than the metropolitan dominance variable. However, in considering the more metropolitan divisions distinct from the less metropolitan divisions, it was found that metropolitan dominance is a very important determinant of community social structure variation and fertility behavior. Furthermore for these same more metropolitan divisions, it was found that in all residential sectors metropolitan dominance exceeded community social structure in determining fertility levels, whereas in the less metropolitan divisions education and females age 15-24 exceeded metropolitan dominance in rural and urban hinterland communities respectively. A differentiating process is operative among the residential sectors, especially among the more metropolitan divisions, whereas divisional differences are diminishing. It is concluded that the discovery of such a pattern is proof of a gradual emergence of metropolitan centers as the primary organizing agent of inter-community hinterland variation. As all divisions continue to become more metropolitan, the influence of metropolitan centers will likewise increase.

CHAPTER VI

REFLECTIONS AND IMPLICATIONS FOR FURTHER RESEARCH

New approaches to the study of differential fertility are definitely needed in demographic research today. It is my hope that if any contribution has been made by this thesis, it has been in the direction of demonstrating a new approach to the study of the urban-rural fertility differential, or for that matter, any of the fertility differentials. Indeed the prediction by many demographers that the gap between urban and rural fertility levels in the United States is disappearing is not sufficient justification to end our investigations in this area. Rather new approaches, methodological and theoretical, must be sought in order to increase our understanding of the true and complex dynamics of fertility.

Methodologically the present study has attempted to point out the inadequacies of such conventional approaches to differential fertility as trend analysis and the "aggregate" approach. Longitudinal and cross-sectional analyses which attempt merely to document whether there exists a significant association between various socio-economic and demographic variables and fertility are not sensitive enough to represent accurately and comprehensively current differential fertility patterns. The degree of association as well as the relative importance of such variables in determining fertility patterns should be investigated also. Although there are other methodological approaches available which could solve such problems, the present study found a distributive approach operationalized in the form of multiple regression analysis extremely valuable for such purposes. Employing new methodological techniques, however, does not necessitate a search for new sources of data. Though a major source of information for studies employing trend analysis and the aggregate approach has been the census, and though the vogue in fertility analysis has been large sample surveys, the present study has attempted to demonstrate that census data, likewise, are very amenable to entirely different methodological approaches such as multiple regression analysis. Methodological ingenuity and experimentation are urgently needed in differential fertility analysis at a time when conventional methods seem to be providing only fruitless repetition and little new knowledge.

Theoretically we must also turn in new directions. Differential fertility theory has been as deficient as its methodology. Indeed there is much evidence of emerging new middle range theories of differential fertility and these are contributing much to a bridging of the gap which formerly existed between "theory" and "empirical data." Demographic transition theory, which for many years served as puny proof that demographers were interested in theory, has undergone repeated attack. Many of its generalizing principles have been shown to be inadequate to explain current as well as past fertility patterns. It has failed to generate new hypotheses. In addition this thesis has attempted to demonstrate that the theory itself, when applied to the current situation in American society, leads to inaccurate and questionable conclusions. Implicit in the demographic transition theory is the concept of urban dominance. It is this concept which has led many researchers to the conclusion that the urban-rural fertility differential is doomed to dissolution. The present study has argued that urban dominance is not an adequate description of the dynamics of American society, but metropolitan dominance is. It is suggested that metropolitan dominance theory must somehow be incorporated into the framework of demographic transition theory if the latter is to continue as a useful theoretical framework by which to understand currently modern complex societies.

By substituting metropolitan dominance theory for urban dominance theory in differential fertility analysis, new questions and problems are produced and new dimensions for further research are uncovered. But, of course, there have been deficiencies in the manner by which metropolitan dominance theory has been researched as well. Many researchers apparently have failed to perceive that these two theoretical positions, urban and metropolitan dominance, lead to conflicting conclusions. This oversight has been due primarily to an overemphasis on the gradient principle and an equally underemphasis of the differentiating principle. The gradient principle, it has been noted previously, is an element common to both urban dominance and metropolitan dominance theory. Hence the successful testing of this principle has usually found the researcher confused as to whether his findings actually supported one theory or the other. All too frequently the researcher would choose to avoid the issue altogether rather than deal with it directly. It is the differentiating principle, however, which is the distinguishing characteristic of the two theories, but little research has been performed directed by this principle. In the application of metropolitan dominance theory to differential fertility analysis, it is the differentiating principle which has lead to the conclusion that urban and rural fertility levels may not eventually converge. Even if the levels themselves do converge, on the basis of the ideas presented on differential fertility in this thesis, it is possible that the patterns of differential fertility found in urban and rural areas may not necessarily resemble each other.

Much more research, then, is needed to determine the differentiating effects of metropolitan centers on the hinterland communities comprising the metropolitan region. The present study attempted to do just that and the findings seem to indicate that urban and rural differential fertility patterns are distinct, especially in the more metropolitan geographic divisions of the nation. In a sense, then, the findings of this study have lent some support to the "pro" side of the current argument as to whether the "urban" and "rural" categories provide a meaningful distinction in the analysis of American society. The present study has assumed, of course, that one of the main dimensions of the differentiating effect of metropolitan dominance on hinterland communities is along urban-rural lines. The findings of this study seem to bear this out, although, obviously, more research on this problem is needed. I am not wholly satisfied with the design of this thesis in testing this question, however. A weakness of the present study, it seems to me, is the failure to consider the differentiating effects of metropolitan dominance for areas smaller than a geographic division. It seems to me that the next logical step is to research the hypotheses of this study for individual metropolitan regions. At this level it would be possible to contrast the differentiating effect of metropolitan dominance on urban and rural hinterland communities even within the same distance zone from a given metropolitan center. In such a study, of course, differential fertility patterns would provide only one of numerous dimensions which should be investigated to determine the differentiating effect of metropolitan dominance on urban and rural hinterland communities. In addition, other classification schemes for hinterland communities must also be devised other than the traditional urban-rural categories.

In conclusion, I wish to point out that these are only a few of the problems which could profitably be researched in the future. As the pattern is in any intensive struggle with a given problem, I find this study gives rise to many more questions than it answers. In fact I am not sure myself that the answers which have been presented in this thesis are valid. I do not intend, however, to follow the example of Malthus and spend the rest of my life producing improved editions of the same old, overworked ideas. If the ideas presented in this thesis are of any value, they should lead to the production of even fresher ideas.

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APPENDIX A

DETAILED RESULTS OF MULTIPLE REGRESSION EQUATIONS

Table 49. First-order partial correlation of fertility and employment in agricultural occupations (urbanization) controlling for metropolitan dominance for conterminous United States and division, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Farmers & Farm Managers			Correlation of Fertility and Farm Laborers & Foremen		
	Urb $r_{Y2.1}$	RNF $r_{Y2.1}$	RF $r_{Y2.1}$	Urb $r_{Y3.1}$	RNF $r_{Y3.1}$	RF $r_{Y3.1}$
UNITED STATES	.138*	.076*	-.041*	.327*	.243*	.110*
New England	-.043	.345*	.346*	.279*	.593*	.324
Middle Atlantic	.028	.046	-.080	-.008	.104	.161
E. N. Central	-.049	-.178*	-.188*	-.110*	-.069	.167*
W. N. Central	.045	-.005	-.045	.000	-.001	.237*
South Atlantic	.130*	.125*	-.166*	.174*	.202*	.075
E. S. Central	-.054	-.029	-.311*	-.173*	.133*	.091
W. S. Central	.092	-.036	-.268*	.624*	.513*	.128*
Mountain	.286*	.235*	-.205*	.168*	.198*	-.107
Pacific	.340*	-.014	-.247*	.328*	.345*	-.041

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_2 Percent of male labor force who are employed as farmers and farm managers.

X_3 Percent of male labor force who are employed as farm laborers and foremen.

Table 50. First-order partial correlation of fertility and socio-economic status controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Education			Correlation of Fertility and Family Income		
	Urb $r_{Y4.1}$	RNF $r_{Y4.1}$	RF $r_{Y4.1}$	Urb $r_{Y5.1}$	RNF $r_{Y5.1}$	RF $r_{Y5.1}$
UNITED STATES	-.191*	-.225*	-.169*	.063*	.088*	.119*
New England	.038	-.353*	-.140	-.147	-.308*	-.198
Middle Atlantic	.085	.001	-.017	-.176*	.019	.007
E. N. Central	.060	-.178*	-.398*	.296*	-.273*	-.248*
W. N. Central	-.175*	-.278*	-.404*	-.323*	-.176*	-.096*
South Atlantic	-.278*	-.385*	-.268*	-.116*	.152*	.123*
E. S. Central	-.190*	-.397*	-.247*	-.037	-.170*	-.010
W. S. Central	-.629*	-.564*	-.496*	.051	-.098*	-.289*
Mountain	-.487*	-.419*	.007	.147	-.286*	.053
Pacific	-.456*	-.595*	-.356*	-.040	-.095	-.238*

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_4 Median years of school completed by males and females, age 25 and over.

X_5 Median family income in 1959.

Table 51. First-order partial correlation of fertility and wife's alternative opportunities controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Female Personal Income			Correlation of Fertility and Female Employment		
	Urb $r_{Y6.1}$	RNF $r_{Y6.1}$	RF $r_{Y6.1}$	Urb $r_{Y7.1}$	RNF $r_{Y7.1}$	RF $r_{Y7.1}$
UNITED STATES	-.231*	-.205*	-.145*	-.179*	-.279*	-.144*
New England	-.092	-.348*	-.265*	-.073	-.193	-.081
Middle Atlantic	-.354*	-.260*	-.112	-.239*	-.294*	-.037
E. N. Central	-.159*	-.195*	-.113*	-.028	-.114*	.007
W. N. Central	-.343*	-.112*	-.202*	-.165*	-.039	-.023
South Atlantic	-.295*	-.289*	-.179*	-.245*	-.408*	-.224*
E. S. Central	-.189*	-.211*	-.203*	-.330*	-.528*	-.430*
W. S. Central	-.235*	-.148*	-.197*	-.146*	-.197*	-.205*
Mountain	-.372*	-.234*	-.171*	-.455*	-.391*	-.211*
Pacific	-.378*	-.119	.011	-.185	-.087	-.020

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_6 Median female personal income in 1959.

X_7 Percent females, age 14 and over, who are employed.

Table 52. First-order partial correlation of fertility and demographic age structure controlling for metropolitan dominance for conterminous United States and divisions, by residence: 1960

Conterminous United States and Divisions	Correlation of Fertility and Females, Ages 15-24			Correlation of Fertility and Females, Ages 25-34		
	Urb $r_{Y8.1}$	RNF $r_{Y8.1}$	RF $r_{Y8.1}$	Urb $r_{Y9.1}$	RNF $r_{Y9.1}$	RF $r_{Y9.1}$
UNITED STATES	-.366*	-.128*	-.137*	.208*	.018*	.097*
New England	-.145	.280*	-.226	.106	-.054	.074
Middle Atlantic	-.161	.045	-.015	.202*	-.091	-.052
E. N. Central	-.529*	-.185*	-.272*	.189*	.066	.025
W. N. Central	-.516*	-.257*	-.164*	.229*	.096*	.090*
South Atlantic	-.351*	-.097*	-.071	.186*	-.099*	.099*
E. S. Central	-.454*	-.039	-.014	.171*	-.103	-.013
W. S. Central	-.308*	-.052	.049	.346*	.137*	.034
Mountain	-.367*	-.115	-.354*	.069	-.002	.014
Pacific	-.316*	-.111	-.210*	.259*	.048	-.005

*Significantly different from zero at the .05 level.

Y Cumulative fertility ratio.

X_8 Percent ever-married females, ages 15-44, who are age 15-24.

X_9 Percent ever-married females, ages 15-44, who are age 25-34.

Table 53. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--conterminous United States: 1960

Multiple Correlation Coefficient	.581*
Standard Error of Estimate	233.024
Coefficient of Multiple Determination	.338*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	2444.062	105.491	....	23.168*
Metropolitan dominance (X_1).	-10.007	.839	-.257	-11.923*
Percent of white male labor force who are farmers and farm managers X_2	-.149	.312	-.010	-.477
Percent of white male labor force who are farm laborers and foremen (X_3)	3.924	.265	.299	14.819*
Median years of school completed by white males and females, age 25 and over (X_4). .	-2.200	.467	-.091	-4.708*
Median white family income (X_5).	.005	.001	.093	4.496*
Median white female personal income for county (X_6).	-.030	.005	-.160	-5.995*
Percent of white females, age 14 and over, in county who are employed (X_7).	-.223	.144	-.043	-1.552
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8).	-2.172	.124	-.342	-17.465*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9).	.791	.147	.101	5.393*

*Significantly different from zero at the .05 level.

Table 54. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--conterminous United States: 1960

Multiple Correlation Coefficient	.521*
Standard Error of Estimate	268.689
Coefficient of Multiple Determination	.272*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	3134.155	76.134	....	41.167*
Metropolitan dominance (X_1)	-14.813	.905	-.314	-16.368*
Percent of white male labor force who are farmers and farm managers (X_2)	-.097	.119	-.015	-.818
Percent of white male labor force who are farm laborers and foremen (X_3)	1.300	.102	.220	12.771*
Median years of school completed by white males and females, age 25 and over (X_4)	-4.874	.433	-.204	-11.257*
Median white family income (X_5)	.009	.001	.224	11.463*
Median white female personal income for county (X_6)	-.006	.005	-.026	-1.208
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.283	.121	-.239	-10.626*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.233	.121	-.172	-10.152*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.362	.122	.049	2.950*

*Significantly different from zero at the .05 level.

Table 55. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--conterminous United States: 1960

Multiple Correlation Coefficient	.407*
Standard Error of Estimate	355.366
Coefficient of Multiple Determination	.166*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	3519.037	78.059	....	45.082*
Metropolitan dominance (X_1)	-14.944	1.247	-.254	-11.987*
Percent of white male labor force who are farmers and farm managers (X_2)	-.131	.050	-.051	-2.606*
Percent of white male labor force who are farm laborers and foremen (X_3)	.745	.106	.136	7.003*
Median years of school completed by white males and females, age 25 and over (X_4)	-7.818	.613	-.268	-12.753*
Median white family income (X_5)	.013	.001	.229	10.193*
Median white female personal income for county (X_6)	-.022	.008	-.071	-2.863*
Percent of white females, age 14 and over, in county who are employed (X_7)	-.617	.163	-.093	-3.781*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.590	.161	-.190	-9.905*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.384	.124	.060	3.102*

*Significantly different from zero at the .05 level.

Table 56. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--New England division: 1960

Multiple Correlation Coefficient	.677*
Standard Error of Estimate	127.940
Coefficient of Multiple Determination	.459*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	3785.453	1665.395	....	2.273*
Metropolitan dominance (X_1)	-4.480	3.767	-.228	-1.189
Percent of white male labor force who are farmers and farm managers (X_2)	-7.841	2.962	-.420	-2.647*
Percent of white male labor force who are farm laborers and foremen (X_3)	11.634	3.228	.579	3.604*
Median years of school completed by white males and females, age 25 and over (X_4)	.504	1.845	.031	.273
Median white family income (X_5)	-.019	.008	-.443	-2.214*
Median white female personal income for county (X_6)	-.005	.021	-.048	-.232
Percent of white females, age 14 and over, in county who are employed (X_7)	-.013	.725	-.004	-.018
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.735	.649	-.360	-2.675*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.426	.835	-.069	-.510

*Significantly different from zero at the .05 level.

Table 57. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--New England division: 1960

Multiple Correlation Coefficient	.855*
Standard Error of Estimate	99.038
Coefficient of Multiple Determination	.731*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	3400.652	1355.724	....	2.508*
Metropolitan dominance (X_1)	-2.709	2.748	-.120	-.986
Percent of white male labor force who are farmers and farm managers (X_2)	.520	1.342	.039	.387
Percent of white male labor force who are farm laborers and foremen (X_3)	2.928	.832	.366	3.518*
Median years of school completed by white males and females, age 25 and over (X_4)	-1.567	1.556	-.083	-1.007
Median white family income (X_5)	-.015	.004	-.452	-3.501*
Median white female personal income for county (X_6)	-.026	.015	-.232	-1.746*
Percent of white females, age 14 and over, in county who are employed (X_7)	.475	.455	.134	1.044
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.196	.540	-.044	-.363
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.262	.537	-.039	-.488

*Significantly different from zero at the .05 level.

Table 58. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--New England division: 1960

Multiple Correlation Coefficient	.674*
Standard Error of Estimate	285.087
Coefficient of Multiple Determination	.455*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	3922.504	1110.553	....	3.532*
Metropolitan dominance (X_1)	-1.460	8.492	-.032	-.172
Percent of white male labor force who are farmers and farm managers (X_2)	.622	.812	.127	.766
Percent of white male labor force who are farm laborers and foremen (X_3)	1.2905	.968	.229	1.334
Median years of school completed by white males and females, age 25 and over (X_4)	.551	5.357	.016	.103
Median white family income (X_5)	-.040	.018	-.382	-2.190*
Median white female personal income for county (X_6)	-.105	.056	-.467	-1.892*
Percent of white females, age 14 and over, in county who are employed (X_7)	2.131	1.713	.303	1.244
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.429	.982	-.189	-1.455
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.637	.568	-.137	-1.123

*Significantly different from zero at the .05 level.

Table 59. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--Middle Atlantic division: 1960

Multiple Correlation Coefficient	.612*
Standard Error of Estimate	130.452
Coefficient of Multiple Determination	.375*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	4270.252	953.020	....	4.481*
Metropolitan dominance (X_1)	-10.137	1.920	-.473	-5.281*
Percent of white male labor force who are farmers and farm managers (X_2)	.440	2.758	.013	.160
Percent of white male labor force who are farm laborers and foremen (X_3)	-.644	2.113	-.027	-.305
Median years of school completed by white males and females, age 25 and over (X_4)	.299	1.385	.016	.216
Median white family income (X_5)	-.031	.008	-.295	-3.663*
Median white female personal income for county (X_6)	-.044	.011	-.466	-3.794*
Percent of white females, age 14 and over, in county who are employed (X_7)	.229	.457	.060	.502
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.766	.403	-.159	-1.901*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.434	.469	.074	.925

*Significantly different from zero at the .05 level.

Table 60. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for ruran-nonfarm part of county--Middle Atlantic division: 1960

Multiple Correlation Coefficient	.619*
Standard Error of Estimate	154.685
Coefficient of Multiple Determination	.383*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	3598.756	912.581	....	3.943*
Metropolitan dominance (X_1)	-14.079	2.420	-.514	-5.819*
Percent of white male labor force who are farmers and farm managers (X_2)	-.896	2.346	-.045	-.382
Percent of white male labor force who are farm laborers and foremen (X_3)	2.800	1.539	.216	1.819*
Median years of school completed by white males and females, age 25 and over (X_4)	1.765	1.670	.090	1.057
Median white family income (X_5)	-.012	.018	-.049	-.651
Median white female personal income for county (X_6)	-.003	.015	-.022	-.181
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.358	.591	-.293	-2.299*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.140	.506	-.025	-.278
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.181	.596	-.023	-.304

*Significantly different from zero at the .05 level.

Table 61. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--Middle Atlantic division: 1960

Multiple Correlation Coefficient	.479*
Standard Error of Estimate	302.896
Coefficient of Multiple Determination	.230*

Independent Variables	Partial Regression Coefficients	Standard Deviations	Beta Coefficients	Computed t Values
Constant term	3766.085	730.794	....	5.153*
Metropolitan dominance (X_1)	-23.859	5.029	-.477	-4.744*
Percent of white male labor force who are farmers and farm managers (X_2)	-.668	.438	-.147	-1.526
Percent of white male labor force who are farm laborers and foremen (X_3)	1.800	.744	.251	2.420*
Median years of school completed by white males and females, age 25 and over (X_4)	-2.730	3.250	-.072	-.840
Median white family income (X_5)	-.001	.058	-.002	-.018
Median white female personal income for county (X_6)	-.054	.036	-.245	-1.521
Percent of white females, age 14 and over, in county who are employed (X_7)	1.147	1.266	.143	.906
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.263	.952	-.134	-1.327
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.970	.648	-.136	-1.497

*Significantly different from zero at the .05 level.

Table 62. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--East North Central division: 1960

Multiple Correlation Coefficient	.640*
Standard Error of Estimate	179.035
Coefficient of Multiple Determination	.410*

Independent variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	1580.038	701.529	....	2.252*
Metropolitan dominance (X_1)	-16.627	1.921	-.369	-8.654*
Percent of white male labor force who are farmers and farm managers (X_2)	-.666	1.319	-.024	-.505
Percent of white male labor force who are farm laborers and foremen (X_3)	-1.733	1.558	-.053	-1.112
Median years of school completed by white males and females, age 25 and over (X_4)	4.025	1.126	.162	3.573*
Median white family income (X_5)	.015	.003	.200	4.590*
Median white female personal income for county (X_6)	-.042	.014	-.188	-3.053*
Percent of white females, age 14 and over, in county who are employed (X_7)	.149	.365	.026	.408
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-2.832	.291	-.410	-9.741*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.317	.328	.043	.964

*Significantly different from zero at the .05 level.

Table 63. Results of the analysis of factors influencing number of children ever born per 1,000 ever married white females, age 15-44, for rural-nonfarm part of county--East North Central division: 1960

Multiple Correlation Coefficient	.531*
Standard Error of Estimate	185.177
Coefficient of Multiple Determination	.282*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	7401.366	600.824	....	12.319*
Metropolitan dominance (X_1)	-12.743	1.986	-.288	-6.418*
Percent of white male labor force who are farmers and farm managers (X_2)	-2.250	.540	-.238	-4.169*
Percent of white male labor force who are farm laborers and foremen (X_3)	.770	.613	.069	1.256
Median years of school completed by white males and females, age 25 and over (X_4)	-3.840	1.201	-.178	-3.198*
Median white family income (X_5)	-.076	.014	-.230	-5.323*
Median white female personal income for county (X_6)	-.041	.013	-.187	-3.127*
Percent of white females, age 14 and over, in county who are employed (X_7)	.369	.316	.074	1.167
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.991	.276	-.154	-3.585*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.402	.278	.065	1.446

*Significantly different from zero at the .05 level.

Table 64. Results of the analysis of factors influencing number of children ever born per 1,000 ever married white females, age 15-44, for rural-farm part of county--East North Central division: 1960

Multiple Correlation Coefficient	.600*
Standard Error of Estimate	309.916
Coefficient of Multiple Determination	.360*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	6375.617	466.199	....	13.676*
Metropolitan dominance (X_1)	-19.164	3.469	-.235	-5.524*
Percent of white male labor force who are farmers and farm managers (X_2)	-.877	.164	-.250	-5.353*
Percent of white male labor force who are farm laborers and foremen (X_3)	1.846	.445	.194	4.149*
Median years of school completed by white males and females, age 25 and over (X_4)	-10.652	1.616	-.316	-6.592*
Median white family income (X_5)	-.052	.024	-.099	-2.125*
Median white female personal income for county (X_6)	-.065	.022	-.169	-2.946*
Percent of white females, age 14 and over, in county who are employed (X_7)	1.862	.541	.205	3.439*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-2.583	.466	-.225	-5.540*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.203	.357	.024	.567

*Significantly different from zero at the .05 level.

Table 65. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--West North Central division: 1960

Multiple Correlation Coefficient	.649*
Standard Error of Estimate	206.822
Coefficient of Multiple Determination	.421*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	4282.949	685.692	....	6.246*
Metropolitan dominance (X_1)	-12.432	2.319	-.268	-5.360*
Percent of white male labor force who are farmers and farm managers (X_2)	-.271	.729	-.019	-.372
Percent of white male labor force who are farm laborers and foremen (X_3)	.467	1.046	.022	.447
Median years of school completed by white males and females, age 25 and over (X_4)	-2.325	1.167	-.098	-1.992*
Median white family income (X_5)	-.022	.005	-.200	-4.533*
Median white female personal income for county (X_6)	-.068	.015	-.287	-4.537*
Percent of white females, age 14 and over, in county who are employed (X_7)	.863	.396	.139	2.180*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-2.590	.294	-.403	-8.822*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.269	.337	.037	.800

*Significantly different from zero at the .05 level.

Table 66. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--West North Central division: 1960

Multiple Correlation Coefficient	.437*
Standard Error of Estimate	249.364
Coefficient of Multiple Determination	.191*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	5180.238	436.132	....	11.878*
Metropolitan dominance (X_1)	-8.724	2.457	-.174	-3.551*
Percent of white male labor force who are farmers and farm managers (X_2)	-.489	.259	-.087	-1.888*
Percent of white male labor force who are farm laborers and foremen (X_3)	.314	.356	.036	.880
Median years of school completed by white males and females, age 25 and over (X_4)	-6.890	1.073	-.269	-6.421*
Median white family income (X_5)	-.039	.011	-.145	-3.625*
Median white female personal income for county (X_6)	-.023	.014	-.079	-1.635
Percent of white females, age 14 and over, in county who are employed (X_7)	.403	.270	.072	1.494
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.515	.262	-.230	-5.773*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.288	.236	.046	1.221

*Significantly different from zero at the .05 level.

Table 67. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--West North Central division: 1960

Multiple Correlation Coefficient	.577*
Standard Error of Estimate	304.647
Coefficient of Multiple Determination	.333*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	4818.965	322.567	....	14.939*
Metropolitan dominance (X_1).	-17.406	3.122	-.261	-5.575*
Percent of white male labor force who are farmers and farm managers (X_2)	-.086	.148	-.027	-.579
Percent of white male labor force who are farm laborers and foremen (X_3)	2.108	.277	.304	7.613*
Median years of school completed by white males and females, age 25 and over (X_4). .	-11.641	1.090	-.387	-10.681*
Median white family income (X_5).	-.020	.014	-.049	-1.423
Median white female personal income for county (X_6).	-.059	.018	-.150	-3.301*
Percent of white females, age 14 and over, in county who are employed (X_7).	.462	.312	.063	1.482
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8).	-2.666	.338	-.294	-7.891*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9).	.059	.263	.009	.226

*Significantly different from zero at the .05 level.

Table 68. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--South Atlantic division: 1960

Multiple Correlation Coefficient	.630*
Standard Error of Estimate	153.787
Coefficient of Multiple Determination	.397*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	4007.837	709.715	....	5.647*
Metropolitan dominance (X_1).	-2.878	1.667	-.102	-1.726*
Percent of white male labor force who are farmers and farm managers (X_2)	1.134	.830	.064	1.366
Percent of white male labor force who are farm laborers and foremen (X_3)	.835	.771	.049	1.083
Median years of school completed by white males and females, age 25 and over (X_4). .	-5.185	.700	-.311	-7.408*
Median white family income (X_5).	-.018	.004	-.266	-4.499*
Median white female personal income for county (X_6).	-.017	.006	-.188	-2.897*
Percent of white females, age 14 and over, in county who are employed (X_7).	-.316	.186	-.109	-1.705*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8).	-1.399	.182	-.328	-7.682*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9).	.526	.221	.102	2.381*

*Significantly different from zero at the .05 level.

Table 69. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--South Atlantic division: 1960

Multiple Correlation Coefficient	.603*
Standard Error of Estimate	231.375
Coefficient of Multiple Determination	.363*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	3939.608	518.444	....	7.599*
Metropolitan dominance (X_1)	-14.851	2.565	-.311	-5.791*
Percent of white male labor force who are farmers and farm managers (X_2)	-.016	.297	-.003	-.055
Percent of white male labor force who are farm laborers and foremen (X_3)	.812	.276	.113	2.943*
Median years of school completed by white males and females, age 25 and over (X_4)	-8.222	.860	-.357	-9.566*
Median white family income (X_5)	.002	.006	.016	.289
Median white female personal income for county (X_6)	-.010	.010	-.056	-1.028
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.291	.223	-.315	-5.799*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.703	.271	-.241	-6.289*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.028	.266	-.004	-.104

*Significantly different from zero at the .05 level.

Table 70. Results of the analysis of factors influencing number of children ever born per

Table 70. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--South Atlantic division: 1960

Multiple Correlation Coefficient	.449*
Standard Error of Estimate	331.621
Coefficient of Multiple Determination	.202*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	3633.402	371.494	....	9.781*
Metropolitan dominance (X_1)	-18.898	3.761	-.310	-5.025*
Percent of white male labor force who are farmers and farm managers (X_2)	-.703	.143	-.218	-4.903*
Percent of white male labor force who are farm laborers and foremen (X_3)	.783	.282	.122	2.779*
Median years of school completed by white males and females, age 25 and over (X_4)	-9.369	1.622	-.268	-5.776*
Median white family income (X_5)	.012	.007	.112	1.824*
Median white female personal income for county (X_6)	-.009	.015	-.038	-.575
Percent of white females, age 14 and over, in county who are employed (X_7)	-.552	.342	-.106	-1.613
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.792	.341	-.105	-2.322*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.417	.257	.072	1.622

*Significantly different from zero at the .05 level.

Table 71. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--East South Central division: 1960

Multiple Correlation Coefficients	.584*
Standard Error of Estimate	180.892
Coefficient of Multiple Determination	.341*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	2905.702	990.686	....	2.933*
Metropolitan dominance (X_1)	-6.344	3.354	-.115	-1.892*
Percent of white male labor force who are farmers and farm managers (X_2)	-.210	.834	-.015	-.251
Percent of white male labor force who are farm laborers and foremen (X_3)	-2.962	1.396	-.137	-2.121*
Median years of school completed by white males and females, age 25 and over (X_4)	-3.006	1.136	-.184	-2.647*
Median white family income (X_5)	.004	.005	.044	.716
Median white female personal income for county (X_6)	.022	.016	.111	1.368
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.294	.337	-.349	-3.844*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.949	.295	-.402	-6.604*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.300	.332	.054	.905

*Significantly different from zero at the .05 level.

Table 72. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--East South Central division: 1960

Multiple Correlation Coefficient	.629*
Standard Error of Estimate	279.461
Coefficient of Multiple Determination	.396*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	4953.045	534.450	....	9.268*
Metropolitan dominance (X_1)	-20.558	4.274	-.210	-4.810*
Percent of white male labor force who are farmers and farm managers (X_2)	-1.309	.442	-.159	-2.961*
Percent of white male labor force who are farm laborers and foremen (X_3)	1.685	.548	.170	3.075*
Median years of school completed by white males and females, age 25 and over (X_4)	-5.493	1.698	-.178	-3.234*
Median white family income (X_5)	-.014	.008	-.076	-1.686*
Median white female personal income for county (X_6)	.068	.021	.182	3.292*
Percent of white females, age 14 and over, in county who are employed (X_7)	-3.169	.318	-.609	-9.968*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.868	.420	-.203	-4.449*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.234	.446	-.024	-.525

*Significantly different from zero at the .05 level.

Table 73. Results of the analysis of factors influencing number of children ever born per 1,000 ever married white females, age 15-44, for rural-farm part of county--East South Central division: 1960

Multiple Correlation Coefficient	.582*
Standard Error of Estimate	321.006
Coefficient of Multiple Determination	.339*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	4995.944	427.622	....	11.683*
Metropolitan dominance (X_1)	-12.544	5.488	-.116	-2.286*
Percent of white male labor force who are farmers and farm managers (X_2)	-1.042	.149	-.325	-6.980*
Percent of white male labor force who are farm laborers and foremen (X_3)	1.405	.339	.205	4.146*
Median years of school completed by white males and females, age 25 and over (X_4)	-4.951	2.454	-.114	-2.018*
Median white family income (X_5)	-.013	.020	-.033	-.659
Median white female personal income for county (X_6)	.038	.024	.091	1.566
Percent of white females, age 14 and over, in county who are employed (X_7)	-2.818	.375	-.506	-7.512*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.612	.429	-.196	-3.757*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.080	.347	-.011	-.230

*Significantly different from zero at the .05 level.

Table 74. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--West South Central division: 1960

Multiple Correlation Coefficient	.812*
Standard Error of Estimate	192.398
Coefficient of Multiple Determination	.660*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Coefficients	Computed t Values
Constant term	4756.609	1112.257	....	4.277*
Metropolitan dominance (X_1)	-15.349	3.839	-.144	-3.998*
Percent of white male labor force who are farmers and farm managers (X_2)	-.748	.398	-.066	-1.881*
Percent of white male labor force who are farm laborers and foremen (X_3)	3.320	.383	.390	8.663*
Median years of school completed by white males and females, age 25 and over (X_4)	-8.070	.990	-.361	-8.149*
Median white family income (X_5)	-.039	.020	-.065	-1.955*
Median white female personal income for county (X_6)	-.047	.018	-.105	-2.601*
Percent of white females, age 14 and over, in county who are employed (X_7)	.280	.300	.039	.933
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.057	.252	-.147	-4.185*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	1.846	.266	.244	6.944*

*Significantly different from zero at the .05 level.

Table 75. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--West South Central division: 1960

Multiple Correlation Coefficient	.685*
Standard Error of Estimate	237.613
Coefficient of Multiple Determination	.469*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	5728.031	630.501	....	9.085*
Metropolitan dominance (X_1)	-9.085	4.123	-.087	-2.204*
Percent of white male labor force who are farmers and farm managers (X_2)	-.729	.247	-.109	-2.950*
Percent of white male labor force who are farm laborers and foremen (X_3)	1.698	.180	.434	9.436*
Median years of school completed by white males and females, age 25 and over (X_4)	-8.307	1.138	-.328	-7.298*
Median white family income (X_5)	-.654	.019	-.129	-3.461*
Median white female personal income for county (X_6)	-.016	.020	-.032	-.775
Percent of white females, age 14 and over, in county who are employed (X_7)	-.629	.297	-.078	-2.121*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.779	.257	-.109	-3.030*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.753	.249	.110	3.024*

*Significantly different from zero at the .05 level.

Table 76. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--West South Central division: 1960

Multiple Correlation Coefficient	.586*
Standard Error of Estimate	321.668
Coefficient of Multiple Determination	.343*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	7337.836	519.946	....	14.113*
Metropolitan dominance (X_1)	-16.104	6.400	-.124	-2.516*
Percent of white male labor force who are farmers and farm managers (X_2)	-.378	.134	-.126	-2.830*
Percent of white male labor force who are farm laborers and foremen (X_3)	.904	.240	.215	3.773*
Median years of school completed by white males and females, age 25 and over (X_4)	-12.890	1.523	-.408	-8.463*
Median white family income (X_5)	-.117	.020	-.281	-5.883*
Median white female personal income for county (X_6)	-.025	.029	-.042	-.844
Percent of white females, age 14 and over, in county who are employed (X_7)	-.270	.422	-.033	-.639
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-.306	.366	-.039	-.838
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.199	.254	-.035	-.783

*Significantly different from zero at the .05 level.

Table 77. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--Mountain division: 1960

Multiple Correlation Coefficient	.757*
Standard Error of Estimate	206.611
Coefficient of Multiple Determination	.574*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	3069.680	2488.875	....	1.233
Metropolitan dominance (X_1).	-17.268	8.600	-.136	-2.008*
Percent of white male labor force who are farmers and farm managers (X_2)	4.005	.959	.297	4.176*
Percent of white male labor force who are farm laborers and foremen (X_3)	.130	.943	.010	.137
Median years of school completed by white males and females, age 25 and over (X_4). .	-12.734	2.329	-.388	-5.468*
Median white family income (X_5).	.023	.013	.107	1.736*
Median white female personal income for county (X_6).	-.030	.019	-.132	-1.576
Percent of white females, age 14 and over, in county who are employed (X_7).	-.899	.583	-.141	-1.543
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8).	-1.965	.387	-.308	-5.077*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9).	.616	.502	.077	1.227

*Significantly different from zero at the .05 level.

Table 78. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--Mountain division: 1960

Multiple Correlation Coefficient	.651*
Standard Error of Estimate	323.654
Coefficient of Multiple Determination	.424*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi- cients	Computed t Values
Constant term	8522.565	1580.610	....	5.392*
Metropolitan dominance (X_1)	-42.212	10.059	-.228	-4.197*
Percent of white male labor force who are farmers and farm managers (X_2)	1.166	.339	.181	3.443*
Percent of white male labor force who are farm laborers and foremen (X_3)	-.047	.331	-.008	-.142
Median years of school completed by white males and females, age 25 and over	-10.306	1.966	-.303	-5.241*
Median white family income (X_5)	-.078	.021	-.181	-3.638*
Median white female personal income for county (X_6)	.001	.023	.002	.032
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.583	.528	-.210	-3.000*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.046	.392	-.130	-2.667*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.019	.400	-.002	-.048

*Significantly different from zero at the .05 level.

Table 79. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--Mountain division: 1960

Multiple Correlation Coefficient	.515*
Standard Error of Estimate	402.286
Coefficient of Multiple Determination	.265*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	552.621	1675.970	....	.330
Metropolitan dominance (X_1)	-24.384	15.838	-.104	-1.540
Percent of white male labor force who are farmers and farm managers (X_2)	-.953	.237	-.278	-4.020*
Percent of white male labor force who are farm laborers and foremen (X_3)	-.160	.343	-.033	-.467
Median years of school completed by white males and females, age 25 and over (X_4)	3.514	3.057	.079	1.150
Median white family income (X_5)	.084	.042	.132	2.006*
Median white female personal income for county (X_6)	-.048	.038	-.105	-1.268
Percent of white females, age 14 and over, in county who are employed (X_7)	-1.180	.753	-.134	-1.566
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-3.072	.578	-.374	-5.317*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	-.181	.493	-.003	-.367

*Significantly different from zero at the .05 level.

Table 80. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for urban part of county--Pacific division: 1960

Multiple Correlation Coefficient	.792*
Standard Error of Estimate	114.849
Coefficient of Multiple Determination	.627*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	3590.023	1065.322	....	3.370*
Metropolitan dominance (X_1)	-8.269	1.938	-.387	-4.266*
Percent of white male labor force who are farmers and farm managers (X_2)	3.386	.838	.281	4.041*
Percent of white male labor force who are farm laborers and foremen (X_3)	-.036	.406	-.008	-.089
Median years of school completed by white males and females, age 25 and over (X_4)	-11.508	2.370	-.395	-4.856*
Median white family income (X_5)	-.001	.010	-.008	-.093
Median white female personal income for county (X_6)	-.050	.009	-.451	-5.214*
Percent of white females, age 14 and over, in county who are employed (X_7)	1.299	.468	.248	2.774*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.504	.384	-.287	-3.912*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.437	.447	.068	.978

*Significantly different from zero at the .05 level.

Table 81. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-nonfarm part of county--Pacific division: 1960

Multiple Correlation Coefficient	.757*
Standard Error of Estimate	130.719
Coefficient of Multiple Determination	.573*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coeffi-cients	Computed t Values
Constant term	6334.327	841.169	....	7.530*
Metropolitan dominance (X_1)	-4.923	2.086	-.204	-2.361*
Percent of white male labor force who are farmers and farm managers (X_2)	-.186	.491	-.028	-.378
Percent of white male labor force who are farm laborers and foremen (X_3)	.304	.202	.135	1.508
Median years of school completed by white males and females, age 25 and over (X_4)	-13.369	1.826	-.594	-7.320*
Median white family income (X_5)	-.045	.015	-.245	-2.996*
Median white female personal income for county (X_6)	-.026	.011	-.208	-2.453*
Percent of white females, age 14 and over, in county who are employed (X_7)	.967	.447	.193	2.162*
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8)	-1.394	.357	-.258	-3.900*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9)	.316	.357	.055	.886

*Significantly different from zero at the .05 level.

Table 82. Results of the analysis of factors influencing number of children ever born per 1,000 ever-married white females, age 15-44, for rural-farm part of county--Pacific division: 1960

Multiple Correlation Coefficient	.554*
Standard Error of Estimate	222.173
Coefficient of Multiple Determination	.306*

Independent Variables	Partial Regression Coefficients	Standard Deviation	Beta Coefficients	Computed t Values
Constant term	7093.373	784.185	....	9.046*
Metropolitan dominance (X_1).	-5.675	3.862	-.185	-1.469
Percent of white male labor force who are farmers and farm managers (X_2)	-.108	.237	-.047	-.456
Percent of white male labor force who are farm laborers and foremen (X_3)	.231	.300	.080	.771
Median years of school completed by white males and females, age 25 and over (X_4). .	-10.789	2.671	-.370	-4.039*
Median white family income (X_5).	-.068	.027	-.286	-2.480*
Median white female personal income for county (X_6).	-.016	.021	-.085	-.776
Percent of white females, age 14 and over, in county who are employed (X_7).	.846	.845	.109	1.001
Percent of ever-married white females, age 15-44, who are age 15-24 (X_8).	-1.625	.638	-.257	-2.547*
Percent of ever-married white females, age 15-44, who are age 25-34 (X_9).	-.204	.411	-.045	-.497

*Significantly different from zero at the .05 level.

APPENDIX B

CHECKLIST FOR SELECTING STUDIES FOR INTENSIVE REVIEW

CHECKLIST FOR SELECTING STUDIES FOR INTENSIVE REVIEW

1. Reference:____

2. Type of study:____Causal (attempts to determine factors affecting fertility)
____Descriptive (attempts to establish relationships with fertility)
____Other:

3. Source of data:___Census:
____Survey sample (size and nature of S:____________________________________)
____Other:

4. Unit of analysis:

5. What country (U.S.?) or parts of country included in study:

6. Period of time or date of study (when data originally collected):

7. The basic problem:

8. General hypothesis(es):

9. Measure(s) of fertility:

10. Independent variables (used in present thesis):

	Measure:	Relationship with Fertility
(a) Occupation:		
(b) Female Employment:		
(c) Education:		
(d) Income:		
(e) Age:		
(f) Distance:		

11. Independent variables (extraneous to present thesis):

Variable	Measure:	Relationship with Fertility:

12. Are residence categories used?
    What are the categories?

    Findings:

    Contributions to rural or urban social structure:

13. Are color categories used?
    What are the categories?

    Findings:

14. Control variables:

    How used and findings:

15. Statistical techniques:

16. Selected bibliographic references (empirical studies only):

17. Remarks, summary and/or evaluation of study, quotable quotes (give page no.):