# MIGRATION IN NONMETROPOLITAN COUNTIES: AN ECOLOGICAL APPROACH

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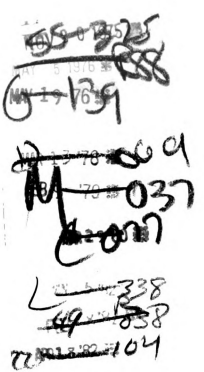

ABSTRACT

MIGRATION IN NONMETROPOLITAN COUNTIES:
AN ECOLOGICAL APPROACH

By

Carolyn Tyirin Kirk

Utilizing a modified version of Hawley's ecological model of the process of territorial versus structural differentiation, this study examined the relationship between both organization and environment as well as changes in both and the net-migration rate. Specifically, analyzing 227 nonmetropolitan counties in the North Central Division during the 1960-70 decade through various techniques of correlational analysis, the study tested the hypothesis that both posited independent components of the ecological complex and changes in each affect the net-migration rate directly with organization having a stronger effect than environment.

Simple correlational analysis revealed indicators of both organization and environment to be directly related to migration in the posited directions based on the model with the former having a greater impact than the latter independent component. Moreover, diversity of structure, either of or easily accessible to a population, was the best predictor of the net-migration rate followed by variables

measuring various aspects of manufacturing and institutional populations. Dividing the sample into a rural and an urban sub-sample showed few differences in the relative rank of the factors most highly correlated with migration.

Stepwise multiple regression results showed that organization explained over half and environment slightly under a fourth of the variance in the dependent variable. Combining both sets of independent variables and using stepwise multiple regression and partial correlational analysis revealed, however, that environment had a negligible influence on the net-migration rate. On the other hand, the partials for the most important organizational variables showed almost no change between the analysis utilizing organizational measures alone and the examination employing both sets of independent variables. Such results, coupled with a strong association between organizational diversity and environmental nearness to an SMSA, indicate a need to revise the model by positing organization to have a direct impact on net-migration and environment to have an indirect effect through its influence on organization.

Examination of measures of change also indicated that organization has a direct influence on net-migration, although the two factors most highly correlated with migration may measure components of the complex other than those for which they were designated. Thus, this analysis showed the continuing methodological problem of developing

meaningful indices that clearly stand for only one compenent of the ecological complex.

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By

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# CHAPTER I

## INTRODUCTION

Human ecology has progressed from an emphasis on community spatial and temporal relationships to a more cogently defined perspective with a major emphasis on explaining the causes and effects of organization in relationship to population, environment, and technology. The impetus for this redirection came largely from the 1950 publication of Hawley's Human Ecology: A Theory of Community Structure.[1] Although still tied to some extent to the earlier tendency of researchers to dwell primarily on the spatial and temporal aspect of local community structure, Hawley's approach marked a serious effort "to restore a conceptual continuity with plant and animal ecologies."[2] It also resulted in emphasizing a broader view of sustenance organization than had characterized the earlier empirical studies of the Chicago School.

Following this direction, ecological theorists since 1950 have developed a model consisting of four

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[1]Amos H. Hawley, Human Ecology: A Theory of Community Structure (New York, 1950).

[2]Amos H. Hawley, "Human Ecology," International Encyclopedia of the Social Sciences (New York, 1967), 319.

interacting components designated as the ecological complex.[3] The variables include population, organization, environment and technology. In this schema population refers to the demographic characteristics of a set of inhabitants in a given territory, e.g., age-sex structure and size. Furthermore, it is posited that a population's structure and size is continually moving towards a state of equilibrium in regard to the other three components while at the same time inducing further change in the other three variables. In moving toward this equilibrium, migration is the major means by which a population changes in the short run.[4] On the other hand, fertility and mortality (except under special conditions where systematic policies of fertility and/or mortality control are instituted) are long-run phenomena effecting population change.

Agreement on the conceptualization of organization is far less common than for population. Although all agree

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[3]See in particular Otis Dudley Duncan, "Human Ecology and Populations Studies," in The Study of Population, An Inventory and Appraisal, ed. by Philip M. Hauser and Otis Dudley Duncan, (Chicago, 1959), 678-716 and Otis Dudley Duncan and Leo F. Schnore, "Cultural, Behavioral, and Ecological Perspectives in the Study of Social Organization," The American Journal of Sociology, 65, (September, 1959), 132-46.

[4]Donald J. Bogue, Components of Population Change 1940-50: Estimates of Net-Migration and Natural Increase for Each Standard Metropolitan Area and State Economic Area (Oxford, 1957). Bogue finds, for example, that in the 1940-50 decade, percentage change in total population over all nonmetropolitan state economic areas correlates with net-migration at .917, p. 26.

it is a structural variable differing from what can be called economic organization in the sense of pertaining to factors amenable to cost analysis, the breadth of its definition varies substantially among theorists. Gibbs and Martin, for example, define organization narrowly in terms of sustenance. More precisely, sustenance activities are activities which provide a population with a livelihood. In their illustration of this definition, they specifically include types of economic concerns and occupations such as a large department store, a municipal power company, an independent taxi cab driven by its owner, and a housewife.[5] Likewise, Duncan and Schnore view organization "as a ramification of sustenance activities," but broadly conceived. However, they do not specify the parameters of the concept.[6] Hawley, on the other hand, initially defines the concept very broadly by stating that "ecological organization pertains to the total fabric of dependences that exist within a population."[7] Furthermore, both this earlier definition (1950) and a later discussion (1967) of the term imply that organization is similar to if not identical with social organization. Hawley does, however, note that this ecological conceptualization emphasizes functional

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[5]Jack P. Gibbs and Walter T. Martin, "Toward a Theoretical System of Human Ecology," Pacific Sociological Review, 2, (Spring, 1959), 30-3.

[6]Duncan and Schnore, 136.

[7]Hawley (1950), p. 179.

structures and excludes the normative aspects of social organization.[8] Yet, like Duncan and Schnore, he does not specify concretely what is included in ecological organization.

Similar to the broader views of organization, environment is easily defined in the abstract; the difficulty comes in defining specifically what is included under the rubric. Conceptually, environment refers to factors both within and outside a unit under study which actually influence or can potentially influence a population by aiding or impeding the utilization of resources. Moreover, it includes not only the physical environment but also other populations or the social environment. Such factors as climate and topography fall easily within the environmental category. Others, particularly those pertaining to social environment, are not easily classified. That is, an apparently infinite number of historical situations with regard to a given population's position vis-a-vis other populations complicates the cataloging of specific social environmental factors. For example, excluding the U.S.S.R. should all Eastern European nations commonly referred to as the Communist bloc be viewed as being in the same ecological position vis-a-vis the U.S.S.R. or do the various situations differ sufficiently to categorize the countries into two, three or more groups in reference to

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[8]Hawley (1967), 329-330, 337.

this particular social environmental variable, the Russian population? Until more systematic research is done in this area, it is perhaps only possible to conclude with Hawley that environment "has no fixed content and must be defined anew for each different object of investigation."[9]

Technology, the fourth component of the complex, generally means technology in use. It includes both the types and quantities of tools and techniques used in exploiting resources and their effectiveness in providing sustenance and in this manner places limits on both the quantity and the quality of resource exploitation.[10]

The basic premise of ecology is that the four components of the ecological complex are reciprocally related to each other. That is, in order to analyze any one element of the complex adequately, one has to consider the other three components of the complex. Traditionally, the major goal of human ecologists has been to explain organization in terms of the other three variables. However, a second goal, alluded to above in the discussion of population, "seeks to establish the consequences of the presence or absence of particular characteristics of sustenance organization within the ecological complex or 'ecosystem.'"[11] The traditional primacy of the first goal,

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[9]Hawley (1967), 330.

[10]Gibbs and Martin, 33; David F. Sly, "Migration and the Ecological Complex," American Sociological Review, 37 (October, 1976), 617.

[11]Gibbs and Martin, 33.

as Hawley suggests, may be due largely to the convenience in proceeding from the more operationally well-defined such as population to the less well-defined such as organization. However, as he points out in regard to population and organization, for theoretical reasons "population is for many purposes better regarded as the dependent variable, delimited and regulated by organization."[12]

Despite the formulation of a cogent set of variables, human ecology remains both an heuristic device in which the precise relationships among the components remain unknown and basically an approach to urban systems rather than to general social systems. Perhaps the major hindrance to the development of a more formal theoretical statement has been the recognition by ecologists that no one variable can stand alone but must be considered in relationship to the other three. However, to adhere to this permise in conducting research entails the delineation and measurement of four extremely inclusive variables. For example, to include population in its totality necessitates consideration of size, age-sex structure, in-, out- and net-migration, fertility, and mortality. An alternative strategy is to break down the complex as a whole and each of the four variables into smaller component parts, examine the relationships, and then put the complex together again later in a more precise theoretical formulation.

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[12]Hawley (1967), 330.

In addition to the scarcity of research explicitly examining the precise relationships among the components of the ecological model, the focus of ecologists continues to center on the city and its tributary area as the prototype of community or sustenance organization, even though this focus of early ecologists was largely fortuitous.[13] This continued emphasis may be due in part to the use of the term community with its normative connotations and equation with town or city rather than the more neutral terms organization and/or social system. Also, the availability of data provided by the U.S. Census on cities, SMA's, and later SMSA's has perhaps been instrumental in sustaining such an emphasis. Because the delineation of SMSA's includes a criterion based on sustenance dependence of the population of surrounding counties on a particular city of 50,000 or more, the problem of differentiating between the ecological unit, defined by Hawley as "that population which carries on its daily life through a given system of relationships,"[14] and a governmental unit for which data are available is resolved to some extent. Such a focus has resulted in a tendency to view social systems as central place systems without recognizing the ecological "situation" of nonmetropolitan populations other than in relationship to the nearest city. The ecological perspective itself, however, does not necessitate such an emphasis.

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[13]Hawley (1967), 331.

[14]Ibid., 33.

Although little research exists testing explicitly the relationships among the four ecological components in nonmetropolitan areas *per se*, demographers have put forth a number of generalizations concerning population and sustenance organization in these areas.[15] In general, loss of population has been attributed to the increasing mechanization of agriculture and the accompanying decline of agricultural employment coupled with the inability of nonmetropolitan areas to provide facilities attractive to nonagricultural economic concerns. Such circumstances have caused the young and educated to migrate out of rural areas. This in turn has produced an age structure which led to approximately 345 nonmetropolitan counties experiencing more deaths than births in 1967. On the other hand, some nonmetropolitan areas have reversed this trend and are both growing in population and attracting more migrants than they are losing. These developments have been attributed to the ability of the population of such areas to diversify by becoming commuter towns, retirement communities, college or university towns, or by developing specialized shopping facilities. In other cases, the existence of an interstate highway seems to explain the divergence from the

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[15]Two sources providing excellent summaries of these generalizations are U.S. Department of Agriculture, Economic Research Service, Economic Development Division, *The Economic and Social Condition of Rural America in the 1970's*, (Washington, 1971), Ch. I; and the Commission on Population Growth and the American Future, *Population and the American Future* (New York, 1972), 30-33.

general pattern of population loss for both counties and towns. Excluding the effects of age-structure, a population variable, these generalizations suggest that both organization and environment are important determinants of population change. Specifically, the ability of a population to reorganize its sustenance organization as agricultural employment declines and the existence of environmental factors whether natural such as climatic factors amenable to retirement centers or manmade such as interstates help to explain different rates of population change and migration in these areas.

These demographic generalizations indicate that the ecological complex may be able to provide a framework for explaining more fully differential migration rates in nonmetropolitan areas. In addition, these findings as well as the results of other specific studies discussed below indicate that the study of nonmetropolitan areas can serve to test explicitly the relationships posited within the ecological complex in order to develop that useful heuristic device into a more precise model.

## PURPOSE OF THE STUDY

The purpose of this study is to test the relationship between net-migration and both sustenance organization and environment in nonmetropolitan counties in the North Central Region during the 1960-70 decade. The analysis will focus on several variables that have been measured in various

ways in studies utilizing nonmetropolitan counties, towns, and State Economic Areas over several time periods. Other factors which have been hypothesized as being of increasing importance in explaining net-migration and can serve as indices of organization, environment, and changes in each will also be included. Furthermore, although employment figures are the basis of several measures, the study also incorporates several measures not based on employment in determining manufacturing and agricultural specialization and in dealing with recreation and governmental expenditures.

Testing these variables systematically over one decade will help to clarify the importance of each variable relative to other factors used as indicators of components of the ecological complex. In turn, this will enhance our understanding of why some nonmetropolitan counties are attracting migrants while the vast majority are continuing to lose population through net-migration. Moreover, the results of such a study will contribute to defining more precisely how two components of the ecological complex affect one means through which population size changes.

## THEORY AND LITERATURE

From a theoretical standpoint, the relationship between migration and environmental resources is simply the question of how large a population can the existing environment sustain. If the population is too large for available resources, then the population contracts through

migration, decreased fertility, and increased mortality. As pointed out earlier, however, out-migration is more effective than either fertility or mortality in altering population size in the short run. On the other hand, where the environment can support a larger population than it is sustaining, the population will tend to increase through the acquisition of individuals migrating from areas unable to support their populations.

The relationship between environment and migration, however, is more complex when other factors are considered. Hawley has developed a model of this relationship that also incorporates organization. According to his model, the organizational process can be viewed in four stages beginning with the competition of individuals or other units with similar demands on a scarce resource supply so that what one competitor gets necessarily decreases accordingly the amount others can obtain. In the second stage both the singularity of the supply and environmental factors impose standard competitive conditions which lead to increasing homogeneity among the competitors while in the third stage congestion operates to eliminate the weakest competitors. Finally, in the fourth stage either territorial or structural differentiation (or a combination of the two) appears with migration providing the mechanism leading to the former rather than the latter.[16] That is, at the point at which some members win and others lose in the competition over

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[16]Hawley (1950), pp. 201-3.

scarce (valuable) resources, the "deposed competitors" have the option of either migrating into new territories leading to territorial differentiation or remaining and developing new skills in order to make oblique attacks on the scarce resource supply leading to greater structural differentiation. In addition, Hawley posits that the characteristics of both the population and the environment in which individuals compete have a direct although secondary influence of their own in determining which differentiating process will predominate. On the other hand, technology is considered only indirectly when he discusses the development of new skills by individuals. Thus, in this model the resolution of competition is the primary causal factor producing either structural or territorial differentiation while environmental and population characteristics have secondary influences.[17]

As stated, the model offers little theoretical insight into how organization and migration are directly related. This may be because it starts at a point at which either a new resource is discovered that totally dismantles the existing sustenance structure or an undifferentiated population enters a territory in order to exploit it for

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[17]Both Jane Jacobs, The Death and Life of Great American Cities, (New York, 1961), ch. 13; and Harriet and Terry King, "New Town, Mon Amour," The Chicagoan, November, 1973, 78-83, provide illustrations of this process in Greenwich Village, New York, and in Chicago entertainment areas respectively although both works emphasize the possible destructive elements of the process to a community rather than the ecological processes involved.

the first time. In an ongoing system, however, competition occurs within the context of an existing structure.

Hawley does suggest implicitly, however, that organization has a direct effect on migration. That is, the resolution of competition implies that at least a crude form of organization exists at this point with the population divided into two parts, successful and unsuccessful sustenance-getters. Within the context of an existing structure, moreover, it seems plausible to modify the model by proposing that if the new resource competition involves diversification of organization, more members of the population can gain sufficient sustenance than in a situation where those receiving sufficient sustenance increase their sustenance level while members receiving little or no livelihood before remain in that position. The research cited earlier on population change and migration in nonmetroplitan areas, moreover, supports the proposition that a more diversified sustenance organization can support a larger population in a given territory than can a highly specialized structure.

This relationship can perhaps be better stated through an illustration involving specific territorial units. If a state, for example, is divided into specialized units such as counties with each county specializing in a different activity and consequentially each county being structurally undifferentiated, then persons in any given county not possessing skills for that county's specialty

will either have to develop such skills or migrate elsewhere. The model further suggests that migration will be greater in this situation than in the opposite polar case where all activities are evenly distributed throughout all the counties, i.e., structural differentiation is equal among all counties. This is because in the territorially differentiated state, persons will be more likely not to reside initially in a county in which they can utilize their skills whereas in an undifferentiated state where all sustenance activities are equally distributed, i.e., each county population is maximally differentiated structurally within the limits of the state structure, everybody will reside initially at a point where he can potentially utilize his skills in attacking the resouce supply. Furthermore, assuming an equal level of resources, this also implies that in a situation in which different types of territorial units exist, some structurally differentiated and some structurally undifferentiated, those that are undifferentiated will lose people through migration and those that are structurally differentiated will gain population through migration since the latter have a wider range of sustenance niches available and hence can both attract and retain a wider range of skills.

This study focusses on defining more precisely the causal relationships that Hawley's modified migration model posits between organization and environment on one hand and migration on the other. Specifically, it is hypothesized

that the greater the organizational diversification and the higher the level of environmental resources, the more positive will be the net-migration rate. Moreover, it is posited that the influence of organization will be stronger than that of environment.

The study also examines the relationship between change in the two independent variables and migration. Hawley neither specifies nor implies how changes in these two components of the ecological complex relate to population change through migration. Given the suggested relationships between environment and organization at one point in time followed by migration, however, it is plausible to assume that changes in these two variables will relate to net-migration in similar ways. Thus, it is hypothesized that the greater the changes in organization indicating diversification and secondarily the greater the changes in environment indicating increasing resource availability to more members of a population, the more positive the net-migration rate will be.

Both ecologists and demographers have taken some steps toward examining the relationships among the components of the ecological complex in nonmetropolitan areas although only a few have tested these relationships explicitly. Among these studies are several utilizing employment figures which support evidence presented earlier that the major cause of differential migration rates among rural areas is related directly to both the

decrease of opportunities in farming and the ability of populations to diversify away from agriculture.[18] Furthermore, they suggest that diversification involving the acquisition of manufacturing concerns is an important factor in explaining net-migration differentials. In general, these studies taken together indicate that a nonmetropolitan area that continues to rely heavily only on agriculture and fails to augment this with manufacturing may be regarded as a structurally undifferentiated area with a strong negative net-migration rate. Conversely, an agricultural population that includes some manufacturing and is increasingly developing a more differentiated structure through the acquisition of manufacturing concerns within its sustenance structure loses less and/or gains population through net-migration. On the other hand, only one of three studies that also test standard of living indicates that this factor plays a part in explaining net-migration.

Specifically, Bogue's study of correlates of net-migration in nonmetropolitan economic regions from 1940 to 1950 indicates that net-migration correlates positively with size of manufacturing labor force and negatively with size of agricultural labor force in 1950. In addition, he

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[18]Although a population in a given territory may be undifferentiated structurally in regard to any sustenance activity, nonmetropolitan populations in the United States tend to be involved in primary or extractive sustenance activities, particularly agriculture. The degree to which the sample utilized in this study conforms to this pattern will be discussed in Chapter II. Also see Otis Dudley Duncan and Albert J. Reiss, Jr., Social Characteristics of Urban and Rural Communities, 1950 (New York, 1956), p. 215.

finds that the farm operator level-of-living index for 1945 correlates positively with net-migration. It should be noted, however, that unless one assumes that the size of both the agricultural and manufacturing labor forces remained in relative proportion to each other, Bogue may be measuring the organizational result of migration rather than its cause; that is, the 1950 labor force size followed the 1940-50 period in which migration is measured. Thus, care must be taken in imputing causality. Furthermore, it should also be noted that all three correlations vary from moderate to strong within different regions although the direction of all relationships are comparable between areas.[19]

Levitan and Houghteling's study of the slower growth rate of Missouri compared with the nation as a whole suggests an explanation for Bogue's negative correlation between net-migration and agricultural employment. They find that the best explanation for this phenomenon rests on the agricultural nature of the state. That is, slower growth is due to the exodus of farmers primarily caused by increased farm productivity, consolidation of farms, and a corresponding higher birth rate in rural areas which has forced migration of "excess" farmers and/or farmers' children to urban areas in search of employment both within and outside the state.[20]

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[19]Bogue, pp. 26-27.

[20]Sar A. Levitan and Louis D. Houghteling, Factors Affecting the Slower Growth of Missouri Population Compared with the United States, rev. ed., (Washington, 1961).

Two other studies add additional support to the findings concerning employment but reveal that standard of living may not be as strongly associated with net-migration as Bogue's results denote. In a study of migration utilizing State Economic Areas in West Virginia, Rutman's results indicate that population inflows are dependent on economic opportunities available in general in the area of destination in the 1950s. However, he finds no statistically significant relationship between migration and any of five indicators of well-being based on percentage above or below various income levels.[21]

Beegle, Marshall, and Rice have categorized non-metropolitan counties in the North Central Region and Kentucky on the basis of three variables, in- or out-migration, high or low manufacturing, and high or low standard of living based on the farm operator level-of-living index over the 1940-50 and 1950-60 decades. On this basis they find three prevailing patterns. The first includes counties characterized by in-migration, high standard of living and high proportions in manufacturing; the other two patterns represent counties with out-migration, low proportions in manufacturing, and either high or low farm operator level of living. This suggests that a strong and positive association exists between net-migration and manufacturing employment, although as in the Bogue study

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[21]Gilbert L. Rutman, "Migration and Economic Opportunities in West Virginia: A Statistical Analysis," Rural Sociology, 35 (June, 1970), 206-17.

manufacturing percentages are based on end-of-decade data. On the other hand, the results also suggest that the well-being of an agricultural population has little influence on migration. Because this study also includes the 1950s while Bogue's encompasses only the 1940s, the discrepancy in results may be due to the use of several factors in the farm level-of-living index which may no longer be useful measures of well-being. That is, in 1959 the index included percentage of farms with telephones, with freezers, and with automobiles in addition to two items dealing with average value of land and buildings and average value of sales.[22]

Comparing the variables used in these four studies with reference to the ecological model, Rutman deals primarily with measures of sustenance level. On the other hand, Bogue and Beegle, et.al., have added indices of organizational diversity or specialization based on percentage employed in manufacturing and/or agriculture while Levitan and Houghteling are only concerned with diversity and specialization. Furthermore, although various functional classifications of cities or central places have been devised that consider the entire occupational structure, the vast majority of studies of

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[22]Allan Beegle, Douglas Marshall, Rodger Rice, "Selected Factors Related to County Migration Patterns in the North Central States 1940-50 and 1950-60," Michigan State University Agricultural Experiment Station Quarterly Bulletin, 46 (November, 1963), 1-40.

nonmetropolitan migration, like the above studies, incorporate unidimensional indices of organization.[23]

There are two exceptions to this generalization. Both Groth and Sly explicitly utilize measures of organization embracing the entire occupational structure in migration studies based on county units of analysis. Groth has developed a functional classification in which those counties ranking in the top ten per cent in employment in any one of six industry groups or having over ten per cent employed in any one of three other "low employment" categories are designated as functionally specialized. He has further dichotomized functional types into rural or urban counties based on population size, nonagricultural labor force size, or per cent commuting to urban centers and has compared the resulting types with net-migration rates 1960-70 in counties throughout the 48 contiguous States. In comparing rural and urban subtypes where greater out-migration than in-migration occurs, the loss is more severe for rural subtypes; in other cases, controlling for functional type reveals that rural subtypes show a net loss while their urban counterparts show a net gain. Finally, his results

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[23]For discussions and critiques of several of these schema see Ralph Thomlinson, Urban Structure: The Social and Spatial Character of Cities (New York, 1969), 66-8; Albert J. Reiss, Jr., "Functional Specialization of Cities," Cities and Society: The Revised Reader in Urban Sociology, ed. by Paul K. Hatt and Albert J. Reiss, Jr. (New York, 1957), 555-75; Otis Dudley Duncan, et. al., Metropolis and Region (Baltimore, 1960); Philip G. Groth, "Functional Classifications of Counties: Some Applications," Department of Rural Sociology, University of Wisconsin, Madison, May 26, 1972, 1-3.

show less variation in net-migration in rural subtypes than in similar urban counties. He concludes from this that "rurality per se exerts a stronger influence on net-migration than does functional specialization."[24]

Sly, in an explicit test of the relative importance of the three nonpopulation components of the ecological complex in relation to migration, finds that both occupational diversification and agricultural stability directly affect the out-migration rate of the black male population of Cotton Belt counties over the 1940-50 and 1950-60 decades. The first of the two measures, the index of occupational dispersion, is based on the difference between actual percentage of blacks in each occupational category and the expected percentage assuming all workers have equal access to all occupations and hence would be equally distributed among all categories. The stability of the agricultural structure over a decade is measured through the development of a weighted index based on four agricultural occupations in which the least stable occupation is weighted most heavily and the most stable is weighted least. On the basis of the ecological model, Sly hypothesizes that the higher the former index indicating greater diversity the lower the out-migration rate will be whereas the higher the latter measure indicating greater occupational instability the greater the out-migration rate will be.[25]

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[24]Groth, 22.

[25]Sly, passim.

His results confirm the model with the index of occupational dispersion correlating more strongly than the agricultural index over both decades. Furthermore, path analysis indicates that in general both organizational factors have a direct relationship with migration while technological and environmental factors affect migration only indirectly through organization. There are two exceptions to this. The first is a technological variable, gas consumption, which ranks between the two organizational indices in the 1940s in direct influence, and the second is white-nonwhite acreage ratio, an environmental factor, which is the most important direct influence on migration in the 1950s.

Sly's results also reveal that the relationship between both organizational indices and migration are weaker in the 1950s than in the previous decade. He suggests that the lessening influence of organization could be due to the effectiveness of migration in the 1940s or to greater discontent unrelated to the ecosystem among Southern blacks in the 1950s. Thirdly, given the predominance of the acreage ratio variable in the latter decade, Sly suggests that possibly the 1950s witnessed a reorganization of agriculture within these counties accompanied by a lack of opportunity for blacks outside of this sector.

It is difficult both to compare and to reconcile the findings of the Groth and Sly studies unless one

concludes that organization is simply decreasing in influence on migration and hence population change. However, the noncomparability of the populations under study (total versus black male residents of county) as well as Sly's third possible explanation for apparent declining organizational influence cautions against this. Furthermore, it is not known how dispersed the Cotton Belt counties would be throughout the Groth classification. If the Cotton Belt counties fall into different functional categories based on Groth's schema, it would suggest that the organizational index used determines to some extent the relationship found between organization and migration. On the other hand, if the southern counties are all specialized in one of Groth's categories, it would suggest that Sly's two indices, and in particular his index of occupational dispersion, which is meant to measure the same dimension as Groth's index, may in fact measure a different dimension of organization. Groth acknowledges that it is only through the exploration of alternative modes of classification that it can be discovered which is the most fruitful measure of sustenance organization.[26] The results of these two studies indicate that it is also only through the exploration of alternative modes of classification that the precise effects of sustenance organization on migration can be determined.

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[26]Groth, 19.

In addition to research based on occupational indices, several ecological studies of nonmetropolitan areas utilize other indicators of structural diversity. A major focus of these studies is urban size as either cause or effect of population change or migration. As Lampard points out, urbanization can be regarded as the movement of people out of agricultural and into non-agricultural occupational pursuits and generally larger communities; moreover, this perspective "gives primary recognition to the differential ordering of occupations or industries within a given territorial space."[27] Moreover, economic geographers have long noted a relationship between size of urban place and function with larger places providing more specialized services than smaller places.[28] From an ecological standpoint, it follows that because larger urban places provide more services they also provide a wider variety of occupational niches. Thus, degree of urbanization and in particular size of largest urban place can serve as a measure of occupational diversity.

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[27]Eric E. Lampard, "Historical Aspects of Urbanization," The Study of Urbanization, ed. by Philip M. Hauser and Leo F. Schnore (New York, 1965), 520.

[28]See in particular Brian J. L. Berry and Allen Pred, Central Place Studies: A Bibliography of Theory and Applications (Philadelphia, 1965); and Allen K. Philbrick, "Principles of Areal Functional Organization in Regional Human Geography," Economic Geography, 33 (October, 1957) 299-336.

Two of the studies dealing with urban places also incorporate other measures of structural diversity relating to the existence of college, military, and/or other institutional facilities which can be viewed in two ways in reference to migration. The existence of these institutions draws migrants into an area while from an ecological perspective they are also indices of structural diversity. That is, they provide additional occupational niches for the population both within the facilities themselves as well as in supporting services that may arise due to their location in a particular area, e.g., restaurants to accommodate visitors to those within these three types of facilities.

In an examination of nonmetropolitan counties between 1960 and 1970 utilizing five organizational and one environmental variable, Irwin finds that all measures correlate positively with change in population size with existence of a college being the most important factor (r=.209). However, all correlations are low and the multiple correlation coefficient for all six variables is only .3087. The other four organizational variables include military, large city, small city, and institution with all variables set up as binary variables, i.e., existence or absence based upon various size criteria. However, the study deals with population change rather than migration. More importantly, as Irwin suggests, the use of continuous variables might yield somewhat different results

than his binary variables and might clarify those relationships he has found. For example, it seems likely that a college of 1,000 students would generate fewer supporting services both in terms of variety and quantity than would a university of 40,000 students.[29]

In addition to the five organizational factors, Irwin's results show that the existence of a freeway, an environmental factor, is the second most important variable explaining population change during the decade (r=.199). There are a number of possible explanations for this phenomenon. Such access may induce manufacturing concerns to locate near such interchanges, lead to the creation of subsidiary road services for travelers, and/or signify access to SMSA's or at least to a larger territory, all of which would presumably promote greater structural differentiation. Thus, this result in addition to Sly's finding that the strongest direct influence on migration in the 1950s was an environmental factor which may be linked to organizational changes suggests that the relationship between environment and migration needs to be explored more thoroughly relative to organization.

In a study of in-migration (rather than net-migration) focussing on nonmetropolitan urban places, Zuiches finds that both college and military activity

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[29]Richard Irwin, "Nonmetropolitan Population Change: 1960-70," paper prepared for presentation at the annual meeting of the Population Association of America, Washington, D.C., April 23, 1971.

are important explanatory factors, the former to intrastate and the latter to interstate in-migration to urban places. His analysis also indicates that those places farthest from metropolitan complexes are experiencing higher levels of in-migration than other urban places controlling for all other variables. He concludes that these results suggest that the remote urban places may act as central places in their own right in dominating a rural hinterland.[30]

Zuiches' explanation of the relationship between remoteness and population has also been examined by Burford, Lemon, and Fuguitt. Before discussing these studies, however, it should be noted that the concept of central place has two implications pertaining to population. The first is that the more important the place is as a center the larger it will be. Secondly, a central place will be more diversified occupationally due to the greater variety of services it performs for its hinterland than will be a noncentral place of similar size at a given point in time. Thus, if the ecological model is valid, this diversity should induce greater growth through migration to the central place than to the comparable noncentral place town.

Testing the relationship between county level net-migration to urban centers and a remoteness index based

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[30]James J. Zuiches, "In-Migration and Growth of Nonmetropolitan Urban Places," Rural Sociology, 35 (September, 1970), 410-20.

in part on cities with a population as low as 10,000 for the 1930-40 decade, Burford obtains a small but significant parabolic correlation indicating that net-migration is lowest in those areas both closest to and farthest from large cities. In an analysis of the results, he suggests that in those areas closest to cities, members can migrate occupationally without necessarily migrating spatially. Also, the tendency for places farthest from cities to have lower net-migration rates than intermediate counties can be attributed to a remoteness so great from large centers that both in- and out-migration between the area and large centers is discouraged. These results tend to confirm partially Zuiches' suggested explanation of remoteness. That is, Burford's findings suggest that isolation promotes the fuller development of urban places remote from cities as regional centers with greater differentiation than urban places located in intermediate counties.[31]

Lemon's study of urbanization in southeastern Pennsylvania in the eighteenth century indicates that population size and central place functions are directly related to each other and to remoteness from already existing central places. Through classifying towns by size and function and comparing the actual distribution of towns with that theoretically expected utilizing central place theory, Lemon concludes that the "strong" fourth order

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[31]Roger L. Burford, "An Index of Distance as Related to Internal Migration," Southern Economic Journal, 29 (October, 1962), 77-81.

county seats in the backcountry which functioned as commercial centers as well as political centers prevented the expansion of other places. Similarly, the primacy of Philadelphia prevented the growth of county seats near it to fourth order central places as in the backcountry and in general inhibited town growth in places within a 30-mile radius of this fifth order metropolis.[32]

In a study exploring the relationship between county seat status and growth Fuguitt suggests that although federal and State governments have a greater influence on local affairs today, it has been done generally through the county,"so that county governmental functions have been strengthened and augmented."[33] In organizational terms this strengthening and augmenting of functions also suggests an increase and diversification of job opportunities and hence occupational niches within the structure. In a test of the relationship between county seat status and population growth or decline in the North Central Region plus New Jersey, New York, and Pennsylvania, he finds that such status is positively related to growth of towns in counties more than fifty miles from SMSA Central Cities.

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[32]James T. Lemon, "Urbanization and the Development of Eighteenth-Century Southeastern Pennsylvania and Adjacent Delaware," The William and Mary Quarterly, 3d. Ser., XXIV (October, 1967), 502-33.

[33]Glenn V. Fuguitt, "County Seat Status as a Factor in Small Town Growth and Decline," Social Forces, 44 (December, 1965), 246.

Although the studies discussed in this survey vary as to both the mechanism of population size change considered and the unit of analysis employed, several conclusions can be drawn. In regard to environment, three of the studies indicate that there is a relationship between environment and population other than the effect of remoteness from metropolises leading to diversification. Specifically, environmental expansion (interstates) is associated with population expansion while environmental restriction (white-nonwhite acreage ratio) correlates with population decline through migration. In addition, Fuguitt's results comparing towns with and without county seat status suggest that another environmental factor, the impact of differential outside influences from other governmental units on counties, needs to be explored further.

Utilizing different measures of structural diversity, these studies also indicate that, despite Groth's conclusion regarding the importance of rurality, counties more remote from cities or SMSA's may possess towns that serve as regional centers and consequently either retain more of their populations and/or attract more migrants than less remote towns. Furthermore, both empirical research and theoretical work by economic geographers and ecologists suggest that the size of urban places is related directly and positively to diversity of function and hence organizational diversification. Finally, all of these studies

reveal that structural diversification away from agriculture in nonmetropolitan areas is positively correlated with both migration and population change.

# CHAPTER II

# METHODOLOGY

Employing ecological theory, this study will examine the relationship between both organization and environment and the net-migration rate. More specifically, various methods of correlational analysis will be used in order to measure the effects of specific variables (serving as indicators of organization and environment) in explaining differential migration rates in nonmetropolitan counties. Moreover, the study will also focus on exploring the relationships among various indices of organization and environment that have been either explicitly or implicitly suggested to be important factors contributing to the net-migration rate.

## Unit of Analysis

The study includes 227 counties, a one-quarter sample of all nonmetropolitan counties in the North Central Division as of 1970. Although a particular governmental unit such as a county does not necessarily constitute an ecological unit from an organizational standpoint, two methodological considerations favor the use of governmental units. As Gibbs and Martin point out, of major importance

is the availability of data which is generally compiled by governmental units.[1] Furthermore, the use of such territories allows for easy comparability over time. That is, the use of ecological units such as communities would entail redefining population boundaries as neighboring populations become integrated into one structure or part of a population appears to break off into a new sustenance structure. The use of governmental units with relatively stable boundaries avoids this problem.

In addition, research indicates that the county unit is not only a methodological convenience but also serves as a basis for ecological organization. Fuguitt has noted the strengthening of county level government as a liason between federal and State agencies and the local population. Brown, in an analysis of the political areal-functional hierarchy in Minnesota also indicates two sub-functions of counties themselves that affect sustenance structure directly. The collection and disbursement of tax money, he notes, can affect industry location, and the county's power to create or dissolve school districts can affect the sustenance structure in terms of both occupational niches and the training of prospective labor force entrants.[2]

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[1]Gibbs and Martin, 32.

[2]Fuguitt, p. 246; and Robert Harold Brown, Political Areal Functional Organization: with special reference to St. Cloud, Minnesota (Chicago, 1957), p. 110.

Lyford's study of Vandalia, Illinois, supports even more strongly the idea that counties serve as ecological units as well as political units. Specifically, he maintains that there are strong ties between the town and farmers in the rest of Fayette county. Regarding the farmer's decline, he asserts that "Vandalia would suffer without its factories--their loss would be a fearful blow to the town's hopes for the future--but it could not survive without its farmers. As Dr. Josh Weiner puts it, 'the job of people in town is to supply the farmer all the services he needs.'"[3] This suggests that there are strong sustenance ties between rural towns and the surrounding farm population beyond the political ties of county government.

## Description of the Sample

Demographically, the 227 counties include 179 with negative net-migration rates in the 1960s, 46 with positive net-migration rates, and two that neither gained nor lost population through net-migration during the decade. Comparing counties over a two decade period indicates that 171 have followed the traditional pattern of losses through net-migration in both decades; furthermore, for 55 of these counties the percentage of negative net-migration increased in the latter decade. On the other hand, 12 counties gained through net-migration in both decades, 34 switched for losing

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[3]Joseph P. Lyford, The Talk in Vandalia: The Life of an American Town (New York 1965), p. 12.

to gaining counties, and eight recorded negative net-migration rates after gaining in the 1950s. Finally, the two counties that neither gained nor lost population in the 1960s through migration had negative net-migration rates the previous decade.

Occupationally, the sample reflects the traditional agricultural nature of the rural United States based on a 14 industry classification of occupations. Specifically, agriculture ranked first in number employed in 165 counties in 1960 while retailing ranked first in 26 counties, durable manufacturing in 22, nondurable manufacturing in seven, professional services in four, mining in two and contruction in one. Transportation and communication, wholesale trade, finance and insurance, business and repair services, personal services, entertainment, and public administration did not predominate in any counties. Agriculture dominated even more in 1950 ranking first in employment in 202 counties; durable manufacturing ranked first in ten counties, retailing in eight, nondurable manufacturing in four, mining in two and transportation and communication in one.

A comparison of the percentage of agricultural employees in each county to that expected if all industries of occupation were distributed evenly throughout the United States further indicates that agriculture predominates. Using this measure, 220 counties in both 1950 and 1960 had more than the expected number of workers employed in agriculture; moreover, in both decades workers in two of the seven remaining counties were principally engaged in mining.

Thus, as measured by these indicators, the sample has been primarily agricultural in nature although by 1960 27.3 per cent of the counties had diversified to the extent that agriculture did not rank first in primary industry of employment.

Dependent Variable

The dependent variable in this study is the net-migration rate computed using the residual method:

$$NM = \frac{P_2 - P_1 + B - D}{P_1}$$

Rates rather than absolute numbers are used in computing net-migration as well as the majority of independent variables because of the vast differences in size of the base population among counties. For example, it would be impossible for Arthur County, Nebraska, with 680 inhabitants in 1960 to lose the 6,000 residents that Kankakee County, Illinois, lost through net-migration during the decade. If all variables were based on employment, these differences would in effect be accounted for in the statistical analysis since both net-migration and all independent variables would reflect the limitations of various population sizes in the counties. However, the inclusion of several non-population based variables necessitates that rates rather than absolute numbers be utilized in order to establish a meaningful basis for comparison.

## Independent Variables

The study utilizes eighteen measures of organization, nine measures of changing organization, six environmental variables and one variable measuring environmental change. Each variable is stated below (the title in parentheses is how it will appear in tables) along with comments explaining either the measure itself and/or its relevance to the study. Unless stated otherwise, it is predicted that each variable will correlate positively with net-migration. All predicted directions of association are based on what should occur if the ecological model is valid.

## Measures of Organization

Because of the predominance of agriculture in 1960 as well as historically as indicated by 1950 data, all structural measures pertaining to nonagricultural sustenance are assumed to be indicators of diversity. For example, a high percentage employed in manufacturing is assumed to be an indication of greater structural diversity than a low percentage similarly employed.

In addition, although it seems reasonable to assert causation between independent variables measured in 1960 and the 1960-70 net-migration rate, caution must be exerted in inferring causal relationships between mid-decade measures and migration. However, because each variable is measured for all counties at the same point in time, the data are consistent among counties. Thus, relationships found

between these factors and net-migration can suggest further areas of research in order to find more accurate measures to clarify ecological relationships.

The specific variables which measure diversification, size, or sustenance level and opportunity are as follows:

1. Percentage employed in manufacturing, 1960 (Manufacturing Employment).

2. Degree of diversity, 1960 (Diversity). This variable is measured by subtracting the Index of Dissimilarity from one. The Index of Dissimilarity utilizes the U.S. labor force structure categorized into the 14 industries employed earlier in this chapter to determine primary industry of occupation. The index figure is the percentage of workers who would have to transfer to other industry groups for the county structure to duplicate the national structure. It is determined by subtracting actual number of workers in a category from expected number based on the U.S. structure, summing all positive differences, and then dividing by the total number of labor force participants in the county.[4] The result measures specialization, while subtracting the index figure from one indicates the extent of diversification of the structure within the limits imposed by the national structure. For example, if a country had an occupational profile such that 50 per cent of the workers were engaged in agriculture and 50 per

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[4]Duncan, et. al., Metropolis and Region, 209-11.

cent in retail trade and a particular county's profile was 60-40 per cent respectively, 10 per cent of the county's workers would have to switch occupations to duplicate the national structure (Index of Dissimilarity) while 90 per cent could remain in their present occupational niches (degree of diversity).

3. Number of categories (21 possible types of manufacturing production) in which at least one manufacturing concern exists, 1967 (Manufacturing Categories).
This is a crude measure of diversity within the manufacturing sector.

4. Number of manufacturing firms with at least 20 employees, 1967 (Manufacturing Firms).
This variable serves as an indicator of both size of the manufacturing sector and diversity within it in terms of number of facilities which can possibly offer employment.

5. Percentage of farm operator family income from other employment, 1964 (Other Farm Income).
A negative association has been posited for this analysis, although until it is tested the ecological model offers arguments for correlation in either direction. The ability to find work off the farm indicates structural differentiation within a given territory. However, the low sustenance level of farming in an area as indicated by the fact that the farm operator's family needs other sources of income and yet does not quit farming suggests that structural differentiation is not great enough to induce an occupational

change although farming does not provide enough sustenance for the family. Thus, a multiple income circumstance is merely a step between full-time farm operator and migration.

6. Number of categories (eight possible types of agricultural production) in which at least one farm exists, 1964 (Farm Categories).

This is a crude measure of diversity of farm land use indicating differentiation within the agricultural sector.

7. Unemployment rate, 1960 (Unemployment).

This indicates the proportion of the potential labor force that cannot find employment and should correlate negatively with net-migration.

8. Female participation rate in the labor force, 1960 (Female Participation).

A high female participation rate suggests the existence of a more diversified structure in which a greater variety of skills can be utilized.

9. Percentage of families with median income under $3,000, 1960 (Income Under $3,000).

10. Percentage of public relief recipients, 1964.

Both this variable and the previous one should be negatively correlated with net-migration. They are both indicators of the sustenance structure's inability to accommodate the population sufficiently.

11. Percentage employed in public administration and education, 1960 (Public Administration).

Both this and the following variable test the effects of the increasing role of governments as employers.

12. Percentage full-time equivalent employees in local government, 1967 (Local Government Employment).

13. Number of hotels, tourist courts, motels, trailer parks, camps, 1966 (Hotels).

14. Number of amusement and recreation services excluding bowling alleys, billiard halls, movie theaters, 1966 (Amusement Places).

Both numbers 13 and 14 are indirect indices of the extent to which a county serves as a resort or recreation area and thus reflects employment opportunities in tourist-related businesses.

15. Percentage college poppulation, 1960 (College).

16. Percentage male military population, 1960 (Military).

17. Percentage institutionalized population, 1960 (Institutionalized).

Variables 15, 16 and 17 measure the impact of various institutionalized populations which have been posited as being positively correlated with the net-migration rate.

18. Largest urban place, 1960 (Largest Town).

Size of the largest urban place is used as a measure of diversification. As discussed in the previous chapter, the positive correlation between size of place and diversity of function implies a wider variety of occupational niches leading to a more positive net-migration rate for those counties with the more populous largest urban places. Within this sample there are four

cases in which the largest urban place has a population that resides in two counties; in such instances only that part of the population residing in the sample county is included.

Measures of Organizational Change

With one exception, these variables designate changes in various measures listed under organization. The nine variables are as follows:

1. Change in percentage employed in manufacturing, 1960-70 (Change in Manufacturing Employment).

2. Change in land use, 1959-69 (Change in Land Use). This is a binary variable indicating whether or not the major type of farm activity remains constant from the beginning to the end of the decade. Changing land use may mean a change in skills needed which may in turn reflect itself in the net-migration rate; that is, new farm operators will migrate into an area while former farm operators will be more likely to look for new local jobs before migrating.[5] The major problem in testing this relationship is that the 1959 data are for all farms and those for 1969 are only for farms with sales of $2,500 or more. This means that

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[5]The results of studies by Isbell and by Bright and Thomas suggest that individuals will migrate the least distance possible in search of employment. See Eleanor Collins Isbell, "Internal Migration in Sweden and Intervening Opportunities," American Sociological Review, 9 (December, 1944), 627-39; and Margaret L. Bright and Dorothy S. Thomas, "Interstate Migration and Intervening Opportunities," American Sociological Review, 6 (December, 1941), 773-83.

one must assume that smaller and part-time farms fall into each category in similar proportion to larger farms.

3. Change in unemployment rate, 1960-70 (Change in Unemployment).

Similar to the reasoning for the unemployment rate in 1960, this variable should correlate negatively with net-migration.

4. Change in female participation rate, 1960-70 (Change in Female Participation).

The rationale for the posited positive correlation between this variable and the net-migration rate as well as for the remaining measures of organizational change and the dependent variable corresponds to that given for each comparable static measure of organization in the previous section.

5. Change in percentage employed in public administration and education, 1960-70 (Change in Public Administration).

6. Change in percentage college population, 1960-70 (Change in College).

7. Change in percentage male military population, 1960-70 (Change in Military).

8. Change in percentage institutionalized population, 1960-70 (Change in Institutionalized).

9. Change in percentage of population in largest urban place, 1960-70 (Change in Largest Town).

In five instances the largest place in 1960 did not remain the largest place in 1970. Because the focus of this study is the relationship between size of urban place as an index

of diversification and net-migration rather than on urban place per se, the percentage change is computed using one place in 1960 and the other in 1970.

Measures of Environment

Five of the six environmental variables are indicators of resources related to access either to employment or to aid which may affect the sustenance level of a population. The sixth variable, interstates, as noted in the discussion of Irwin's study, can be viewed as an environmental factor which has implications for both local structural change and access to cities or larger organizational complexes. Finally, none of the variables is based on data for 1960 which mitigates against inferring causality. However, in several cases it seems reasonable to posit net-migration as the dependent variables despite time of measurement. The reasons for this are discussed under the specific variables. The six environmental variables are as follows:

1. Amount of federal funds spent per capita in fiscal 1970 (Federal Outlays).

This variable as well as the two that follow pertain specifically to the outside influence of federal and State governments. Although counties are a part of these larger units, the three variables are included under environment because state and federal policies affecting a county are not totally determined by the local population but in competition with other populations seeking both funds and jobs.

Also, in regard to this one measure, because relative federal expenditures have remained fairly consistent over time among units, causality can be reasonably inferred.

2. Per capita revenue from state government in a county, 1966-67 (State Revenues).

3. Percentage of federal government employees, December 1965 (Federal Employment).

4. Existence of an interstate highway, 1970 (Interstate).

This binary variable includes only highways completed by 1970; thus, they existed at least during part of the previous decade. Also, although the measure is designated interstates, it includes other four-lane (or larger) highways if they lead to places outside the county. On the other hand, multi-lane roads that either encircle part of a town or run between two nearby towns within the same county are not coded as interstates. The major noninterstate four-lane highway that is coded as an interstate is route 66 in Illinois and Missouri which be being superceded by Interstates 55 and 44.

5. Nearness to closest SMSA, 1970 (Nearness to SMSA).

Both numbers 5 and 6 are calculated by measuring the distance from each nonmetropolitan county seat to the central city of the nearest SMSA or city respectively. It is hypothesized that nearness to an SMSA will be positively correlated with net-migration. The use of

the 1970 SMSA's affects one sample county and the new SMSA in 1970 already had a population of 130,020 in 1960 while the two cities comprising the Central City had a larger total population in 1960 than in 1970.

6. Nearness to closest city of 25,000 or more, 1970 (Nearness to City).

The relationship between this variable and net-migration is posited to be similar to the association between SMSA's and migration. Because cities of 25,000 or more exist in nine counties in the sample, this variable overlaps with largest urban place and thus blurs the distinction between organization and environment in those cases. The use of 1970 data, moreover, entails the use of six cities that moved into the 25,000 or more category during the decade. On the other hand, no usable 1960 cities of 25,000 or more fell below that population level by 1970.

Measure of Environmental Change

1. Average change in acreage per farm, 1959-69 (Change in Farm Size).

It is posited that smaller increases in average farm size (average size decreased in only two counties) will be positively correlated with net-migration since a smaller increase suggests that fewer farms are being consolidated and fewer farm operators are being displaced through sales of farms.

## Data

Various population data are available in the published U.S. Census of Population for 1960 and 1970. Local government employment and state funds data are found in the 1967 U.S. Census of Governments while the 1967 Census of Manufactures provides data on manufacturing concerns. Information on recreation-related facilities is available in the 1967 Census of County Business. Data pertaining to farms and farm operators are provided by the Census of Agriculture for 1959, 1964 and 1969. Since some of the data have been compiled, percentages computed, and published in the 1967 County and City Data Book, this source is utilized where applicable. Data for federal expenditures for 1970 are published by the National Technical Information Service, and measures of distance and existence of an interstate have been determined with the use of the Rand-McNally Road Atlas.

## Method of Analysis

The data will be analyzed through simple and partial correlation and stepwise multiple regression analysis. The only difficulty in using such techniques arises with two binary variables, change in land use and existence of an interstate highway. All other factors are interval level variables and all relationships are assumed to be linear. Furthermore, because in several cases confirmation of the ecological model would be found in obtaining negative correlations, those variables have been transposed by

multiplying by -1 so that all positive correlations appearing in the tables support the model and negative correlations do not. Furthermore, because of the large number of variables used in the study, the transposed variables will be marked by a (t) throughout the analysis to aid the reader.

# CHAPTER III

## ZERO-ORDER CORRELATIONAL ANALYSIS

In order to examine the relationships of various organizational and environmental indices to migration, Pearson's r will be calculated between all independent variables and the net-migration rate. In addition to these 34 independent variables, correlations will also be computed between migration and population change in both the urban and rural non-farm and the rural farm sectors. The analysis will also encompass the examination of two sub-samples. The first consists of the 167 counties where the 1960 labor force was principally engaged in agriculture (165) or mining (2), and the second includes the 60 more diversified counties where other types of industrial employment predominated in 1960--primarily manufacturing (29) and retail trade (26). Underlying this division is the assumption that the second sub-sample represents diversification away from agriculture. This assumption rests on the fact that noncity populations historically in the United States have been primarily engaged in agriculture. That 55 of the 60 counties in the more diversified sub-sample, even though having fewer workers

in agriculture compared to other industries, still maintained more farm workers than would be expected based on the U.S. occupational structure in 1960 and that 37 of these counties would have been placed in the agricultural group in 1950 indicate that this second sub-sample represents diversification away from agriculture.

Since urbanization on one level can be viewed as the movement of a population from an agricultural to a nonagricultural sustenance base, such a schema can serve to clarify and test Groth's suggestion that rurality may be more important than functional diversity in determining migration patterns. That is, the 167 agricultural or mining counties can be designated as rural while the 60 more diversified counties can be viewed as more urbanized nonmetropolitan areas.[1] Thus, an analysis utilizing these two sub-samples as well as the entire sample can offer further insights into not only the relationship between rurality and functional specialization but also their relative impact on migration.

The first step in this examination is to determine how the farm and non-farm sectors of nonmetropolitan county populations relate to net-migration. Correlating migration with changes in the size of both the urban and rural nonfarm and the rural farm sectors not only measures the

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[1]Although the criterion for determining a county's rurality in this study differs from Groth's, one of his three criteria is also based on occupation.

contribution of migration to population change but also gives an indication of how changes in these sectors influence migration. That is, from this second perspective population size in a particular sector of the sustenance structure serves as a surrogate measure for employment opportunities. Examination of these variables demonstrates that for the sample, rural and urban sub-samples respectively migration is more highly associated with changes in non-farm population (.670, .573, .929) than with changes in the farm population (.138, .270, .059). This indicates, similar to previous studies, that migration is directly and positively related to the ability of a population to absorb displaced farmers and their children into a non-agricultural structure when agricultural employment declines. The relatively higher correlation between rural farm population change and migration in the rural sub-sample with its lower degree of urbanization than the entire sample, however, also indicates that an expanding agricultural sector is positively associated with migration. On the other hand, the extremely high correlation between the non-farm population and net-migration in urban counties suggests that the lower fertility rates among nonagricultural populations may also affect the relationship between population growth in that sector and migration. That is, because population size is a function of fertility and mortality as well as migration, a low fertility rate which makes a comparatively small contribution will increase the relative

influence of migration in contributing to population growth. However, the large differences in the correlations yielded by the two independent variables in all three sets of counties also indicate that, in addition to the possible influence of differential fertility rates, migration is positively related to the ability of nonmetropolitan populations to diversify away from agriculture.

Organization and Environment

Although moderate to low, correlations between organizational measures for the entire sample and the two sub-samples generally support the ecological model (see Table 1).[2] The index of diversity which encompasses a county's entire employed population correlates most strongly with the net-migration rate in all three groups (.517, .503, .328 for the sample, rural and urban counties respectively). That the association between this variable and the net-migration rate is lower for the urban than for the rural sub-sample further suggests that this particular index may be less sensitive to structural differences in diversified areas than in specialized areas.

Three of the four remaining variables correlating with migration at .30 or above for the entire sample are measures of manufacturing. Percentage employed in manufacturing is associated with migration at a level almost identical

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[2]Significance levels for the results of this analysis as well as for the results of the stepwise multiple regression and partial correlation analyses can be found in Appendix III.

TABLE 1

ZERO-ORDER CORRELATIONS BETWEEN MEASURES OF ORGANIZATION AND NET-MIGRATION

| | Sample N=227 | Rural (Agriculturally Specialized) N-167 | Urban (Diversified) N=60 |
|---|---|---|---|
| Diversity | .517 | .503 | .328 |
| Manufacturing Employment | .516 | .532 | .329 |
| Manufacturing Categories | .466 | .445 | .271 |
| Other Farm Income (t) | -.427 | -.420 | -.270 |
| Manufacturing Firms | .301 | .276 | .132 |
| College | .298 | .262 | .300 |
| Local Government Employment | -.295 | -.319 | -.260 |
| Hotels | .250 | .180 | .149 |
| Farm Categories | .240 | .210 | .125 |
| Female Participation | .236 | .163 | .131 |
| Largest Town | .158 | .173 | -.122 |
| Income Under $3000 (t) | .156 | .086 | -.154 |
| Institutionalized | .148 | .190 | .045 |
| Public Administration and Education | .113 | .029 | .309 |
| Unemployed (t) | -.104 | -.087 | .085 |
| Amusement Places | .059 | .052 | .142 |
| Military | .050 | .106 | -.068 |
| Public Relief (t) | -.021 | -.123 | .150 |

to that between diversity and migration (.517 and .516) for the entire sample. In addition, number of manufacturing categories and number of manufacturing firms with at least 20 employees yield correlations of .466 and .301 respectively for the 227 counties. However, all three variables have weaker relationships with migration in the urban subsample. Since manufacturing activity has been accounted

for, in part, through the inclusion criterion for this sub-sample, such results are to be expected; i.e., almost half the urban counties are designated as high in manufacturing so that these variables are partially measuring strength of manufacturing activity in comparatively strong manufacturing areas. That a similar pattern holds between diversity and migration comparing the urban sub-sample to the other two groups also suggests not only a high degree of relationship between diversity and manufacturing but also the importance of manufacturing activity in the diversification of nonmetropolitan counties.

Other farm income (transposed), the fourth variable, contradicts the ecological model correlating at -.427 with net-migration for the total sample. However, as pointed out in the previous chapter, the model suggests a relationship in either direction. Accordingly, the seemingly more plausible negative correlation between farm income and migration indicating a multiple-income circumstance to be a step between full-time farmer and migration was chosen to be tested and the variable transposed accordingly. Results now indicate, however, that it is more probable that the availability of off-the-farm employment to members of a farm family is either an inducement to other farmers to migrate into a county and/or allows existing farm operators to remain while other factors influence migration. Such "flip-flop" explanations in the model indicate, though,

that the model has not been highly developed and further empirical explorations are needed.

Similar to the manufacturing variables, other farm income yields a lower correlation with migration among urban counties than overall. That it also correlates (transposed) with manufacturing employment at -.528, -.524 and -.280 for the sample, rural and urban sub-samples suggests a fairly strong association with manufacturing.[3] Thus, the lower correlation with migration in the urban sub-sample may reflect other farm income's relationship with manufacturing. On the other hand, the lower correlation may also be due to the lesser influence of farming in these 60 counties.

Both percentage college students (.298) and percentage employed in local government (-.295) correlate with net-migration near .30 for the sample; the respective correlations for the sub-samples are similar. That the latter variable is negatively associated with migration suggests that a minimal level of government services and hence employees are maintained whether or not a county is losing population through migration. It also suggests, moreover, that there may be a lag in cutting back positions in such counties while there may be a concomitant lag in expanding local government in areas that are growing through migration.

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[3]Correlation matrices for the entire sample, rural and urban sub-samples can be found in Appendix II.

With one exception, the remaining eleven variables correlate with net-migration at or below .25 for all three groups. Percentage in public administration and education, the only exception, correlates with net-migration at .309 in the urban sub-sample compared to .113 for the sample and a negligible .029 for rural counties indicating that public services may be a dimension of diversification that develops where either diversification and/or urbanization has reached some critical point. That is, a progression in diversification from agriculture to industry or trade to public services may exist.

Finally, three variables are associated with net-migration in the urban sub-sample contrary to their relationships in the other two groups. Size of largest town and percentage with median income under three thousand correlate negatively while percentage on public relief correlates positively with net-migration among these 60 counties and vice versa for the sample and rural counties. The low correlations coupled with the small urban sample size, however, mitigate against making assertions about these differences or any similar differences concerning variables under the other three rubrics.

An analysis of environmental variables shows that they also tend to confirm the ecological model although the most important of these factors have lower correlations with migration than do the most important organizational measures (see Table 2). Nearness to SMSA has the strongest

relationship with net-migration (.410, .400 and .303 for the sample, rural and urban sub-samples respectively) among environmental variables. Coupled with the strong association between diversity of county structure and migration, this suggests that diversity of structure, either of a county's population or easily accessible to it, is the most important factor in explaining the net-migration rate.

TABLE 2

ZERO-ORDER CORRELATIONS BETWEEN MEASURES OF ENVIRONMENT AND NET-MIGRATION

| | Sample N=227 | Rural (Agriculturally Specialized) N=167 | Urban (Diversified) N=60 |
|---|---|---|---|
| Nearness to SMSA | .410 | .400 | .303 |
| Federal Outlays | -.379 | -.376 | -.194 |
| Nearness to City | .304 | .301 | .110 |
| Federal Employment | -.192 | -.201 | .060 |
| Interstate | .181 | .125 | .071 |
| State Revenues | .043 | .003 | .096 |

Federal outlays, the second most highly correlated variable, is negatively associated with net-migration (-.379, -.376, and -.194 for all, rural and urban counties). The reasons for this may be identical to those suggested regarding local government employment, i.e., certain minimal levels are maintained and/or expansion or contraction does not take place at the same rate as population size change through migration. However, this variable

also includes two other dimensions that may account for its negative correlation. Many of the costs of federal projects such as highways tend to be similar wherever they are built; these stable costs will be reflected in a higher amount spent per capita in areas with smaller populations (the more rural areas) which demographers have indicated to be the areas with greatest population loss through migration. The reduction in this correlation for urban counties compared to the entire sample tends to support such an explanation. In addition, rural congressmen may be better able to solicit funds and jobs for their constituents than urban legislators. Illustrative of this was the existence of post offices and personnel in rural areas that served extremely small numbers of residents in the 1960s compared with the larger populations served per employee in large urban centers. Such explanations would also explain the negative correlations between federal employment and migration in the sample and rural sub-sample. Finally, the negative correlation between federal outlays and net-migration may reflect high governmental subsidies to farmers in the form of cash payments for crops and loans administered through the Department of Agriculture.

One additional variable is associated with net-migration above .30 for the entire sample; nearness to cities of 25,000 or more correlates at .304. Comparing this with the higher correlation for the presumably more diversified SMSA's in which the central city must have a 50,000 minimum population supports the proposition that the greater

the organizational diversity, either of a population or easily accessible to it, the more positive will be the net-migration rate. Furthermore, for both these variables the correlations are lower in the urban sub-sample than in the other two groups suggesting that where diversification exists within a population, access to an even more diversified structure has less influence on net-migration than where the population is more heavily specialized in agricultural sustenance activities.

## Organizational and Environmental Change

Switching the focus to variables indicating rates of organizational and environmental change provides an indication of how these two processes relate to migration. Although ecologists propose that on-going changes in population, organization, and environment (as well as technology) are reciprocally related, for the purpose of this study, migration is viewed as the dependent variable. This somewhat arbitrary decision is based on the premise that it seems more logical that a change in either of the two posited independent variables will affect migration more directly than migration will affect either organizational or environmental change in nonmetropolitan areas. That is, it is more likely that the decision to locate a factory or establish an interstate will have a greater direct effect on migration in a particular nonmetropolitan area than vice versa.

Among measures of organizational change, change in size of largest urban place correlates most strongly with net-migration for all three groups--.528, .501 and .679.

for the sample, rural and urban sub-samples respectively (see Table 3). The higher association for urban counties, contrary to the pattern found among measures of organization, suggests that this variable is either measuring a different dimension of organization than the static variables or reflecting a dimension of population change rather than organizational change. The low correlations between largest urban place in 1960 and net-migration as well as the negligible relationship between this independent variable and change in size of largest urban place--.03, .07 and .03 respectively for the total sample, rural and urban groups respectively--also indicate that these two apparently related town size variables may be tapping different dimensions in regard to net-migration.

TABLE 3

ZERO-ORDER CORRELATIONS BETWEEN MEASURES OF ORGANIZATIONAL CHANGE AND NET-MIGRATION

| | Sample N=227 | Rural (Agriculturally Specialized) N=167 | Urban (Diversified) N=60 |
|---|---|---|---|
| Change in: | | | |
| Largest Town | .528 | .501 | .679 |
| College | .305 | .301 | .230 |
| Military | .238 | .079 | .450 |
| Institutionalized | -.179 | .230 | -.011 |
| Female Participation | .082 | .010 | -.129 |
| Manufacturing Employment | .065 | .142 | .092 |
| Unemployed (t) | -.056 | .002 | -.226 |
| Public Administration | -.018 | .019 | -.175 |
| Land Use | .004 | -.039 | .103 |

Change in percentage college students, the only other variable in this set to be related to net-migration above .30 for the sample, ranks second in importance in its association with migration both for all 227 counties (.305) and for rural counties (.301) and third for urban counties (.230). Furthermore, the correlation for the sample is similar to that for percentage college students in 1960 while the change variable is slightly higher for rural and lower for urban counties than the static variable.

Although none of the seven other variables correlates with net-migration above .30 for the entire sample, sub-sample correlations reveal that various factors differ in their relationships with migration in rural and urban areas. Among the 167 rural counties percentage of institutionalized population is positively related to migration (.230) although the comparable correlation is negative overall (-.179) and negligible for urban counties (-.011). This indicates that the establishment of such institutional facilities is much more important in inducing in-migration and/or in retarding out-migration of residents in rural areas than in urban areas where diversity of structure has developed along other lines.

The remaining discrepancies between sub-samples and the entire sample follow the same pattern for measures of organizational change as for static organizational variables in that most of the differences occur in the urban sub-sample. Most importantly, change in percentage of military

personnel has the second highest correlation with net-migration among these 60 counties (.450). A comparison with the negligible association in the rural sub-sample (.079) and the lack of association between military personnel in 1960 and net-migration reflects the existence of military bases in some of the urban counties by 1970 and the build-up of armed forces personnel in the 1960s. Furthermore, this also suggests that urban or diversified nonmetropolitan counties offering more services to military personnel than rural counties while still possessing relatively large amounts of unpopulated land are attractive sites for military bases.

Finally, two additional factors correlate more strongly with net-migration in the urban sub-sample than in the other two groups. In contrast to the negligible relationships found in both the entire sample and rural sub-sample, both change in the unemployment rate (-.226) and in percentage employed in public administration and education (-.175) are more negatively associated with net-migration in the urban group. The latter variable follows the same pattern as percentage employed in public administration and education in 1960 in its stronger correlation for the urban group. However, the static variable is related positively with net-migration while the change variable, similar to other government-related variables, yields a

negative correlation.[4] This indicates that although public services may be a more important dimension of diversification in urban counties compared to rural counties as discussed earlier, the negative relationship between change in such employment and migration reflects either minimal necessary levels and/or particularly an inability to expand or contract public services quickly in response to population changes due to migration in urban as well as rural counties. A more precise analysis of these tentative explanations regarding government-related variables, however, must await future investigations encompassing population change per se. To an even greater extent any explanation regarding change in the unemployment rate must remain tenuous. It is possible, however, that this measure may reflect a time lag between individual migration and employment among nonagricultural migrants.

Change in average size of farm (transposed), the only measure of environmental change utilized in the study, moderately supports the ecological model correlating with net-migration at .361, .330 and .587 for the entire sample, rural and urban sub-samples respectively. This demonstrates that more positive net-migration rates are associated with smaller increases in average farm size. Such results also imply that a larger increase in farm

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[4]Ten government-related correlations are negative while five are positive; moreover, three of the five positive correlations with net-migration concern public administration and education employment in 1960.

size is related to a more negative net-migration rate. If both this implication and the ecological model are valid, the stronger association in the urban sub-sample may reflect a strong stream of farm migrants to nonagricultural niches in nearby towns which in turn would decrease the availability of jobs for inter-county migrants and thus stem in-migration. The lower association between farm size change and migration in rural counties, on the other hand, would reflect the fewer nonagricultural employment opportunities available to either displaced farmers or inter-county migrants.

## Theoretical Implications

This examination supports the two hypotheses drawn from the ecological model although correlations generally are low to moderate. Specifically, correlations support the hypothesis that both organization and environment have a direct effect on the net-migration rate, and the positive associations between the vast majority of variables and migration support the hypothesized direction of specific relationships.[5] The higher associations obtained for the most important organizational variables compared with environmental variables among both static and change factors also

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[5]Among the twelve indicators of organization and environment and changes in each that are most strongly associated with migration, only other farm income (transposed) and federal outlays do not correlate in the hypothesized direction.

indicate that the direct influence of the former is greater than the latter on net-migration.

Findings further reveal that within each rubric the variable which measures total diversity of structure, either of or easily accessible to a population (diversity, SMSA, change in largest town), correlates most strongly with net-migration although the organizational change in largest town may be tapping population change rather than functional diversification. Regarding other variables, results indicate that manufacturing--measured in terms of employment, diversity of enterprises, and/or size--as well as the existence and growth of a college population are important factors in yielding more positive net-migration rates.

A comparison of sub-samples reveals that diversity of structure has a greater impact on the net-migration rate in rural than in urban areas. However, these differences are better explained by the dimension of diversity away from agriculture in the inclusion criterion for urban than by urbanization itself. Such results point out the problems inherent in attempting to discern the influence of various ecological factors when utilizing a measure of rurality versus urbanity based on occupation. Two solutions to this dilemma are possible, however. One is to determine if "urban" has a meaning other than one based on occupation, and if so, to develop indices based on these other dimensions. Parenthetically it should be noted, though, that even Wirth's

classic criteria of size, density, and heterogeneity in determining degree of urbanization rests to some extent on an occupational assumption since the relatively larger amount of unpopulated land needed for farming mitigates against as large and dense settlements as those comprising populations not engaged in agriculture.[6]

The other alternative is suggested by the results concerning percentage employed in public administration and education. That is, there may be a pattern such that at one structural point diversification tends in one direction, e.g., agriculture to manufacturing or trade, and at other points tends in other directions, e.g., manufacturing to public services. Thus, by determining the critical structural points at which diversification entails different dimensions it may be possible to categorize counties on the basis of occupational and occupation-related variables as to degree of urbanization and then within different categories explore various ecological relationships. Moreover, the establishment of such critical points may help to clarify more fully the process of a population's occupational movement from primary to secondary to tertiary industries.

Finally, although the two sub-samples yield different correlations between the various independent variables and net-migration, the most important variables in one group with few exceptions correspond to the most important in the other. Because of this consistency, all multiple and partial correlational analyses will encompass only the entire sample.

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[6]Louis Wirth, "Urbanism as a Way of Life," The American Journal of Sociology, 44 (July, 1938), 1-24.

# CHAPTER IV

## STEPWISE MULTIPLE REGRESSION AND PARTIAL CORRELATIONAL ANALYSES

Extending the analysis of net-migration from simple correlations to stepwise multiple regression will not only further explicate the degree of variance in the dependent variable explained by the three sets of ecological variables and the one measure of environmental change but will also indicate how much each independent variable adds to the explanation provided by all previously entered variables. Basically the computation of multiple stepwise regression beyond the first step (where the single best predictor of the dependent variable is entered) entails adding each variable on the strength of the product of its normalized beta squared if added at that step multiplied by its tolerance or the degree to which the measure taps a different linear dimension than those variables already entered; this product equals the partial correlation coefficient squared. In this examination, all ecological variables will be included in the appropriate equations regardless of the strength or direction of association with net-migration shown by simple correlations since it is possible that in controlling for factors

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previously entered into the equation, a particular independent variable may be related to net-migration more strongly or in the opposite linear direction than indicated by Pearson's r.

In carrying out the analysis, the multiple correlation coefficient (R), the variance explained ($R^2$) and the change in variance explained by the addition of a variable ($R^2$ Change) will be included in tables. The normalized beta controlling for all other independent variables will also be listed although the generally low to moderate simple correlations caution against strong predictive assertions based on this statistic. Moreover, the relatively high degree of association among several of the independent variables suggested by the analysis of zero-order correlations also indicates that the beta weights may not accurately reflect the actual relationship between some independent variables and the net-migration rate. Examination of migration using partial correlational analysis in the second section of this chapter will help to clarify the extent of such multicollinearity among those independent variables explaining the greatest amount of variance in the net-migration rate.

In addition to its use in examining more closely those variables contributing most fully to the explanation of variance, partial correlational analysis will be utilized in the first section of the chapter to define more precisely the relationship between the first variable entered into

each stepwise regression equation and other independent variables highly correlated with the first variable regardless of their associations with net-migration. This is because, as noted above, the variable entered on the first step is simply that factor which is the best predictor, based on the zero-order correlation coefficient, of the dependent variable. However, it is possible that the measure may, in fact, be a surrogate for or a composite of other factors used in the study. Thus, prior to each examination utilizing stepwise regression analysis, partial correlations will be computed using net-migration as the dependent variable in order to clarify the relationship between the first variable entered and others closely associated with it. Specifically, the other variables include all independent measures under the same ecological rubric correlating above .50 with the first independent variable in the equation.

## STEPWISE MULTIPLE REGRESSION ANALYSIS

### Measures of Organization and Environment

Among the eighteen organizational variables, the index of diversity, correlating most highly with net-migration at .517, is the first variable entered into the regression equation. That the association between percentage employed in manufacturing and net-migration (.516) was found to be almost as high and the two independent variables correlate with each other at .668 necessitates

further investigation of these relationships. Although partial correlational analysis of the two variables reveals that each correlates at a much lower level with net-migration suggesting that to some extent they are measuring the same thing (or tapping the same linear dimension), they retain their relative order of importance. Specifically, the partial correlations for diversity and manufacturing equal .271 and .268 respectively.

Two other variables, number of manufacturing categories (.751) and number of manufacturing firms with at least 20 employees (.512), are also highly associated with diversity. Including all four variables, the partial correlation for each with migration equals .201, .247, .079 and -.110 respectively for diversity, manufacturing employment, manufacturing categories and manufacturing firms of 20 or more. In other words, the correlations between the last two variables and net-migration fall to extremely low levels compared with both their simple correlations (.466 and .301 respectively) and the partial correlations for the first two measures; however, the association between diversity and migration also is weakened more than that between manufacturing employment and the dependent variable yielding a reversal in their relative positions. These results suggest that, although the structural index contains other dimensions, to a great extent it is measuring the influence of various aspects of manufacturing on net-migration; such results are not

surprising since manufacturing is one of the two major avenues diversification takes in these nonmetropolitan counties. However, that diversity is still the best single predictor of net-migration, encompasses more aspects of manufacturing than percentage in manufacturing, and maintains that position vis-a-vis partial correlational analysis between only diversity and percentage in manufacturing indicates it is a better overall measure than the latter to enter first into the equation in seeking the optimal solution to explaining the greatest amount of variance with the fewest independent variables.

Results of stepwise multiple regression show that all eighteen organizational variables collectively explain almost 54 per cent of the variance in net-migration (see Table 4). However, seven of these measures account for more than 50 per cent with each adding at least one per cent to the explained variance. In contrast, the eleven remaining variables only explain an additional 3.5 per cent and none increases the amount of variance explained by at least one per cent.

Comparing the seven highest ranking variables with their relative position utilizing Pearson's r demonstrates that five of them--diversity, percentage local government employment, percentage college population, percentage employed in manufacturing, number of manufacturing categories--also correlate individually close to or above .30 with net-migration. Two of these five, however,

TABLE 4

RESULTS OF STEPWISE MULTIPLE REGRESSION OF MEASURES OF ORGANIZATION WITH NET-MIGRATION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Diversity | .518 | .268 | .268 | .271 |
| Local Government Employment | .575 | .331 | .063 | -.203 |
| College | .617 | .381 | .050 | .239 |
| Manufacturing Employment | .658 | .433 | .052 | .261 |
| Largest Town | .689 | .474 | .041 | -.375 |
| Manufacturing Categories | .701 | .491 | .017 | .273 |
| Public Relief (t) | .710 | .504 | .013 | -.077 |
| Unemployment (t) | .716 | .513 | .009 | .161 |
| Other Farm Income (t) | .723 | .522 | .009 | -.082 |
| Hotels | .728 | .530 | .008 | .150 |
| Public Administration | .730 | .533 | .003 | .068 |
| Military | .732 | .535 | .002 | .055 |
| Amusement Places | .733 | .537 | .002 | -.070 |
| Income Under $3000 (t) | .733 | .538 | .001 | -.047 |
| Institutionalized | .734 | .539 | .001 | .026 |
| Female Participation | .734 | .539 | .000 | -.035 |
| Manufacturing Firms | .734 | .539 | .000 | .040 |
| Farm Categories | .734 | .539 | .000 | .006 |

contribute less to the explanation than their simple correlations with net-migration would indicate. Both percentage in manufacturing and number of manufacturing categories, the second and third most important variables in the simple correlational analysis, are entered at steps four and six respectively. In regard to the former, the above partial correlational analysis indicates that the high relationship between diversity and percentage in manufacturing coupled with diversity being entered first would decrease the

manufacturing variable's contribution since the structural index, to some extent, measures the same linear dimension. Similarly, the extremely low partial correlation for manufacturing categories and net-migration controlling for diversity and manufacturing employment as well as number of manufacturing firms of 20 or more indicates that manufacturing categories is tapping a dimension similar to these other variables.

On the other hand, two variables that ranked in the lower half in the simple correlational analysis collectively contribute more than five per cent to the explained variance. Specifically, size of largest urban place ($r = .158$) is entered on the fifth step, and percentage on public relief ($r = -.021$) is entered on the seventh. This suggests that these two variables tap linear dimensions both different from other variables more highly correlated with net-migration and more strongly than other low-correlating measures.

By contrast, two variables correlating at more than .30 in the earlier analysis add less than one per cent apiece to the explained variance. The negligible contribution of number of manufacturing firms with at least 20 employees can be attributed to its high association with diversity and the other two manufacturing variables as partial correlational analysis illustrates. Similarly, the small contribution of other farm income may result

from its fairly strong relationship with percentage employed in manufacturing.

Turning attention to the six environmental variables, the first factor to be entered into the stepwise multiple regression equation is nearness to an SMSA. Among other measures under this rubric, only nearness to a city of 25,000 or more, correlating at .766, is associated with this independent variable at a level above .50. Partial correlational analysis yields relationships of .289 between SMSA and net-migration and -.016 between city of 25,000 or more and migration compared with simple correlations of .410 and .304 respectively. Thus, despite the reduction in association between SMSA and net-migration, it remains stronger than the relationship between city of 25,000 or more and net-migration when the influence of the other independent variable is controlled.

A perusal of the results of stepwise multiple regression shows that the six environmental variables collectively explain only 23.3 per cent of the variance in net-migration (see Table 5). Moreover, nearness to an SMSA and federal outlays account for 21.6 per cent of this and are the only variables individually contributing at least one per cent to the explanation. These findings also reveal that the rank order of independent variables is identical to those based on Pearson's r with one exception, the decline in rank from third to fourth of nearest city of 25,000 or more. This is most likely due to the

close relationship between city of 25,000 or more and SMSA as illustrated both by the high correlations between them and the negligible association between the former and net-migration controlling for the latter.

TABLE 5

RESULTS OF STEPWISE MULTIPLE REGRESSION OF MEASURES OF ENVIRONMENT WITH NET-MIGRATION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Nearness to SMSA | .410 | .168 | .168 | .357 |
| Federal Outlays | .465 | .216 | .048 | -.256 |
| Federal Employment | .471 | .222 | .006 | -.075 |
| Nearness to City | .476 | .227 | .005 | -.130 |
| Interstate | .482 | .233 | .006 | .078 |
| State Revenues | .482 | .233 | .000 | .010 |

Comparing the two sets of static variables reveals that organization explains more than twice as much of the variance in net-migration as does environment thus supporting the hypothesis that the former has a stronger direct effect on migration than the latter. Including all variables under both rubics in one stepwise multiple regression equation illustrates even more clearly the difference in their relative explanatory power. SMSA, the highest ranking environmental variable, is entered at step eleven and adds less than one per cent to the variance explained by the ten organizational variables preceding it while other

environmental variables contribute even less (see Table 6). Furthermore, including the environmental variables increases the amount of variance explained by organizational measures

TABLE 6

RESULTS OF STEPWISE MULTIPLE REGRESSION OF MEASURES OF ORGANIZATION AND ENVIRONMENT WITH NET-MIGRATION[a]

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Diversity | .518 | .268 | .268 | .215 |
| Local Government Employment | 575 | .331 | .063 | -.210 |
| College | .617 | .381 | .050 | .211 |
| Manufacturing Employment | .658 | .433 | .052 | .203 |
| Largest Town | .659 | .474 | .041 | -.368 |
| Manufacturing Categories | .701 | .491 | .017 | .252 |
| Public Relief (t) | .710 | .504 | .013 | -.096 |
| Unemployment (t) | .716 | .513 | .009 | .165 |
| Other Farm Income (t) | .723 | .522 | .009 | -.097 |
| Hotels | .728 | .530 | .008 | .161 |
| Nearness to SMSA | .732 | .536 | .006 | .163 |
| Public Administration | .736 | .541 | .005 | .084 |
| Nearness to City | .737 | .544 | .003 | -.099 |
| Federal Outlays | .738 | .545 | .001 | -.072 |
| Military | .740 | .547 | .002 | .048 |
| Amusement Places | .740 | .548 | .001 | -.064 |
| Female Participation | .741 | .549 | .001 | -.046 |
| Interstate | .741 | .550 | .001 | .031 |
| Manufacturing Firms | .742 | .550 | .000 | .054 |
| Institutionalized | .742 | .550 | .000 | .014 |
| Farm Categories | .742 | .550 | .000 | -.013 |
| Income Under $3000 (t) | .742 | .550 | .000 | .011 |

[a]State Revenues and Federal Employment, two environmental variables, were not entered in the equation because of extremely low F-Levels (.001) after the last step listed; the beta weight of each if entered at this step would be .001 and -.002 respectively.

only 1.1 per cent. In addition to demonstrating the overwhelming influence of organization, these findings also indicate that the two highest ranking variables in the analysis of environment alone may be highly associated with high-ranking organizational factors. The correlations between both SMSA and federal outlays and diversity (.507 and -.519 respectively) tend to confirm this suggestion. Because of these correlations and in spite of the results of the combined regression equation showing the negligible influence of environment a partial correlational analysis will be included in the second section of this chapter encompassing both the seven organizational and the two environmental factors contributing over one per cent to the explained variance in separate analyses in order to clarify further relationships between organization and environment.

## Measures of Organizational and Environmental Change

Shifting the focus of analysis to measures of ecological change indicates that change in largest urban place is the best single predictor of net-migration among organizational change variables; moreover, no other independent variable correlates with it above .50.[1] Overall, the nine variables explain only 37.2 per cent of the

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[1]As pointed out in Chapter III, the relationship between change in size of largest urban place and migration may more accurately reflect population change than organizational change.

variation in net-migration, and five of these--change in size of largest town, military, institutionalized, college population, and percentage in public administration and education--explain almost 36 per cent of the variance with each contributing at least one per cent (see Table 7).

TABLE 7

RESULTS OF STEPWISE MULTIPLE REGRESSION OF MEASURES OF ORGANIZATIONAL CHANGE WITH NET-MIGRATION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Change in: | | | | |
| Largest Town | .528 | .299 | .279 | .445 |
| Military | .564 | .318 | .039 | .196 |
| Institutionalized | .573 | .328 | .010 | -.129 |
| College | .582 | .338 | .010 | .195 |
| Public Administration | .600 | .360 | .022 | -.161 |
| Land Use | .604 | .365 | .005 | -.078 |
| Manufacturing Employment | .608 | .370 | .005 | .076 |
| Unemployment (t) | .609 | .371 | .001 | .043 |
| Female Participation | .610 | .372 | .001 | .037 |

A comparison among the five variables with their relative strength utilizing Pearson's r reveals that four of them were also the most important factors in the earlier examination although the order varies. Specifically, change in percentage college students ranked second but is entered on the fourth step in the regression equation after change in percentage military and in percentage institutionalized. In addition to these four variables, percentage employed in

public administration and education, one of the remaining variables each of which yields a Pearson's r under .10 with net-migration, is entered on the fifth step and is the only other variable adding at least one per cent to the explained variance. This indicates that it measures not only a linear dimension different from the four variables previously entered but also one that none of the other extremely low correlated factors either taps or measures as strongly.

Adding change in average farm size, the only measure of environmental change, to the organizational change variables raises the total variance explained from 37.2 to 46.1 per cent (see Table 8). Furthermore, this variable ranks second in importance to change in largest urban place while two other factors--change in percentage military and in the female participation rate--rank third and fourth respectively and also contribute over one per cent to the explained variance. Comparing this regression equation to that generated by organizational change variables alone reveals that in addition to the largest town variable only change in percentage military retains a similar rank in the second equation. On the other hand, the other three major variables in the first equation contribute less to the total explanation and are entered at least two steps later in this equation while change in the female participation rate, in addition to being entered earlier, increases its contribution from almost zero to 2.4 per cent. These

TABLE 8

RESULTS OF STEPWISE MULTIPLE REGRESSION OF MEASURES OF ORGANIZATIONAL AND ENVIRONMENTAL CHANGE WITH NET-MIGRATION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Change in: | | | | |
| Largest Town | .528 | .279 | .279 | .424 |
| Farm Size (t) | .603 | .364 | .085 | .328 |
| Military | .636 | .405 | .041 | .205 |
| Female Participation | .655 | .429 | .024 | .150 |
| Land Use | .661 | .438 | .009 | -.095 |
| Institutionalized | .665 | .442 | .004 | -.103 |
| Public Administration | .668 | .447 | .005 | -.116 |
| College | .675 | .456 | .009 | .124 |
| Unemployment (t) | .678 | .460 | .004 | .072 |
| Manufacturing Employment | .679 | .461 | .001 | .030 |

changes in relative ranking and contribution, moreover, suggest that the differences in general between the two regressions encompassing ecological changes may be due to average farm size being differentially associated with various measures of organizational change.

## Theoretical Implications

The findings using stepwise multiple regression analysis support the hypothesis that organization has a stronger direct effect than environment on migration. Among static variables, the seven most important factors explain half the variance in the net-migration rate while

all six environmental variables explain slightly under one-fourth. That the relationship between environment and migration becomes negligible in the combined regression equation, however, suggests that a high degree of collinearity exists between indicators of organization and of environment; such possible associations will be explored further in the following section.

Contrary to the regression analysis of static variables, this examination shows that the one environmental change variable, change in farm size, maintains its relative importance, as indicated by zero-order correlations, and adds to the total variance explained when it is included in the ecological change equation. Its inclusion also influences the impact of various organizational change variables on the dependent variable. This suggests, similar to the static analysis, a high degree of collinearity between variables under both independent rubrics and/or the possibility that changes in land patterns has both a direct impact on migration and an indirect effect through organization.

Among the sixteen variables contributing over one per cent to the explanation of variance in the net-migration rate in the five equations, beta weights indicate that six factors do not support the hypothesized direction of relationship posited on the basis of the ecological model. Three of the six measure governmental inputs. A fourth factor, percentage on public relief, may reflect governmental

activity as well as level of economic well-being. Thus, the explanations for the negative relationship between government and migration given in the previous chapter may also apply to this variable. The negative beta weight for change in institutionalized population reflects the negative zero-order correlation in the sample and urban sub-sample. Coupled with the positive simple coefficient for the rural sub-sample, this suggests that although the location of special institutions in rural areas may help to stem population losses through migration in those counties losing population most rapidly, they are of little importance in bringing about a more positive net-migration rate in nonmetropolitan counties in general. Therefore, that this variable contributes one per cent to the explained variance yet is negatively associated with net-migration reflects both its positive impact in the more rural counties and the fact that such counties are experiencing higher population losses through migration than more diversified nonmetropolitan counties. Finally, the negative beta weight for size of largest urban place may reflect changing patterns of urbanization.[2]

## PARTIAL CORRELATIONAL ANALYSIS

In order to clarify the relationships between various independent variables and their effects on the variance in

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[2]A full discussion of this possible explanation based on results of simple, regression and partial correlational analysis will be included in the last chapter.

net-migration, partial correlations of all variables in each regression equation contributing at least one per cent to the explained variance of the dependent variable will be examined in this section. Specifically, each independent variable will be correlated with net-migration while controlling for all other major factors in the same regression equation. In addition, each variable's zero-order correlation for the entire sample will also be included in tables, and all measures will be listed in the order in which they were entered into the respective regression equations to provide for easier comparability with previous analyses.

Measures of Organization and Environment

Examination of the seven organizational variables contributing over one per cent to the explained variance of net-migration reveals several differences with the results of the two previous analyses (see Table 9). Percentage college students yields the highest partial correlation followed by size of largest urban place; furthermore, both register higher partial correlations than their respective

TABLE 9

PARTIAL CORRELATIONS BETWEEN MEASURES OF ORGANIZATION AND NET-MIGRATION

| | Partial r | Simple r |
|---|---|---|
| Diversity | .204 | .517 |
| Local Government Employment | -.292 | -.295 |
| College | .409 | .298 |
| Manufacturing Employment | .218 | .516 |
| Largest Town | -.316 | .158 |
| Manufacturing Categories | .199 | .466 |
| Public Relief (t) | -.158 | -.021 |

simple correlations and are the only two measures correlating above .30 with net-migration in this analysis. In addition, it should be noted that contrary to its low positive simple correlation, size of largest urban place has a negative association with net-migration here and thus runs counter to the ecological model. It may be, as other studies suggest, that this relationship reflects the existence of regional centers in counties more distant from SMSA's, that is, counties generally characterized by less positive or more negative net-migration rates compared with those located nearer metropolises. However, a Pearson's r of .232 between SMSA and size of largest urban place indicates that, if anything, urban places closer to SMSA's tend to be larger.

Among the remaining five variables, percentage on public relief also explains a higher percentage of the unexplained variance than its simple correlation with migration indicates while percentage in local government yields almost identical associations with the dependent variable. By contrast, reduced partial correlations at about .20 for diversity, percentage in manufacturing and number of manufacturing categories reflect the high inter-relationships earlier found between these variables which in turn lessen the independent influence of each on migration.

In contrast to the inconsistencies among measures of organization, the two most important environmental factors yield similarly weakened associations with net-migration. Specifically, the partial correlations for SMSA and federal

outlays are .292 and -.240 compared with simple correlations of .410 and -.379 respectively. That these two variables maintain their relative ranks supports the previous examinations showing SMSA to be the most important environmental factor affecting net-migration.

Combining the two sets of variables indicates that environment has little direct influence on the relationship between organization and migration; all partial correlations remain within .03 of what they yield in the organizational analysis alone (see Table 10). Furthermore, that the partial correlation for largest urban place is reduced only slightly does not give further insight into the negative association found above between that variable and migration. On the other hand, results show that the two environmental variables

TABLE 10

PARTIAL CORRELATIONS BETWEEN MEASURES OF ORGANIZATION AND ENVIRONMENT AND NET-MIGRATION

| | Partial r | Simple r |
|---|---|---|
| Diversity | .179 | .517 |
| Local Government Employment | -.288 | -.295 |
| College | .401 | .298 |
| Manufacturing Employment | .189 | .516 |
| Largest Town | -.307 | .158 |
| Manufacturing Categories | .192 | .466 |
| Public Relief (t) | -.159 | -.021 |
| Nearness to SMSA | .081 | .410 |
| Federal Outlays | -.019 | -.379 |

are negligibly associated with net-migration when controlling for organization. Such findings suggest that federal expenditures, as might be expected, are relatively consistent among counties with similar sustenance structures. This analysis also indicates even more than the sub-sample comparisons of simple correlations that the internal sustenance structure has a stronger direct influence on migration than access to an SMSA. That is, regardless of the difference in distance from a metropolis of two county populations, if they have similar sustenance structures, population change through migration will be affected similarly. However, that nearness to SMSA and diversity correlate at .507 suggests that the former variable may have an indirect influence on migration in that populations near SMSA's may be organized into more diversified structures than populations farther away.

## Measures of Organizational and Environmental Change

Examining indices of organizational change reveals only slight differences between these results and those of the two previous analyses (see Table 11). Although its association with migration declines slightly, change in size of largest urban place remains the most important variable and the only one with a partial above .30. Change in percentage military ranks second, and the other three measures yield partial correlations between .15 and .20.

TABLE 11

PARTIAL CORRELATIONS BETWEEN MEASURES OF ORGANIZATIONAL CHANGE AND NET-MIGRATION

| | Partial r | Simple r |
|---|---|---|
| Change in: | | |
| Largest Town | .449 | .528 |
| Military | .227 | .238 |
| Institutionalized | -.157 | -.179 |
| College | .188 | .305 |
| Public Administration | -.179 | -.018 |

The most noticeable differences between these findings and earlier examinations are the increase in explanatory power of change in percentage employed in public administration and education (although still low) and the decrease of change in percentage college students. Similar to the stepwise regression results, this indicates the former measures a linear dimension different from variables entered before it and the latter taps to some extent the same linearity as other variables of organizational change. Finally, while never strong influences, change in percentage institutionalized and in employees in public administration and education yield negative simple and partial correlations with net-migration contrary to what was hypothesized. Regarding the former, it may reflect the possibly greater predominance of old-age facilities in some counties characterized by high age-structures

which are in turn induced by high out-migration of the young; thus, this variable may represent more directly changes in population rather than in organization. The latter independent variable, on the other hand, reflects the generally negative relationships between public service or governmental variables and migration discussed in the previous chapter.

Partial correlations of the highest ranking measures of change incorporating the environmental change in average farm size also yield results similar to those found in the earlier analyses (see Table 12). The only exception to this is the much higher association between change in the female participation rate and net-migration in this examination. Although still fairly low, the partial correlation suggests that when controlling for other changes in organization and environment, net-migration is positively related to the availability to women of occupational niches in the sustenance structure.

TABLE 12

PARTIAL CORRELATIONS BETWEEN MEASURES OF ORGANIZATIONAL AND ENVIRONMENTAL CHANGE AND NET-MIGRATION

| | Partial r | Simple r |
|---|---|---|
| Change in: | | |
| Largest Town | .505 | .528 |
| Farm Size (t) | .397 | .361 |
| Military | .266 | .238 |
| Female Participation | .203 | .082 |

In addition, the slight increase in the correlation between farm size change and migration as well as its effect on other measures or organizational change run counter to the results combining static organizational and environmental variables in which the influence of the latter on the former is negligible and the relationship between environment and net-migration is drastically reduced. This indicates that the particular variables used in this study may not represent environment consistently well. However, since the three environmental factors used in the partial correlational analyses represent very different aspects of environment, it seems more likely that not all facets of environment affect migration equally. Specifically, SMSA represents access to more diversified organizational structures; federal outlays, the impact of other governmental units; and farm size change, internal land pattern change. On the other hand, the different results may also indicate that the interrelationships among the processes of population, organizational and environmental change are of a different order than that reflected by indicators of organization and environment measured at one point in time.

## Theoretical Implications

Partial correlational analysis, similar to the previous two examinations, indicates that organization has a direct effect on migration as hypothesized. The differences between simple and partial correlation coefficients,

though, reveals close relationships among several variables. The lowered partials for diversity and the two manufacturing variables demonstrate that all three to some extent are measuring manufacturing activity. On the other hand, higher partials for college, largest town and public relief indicate that each has a stronger impact on net-migration when controlling for other organizational factors than each has independently. Finally, the consistency between coefficients for local government employment suggests that this variable has a relationship with net-migration which remains unaffected by other independent variables.

The examination of static variables also indicates that environment has little impact on migration when controlling for organization; both regression and partial correlational analysis show a necessity for modifying this part of the ecological model. That is, the regression equation and partials combining static organizational and environmental variables indicate that, if a direct relationship exists between environment and migration, it is negligible, although the strong correlation between diversity and SMSA suggests that environment does affect migration indirectly through its impact on organization.

Among variables measuring ecological change, change in size of largest urban place and change in farm size consistently rank first and second in all three analyses

in their impact on migration. However, difficulties exist in both cases regarding just what part of the ecological model is being measured. As suggested before, change in largest town may tap population rather than organizational change.

Perhaps more importantly from a theoretical viewpoint, change in farm size, the only measure of environmental change, simultaneously reflects changes in organization, i.e., a change in land patterns implies a change in sustenance organization. Furthermore, if farm size change more accurately measures organizational than environmental change, this study indicates that environment only affects migration indirectly through organization as shown by results of the analysis of static variables. Such an interpretation of the variable supports Sly's suggestion that the land pattern variable he used may more accurately reflect organizational than strictly environmental change.[3] If this is the case, than it is neither the different facets of environment being tested nor the difference between static and processual variables that have produced differing results concerning the impact of environment on migration but rather that change in farm size more appropriately measures organizational change. This study then indicates that organizational change has a direct effect on net-migration but the impact of environmental change remains to be tested.

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[3]Sly, 627.

## Stepwise Multiple Regression of Selected Variables

To clarify further the relative impact of organization and environment beyond the simple and multiple correlational analyses employing all variables, those static factors which previous examinations have shown to be most closely associated with migration have been placed into three groups within a stepwise multiple regression equation with each set being forced into the equation on the basis of the importance of each in previous analyses. In order of inclusion the three sets are organization (six variables), environmental locational factors (two) and environmental inputs (one). The specific variables correspond to those utilized in the partial correlational analysis with two exceptions. Percentage on public relief is not included because both its simple and partial correlation coefficients are low. On the other hand, nearness to a city of 25,000 is added because of its relatively high simple correlation with net-migration although its extremely close association with nearness to an SMSA (.765) decreases its influence in the environmental equation. Furthermore, it is included because this examination is concerned with the impact of location near central places, as measured by population size.

Results reveal, similar to previous examinations, that organization has a direct influence on net-migration while the impact of environment, whether locational or

relating to federal inputs, is negligible when organization explains as much as it can (see Table 13). Specifically, organization explains almost half the variance in the net-migration rate while each set of environmental variables adds less than one per cent to the explanation. Thus, this analysis indicates again the need to modify the ecological model by positing a negligible direct relationship between environment and migration.

TABLE 13

RESULTS OF STEPWISE MULTIPLE REGRESSION OF SELECTED MEASURES OF ORGANIZATION AND ENVIRONMENT WITH NET-MIGRATION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Organizational Factors | | | | |
| Diversity | .518 | .268 | .268 | .208 |
| Local Government Employment | .575 | .331 | .063 | -.204 |
| College | .617 | .381 | .050 | .321 |
| Manufacturing Employment | .658 | .433 | .052 | .236 |
| Largest Town | .689 | .474 | .042 | -.304 |
| Manufacturing Categories | .701 | .491 | .017 | .254 |
| Environmental Locational Factors | | | | |
| Nearness to SMSA | .703 | .494 | .003 | .138 |
| Nearness to City | .705 | .498 | .003 | -.115 |
| Environmental External Input Factors | | | | |
| Federal Outlays | .707 | .500 | .002 | -.058 |

The direction of association, as indicated by beta weights, also remains unchanged. It should be noted, however,

that nearness to a city of 25,000, not discussed before, yields a negative beta weight contrasted to a positive simple correlation with migration. That the distance to a city is identical to the distance to an SMSA in 135 cases, i.e., the closest large central place is an SMSA, indicates that small cities remote from SMSA's have little impact on reversing high negative net-migration rates in nearby counties. Furthermore, this suggests, as does the negative relationship between largest urban place and net-migration, that large towns and/or small cities do not serve as central places in the fullest sense of not only providing a wide variety of services but also attracting migrants to surrounding areas because of such services. One explanation for such findings and their implications for population policies will be discussed in the concluding chapter.

# CHAPTER V

# CONCLUSIONS

## The Ecological Model

Hawley's ecological model posits with respect to migration that although the competitive process is the primary factor leading to either territorial or structural differentiation, environment, population, and secondarily individual technologies have a direct yet weaker influence on the differentiating process. Because competition occurs within an organizational structure which sets the rules of competition, the model has been modified and organization has been posited to have both a direct and a stronger impact upon differentiation than does environment.

Utilizing the modified model, this study focusses on that part concerned with both the direct and relative influence of organization and environment on migration or the process of territorial differentiation. Specifically, it is posited that the higher the level of organizational diversity and the higher the level of environmental resources, the more positive will be the net-migration rate.

Results indicate that when considered alone, both organization and environment have a direct impact on net-migration with the direction of association between the

majority of indicators of each and migration supporting the model. Lastly, among both sets of factors, that variable which measures diversity of structure, either of or easily accessible to a population, correlates most strongly with the dependent variable.

When the two sets of variables are combined utilizing stepwise multiple regression and partial correlational analyses, the relationship between organization and net-migration is maintained while the influence of environment becomes almost negligible. On the other hand, the high association between the environmental variable SMSA and organizational diversity indicates that environment may affect migration indirectly through its impact on organization. That is, where a population is located may be either more or less conducive to the development of a sustenance structure that will in turn have a direct impact on net-migration. This study then indicates a need to modify the ecological model by positing that organization has a relatively strong direct effect on migration while environment affects territorial differentiation indirectly through its effect in bringing about organizational diversification.

## Methodological Considerations

Methodologically, the correlations between several variables and net-migration in this study point out the difficulty in constructing variables meant to measure one particular aspect of only one component of the ecological complex. For example, among variables of change results

suggest that change in size of largest urban place and in percentage institutionalized may also be measuring aspects of population in addition to organizational change while change in farm size may more accurately represent organizational rather than environmental change. Somewhat differently, the negative partial between percentage on public relief (transposed) and net-migration corresponds to the negative associations between most government-related variables and the dependent variable. This suggests that, although percentage on public relief still measures a facet of organization, it may more accurately represent the level of local governmental welfare services in a county than sustenance level.

This study has also experimented with several nonemployment based variables, some of which have been used before and others that have not. Two measures of manufacturing not based on employment are incorporated in addition to the more commonly used percentage of manufacturing employees. Number of manufacturing categories correlates relatively highly while number of firms with 20 or more employees yields a moderate association with net-migration. However, partial correlational analysis of all three manufacturing variables and diversity greatly reduces the influence of the nonemployment based measures. On the other hand, the greater combined influence of the two on the relationship between diversity and migration compared with percentage employed in manufacturing and the dependent variable indicates that the two nonemployment

based variables measure to some extent linear dimensions of manufacturing not totally accounted for in the employment variable. Among other nonemployment based factors, percentage on public relief, other farm income and federal outlays vary in importance among the three analyses, and change in average farm size consistently yields moderate relationships with net-migration while none of the other seven such variables is closely associated with migration.

## Areas for Further Research

The results of this study also indicate the need for further research in several areas. Despite its relatively high correlation with net-migration and the inclusion of several aspects of manufacturing, the particular index of diversity used in this study apparently is not sensitive to all structural nuances. This is most clearly illustrated by both the increased partial correlation of college population and the lesser impact of diversity in the urban subsample. Such results indicate the need for further exploration in two directions. Specifically, since no set of variables comparable to those measuring manufacturing represents retail trade although almost half the more diversified counties in the sample could be characterized as being engaged in such activity, further investigation of the index should be undertaken encompassing various facets of both manufacturing and trade in nonmetropolitan counties. Moreover, the results indicate, similar to Groth's findings, the continuing need to test different types of indices until one is constructued that both

incorporates other aspects of diversification, such as colleges, not tapped by this index and is equally useful at all levels of urbanization as measured by nonagricultural employment.[1]

Although it is expected that different independent variables will correlate with the dependent variable at different levels in any study of this type, comparison among static and processual variables of organization and environment suggest two specific areas of inquiry. The differential influences of static organizational variables and their counterparts measuring change emphasize the need for more rigorous examination of the interrelationships between the two. Specifically, it may be, for example, that starting at a base of 15 per cent, a 10 per cent increase in manufacturing employment may have a different impact on the migration rate than starting at a base of 35 per cent; thus, research should focus on determining if and where critical points of changing influence exist. The dissimilar impact of environment in the two types of combined regression and partial correlational examinations also indicates the need for a clearer understanding of why environment measured at one point in time has a negligible influence on migration while change in environment has a relatively strong impact, although as noted earlier this difference may be due to the dissimilarity of measures used in the study.

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[1]Groth, 19.

In addition, among static organizational variables a general pattern emerges where migration is associated most strongly with that variable measuring structural diversity most completely followed by those measuring manufacturing while other factors representing other specific areas of diversification correlate at lower levels. Such results could reasonably be expected. On the other hand, no comparable rationale exists for explaining the dissimilar correlations between various environmental variables and net-migration underscoring Hawley's comment that environment is so diffuse it needs redefining for every investigation. Moreover, until the various facets of environment represented in this study and others are explored more thoroughly and delineated precisely, the theoretical utility of this component of the ecological complex will remain weak.[2]

The generally negative associations between government-related variables and net-migration indicate that the causal relationship between public or governmental services and population change through migration also requires clarification. In particular, the consistently negative relationship between percentage in local government, measured in mid-decade, and migration suggests that the direction of association may be related to the relative inflexibility of government to expand or contract in response to migration rather than increases or decreases in

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[2]Hawley, 1967, 330.

governmental employment opportunities affecting migration. Yet, the small positive simple correlation for percentage in public administration and education in 1960 suggests that government activity does affect the dependent variable.

This apparent discrepancy can be resolved in at least two ways. First, the process of migration may yield differences in the local government employment to population ratio that are only "corrected" after the decadal census counts. Such an explanation could also account for the negative correlations yielded by three other variables--federal employment, change in percentage employed in public administration and education, and federal outlays for fiscal 1970. However, this explanation does not account for the positive correlation between migration and 1960 employment in public administration and education which is measured by precisely that population data which would be used to make adjustments.

On the other hand, since public administration and education employment is actually a composite of employment stemming from all branches of government, it is also plausible that the whole may be related positively with migration while at least the local and federal parts are not. That no variable measures county governmental employment and the only measure of state inputs refers to revenues which also includes monetary inputs other than payrolls preclude further analysis here. However, this explanation does not account for the negative correlation between

change in percentage employed in public administration and education and net-migration which should be positive if it were totally valid. Thus, both these tentative explanations of government-related factors and the variables themselves require further examination.

Diversification into the establishment of resort or recreational activities is represented in this study by number of both hotels and amusement places although neither correlates above .25 with net-migration. Moreover, excluding their strong intercorrelation, both correlate above .50 only with size of largest urban place and number of manufacturing firms with 20 or more employees among all independent variables. This suggests that both these recreational variables may actually tap a dimension of diversification in towns particularly associated with medium-sized or larger manufacturing concerns. Thus, it appears that neither variable represents recreational/ resort activity so much as urban-industrial activity indicating the need for developing other indices to determine the effect of recreational/resort facilities on population change through net-migration.

Apparent inconsistencies in the correlations among largest urban place, nearness to SMSA, and net-migration suggest another area requiring further exploration. In this study the simple correlation for the urban (more diversified) sub-sample as well as the partial correlation for the entire sample show a negative relationship between

size of largest urban place and net-migration. Yet size of largest urban place and net-migration are both positively related to nearness to an SMSA for this sub-sample and the entire sample. In other words, although larger urban places (as measured by the largest town in each county) tend to be located in those counties nearer to an SMSA which also correlates more positively with net-migration, size of largest place, controlling for diversification, is related to more negative net-migration rates.

These inconsistencies appear to be the result of changing patterns of urbanization or small town growth stemming from changing patterns and modes of transportation. Specifically, Lemon notes that in the eighteenth century fourth-order central places were located on either major roads or navigable streams and served primarily as commercial centers while the preemption of transport and commercial functions by Philadelphia prevented the growth to fourth-order centers of towns near that city. In the twentieth century Irwin finds a small positive correlation between interstate location and county population growth comparable to that found in this study between interstates and migration while the U.S. Department of Agriculture's report on rural America in the 1970s indicates that such roads are particularly important in explaining growth of Southern towns.[3]

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[3]Lemon, 502-3, 510; Irwin, 9; U.S. Department of Agriculture, p. 22. The correlation between interstates and net-migration in this study has not been discussed so far because it is below .30 and does not add at least one per cent to the explanation of variance.

In addition, Warner argues that transportational changes after 1920 have affected the physical form of the city and by inference the pattern of urbanization with regard to smaller centers. That is, the increasing availability of the automobile after that date has made living in nearby towns and commuting to jobs in large cities more feasible inducing the growth of towns near metropolises. Moreover, the introduction of the motor truck in the first thirty years of the century and the development of the U.S. Route System in the 1920s, primarily through improvements on existing roads, provided an alternative to railroad transport of freight. The railroad system, however, remained intact until after 1948 due to the delay in construction of a fuller highway network prompted by the Depression and World War II. Thus, after 1920 and particularly after 1948 the transport function of regional railroad centers declined. Finally, Warner suggests that perhaps the most important ramification of this change in transportation was the lengthening of distance and the lessening of costs involved in short-haul freight transport as trucks superceded handcarts and horse-drawn wagons in cities. This in turn allowed manufacturing firms to enjoy greater spatial freedom in regard to location beginning in the 1920s and again especially after 1948 with the improvement of roads and highways within and around metropolises.[4]

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[4]Sam Bass Warner, Jr., The Urban Wilderness, A History of the American City (New York: 1972), pp. 113-9.

Such changing patterns and modes of transportation can resolve the apparent discrepancy concerning the negative partial correlation between size of largest urban place and net-migration as well as the negative simple correlation for the urban sub-sample contrasted to the positive relationships between nearness to an SMSA and both migration and largest urban place. Specifically, it may be that although towns nearer SMSA's tend slightly to be larger than those farther from such centers, some more remote urban places may still be larger than others closer to SMSA's due to their earlier importance as railroad and commercial centers. That is, although the largest urban place in counties at the fringe of metropolitan areas may, on the average, be larger than those in more remote areas, the largest non-metropolitan urban places may lie in remote areas; moreover, such towns which served as more diversified central places during the railroad era may be losing inhabitants through migration with the decline of the railroad and thus their loss of attractiveness to other industries. Both the finding of this study that counties with smaller urban places are growing more rapidly or losing less of their populations through net-migration and Zuiches' results indicating that smaller towns tend to attract proportionately more in-migrants than larger places support such an explanation that large remote centers and their hinterlands, i.e.,

the county, in general have declined with changing trends in transportation.[5]

The strong partial correlation between percentage in colleges in this examination as well as the positive relationship found by Zuiches between colleges and intra-state in-migration, however, also indicate that some smaller remote towns may attract migrants by serving as training grounds for the development of general "urban" and particularly college-related skills which will be transferred to jobs in metropolises at a later stage of individual migration. Thus, the tendency for more remote towns to gain more in-migrants than less remote towns between 1955 and 1960 while such counties in the North Central Region in the 1960s lost rather than gained population through net-migration may result from those places continually attracting students to college or university facilities located there yet not being able to retain them upon graduation. Moreover, the seemingly contradictory correlations may also be due in part to the fact that the measurement of in-migration includes only those entering a county while the component of out-migration in the net-migration rate includes both former in-migrants and county residents that leave.[6]

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[5]The decline of remote towns as central places due to transportational changes would also explain the negative beta weight for nearness to city; that is, small cities remote from SMSA's do not provide the central place services to attract and retain populations in surrounding counties.

[6]Zuiches, 410-20.

On the other hand, the positive association between size of largest urban place and SMSA may reflect the greater feasibility of commuting longer distances to work in cities or metropolitan areas. The low level of this correlation, moreover, probably mirrors the fact that once commuting reaches a high level, the county is incorporated into an SMSA as well as the continued existence of some large rural centers of an earlier era. Similarly, the negative correlation between largest urban place and migration may reflect in addition to the decline of large rural centers and the incorporation of high-commuting counties into SMSA's, the increasing spatial flexibility of commuters in continguous nonmetropolitan counties due to the automobile and an intricate system of roads which no longer makes it necessary to live close to commuter lines or shopping facilities. Furthermore, the strong positive correlation found between diversity and SMSA similarly demonstrates the movement of manufacturing firms to outlying counties as more multilane highway networks link these counties to the metropolitan area. Finally, although the various results suggest such an explanation they also indicate that the relationships may be extremely complex. Thus, a more precise understanding must await the undertaking of longitudinal studies addressed specifically to how transportational changes, urbanization, and population redistribution relate with one another on a state or regional basis.

## Policy Implications

The results of this study are similar to the findings of the Commission on Population Growth and the American Future and indicate that its policy recommendations concerning depressed rural areas can be implemented without great difficulty. On the other hand, findings also show that current federal monetary policies, if anything, promote a population distribution pattern contrary to the Commission's recommendations. Specifically, counties more remote from metropolitan areas tend to have more negative net-migration rates than those closer to SMSA's. However, as farm consolidation continues, these findings demonstrate that heavy population losses from rural areas can be stemmed when employment opportunities, particularly in manufacturing and secondarily in public services, are available. That this study indicates that particular counties have already diversified away from agriculture and have also stemmed the tide of heavy rural out-migration suggests that it is quite feasible to pinpoint those areas that have displayed the potential for growth and could be developed further in line with the Commission's recommendation of employing a growth center strategy for such places in depressed areas. The promotion of selected centers as governmental policy would not only enhance employment opportunities but also would concentrate public services in such towns/cities making them central places in the fullest sense of providing greater services for surrounding

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rural residents. Such a concentration may also make such centers more attractive to residents and potential migrants and thus alleviate population pressures on metropolitan areas.

The findings of this study concerning federal inputs, however, demonstrate the lack of any such growth policy by the federal government at this time. That is, controlling for the level of manufacturing and size of largest place, federal inputs do not vary in relationship to migration trends. Moreover, that such monies tend to be concentrated in agricultural areas yielding the highest losses through net-migration suggests that aiding farmers has a negative effect on making the most rural areas attractive residential locations and underscores the lack of concern for population distribution problems by the federal government in its monetary policies. This is not to argue that the Midwestern farmer should not be aided through loans and cash payments for crops but to point out that if this country is committed to producing a higher quality of life for its citizens through population redistribution, an assumption the Commission maintains, the current pattern of fund allocations is inadequate at best and detrimental at worst to promoting such a policy. Thus, either current budgeting policies must be redirected or additional taxation imposed to be earmarked specifically for growth promotion purposes in specific areas through the building or repair of existing transportation networks, incentives

to businesses to relocate, and the provision of social services to residents of nonmetropolitan areas.

# APPENDICES

# APPENDIX I

## MEANS AND STANDARD DEVIATIONS

APPENDIX I

TABLE 14

MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES FOR THE ENTIRE SAMPLE (N=227)[a]

| | Mean | Standard Deviation |
|---|---|---|
| **Variable** | | |
| Net-Migration[b] | .922 | .129 |
| Non-Farm Population Change[b] | 1.080 | .195 |
| Farm Population Change[b] | .841 | .483 |
| **Organization** | | |
| Diversity | .699 | .116 |
| Manufacturing Employment | .142 | .115 |
| Manufacturing Firms | 7.784 | 11.662 |
| Manufacturing Categories | 7.366 | 4.284 |
| Other Farm Income (t)[c] | .775 | .128 |
| College | .010 | .023 |
| Institutionalized | .008 | .016 |
| Military | .002 | .011 |
| Local Government Employment | .031 | .020 |
| Public Administration | .084 | .032 |
| Farm Categories | 5.247 | 1.097 |
| Hotels | 3.595 | 7.707 |
| Amusement Places | 1.370 | 4.630 |
| Female Participation | .276 | .048 |
| Largest Town | 5943.9 | 6900.7 |
| Income Under $3000 (t)[c] | .656 | .113 |
| Unemployment (t)[c] | .957 | .025 |
| Public Relief (t)[c] | .964 | .031 |
| **Environment** | | |
| Nearness to SMSA[d] | 902.180 | 70.093 |
| Nearness to City[d] | 928.079 | 55.346 |
| Federal Outlays[e] | 961.06 | 654.53 |
| Federal Employment | .006 | .005 |

APPENDIX I

TABLE 14 (Continued)

| | Mean | Standard Deviation |
|---|---|---|
| State Revenues[e] | 89.25 | 42.23 |
| Interstate[f] | .308 | .463 |
| Organizational Change | | |
| Change in: | | |
| Largest Town[b] | 1.062 | .173 |
| College[b] | 1.014 | .024 |
| Military[b] | 1.000 | .013 |
| Institutionalized[b] | 1.005 | .011 |
| Female Participation[b] | 1.075 | .044 |
| Manufacturing Employment[b] | 1.031 | .040 |
| Public Administration[b] | 1.021 | .029 |
| Land Use[f] | .163 | .370 |
| Unemployment (t)[c] | 1.002 | .017 |
| Environmental Change | | |
| Change in Farm Size (t)[d,g] | 9909.8 | 173.7 |

[a]All means and standard deviations for variables computed as percentages are given in decimal form.

[b]Due to negative figures 1.000 has been added to yield all positive figures for computational purposes.

[c]Because of the hypothesized negative correlation with net-migration and negative figures, each figure has been multiplied by -1 and 1.000 has been added to yield all positive figures.

[d]Because of hypothesized relationship with net-migration and negative figures, each figure has been multiplied by -1 and 1000. has been added to yield all positive figures.

[e]Figures are in terms of dollars and cents.

[f]This is a binary variable.

[g]Acres have been computed through one decimal place, multiplied by -1 due to hypothesized relationship with net-migration, and 10,000 has been added to yield all positive figures

APPENDIX I

TABLE 15

MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES FOR THE RURAL (AGRICULTURALLY SPECIALIZED) COUNTIES (N=167)[a]

| | Mean | Standard Deviation |
|---|---|---|
| **Variable** | | |
| Net-Migration | .900 | .119 |
| Non-Farm Population Change | 1.067 | .197 |
| Farm Population Change | .786 | .139 |
| **Organization** | | |
| Diversity | .663 | .109 |
| Manufacturing Employment | .099 | .081 |
| Manufacturing Firms | 3.940 | 5.890 |
| Manufacturing Categories | 5.755 | 3.142 |
| Other Farm Income (t) | .802 | .109 |
| College | .008 | .020 |
| Institutionalized | .007 | .015 |
| Military | .002 | .008 |
| Local Government Employment | .033 | .023 |
| Public Administration | .085 | .028 |
| Farm Categories | 5.084 | 1.020 |
| Hotels | 1.707 | 4.620 |
| Amusement Places | .359 | 2.450 |
| Female Participation | .266 | .047 |
| Largest Town | 3884.6 | 3806.1 |
| Income Under $3000 (t) | .623 | .102 |
| Unemployment (t) | .962 | .018 |
| Public Relief (t) | .963 | .031 |
| **Environment** | | |
| Nearness to SMSA | 892.742 | 72.969 |
| Nearness to City | 919.611 | 56.203 |
| Federal Outlays | 1065.09 | 695.03 |

APPENDIX I

TABLE 15 (Continued)

| | Mean | Standard Deviation |
|---|---|---|
| Federal Employment | .007 | .006 |
| State Revenues | 87.71 | 43.76 |
| Interstate | .228 | .421 |
| Organizational Change | | |
| Change in: | | |
| Largest Town | 1.063 | .171 |
| College | 1.012 | .022 |
| Military | 1.000 | .009 |
| Institutionalized | 1.006 | .010 |
| Female Participation | 1.072 | .048 |
| Manufacturing Employment | 1.031 | .040 |
| Public Administration | 1.020 | .030 |
| Land Use | .162 | .369 |
| Unemployment (t) | 1.002 | .017 |
| Environmental Change | | |
| Change in Farm Size (t) | 9896.8 | 185.9 |

[a]See footnotes to Appendix I, Table 13.

APPENDIX I

TABLE 16

MEANS AND STANDARD DEVIATIONS FOR ALL VARIABLES FOR THE URBAN (DIVERSIFIED) COUNTIES (N=60)[a]

| | Mean | Standard Deviation |
|---|---|---|
| **Variable** | | |
| Net-Migration | .983 | .137 |
| Non-Farm Population Change | 1.119 | .185 |
| Farm Population Change | .997 | .897 |
| **Organization** | | |
| Diversity | .798 | .062 |
| Manufacturing Employment | .259 | .118 |
| Manufacturing Firms | 18.483 | 16.282 |
| Manufacturing Categories | 11.850 | 3.835 |
| Other Farm Income (t) | .701 | .146 |
| College | .015 | .030 |
| Institutionalized | .009 | .020 |
| Military | .004 | .016 |
| Local Government Employment | .028 | .006 |
| Public Administration | .081 | .040 |
| Farm Categories | 5.700 | 1.183 |
| Hotels | 8.850 | 11.372 |
| Amusement Places | 4.183 | 7.368 |
| Female Participation | .304 | .041 |
| Largest Town | 11675.6 | 9810.3 |
| Income Under $3000 (t) | .747 | .089 |
| Unemployment (t) | .943 | .035 |
| Public Relief (t) | .968 | .032 |
| **Environment** | | |
| Nearness to SMSA | 928.450 | 53.709 |
| Nearness to City | 951.650 | 45.598 |
| Federal Outlays | 671.56 | 407.45 |

APPENDIX I

TABLE 16 (Continued)

| | Mean | Standard Deviation |
|---|---|---|
| Federal Employment | .004 | .003 |
| State Revenues | 93.54 | 37.66 |
| Interstate | .533 | .503 |
| Organizational Change | | |
| Change in: | | |
| Largest Town | 1.060 | .177 |
| College | 1.020 | .028 |
| Military | 1.001 | .019 |
| Institutionalized | 1.003 | .014 |
| Female Participation | 1.083 | .029 |
| Manufacturing Employment | 1.030 | .041 |
| Public Administration | 1.022 | .024 |
| Land Use | .167 | .376 |
| Unemployment (t) | 1.003 | .018 |
| Environmental Change | | |
| Change in Farm Size (t) | 9946.7 | 84.4 |

[a]See footnotes to Appendix I, Table 13.

# APPENDIX II

# CORRELATION MATRICES

## APPENDIX II

### TABLE 17

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | 1.000 | .670 | .138 | .517 | .516 | .301 | .466 | -.427 |
| Non-Farm Population Change (2) | .670 | 1.000 | -.034 | .150 | .292 | .146 | .210 | -.256 |
| Farm Population Change (3) | .138 | -.034 | 1.000 | .120 | .170 | .139 | .121 | -.029 |
| Organization | | | | | | | | |
| Diversity (4) | .517 | .150 | .120 | 1.000 | .668 | .512 | .751 | -.439 |
| Manufacturing Employment (5) | .516 | .292 | .170 | .668 | 1.000 | .617 | .735 | -.528 |
| Manufacturing Firms (6) | .301 | .146 | .139 | .512 | .617 | 1.000 | .790 | -.143 |
| Manufacturing Categories (7) | .466 | .210 | .121 | .751 | .735 | .790 | 1.000 | -.264 |
| Other Farm Income (t) (8) | -.427 | -.256 | -.029 | -.439 | -.528 | -.143 | -.264 | 1.000 |
| College (9) | .298 | .245 | .014 | .099 | -.016 | .093 | .096 | .005 |
| Institutionalized (10) | .148 | .053 | .084 | .250 | .112 | .219 | .251 | -.052 |
| Military (11) | .050 | .071 | .034 | .084 | -.026 | .048 | .103 | -.075 |
| Local Government Employment (12) | -.295 | -.205 | -.095 | -.088 | -.160 | -.092 | -.041 | .184 |
| Public Administration (13) | .113 | .114 | .039 | -.061 | -.229 | -.146 | -.210 | -.096 |
| Farm Categories (14) | .240 | .166 | .006 | .332 | .424 | .389 | .425 | -.184 |
| Hotels (15) | .250 | .152 | .258 | .335 | .188 | .509 | .438 | -.080 |
| Amusement Places (16) | .059 | -.008 | .054 | .316 | .261 | .671 | .498 | .054 |
| Female Participation (17) | .236 | .091 | .056 | .498 | .286 | .421 | .505 | .039 |
| Largest Town (18) | .158 | .047 | .115 | .458 | .395 | .737 | .648 | -.031 |
| Income Under $3,000 (t) (19) | .156 | .046 | .184 | .394 | .383 | .467 | .479 | .097 |
| Unemployment (t) (20) | -.104 | -.030 | -.076 | -.352 | -.256 | -.062 | -.155 | .471 |
| Public Relief (t) (21) | -.021 | -.168 | .077 | .038 | .044 | .182 | .123 | .355 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .410 | .158 | .018 | .507 | .541 | .336 | .482 | -.209 |
| Nearness to City (23) | .304 | .166 | .068 | .433 | .469 | .400 | .464 | -.085 |
| Federal Outlays (24) | -.379 | -.393 | -.067 | -.519 | -.454 | -.299 | -.453 | .262 |
| Federal Employment (25) | -.192 | -.009 | -.016 | -.234 | -.274 | -.188 | -.239 | .090 |
| State Revenues (26) | .043 | .015 | .032 | .160 | .081 | -.014 | .075 | -.268 |
| Interstate (27) | .181 | .084 | .010 | .282 | .248 | .312 | .369 | -.018 |
| Organizational Changes | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .528 | .460 | -.031 | .125 | .187 | .072 | .122 | -.214 |
| College (29) | .305 | .254 | .019 | .165 | .042 | .162 | .167 | .092 |
| Military (30) | .238 | .180 | .042 | .068 | .100 | .078 | .075 | -.193 |
| Institutionalized (31) | -.179 | .156 | -.074 | -.220 | -.267 | -.174 | -.259 | .157 |
| Female Participation (32) | .082 | -.035 | .068 | .029 | .157 | .117 | .093 | .008 |
| Manufacturing Employment (33) | .065 | .028 | -.001 | .130 | .120 | .014 | .060 | -.103 |
| Public Administration (34) | -.018 | .072 | -.016 | -.014 | -.082 | .022 | .053 | .069 |
| Land Use (35) | .004 | .056 | -.075 | .048 | .076 | -.031 | .021 | -.153 |
| Unemployment (t) (36) | -.056 | -.129 | .048 | .060 | -.041 | -.020 | -.075 | -.085 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .361 | .292 | -.025 | .445 | .323 | .194 | .364 | -.192 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .298 | .148 | .050 | -.295 | .113 | .240 | .250 | .059 |
| Non-Farm Population Change (2) | .245 | .053 | .071 | -.205 | .114 | .166 | .152 | -.008 |
| Farm Population Change (3) | .014 | .084 | .034 | -.095 | .039 | .006 | .258 | .054 |
| Organization | | | | | | | | |
| Diversity (4) | .099 | .250 | .084 | -.088 | -.061 | .332 | .335 | .316 |
| Manufacturing Employment (5) | -.016 | .112 | -.026 | -.160 | -.229 | .424 | .188 | .261 |
| Manufacturing Firms (6) | .093 | .219 | .048 | -.092 | -.146 | .389 | .509 | .671 |
| Manufacturing Categories (7) | .096 | .251 | .103 | -.041 | -.210 | .425 | .438 | .498 |
| Other Farm Income (t) (8) | .005 | -.052 | -.075 | .184 | -.096 | -.184 | -.080 | .054 |
| College (9) | 1.000 | .061 | .132 | -.106 | .585 | -.030 | .450 | .009 |
| Institutionalized (10) | .061 | 1.000 | -.042 | -.105 | -.077 | .165 | .168 | .185 |
| Military (11) | .132 | -.423 | 1.000 | -.031 | .179 | -.080 | .175 | .095 |
| Local Government Employment (12) | -.106 | -.105 | -.031 | 1.000 | -.006 | -.137 | -.084 | -.048 |
| Public Administration (13) | .585 | -.077 | .179 | -.006 | 1.000 | -.163 | .282 | -.119 |
| Farm Categories (14) | -.030 | .165 | -.080 | -.137 | -.163 | 1.000 | .137 | .229 |
| Hotels (15) | .450 | .168 | .175 | -.084 | .282 | .137 | 1.000 | .516 |
| Amusement Places (16) | .009 | .185 | .095 | -.048 | -.119 | .229 | .516 | 1.000 |
| Female Participation (17) | .294 | .134 | .086 | -.081 | -.042 | .192 | .398 | .264 |
| Largest Town (18) | .295 | .234 | .255 | -.042 | .034 | .223 | .635 | .586 |
| Income Under $3,000 (t) (19) | .161 | .156 | .105 | -.111 | -.007 | .141 | .387 | .353 |
| Unemployment (t) (20) | .051 | .042 | -.117 | .019 | -.092 | -.142 | -.177 | -.123 |
| Public Relief (t) (21) | .133 | .069 | .041 | -.224 | -.039 | .097 | .135 | .134 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .085 | .172 | .032 | -.107 | -.210 | .387 | .059 | .120 |
| Nearness to City (23) | .127 | .150 | .050 | -.177 | -.136 | .341 | .182 | .240 |
| Federal Outlays (24) | -.096 | -.120 | .041 | .145 | .087 | -.312 | -.176 | -.161 |
| Federal Employment (25) | -.044 | .157 | .183 | .228 | .207 | -.092 | -.051 | -.117 |
| State Revenues (26) | -.176 | -.084 | .025 | .165 | -.044 | .195 | .065 | -.003 |
| Interstate (27) | .155 | .184 | .103 | .053 | .029 | .181 | .201 | .211 |
| Organizational Changes | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .358 | .075 | .001 | -.184 | .212 | .048 | .173 | -.006 |
| College (29) | .762 | .032 | .122 | -.087 | .416 | .031 | .409 | .095 |
| Military (30) | .205 | .040 | -.232 | -.013 | .240 | .057 | .207 | -.101 |
| Institutionalized (31) | -.053 | -.664 | -.042 | .107 | .104 | -.118 | -.142 | -.102 |
| Female Participation (32) | .031 | .096 | -.048 | .035 | .040 | -.057 | .049 | .004 |
| Manufacturing Employment (33) | -.238 | -.113 | -.110 | .075 | -.226 | .061 | -.216 | -.133 |
| Public Administration (34) | .270 | .134 | .204 | .043 | .026 | -.004 | .223 | .105 |
| Land Use (35) | -.103 | -.054 | .028 | .152 | -.048 | -.012 | -.043 | -.053 |
| Unemployment (t) (36) | -.087 | -.091 | -.011 | -.130 | .041 | .002 | -.032 | .028 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .058 | .093 | .038 | -.021 | -.215 | .313 | .093 | .077 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .236 | .158 | .156 | -.104 | -.021 | .410 | .304 | -.379 |
| Non-Farm Population Change (2) | .091 | .047 | .046 | -.030 | -.168 | .158 | .166 | -.393 |
| Farm Population Change (3) | .056 | .115 | .184 | -.076 | .077 | .018 | .068 | -.067 |
| Organization | | | | | | | | |
| Diversity (4) | .498 | .458 | .394 | -.352 | .038 | .507 | .433 | -.519 |
| Manufacturing Employment (5) | .286 | .395 | .383 | -.256 | .044 | .541 | .469 | -.454 |
| Manufacturing Firms (6) | .421 | .737 | .467 | -.062 | .182 | .336 | .400 | -.299 |
| Manufacturing Categories (7) | .505 | .648 | .479 | -.155 | .123 | .482 | .464 | -.453 |
| Other Farm Income (t) (8) | .039 | -.031 | .097 | .471 | .355 | -.209 | -.085 | .262 |
| College (9) | .294 | .295 | .161 | .051 | .133 | .085 | .127 | -.096 |
| Institutionalized (10) | .134 | .234 | .156 | .042 | .069 | .172 | .150 | -.120 |
| Military (11) | .086 | .255 | .105 | -.117 | .041 | .032 | .050 | .041 |
| Local Government Employment (12) | -.081 | -.042 | .111 | .019 | -.224 | -.107 | -.177 | .145 |
| Public Administration (13) | -.042 | .034 | -.007 | -.092 | -.039 | -.210 | -.136 | .087 |
| Farm Categories (14) | .192 | .223 | .141 | -.142 | .097 | .387 | .341 | -.312 |
| Hotels (15) | .398 | .635 | .387 | -.177 | .135 | .059 | .182 | -.176 |
| Amusement Places (16) | .264 | .586 | .353 | -.123 | .134 | .120 | .240 | -.161 |
| Female Participation (17) | 1.000 | .465 | .457 | .002 | .379 | .221 | .270 | -.387 |
| Largest Town (18) | .465 | 1.000 | .496 | -.051 | .162 | .232 | .363 | -.248 |
| Income Under $3,000 (t) (19) | .457 | .496 | 1.000 | -.024 | .564 | .041 | .102 | -.015 |
| Unemployment (t) (20) | .002 | -.051 | -.024 | 1.000 | .205 | -.094 | -.073 | .206 |
| Public Relief (t) (21) | .379 | .162 | .564 | .205 | 1.000 | .085 | .100 | .055 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .221 | .232 | .041 | -.094 | .085 | 1.000 | .765 | -.446 |
| Nearness to City (23) | .270 | .363 | .102 | -.073 | .100 | .765 | 1.000 | -.490 |
| Federal Outlays (24) | -.387 | -.248 | -.015 | .206 | .055 | -.446 | -.490 | 1.000 |
| Federal Employment (25) | -.101 | -.108 | -.127 | .014 | -.138 | -.229 | -.181 | .208 |
| State Revenues (26) | .052 | -.118 | .045 | -.300 | -.052 | .026 | -.107 | -.014 |
| Interstate (27) | .299 | .317 | .262 | -.082 | .058 | .274 | .302 | -.151 |
| Organizational Changes | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .101 | .034 | -.064 | .086 | -.122 | .134 | .073 | -.162 |
| College (29) | .293 | .300 | .223 | .016 | .156 | .056 | .113 | -.159 |
| Military (30) | .090 | -.044 | .050 | -.106 | .037 | .001 | -.037 | .009 |
| Institutionalized (31) | -.050 | -.165 | -.147 | .054 | -.009 | -.174 | -.183 | .169 |
| Female Participation (32) | -.343 | .060 | .237 | .043 | .041 | .002 | -.068 | .159 |
| Manufacturing Employment (33) | .009 | -.190 | -.168 | .038 | -.112 | .186 | .147 | -.188 |
| Public Administration (34) | .135 | .115 | .105 | -.199 | .026 | -.067 | -.060 | -.004 |
| Land Use (35) | -.067 | -.055 | -.102 | -.064 | -.181 | .012 | .016 | -.037 |
| Unemployment (t) (36) | .058 | -.033 | .015 | -.457 | .122 | .035 | -.001 | -.039 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .277 | .170 | -.008 | -.001 | .037 | .497 | .386 | -.494 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | -.192 | .043 | .181 | .528 | .305 | .238 | -.179 | .082 |
| Non-Farm Population Change (2) | -.009 | .015 | .084 | .460 | .254 | .180 | .156 | -.035 |
| Farm Population Change (3) | -.016 | .032 | .010 | -.031 | .019 | .042 | -.074 | .068 |
| Organization | | | | | | | | |
| Diversity (4) | -.234 | .160 | .282 | .125 | .165 | .068 | -.220 | .029 |
| Manufacturing Employment (5) | -.274 | .081 | .248 | .187 | .042 | .100 | -.267 | .157 |
| Manufacturing Firms (6) | -.188 | -.014 | .312 | .072 | .162 | .078 | -.174 | .117 |
| Manufacturing Categories (7) | -.239 | .075 | .369 | .122 | .167 | .075 | -.259 | .093 |
| Other Farm Income (t) (8) | .090 | -.268 | -.018 | -.214 | .092 | -.193 | .157 | .008 |
| College (9) | -.044 | -.176 | .155 | .358 | .762 | .205 | -.053 | .031 |
| Institutionalized (10) | .157 | -.084 | .184 | .075 | .032 | .040 | -.664 | .096 |
| Military (11) | .183 | .025 | .103 | .001 | .122 | -.232 | -.042 | -.048 |
| Local Government Employment (12) | .228 | .165 | .053 | -.184 | -.087 | -.013 | .107 | .035 |
| Public Administration (13) | .207 | -.442 | .029 | .212 | .416 | .240 | .104 | .040 |
| Farm Categories (14) | -.092 | .195 | .181 | .048 | .031 | .057 | -.118 | -.057 |
| Hotels (15) | -.051 | .065 | .201 | .173 | .409 | .207 | -.142 | .049 |
| Amusement Places (16) | -.117 | -.003 | .211 | -.006 | .095 | -.101 | -.102 | .004 |
| Female Participation (17) | -.101 | .052 | .299 | .101 | .293 | .090 | -.050 | -.343 |
| Largest Town (18) | -.108 | -.118 | .317 | .034 | .300 | -.044 | -.165 | .060 |
| Income Under $3,000 (t) (19) | -.127 | .045 | .262 | -.064 | .223 | .050 | -.147 | .237 |
| Unemployment (t) (20) | .014 | -.300 | -.082 | .058 | .016 | -.106 | .054 | .043 |
| Public Relief (t) (21) | -.138 | -.052 | .086 | -.122 | .156 | .037 | -.009 | .041 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | -.229 | .026 | .274 | .302 | .056 | .001 | -.174 | .002 |
| Nearness to City (23) | -.181 | -.107 | .134 | .073 | .113 | -.037 | -.183 | -.068 |
| Federal Outlays (24) | .208 | -.014 | -.151 | -.162 | -.159 | .009 | .169 | .159 |
| Federal Employment (25) | 1.000 | -.041 | -.069 | -.087 | -.039 | .063 | -.069 | -.053 |
| State Revenues (26) | -.041 | 1.000 | .037 | -.077 | -.140 | .057 | .058 | -.002 |
| Interstate (27) | -.069 | .037 | 1.000 | .097 | .131 | -.061 | -.021 | .089 |
| Organizational Changes | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | -.087 | -.077 | .097 | 1.000 | .382 | .081 | -.128 | .056 |
| College (29) | -.039 | -.140 | .131 | .382 | 1.000 | .080 | -.051 | .115 |
| Military (30) | .063 | .057 | -.061 | .081 | .080 | 1.000 | -.087 | -.048 |
| Institutionalized (31) | -.069 | .058 | -.021 | -.128 | -.051 | -.087 | 1.000 | -.169 |
| Female Participation (32) | -.053 | -.002 | .089 | .056 | .115 | -.048 | -.169 | 1.000 |
| Manufacturing Employment (33) | -.087 | .108 | -.014 | .054 | -.268 | -.081 | -.055 | .057 |
| Public Administration (34) | .200 | .078 | .077 | .089 | .412 | .035 | -.190 | .065 |
| Land Use (35) | .004 | .061 | -.036 | .132 | -.010 | .039 | -.009 | .022 |
| Unemployment (t) (36) | -.074 | .007 | -.057 | -.112 | -.011 | -.020 | .150 | -.180 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | -.333 | .156 | .110 | .146 | .109 | .016 | -.027 | -.277 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Net-Migration (1) | .065 | -.018 | .004 | -.056 | .361 |
| Non-Farm Population Change (2) | .028 | .072 | .056 | -.129 | .292 |
| Farm Population Change (3) | -.001 | -.016 | -.075 | .048 | -.025 |
| Organization | | | | | |
| Diversity (4) | .130 | -.014 | .048 | .060 | .445 |
| Manufacturing Employment (5) | .120 | -.082 | .076 | -.041 | .323 |
| Manufacturing Firms (6) | .014 | .022 | -.031 | -.020 | .194 |
| Manufacturing Categories (7) | .060 | .053 | .021 | -.075 | .364 |
| Other Farm Income (t) (8) | -.103 | .069 | -.153 | -.085 | -.192 |
| College (9) | -.238 | .270 | -.103 | -.087 | .058 |
| Institutionalized (10) | -.113 | .134 | -.054 | -.091 | .093 |
| Military (11) | -.110 | .204 | .028 | -.011 | .038 |
| Local Government Employment (12) | .075 | .043 | .152 | -.130 | -.021 |
| Public Administration (13) | -.226 | .026 | -.048 | .041 | -.215 |
| Farm Categories (14) | .061 | -.004 | -.012 | .002 | .313 |
| Hotels (15) | -.216 | .223 | -.043 | -.032 | .093 |
| Amusement Places (16) | -.133 | .105 | -.053 | .028 | .077 |
| Female Participation (17) | .009 | .135 | -.067 | .058 | .277 |
| Largest Town (18) | -.190 | .115 | -.055 | -.033 | .170 |
| Income Under $3,000 (t) (19) | -.168 | .105 | -.102 | .015 | -.008 |
| Unemployment (t) (20) | .038 | -.199 | -.064 | -.457 | -.001 |
| Public Relief (t) (21) | -.112 | .026 | -.181 | .122 | .037 |

(Continued)

## APPENDIX II

### TABLE 17 (Continued)

ZERO-ORDER CORRELATIONS FOR TOTAL SAMPLE (N=227)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Environment | | | | | |
| Nearness to SMSA (22) | .186 | -.067 | .012 | .035 | .497 |
| Nearness to City (23) | .147 | -.060 | .016 | -.001 | .386 |
| Federal Outlays (24) | -.188 | -.004 | -.037 | -.039 | -.494 |
| Federal Employment (25) | -.087 | .200 | .004 | -.074 | -.333 |
| State Revenues (26) | .108 | .078 | .061 | .007 | .156 |
| Interstate (27) | -.014 | .077 | -.036 | -.057 | .110 |
| Organizational Changes | | | | | |
| Change in: | | | | | |
| Largest Town (28) | .054 | .089 | .132 | -.112 | .146 |
| College (29) | -.268 | .412 | -.010 | -.011 | .109 |
| Military (30) | -.081 | .035 | .039 | -.020 | .016 |
| Institutionalized (31) | -.055 | -.190 | -.009 | .150 | -.027 |
| Female Participation (32) | .057 | .065 | .022 | -.180 | -.277 |
| Manufacturing Employment (33) | 1.000 | -.229 | .074 | -.191 | .127 |
| Public Administration (34) | -.229 | 1.000 | -.068 | .025 | -.085 |
| Land Use (35) | .074 | -.068 | 1.000 | -.010 | .069 |
| Unemployment (t) (36) | -.191 | .025 | -.010 | 1.000 | -.071 |
| Environmental Change | | | | | |
| Change in Farm Size (t) (37) | .127 | -.085 | .069 | -.071 | 1.000 |

## APPENDIX II

### TABLE 18

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | 1.000 | .573 | .270 | .503 | .532 | .276 | .445 | -.420 |
| Non-Farm Population Change (2) | .573 | 1.000 | .000 | .090 | .274 | .148 | .170 | -.250 |
| Farm Population Change (3) | .270 | .000 | 1.000 | .096 | .143 | .158 | .102 | .043 |
| Organization | | | | | | | | |
| Diversity (4) | .503 | .090 | .096 | 1.000 | .710 | .466 | .719 | -.406 |
| Manufacturing Employment (5) | .532 | .274 | .143 | .710 | 1.000 | .517 | .639 | -.524 |
| Manufacturing Firms (6) | .276 | .148 | .158 | .466 | .517 | 1.000 | .690 | -.114 |
| Manufacturing Categories (7) | .445 | .170 | .102 | .719 | .639 | .690 | 1.000 | -.202 |
| Other Farm Income (t) (8) | -.420 | -.250 | .043 | -.406 | -.524 | -.114 | -.202 | 1.000 |
| College (9) | .262 | .205 | .102 | .074 | -.018 | .062 | .070 | .061 |
| Institutionalized (10) | .190 | .066 | .153 | .264 | .109 | .120 | .267 | -.107 |
| Military (11) | .106 | .095 | .107 | .056 | .037 | .090 | .105 | -.114 |
| Local Government Employment (12) | -.319 | -.205 | -.307 | -.049 | -.157 | -.031 | .051 | .202 |
| Public Adminstration (13) | .029 | .047 | .117 | -.055 | -.209 | -.167 | -.231 | -.041 |
| Farm Categories (14) | .210 | .153 | -.005 | .262 | .296 | .234 | .270 | -.168 |
| Hotels (15) | .180 | .145 | .245 | .233 | .152 | .528 | .362 | .029 |
| Amusement Places (16) | .052 | .005 | .061 | .191 | .216 | .609 | .339 | .025 |
| Female Participation (17) | .163 | .023 | .028 | .462 | .171 | .282 | .384 | .040 |
| Largest Town (18) | .173 | .061 | .179 | .466 | .302 | .782 | .592 | .051 |
| Income Under $3000 (t) (19) | .086 | -.009 | .360 | .276 | .107 | .248 | .256 | .261 |
| Unemployment (t) (20) | -.087 | -.067 | -.177 | -.353 | -.364 | -.195 | -.239 | .340 |
| Public Relief (t) (21) | -.123 | -.320 | .283 | .022 | -.124 | .039 | .003 | .425 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .400 | .106 | .040 | .511 | .546 | .291 | .481 | -.178 |
| Nearness to City (23) | .301 | .158 | .037 | .389 | .430 | .318 | .380 | -.046 |
| Federal Outlays (24) | -.376 | -.429 | .017 | -.519 | -.441 | -.285 | -.427 | .243 |
| Federal Employment (25) | -.201 | .000 | -.028 | -.199 | -.217 | -.123 | -.191 | .060 |
| State Revenues (26) | .003 | -.007 | -.056 | .159 | .088 | .129 | .181 | -.196 |
| Interstate (27) | .125 | .029 | .077 | .198 | .051 | .113 | .225 | .032 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .501 | .380 | .072 | .155 | .213 | .055 | .119 | -.288 |
| College (29) | .301 | .236 | .116 | .152 | .016 | .111 | .131 | .089 |
| Military (30) | .079 | .044 | .115 | .098 | .113 | .079 | .132 | -.140 |
| Institutionalized (31) | -.230 | -.189 | -.196 | -.233 | -.348 | -.207 | -.332 | .208 |
| Female Participation (32) | .100 | -.055 | .215 | .000 | .101 | .053 | .023 | .020 |
| Manufacturing Employment (33) | .142 | .078 | -.153 | .163 | .210 | .073 | .129 | -.194 |
| Public Administration (34) | .019 | .120 | .028 | -.006 | -.043 | .078 | .104 | .033 |
| Land Use (35) | -.039 | .032 | -.198 | .045 | .012 | -.009 | .009 | -.057 |
| Unemployment (t) (36) | .002 | -.078 | .063 | .084 | -.013 | -.043 | -.074 | -.033 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .330 | .270 | -.218 | .450 | .339 | .211 | .400 | -.173 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .262 | .190 | .106 | -.319 | .029 | .210 | .180 | .052 |
| Non-Farm Population Change (2) | .205 | .066 | .095 | -.205 | .047 | .153 | .145 | .005 |
| Farm Population Change (3) | .102 | .153 | .107 | -.307 | .117 | -.005 | .245 | .061 |
| Organization | | | | | | | | |
| Diversity (4) | .074 | .264 | .056 | -.049 | -.055 | .262 | .233 | .191 |
| Manufacturing Employment (5) | -.018 | .109 | .037 | -.157 | -.209 | .296 | .152 | .216 |
| Manufacturing Firms (6) | .062 | .120 | .090 | -.031 | -.167 | .234 | .528 | .609 |
| Manufacturing Categories (7) | .070 | .267 | .105 | .051 | -.231 | .270 | .362 | .339 |
| Other Farm Income (t) (8) | .061 | -.107 | -.114 | .202 | -.041 | -.168 | .029 | .025 |
| College (9) | 1.000 | .046 | .270 | -.094 | .442 | -.030 | .277 | .098 |
| Institutionalized (10) | .046 | 1.000 | -.025 | -.096 | -.084 | .140 | .149 | -.016 |
| Military (11) | .270 | -.025 | 1.000 | -.046 | .231 | -.027 | -.023 | -.007 |
| Local Government Employment (12) | -.094 | -.096 | -.046 | 1.000 | -.007 | -.134 | -.066 | -.035 |
| Public Administration (13) | .442 | -.084 | .231 | -.007 | 1.000 | -.127 | .058 | -.089 |
| Farm Categories (14) | -.030 | .140 | -.027 | -.134 | -.127 | 1.000 | .188 | .067 |
| Hotels (15) | .277 | .149 | .098 | -.066 | .058 | .188 | 1.000 | .438 |
| Amusement Places (16) | -.023 | -.016 | -.007 | -.035 | -.089 | .067 | .438 | 1.000 |
| Female Participation (17) | .209 | .141 | .068 | -.051 | -.096 | .131 | .249 | .095 |
| Largest Town (18) | .230 | .281 | .194 | .032 | -.092 | .141 | .635 | .490 |
| Income Under $3000 (t) (19) | .122 | .164 | .077 | -.088 | .079 | .037 | .283 | .177 |
| Unemployment (t) (20) | .015 | -.016 | -.094 | .032 | -.033 | -.230 | -.220 | -.065 |
| Public Relief (t) (21) | .119 | .043 | .033 | -.245 | .001 | .090 | .135 | .079 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .079 | .194 | .038 | -.080 | -.237 | .361 | .014 | .047 |
| Nearness to City (23) | .102 | .129 | .002 | -.157 | -.161 | .282 | .107 | .144 |
| Federal Outlays (24) | -.087 | -.122 | .034 | .124 | .078 | -.263 | -.147 | -.087 |
| Federal Employment (25) | -.032 | .173 | .139 | .227 | .247 | -.048 | -.012 | -.079 |
| State Revenues (26) | -.193 | -.040 | .012 | .153 | -.122 | .238 | .174 | .064 |
| Interstate (27) | .176 | .240 | .134 | .109 | .118 | .096 | .100 | -.021 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .334 | .033 | .118 | -.207 | .159 | -.024 | .099 | -.022 |
| College (29) | .752 | .012 | .260 | -.079 | .367 | -.053 | .344 | -.016 |
| Military (30) | -.030 | .071 | -.124 | .026 | .036 | .170 | .093 | .016 |
| Institutionalized (31) | -.044 | -.602 | -.048 | .076 | .114 | -.118 | -.158 | -.027 |
| Female Participation (32) | .027 | .112 | -.019 | .047 | .138 | -.109 | .043 | .000 |
| Manufacturing Employment (33) | -.216 | -.154 | -.109 | .088 | -.169 | .105 | -.197 | -.057 |
| Public Administration (34) | .309 | .082 | .332 | .056 | -.011 | .006 | .269 | -.006 |
| Land Use (35) | -.068 | -.012 | -.054 | .179 | -.018 | -.036 | -.032 | .069 |
| Unemployment (t) (36) | -.028 | -.105 | -.058 | -.158 | .075 | .042 | -.038 | -.025 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .048 | .098 | .044 | -.009 | -.336 | .305 | .080 | .050 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .163 | .173 | .086 | -.087 | -.123 | .400 | .301 | -.376 |
| Non-Farm Population Change (2) | .023 | .061 | -.009 | -.067 | -.320 | .106 | .158 | -.429 |
| Farm Population Change (3) | .028 | .179 | .360 | -.177 | .283 | .040 | .037 | .017 |
| Organization | | | | | | | | |
| Diversity (4) | .462 | .466 | .276 | -.353 | .022 | .511 | .389 | -.519 |
| Manufacturing Employment (5) | .171 | .302 | .107 | -.364 | -.124 | .546 | .430 | -.441 |
| Manufacturing Firms (6) | .282 | .782 | .248 | -.195 | .039 | .291 | .318 | -.285 |
| Manufacturing Categories (7) | .384 | .592 | .256 | -.239 | .003 | .481 | .380 | -.427 |
| Other Farm Income (t) (8) | .040 | .051 | .261 | .340 | .425 | -.178 | -.046 | .243 |
| College (9) | .209 | .230 | .122 | .015 | .119 | .079 | .038 | -.087 |
| Institutionalized (10) | .141 | .281 | .164 | -.016 | .043 | .194 | .129 | -.122 |
| Military (11) | .068 | .194 | .077 | -.094 | .033 | .102 | .002 | .034 |
| Local Government Employment (12) | -.051 | .032 | -.088 | .032 | -.245 | -.080 | -.157 | .124 |
| Public Administration (13) | -.096 | -.092 | .079 | -.033 | .001 | -.237 | -.161 | .078 |
| Farm Categories (14) | .131 | .141 | .037 | -.230 | .090 | .361 | .282 | -.263 |
| Hotels (15) | .249 | .635 | .283 | -.220 | .135 | .014 | .107 | -.147 |
| Amusement Places (16) | .095 | .490 | .177 | -.065 | .079 | .047 | .144 | -.087 |
| Female Participation (17) | 1.000 | .356 | .291 | -.097 | .332 | .167 | .189 | -.353 |
| Largest Town (18) | .356 | 1.000 | .317 | -.229 | .077 | .200 | .243 | -.262 |
| Income Under $3000 (t) (19) | .291 | .317 | 1.000 | .051 | .567 | -.105 | -.065 | .169 |
| Unemployment (t) (20) | -.097 | -.229 | .051 | 1.000 | .128 | -.130 | -.149 | .264 |
| Public Relief (t) (21) | .332 | .077 | .567 | .128 | 1.000 | .008 | .037 | .159 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .167 | .200 | -.105 | -.130 | .008 | 1.000 | .744 | -.457 |
| Nearness to City (23) | .189 | .243 | -.065 | -.149 | .037 | .744 | 1.000 | -.522 |
| Federal Outlays (24) | -.353 | -.262 | .169 | .264 | .159 | -.457 | -.522 | 1.000 |
| Federal Employment (25) | -.037 | -.047 | -.041 | -.055 | -.169 | -.205 | -.152 | .152 |
| State Revenues (26) | .150 | -.013 | .111 | -.100 | .033 | .052 | -.076 | -.018 |
| Interstate (27) | .251 | .196 | .165 | -.017 | .058 | .183 | .183 | -.105 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .062 | .026 | -.120 | -.009 | -.238 | .116 | .063 | -.186 |
| College (29) | .185 | .303 | .186 | -.099 | .127 | .026 | .076 | -.134 |
| Military (30) | .117 | .046 | .081 | -.138 | -.014 | -.048 | -.074 | -.008 |
| Institutionalized (31) | .036 | -.252 | -.104 | .141 | .090 | -.186 | -.159 | .157 |
| Female Participation (32) | -.507 | .029 | .172 | .036 | -.026 | -.013 | -.102 | .228 |
| Manufacturing Employment (33) | .021 | -.149 | -.192 | .015 | -.183 | .202 | .187 | -.213 |
| Public Administration (34) | .139 | .217 | .097 | -.262 | .012 | -.067 | -.066 | .012 |
| Land Use (35) | -.051 | -.002 | -.150 | .026 | -.271 | .009 | .036 | -.045 |
| Unemployment (t) (36) | .174 | -.010 | .042 | -.421 | .231 | .049 | .019 | -.056 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .284 | .214 | -.076 | .012 | -.007 | .501 | .370 | -.532 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | -.201 | .003 | .125 | .501 | .301 | .079 | -.230 | .100 |
| Non-Farm Population Change (2) | .000 | -.007 | .029 | .380 | .236 | .044 | -.189 | -.055 |
| Farm Population Change (3) | -.028 | -.056 | .077 | .072 | .116 | .115 | -.196 | .215 |
| Organization | | | | | | | | |
| Diversity (4) | -.199 | .159 | .198 | .155 | .152 | .098 | -.233 | .000 |
| Manufacturing Employment (5) | -.217 | .088 | .051 | .213 | .016 | .113 | -.348 | .101 |
| Manufacturing Firms (6) | -.123 | .129 | .113 | .055 | .111 | .079 | -.207 | .053 |
| Manufacturing Categories (7) | -.191 | .181 | .225 | .119 | .131 | .132 | -.332 | .023 |
| Other Farm Income (t) (8) | .060 | -.196 | .032 | -.288 | .089 | -.140 | .208 | .020 |
| College (9) | -.032 | -.193 | .176 | .334 | .752 | -.030 | -.044 | .027 |
| Institutionalized (10) | .173 | -.040 | .240 | .033 | .012 | .071 | -.602 | .112 |
| Military (11) | .139 | .012 | .134 | .118 | .260 | -.124 | -.048 | -.019 |
| Local Government Employment (12) | .227 | .153 | .109 | -.207 | -.079 | .026 | .076 | .047 |
| Public Administration (13) | .247 | -.122 | .118 | .159 | .367 | .036 | .114 | .138 |
| Farm Categories (14) | -.048 | .238 | .096 | -.024 | -.053 | .170 | -.118 | -.109 |
| Hotels (15) | -.012 | .174 | .100 | .099 | .344 | .093 | .016 | .043 |
| Amusement Places (16) | -.079 | .064 | -.021 | -.022 | -.016 | -.158 | -.027 | .000 |
| Female Participation (17) | -.037 | .150 | .251 | .062 | .185 | .117 | .036 | -.507 |
| Largest Town (18) | -.047 | -.013 | .196 | .026 | .303 | .046 | -.252 | .029 |
| Income Under $3000 (t) (19) | -.041 | .111 | .165 | -.120 | .186 | .081 | -.104 | .172 |
| Unemployment (t) (20) | -.055 | -.100 | -.017 | -.009 | -.099 | -.138 | .141 | .036 |
| Public Relief (t) (21) | -.169 | .033 | .058 | -.238 | .127 | -.014 | .090 | -.026 |

(Continued)

APPENDIX II

TABLE 18 (Continued)

ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | -.205 | .052 | .183 | .116 | .026 | -.048 | -.186 | -.013 |
| Nearness to City (23) | -.152 | -.076 | .183 | .063 | .076 | -.074 | -.159 | -.102 |
| Federal Outlays (24) | .152 | -.018 | -.105 | -.186 | -.134 | -.008 | .157 | .228 |
| Federal Employment (25) | 1.000 | -.053 | .022 | -.108 | .005 | .093 | -.065 | -.015 |
| State Revenues (26) | -.053 | 1.000 | .071 | -.084 | -.136 | .073 | .017 | .016 |
| Interstate (27) | .022 | .071 | 1.000 | .048 | .111 | .052 | -.012 | .039 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | -.108 | -.084 | .048 | 1.000 | .400 | -.028 | -.173 | .050 |
| College (29) | .005 | -.136 | .111 | .400 | 1.000 | -.046 | -.046 | .117 |
| Military (30) | .093 | .073 | .052 | -.028 | -.046 | 1.000 | -.119 | -.072 |
| Institutionalized (31) | -.065 | .017 | -.012 | -.173 | -.046 | -.119 | 1.000 | -.194 |
| Female Participation (32) | -.015 | .016 | .039 | .050 | .117 | -.072 | -.194 | 1.000 |
| Manufacturing Employment (33) | -.109 | .158 | .008 | .133 | -.272 | .011 | -.028 | .034 |
| Public Administration (34) | .229 | .122 | .058 | .138 | .461 | .039 | -.154 | .045 |
| Land Use (35) | -.033 | .019 | -.044 | .175 | .081 | -.006 | .027 | .007 |
| Unemployment (t) (36) | -.099 | -.046 | -.075 | -.027 | .099 | -.073 | .205 | -.222 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | -.370 | .156 | .074 | .109 | .068 | -.108 | -.108 | -.319 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Net-Migration (1) | .142 | .019 | -.039 | .002 | .330 |
| Non-Farm Population Change (2) | .078 | .120 | .032 | -.078 | .270 |
| Farm Population Change (3) | -.153 | .028 | -.198 | .063 | -.218 |
| Organization | | | | | |
| Diversity (4) | .163 | -.006 | .045 | .084 | .450 |
| Manufacturing Employment (5) | .210 | -.043 | .012 | -.013 | .339 |
| Manufacturing Firms (6) | .073 | .078 | -.009 | -.043 | .211 |
| Manufacturing Categories (7) | .129 | .104 | .009 | -.074 | .400 |
| Other Farm Income (t) (8) | -.194 | .033 | -.057 | -.033 | -.173 |
| College (9) | -.216 | .309 | -.068 | -.028 | .048 |
| Institutionalized (10) | -.154 | .082 | -.012 | -.105 | .098 |
| Military (11) | -.109 | .332 | -.054 | -.058 | .044 |
| Local Government Employment (12) | .088 | .056 | .179 | -.158 | -.009 |
| Public Administration (13) | -.169 | -.011 | -.018 | .075 | -.336 |
| Farm Categories (14) | .105 | .006 | -.036 | .042 | .305 |
| Hotels (15) | -.197 | .269 | -.032 | -.038 | .080 |
| Amusement Places (16) | -.057 | -.006 | .069 | -.025 | .050 |
| Female Participation (17) | .021 | .139 | -.051 | .174 | .284 |
| Largest Town (18) | -.149 | .217 | -.002 | -.010 | .214 |
| Income Under $3000 (t) (19) | -.192 | .097 | -.150 | .042 | -.076 |
| Unemployment (t) (20) | .015 | -.262 | .026 | -.421 | .012 |
| Public Relief (t) (21) | -.183 | .012 | -.271 | .231 | -.007 |

(Continued)

## APPENDIX II

### TABLE 18 (Continued)

### ZERO-ORDER CORRELATIONS FOR RURAL (AGRICULTURALLY SPECIALIZED) SUB-SAMPLE (167 COUNTIES)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Environment | | | | | |
| Nearness to SMSA (22) | .202 | -.067 | .009 | .049 | .501 |
| Nearness to City (23) | .187 | -.066 | .036 | .019 | .370 |
| Federal Outlays (24) | -.213 | .012 | -.045 | -.056 | -.532 |
| Federal Employment (25) | -.109 | .229 | -.033 | -.099 | -.370 |
| State Revenues (26) | .158 | .122 | .019 | -.046 | .156 |
| Interstate (27) | .008 | .058 | -.044 | -.075 | .074 |
| Organizational Change | | | | | |
| Change in: | | | | | |
| Largest Town (28) | .133 | .138 | .175 | -.027 | .109 |
| College (29) | -.272 | .461 | .081 | .099 | .068 |
| Military (30) | .011 | .039 | -.006 | -.073 | -.108 |
| Institutionalized (31) | -.028 | -.154 | .027 | .205 | -.108 |
| Female Participation (32) | .034 | .045 | .007 | -.222 | -.319 |
| Manufacturing Employment (33) | 1.000 | -.226 | .055 | -.284 | .119 |
| Public Administration (34) | -.226 | 1.000 | -.062 | -.002 | -.088 |
| Land Use (35) | .055 | -.062 | 1.000 | -.024 | .073 |
| Unemployment (t) (36) | -.284 | -.002 | -.024 | 1.000 | -.135 |
| Environmental Change | | | | | |
| Change in Farm Size (t) (37) | .119 | -.088 | .073 | -.135 | 1.000 |

## APPENDIX II

### TABLE 19

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | 1.000 | .929 | .059 | .328 | .329 | .132 | .271 | -.270 |
| Non-Farm Population Change (2) | .929 | 1.000 | -.123 | .198 | .313 | .077 | .198 | -.199 |
| Farm Population Change (3) | .059 | -.123 | 1.000 | .004 | .064 | .023 | -.038 | .057 |
| Organization | | | | | | | | |
| Diversity (4) | .328 | .198 | .004 | 1.000 | .066 | .326 | .470 | -.104 |
| Manufacturing Employment (5) | .329 | .313 | .064 | .066 | 1.000 | .396 | .470 | -.280 |
| Manufacturing Firms (6) | .132 | .077 | .023 | .326 | .396 | 1.000 | .783 | .206 |
| Manufacturing Categories (7) | .271 | .198 | -.038 | .470 | .470 | .783 | 1.000 | .183 |
| Other Farm Income (t) (8) | -.270 | -.199 | .057 | -.104 | -.280 | .206 | .183 | 1.000 |
| College (9) | .300 | .307 | -.048 | -.071 | -.255 | .002 | -.062 | .047 |
| Institutionalized (10) | .045 | .005 | .074 | .318 | .086 | .331 | .298 | .076 |
| Military (11) | -.068 | .023 | .001 | .057 | -.230 | -.042 | .023 | .017 |
| Local Government Employment (12) | -.260 | -.266 | -.015 | -.021 | -.134 | -.258 | -.207 | .063 |
| Public Administration (13) | .309 | .282 | .042 | -.016 | -.313 | -.142 | -.239 | -.236 |
| Farm Categories (14) | .125 | .116 | -.078 | .226 | .461 | .435 | .532 | .003 |
| Hotels (15) | .149 | .108 | .206 | .128 | -.276 | .309 | .185 | .120 |
| Amusement Places (16) | -.142 | -.135 | -.031 | .257 | -.048 | .603 | .461 | .366 |
| Female Participation (17) | .131 | .159 | -.041 | .072 | -.043 | .412 | .432 | .533 |
| Largest Town (18) | -.122 | -.104 | -.004 | .109 | .015 | .583 | .477 | .297 |
| Income Under $3000 (t) (19) | -.154 | -.023 | .056 | -.271 | .181 | .405 | .266 | .503 |
| Unemployment (t) (20) | .085 | .129 | .023 | -.017 | .220 | .340 | .450 | .483 |
| Public Relief (t) (21) | .150 | .243 | .008 | -.094 | .241 | .349 | .325 | .381 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .303 | .263 | -.092 | .197 | .553 | .354 | .392 | -.060 |
| Nearness to City (23) | .110 | .082 | .025 | .230 | .410 | .464 | .491 | .138 |
| Federal Outlays (24) | -.194 | -.150 | -.063 | .017 | -.317 | -.177 | -.286 | .034 |
| Federal Employment (25) | .060 | .089 | .094 | .187 | -.235 | -.154 | -.058 | -.095 |
| State Revenues (26) | .096 | .056 | .074 | .117 | -.012 | -.299 | -.307 | -.449 |
| Interstate (27) | .071 | .112 | -.116 | .041 | .159 | .287 | .297 | .204 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .679 | .711 | -.089 | .154 | .309 | .150 | .265 | -.122 |
| College (29) | .230 | .259 | -.059 | -.060 | -.180 | .094 | .023 | .271 |
| Military (30) | .450 | .406 | .022 | -.014 | .085 | .063 | -.008 | -.253 |
| Institutionalized (31) | -.011 | -.049 | -.023 | -.073 | -.094 | -.089 | -.080 | -.007 |
| Female Participation (32) | -.129 | -.017 | -.009 | -.307 | .193 | .142 | .063 | .170 |
| Manufacturing Employment (33) | -.092 | -.111 | .070 | .184 | .091 | -.009 | .008 | .038 |
| Public Administration (34) | -.175 | -.127 | -.069 | -.221 | -.353 | -.087 | -.138 | .237 |
| Land Use (35) | .103 | .126 | -.070 | .091 | .244 | -.083 | .053 | -.380 |
| Unemployment (t) (36) | -.226 | -.288 | .057 | -.084 | -.182 | -.053 | -.223 | -.171 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .587 | .475 | -.007 | .585 | .446 | .224 | .452 | -.247 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .300 | .045 | -.068 | -.260 | .309 | .125 | .149 | -.142 |
| Non-Farm Population Change (2) | .307 | .005 | .023 | -.266 | .282 | .116 | .108 | -.135 |
| Farm Population Change (3) | -.048 | .074 | .001 | -.015 | .042 | -.078 | .206 | -.031 |
| Organization | | | | | | | | |
| Diversity (4) | -.071 | .318 | .057 | -.021 | -.016 | .226 | .128 | .257 |
| Manufacturing Employment (5) | -.255 | .086 | -.230 | -.134 | -.313 | .461 | -.276 | -.048 |
| Manufacturing Firms (6) | .002 | .331 | -.042 | -.258 | -.142 | .435 | .309 | .603 |
| Manufacturing Categories (7) | -.062 | .298 | .023 | -.207 | -.239 | .532 | .185 | .461 |
| Other Farm Income (t) (8) | .047 | .076 | .017 | .063 | -.236 | .003 | .120 | .366 |
| College (9) | 1.000 | .066 | -.012 | -.266 | .796 | -.122 | .579 | -.058 |
| Institutionalized (10) | .066 | 1.000 | -.072 | -.282 | -.062 | .081 | .180 | .333 |
| Military (11) | -.012 | -.072 | 1.000 | .054 | .141 | -.208 | .190 | .109 |
| Local Government Employment (12) | -.266 | -.282 | .054 | 1.000 | -.049 | -.099 | -.115 | .017 |
| Public Administration (13) | .796 | -.062 | .141 | -.049 | 1.000 | -.210 | .570 | -.136 |
| Farm Categories (14) | -.122 | .081 | -.208 | -.099 | -.210 | 1.000 | -.100 | .255 |
| Hotels (15) | .579 | .180 | .190 | -.115 | .570 | -.100 | 1.000 | .431 |
| Amusement Places (16) | -.058 | .333 | .109 | .017 | -.136 | .255 | .431 | 1.000 |
| Female Participation (17) | .414 | .087 | .065 | -.102 | .122 | .078 | .456 | .287 |
| Largest Town (18) | .308 | .227 | .282 | -.092 | .190 | .115 | .506 | .505 |
| Income Under $3000 (t) (19) | .105 | .119 | .087 | .034 | -.122 | -.012 | .249 | .348 |
| Unemployment (t) (20) | .184 | .151 | -.096 | -.303 | -.197 | .138 | .053 | .028 |
| Public Relief (t) (21) | .144 | .113 | .042 | -.149 | -.109 | .062 | .120 | .185 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .015 | .106 | -.029 | -.272 | -.152 | .347 | -.135 | .058 |
| Nearness to City (23) | .098 | .185 | .086 | -.303 | -.065 | .351 | .091 | .263 |
| Federal Outlays (24) | -.015 | -.093 | .179 | .180 | .101 | -.319 | .007 | -.108 |
| Federal Employment (25) | .013 | .222 | .497 | .027 | .116 | -.051 | .139 | -.056 |
| State Revenues (26) | -.193 | -.207 | .039 | .540 | .139 | .046 | -.115 | -.138 |
| Interstate (27) | .044 | .064 | .027 | -.040 | -.074 | .159 | .100 | .248 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .432 | .162 | -.160 | -.142 | .320 | .228 | .336 | .012 |
| College (29) | .773 | .043 | -.052 | -.136 | .528 | .081 | .461 | .095 |
| Military (30) | .417 | .005 | -.316 | -.228 | .454 | -.095 | .277 | -.192 |
| Institutionalized (31) | -.030 | -.755 | -.019 | .411 | .082 | -.048 | -.065 | -.097 |
| Female Participation (32) | -.010 | .040 | -.181 | .042 | -.243 | -.020 | -.066 | -.133 |
| Manufacturing Employment (33) | -.290 | -.032 | -.122 | .000 | -.344 | -.023 | -.310 | -.246 |
| Public Administration (34) | .215 | .280 | .023 | -.058 | .130 | -.068 | .264 | .276 |
| Land Use (35) | -.177 | -.212 | .147 | .027 | -.106 | .038 | -.081 | -.195 |
| Unemployment (t) (36) | -.206 | -.070 | .044 | .041 | -.012 | -.113 | -.068 | .062 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .054 | .038 | .005 | -.055 | .137 | .393 | .014 | .046 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .131 | -.122 | -.154 | .085 | .150 | .303 | .110 | -.194 |
| Non-Farm Population Change (2) | .159 | -.104 | -.023 | .129 | .243 | .263 | .082 | -.150 |
| Farm Population Change (3) | -.041 | -.004 | .056 | .023 | .008 | -.092 | .025 | -.063 |
| Organization | | | | | | | | |
| Diversity (4) | .072 | .109 | -.271 | -.017 | -.094 | .197 | .230 | .017 |
| Manufacturing Employment (5) | -.043 | .015 | .181 | .220 | .241 | .553 | .410 | -.317 |
| Manufacturing Firms (6) | .412 | .583 | .405 | .340 | .349 | .354 | .464 | -.177 |
| Manufacturing Categories (7) | .432 | .477 | .266 | .450 | .325 | .392 | .491 | -.286 |
| Other Farm Income (t) (8) | .533 | .297 | .503 | .483 | .381 | -.060 | .138 | .034 |
| College (9) | .414 | .308 | .105 | .184 | .144 | .015 | .098 | -.015 |
| Institutionalized (10) | .087 | .227 | .119 | .151 | .113 | .106 | .185 | -.093 |
| Military (11) | .065 | .282 | .087 | -.096 | .042 | -.029 | .086 | .179 |
| Local Government Employment (12) | -.102 | -.092 | .034 | -.303 | -.149 | -.272 | -.303 | .180 |
| Public Administration (13) | .122 | .190 | -.122 | -.197 | -.109 | -.152 | -.065 | .101 |
| Farm Categories (14) | .078 | .115 | -.012 | .138 | .062 | .347 | .351 | -.319 |
| Hotels (15) | .456 | .506 | .249 | .053 | .120 | -.135 | .091 | .007 |
| Amusement Places (16) | .287 | .505 | .348 | .028 | .185 | .058 | .263 | -.108 |
| Female Participation (17) | 1.000 | .481 | .576 | .541 | .531 | .115 | .248 | -.205 |
| Largest Town (18) | .481 | 1.000 | .472 | .351 | .255 | .125 | .443 | -.013 |
| Income Under $3000 (t) (19) | .576 | .472 | 1.000 | .392 | .742 | .027 | .125 | -.039 |
| Unemployment (t) (20) | .541 | .351 | .392 | 1.000 | .439 | .187 | .307 | -.139 |
| Public Relief (t) (21) | .531 | .255 | .742 | .439 | 1.000 | .309 | .250 | -.301 |

(Continued)

## APPENDIX II

TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (17) | (18) | (19) | (20) | (21) | (22) | (23) | (24) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | .115 | .125 | .027 | .187 | .309 | 1.000 | .789 | -.125 |
| Nearness to City (23) | .248 | .443 | .125 | .307 | .250 | .789 | 1.000 | -.069 |
| Federal Outlays (24) | -.205 | -.013 | -.039 | -.139 | -.301 | -.125 | -.069 | 1.000 |
| Federal Employment (25) | -.046 | .035 | -.044 | -.081 | .062 | -.137 | -.069 | .293 |
| State Revenues (26) | -.398 | -.432 | -.332 | -.690 | -.343 | -.161 | -.335 | .117 |
| Interstate (27) | .144 | .245 | .094 | .058 | -.004 | .371 | .441 | .003 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | .262 | .073 | .092 | .234 | .189 | .234 | .130 | -.119 |
| College (29) | .464 | .256 | .151 | .271 | .195 | .019 | .086 | -.123 |
| Military (30) | .049 | -.139 | -.029 | -.068 | .107 | .067 | -.018 | .096 |
| Institutionalized (31) | -.105 | -.028 | -.108 | -.115 | -.181 | -.074 | -.167 | .130 |
| Female Participation (32) | .088 | -.035 | .432 | .249 | .312 | -.098 | -.092 | -.057 |
| Manufacturing Employment (33) | .005 | -.319 | -.151 | .065 | .088 | .175 | .059 | -.167 |
| Public Administration (34) | .106 | .019 | .126 | -.137 | .069 | -.121 | -.092 | -.047 |
| Land Use (35) | -.144 | -.150 | -.026 | -.206 | .060 | .022 | -.057 | -.004 |
| Unemployment (t) (36) | -.306 | -.110 | -.121 | -.589 | -.165 | -.038 | -.099 | .066 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .153 | .077 | -.202 | .005 | .052 | .498 | .419 | -.234 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Net-Migration (1) | .060 | .096 | .071 | .679 | .230 | .450 | -.011 | -.129 |
| Non-Farm Population Change (2) | .089 | .056 | .112 | .711 | .259 | .406 | -.049 | -.017 |
| Farm Population Change (3) | .094 | .074 | -.116 | -.089 | -.059 | .022 | -.023 | -.009 |
| Organization | | | | | | | | |
| Diversity (4) | .187 | .117 | .041 | .154 | -.060 | -.014 | -.073 | -.307 |
| Manufacturing Employment (5) | -.235 | -.012 | .159 | .309 | -.180 | .085 | -.094 | .193 |
| Manufacturing Firms (6) | -.154 | -.299 | .287 | .150 | .094 | .063 | -.089 | .142 |
| Manufacturing Categories (7) | -.058 | -.307 | .297 | .265 | .023 | -.008 | -.080 | .063 |
| Other Farm Income (t) (8) | -.095 | -.449 | .204 | -.122 | .271 | -.253 | -.007 | .170 |
| College (9) | .013 | -.193 | .044 | .432 | .773 | .417 | -.030 | -.010 |
| Institutionalized (10) | .222 | -.207 | .064 | .162 | .043 | .005 | -.755 | .040 |
| Military (11) | .497 | .039 | .027 | -.160 | -.052 | -.316 | -.019 | -.181 |
| Local Government Employment (12) | .027 | .540 | -.040 | -.142 | -.136 | -.228 | .411 | .042 |
| Public Administration (13) | .116 | .139 | -.074 | .320 | .528 | .454 | .082 | -.243 |
| Farm Categories (14) | -.051 | .046 | .159 | .228 | .081 | -.095 | -.048 | -.020 |
| Hotels (15) | .139 | -.115 | .100 | .248 | .461 | .277 | -.065 | -.066 |
| Amusement Places (16) | -.056 | -.138 | .336 | .012 | .095 | -.192 | -.097 | -.133 |
| Female Participation (17) | -.046 | -.398 | .144 | .262 | .464 | .049 | -.105 | .088 |
| Largest Town (18) | .035 | -.432 | .245 | .073 | .256 | -.139 | -.028 | -.035 |
| Income Under $3000 (t) (19) | -.044 | -.332 | .094 | .092 | .151 | -.029 | -.108 | .432 |
| Unemployment (t) (20) | -.081 | -.690 | .058 | .234 | .271 | -.068 | -.115 | .249 |
| Public Relief (t) (21) | .062 | -.343 | -.004 | .189 | .195 | .107 | -.181 | .312 |

(Continued)

APPENDIX II

TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (25) | (26) | (27) | (28) | (29) | (30) | (31) | (32) |
|---|---|---|---|---|---|---|---|---|
| Environment | | | | | | | | |
| Nearness to SMSA (22) | -.137 | -.161 | .371 | .234 | .019 | .067 | -.074 | -.098 |
| Nearness to City (23) | -.069 | -.335 | .441 | .130 | .086 | -.018 | -.167 | -.092 |
| Federal Outlays (24) | .293 | .117 | .003 | -.119 | -.123 | .096 | .130 | -.057 |
| Federal Employment (25) | 1.000 | .108 | -.176 | -.018 | -.078 | .062 | -.235 | -.182 |
| State Revenues (26) | .108 | 1.000 | -.117 | -.054 | -.200 | .038 | .190 | -.142 |
| Interstate (27) | -.176 | -.117 | 1.000 | .235 | .055 | -.233 | .060 | .153 |
| Organizational Change | | | | | | | | |
| Change in: | | | | | | | | |
| Largest Town (28) | -.018 | -.054 | .235 | 1.000 | .369 | .239 | -.045 | .097 |
| College (29) | -.078 | -.200 | .055 | .369 | 1.000 | .217 | -.008 | .064 |
| Military (30) | .062 | .038 | -.233 | .239 | .217 | 1.000 | -.042 | -.033 |
| Institutionalized (31) | -.235 | .190 | .060 | -.045 | -.008 | -.042 | 1.000 | -.068 |
| Female Participation (32) | -.182 | -.142 | .153 | .097 | .064 | -.033 | -.068 | 1.000 |
| Manufacturing Employment (33) | -.023 | -.046 | -.047 | -.157 | -.262 | -.215 | -.116 | .187 |
| Public Administration (34) | .101 | -.112 | .113 | -.075 | .309 | .037 | -.290 | .166 |
| Land Use (35) | .199 | .198 | -.030 | .019 | -.212 | .107 | -.081 | .091 |
| Unemployment (t) (36) | .054 | .161 | -.055 | -.327 | -.246 | .050 | .066 | -.046 |
| Environmental Change | | | | | | | | |
| Change in Farm Size (t) (37) | .087 | .172 | .138 | .432 | .038 | .018 | -.091 | -.483 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Net-Migration (1) | -.092 | -.175 | .103 | -.226 | .587 |
| Non-Farm Population Change (2) | -.111 | -.127 | .126 | -.288 | .475 |
| Farm Population Change (3) | .070 | -.069 | -.070 | .057 | -.007 |
| Organization | | | | | |
| Diversity (4) | .184 | -.221 | .091 | -.084 | .585 |
| Manufacturing Employment (5) | .091 | -.353 | .244 | -.182 | .446 |
| Manufacturing Firms (6) | -.009 | -.087 | -.083 | -.053 | .224 |
| Manufacturing Categories (7) | .008 | -.138 | .053 | -.223 | .452 |
| Other Farm Income (t) (8) | .038 | .237 | -.380 | -.171 | -.247 |
| College (9) | -.290 | .215 | -.177 | -.206 | .054 |
| Institutionalized (10) | -.032 | .280 | -.212 | -.070 | .038 |
| Military (11) | -.122 | .023 | .147 | .044 | .005 |
| Local Government Employment (12) | .000 | -.058 | .027 | .041 | -.055 |
| Public Administration (13) | -.344 | .130 | -.106 | -.012 | .137 |
| Farm Categories (14) | -.023 | -.068 | .038 | -.113 | .393 |
| Hotels (15) | -.310 | .264 | -.081 | -.068 | .014 |
| Amusement Places (16) | -.246 | .276 | -.195 | .062 | .046 |
| Female Participation (17) | .005 | .106 | -.144 | -.306 | .153 |
| Largest Town (18) | -.319 | .019 | -.150 | -.110 | .077 |
| Income Under $3000 (t) (19) | -.151 | .126 | -.026 | -.121 | -.202 |
| Unemployment (t) (20) | .065 | -.137 | -.206 | -.589 | .005 |
| Public Relief (t) (21) | .088 | .069 | .060 | -.165 | .052 |

(Continued)

## APPENDIX II

### TABLE 19 (Continued)

ZERO-ORDER CORRELATIONS FOR URBAN (DIVERSIFIED) SUB-SAMPLE (60 COUNTIES)

| | (33) | (34) | (35) | (36) | (37) |
|---|---|---|---|---|---|
| Environment | | | | | |
| Nearness to SMSA (22) | .175 | -.121 | .022 | -.038 | .498 |
| Nearness to City (23) | .059 | -.092 | -.057 | -.099 | .419 |
| Federal Outlays (24) | -.167 | -.047 | -.004 | .066 | -.234 |
| Federal Employment (25) | -.023 | .101 | .199 | .054 | .087 |
| State Revenues (26) | -.046 | -.112 | .198 | .161 | .172 |
| Interstate (27) | -.047 | .113 | -.030 | -.055 | .138 |
| Organizational Change | | | | | |
| Change in: | | | | | |
| Largest Town (28) | -.157 | -.075 | .019 | -.327 | .432 |
| College (29) | -.262 | .309 | -.212 | -.246 | .038 |
| Military (30) | -.215 | .037 | .107 | .050 | .018 |
| Institutionalized (31) | -.116 | -.290 | -.081 | .066 | -.091 |
| Female Participation (32) | .187 | .166 | .091 | -.046 | -.483 |
| Manufacturing Employment (33) | 1.000 | -.243 | .125 | .052 | .099 |
| Public Administration (34) | -.243 | 1.000 | -.089 | .116 | -.447 |
| Land Use (35) | .125 | -.089 | 1.000 | .024 | .081 |
| Unemployment (t) (36) | .052 | .116 | .024 | 1.000 | -.173 |
| Environmental Change | | | | | |
| Change in Farm Size (t) (37) | .099 | -.447 | .081 | -.173 | 1.000 |

# APPENDIX III

## LEVELS OF SIGNIFICANCE

## APPENDIX III

## LEVELS OF SIGNIFICANCE

Although this study has been concerned with explaining the variance in net-migration among sample counties, levels of significance have been computed to test for generalizability for all zero-order correlation coefficients, change in $R^2$ in the regression analysis for all variables adding at least one per cent to the explanation of variance in the dependent variable and all partial correlation coefficients. Results indicate that the power of the tests, in this case through the sample size, has a strong effect on the levels of significance found.

Specifically, for the zero-order correlations, all associations between independent variables and net-migration for the entire sample (N=227), rural sub-sample (N=167) and urban sub-sample (N=60) at or above .113, .142 and .230 respectively are significant at the .05 level. Moreover, correlations of .236, .230 and .450 or higher for the sample, rural and urban sub-samples respectively are also significant at the .001 level.

All variables explaining at least one per cent of the variance in their respective regression equations are significant in terms of change in percentage explained at

the .001 level with two exceptions; among variables of organizational change, both change in institutionalized and change in college population are significant at the .025 level. All partial correlation coefficients similarly are significant at the .001 level with two exceptions, nearness to SMSA (F=1.450) and federal outlays (F=.082). These two exceptions, however, would be expected given both variables' negligible partials and the points at which they were entered into the multiple regression equation combining measures of organization and environment.

# APPENDIX IV

## STEPWISE MULTIPLE REGRESSION ANALYSIS UTILIZING INDEPENDENT VARIABLES GROUPED INTO SUBSTANTIVE CATEGORIES

# APPENDIX IV

## STEPWISE MULTIPLE REGRESSION ANALYSIS UTILIZING INDEPENDENT VARIABLES GROUPED INTO SUBSTANTIVE CATEGORIES

Although the variables used in this study correspond to particular components of the ecological complex, analysis shows a strong degree of collinearity among some variables such as those measuring manufacturing. Somewhat differently, other variables both similar to each other yet included under different ecological rubrics show similar relationships with migration such as several of the indices of governmental inputs. In order to understand more fully how such related variables affect the net-migration rate, all variables have been grouped into five categories (employment and economic differentiation, institutional, governmental, urban access, recreational) according to their substantive characteristics ignoring their placement in the ecological schema. Using stepwise multiple regression to analyze these five sets, each set has been forced into the equation at a particular time due to theoretical considerations and empirical results from this study and others; however, within the respective sets each variable

has been entered on the basis of its partial correlation coefficient squared as in the ecological analysis. The categories and rationale for entering each set at a particular step are listed as follows in the order in which they are entered into the equation:

Employment and Economic Differentiation Variables

This set has been entered first because of the explanatory importance of particularly diversity and manufacturing in this and other studies. Moreover, diversification, manufacturing activity and a high standard of living have long been posited to be of major importance in attracting migrants.

Institutional Variables

The relative importance of variables pertaining to institutions in this study and others suggests that their existence contributes to stemming the tide of out-migration from nonmetropolitan counties, although the influence of institutions appears not to be as strong as the previous set of variables.

Governmental Variables

Entered on the third step, this set is meant to tap the observed increasing influence of government in terms of both employment and expenditures. However, the ecological analysis indicates that governmental inputs are not as important in explaining the variance in the net-migration rate as are the two sets entered before it.

Urban Access Variables

Although change in size of largest town consistently yields the highest correlation with net-migration throughout the ecological analysis, the negligible effect of the other urban access variables when combined with measures included within the three preceding categories suggests that these factors have a high degree of collinearity with other variables that explain the variance in migration more fully.

Recreational Variables

Despite observations that some rural areas are beginning to grow and prosper due to recreational activities, either the two particular variables used here do not tap this prosperity or the development of recreational facilities and increasing prosperity have little effect on population change through migration.

Results of stepwise multiple regression show that all 34 independent variables together explain 64.5 per cent of the variance in the net-migration rate (see Table 19). Moreover, measures of employment and economic differentiation explain 40.9 per cent of the variance with diversity and manufacturing employment contributing the greatest amount while the addition of institutional variables, particularly those pertaining to military and college population change, raises the percentage explained to 50.4 per cent. That the contribution of governmental variables is smaller than those measuring urban access

suggests that perhaps the latter set should have been entered before the former. However, among urban access variables change in size of largest town contributes by far the greatest amount to the explanation of variance, and, as noted in the ecological analysis, it appears that this variable may be more of an indicator of population change than of diversity or urbanity. Finally, the two measures of recreational activity add almost nothing to the amount of variance explained by the four sets of variables entered before them.

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TABLE 20

RESULTS OF STEPWISE MULTIPLE REGRESSION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Employment and Economic Differentiation[a] | | | | |
| Diversity | .518 | .268 | .268 | .166 |
| Manufacturing Employment | .566 | .321 | .053 | .097 |
| Other Farm Income (t) | .586 | .344 | .023 | -.082 |
| Unemployment (t) | .609 | .371 | .027 | .060 |
| Change in Farm Size (t) | .619 | .383 | .012 | .111 |
| Change in Female Participation | .624 | .390 | .007 | .054 |
| Female Participation | .628 | .394 | .004 | -.047 |
| Change in Land Use | .631 | .398 | .004 | -.082 |
| Change in Manufacturing Employment | .633 | .400 | .002 | -.020 |
| Income Under $3000 (t) | .635 | .403 | .003 | .068 |
| Manufacturing Firms | .636 | .404 | .001 | .038 |
| Manufacturing Categories | .639 | .408 | .004 | .232 |
| Change in Unemployment (t) | .639 | .409 | .001 | .016 |
| Public Relief (t)[b] | | | | -.082 |
| Farm Categories[b] | | | | -.023 |
| Institutional[a] | | | | |
| Change in College | .687 | .471 | .062 | .102 |
| Change in Military | .703 | .495 | .024 | .140 |
| College | .707 | .500 | .005 | .060 |
| Military | .709 | .502 | .002 | .093 |
| Institutional | .710 | .503 | .001 | .029 |
| Change in Institutional | .710 | .504 | .001 | .036 |
| Government[a] | | | | |
| Local Government Employment | .736 | .541 | .037 | -.161 |
| Public Administration | .738 | .545 | .004 | .004 |
| Change in Public Administration | .740 | .547 | .002 | -.091 |
| State Revenues | .740 | .548 | .001 | .007 |
| Federal Employment | .741 | .549 | .001 | .030 |
| Federal Outlays | .741 | .549 | .000 | -.051 |

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TABLE 20 (Continued)

RESULTS OF STEPWISE MULTIPLE REGRESSION

| | Multiple R | $R^2$ | $R^2$ Change | Beta Weight |
|---|---|---|---|---|
| Urban Access[a] | | | | |
| Change in Largest Town | .788 | .622 | .073 | .317 |
| Largest Town | .800 | .640 | .018 | -.274 |
| Nearness to SMSA | .801 | .642 | .002 | .091 |
| Interstate | .801 | .642 | .000 | .017 |
| Nearness to City | .801 | .642 | .000 | -.020 |
| Recreation | | | | |
| Hotels | .802 | .644 | .002 | .070 |
| Amusement Places | .803 | .645 | .001 | -.052 |

[a] $R^2$ Change computed as the difference between $R^2$ of last variable entered in this set and the previous set is significant at the .001 level.

[b] Although the computer program employed should have forced all variables in this set into the equation before entering variables in the next set, these two variables, due to a combination of low tolerances and small F-ratios, were added with institutional variables. See Norman Nie, Dale H. Bent, C. Hadlai Hull, Statistical Package for the Social Sciences (New York, 1970), p. 183. Specifically, public relief was entered after change in college and farm categories was added after college; in both cases Multiple R and $R^2$ were identical to those of the respective variables preceding each and neither added anything to the explained variance. In determining significance levels of $R^2$ Change, however, these two variables were included with institutional variables; such inclusion would have the effect of decreasing the significance of $R^2$ Change contributed by this second set.

# APPENDIX V

# EXPLICATION OF VARIABLES

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The definitions of variables used in this study can be found in the various sources and for the most part are selfevident. However, several factors may need further explication for those not familar with these sources.

Net-migration refers to the differential between those entering and those leaving a county. In other words, if there were two counties such that one experienced no migration while the other received 100 in-migrants but lost 100 people through out-migration, net-migration in both cases would equal zero. The net-migration rate in this study is measured as net numbers per 1000 inhabitants.

Number of manufacturing categories includes 21 different industrial groups. They are as follows: ordnance and accessories; food and kindred products; tobacco manufacturers; textile mill products; apparel and other textile products; lumber and wood products; furniture and fixtures; paper and allied products; printing and publishing; chemicals and allied products; petroleum and coal products; rubber and plastics products, n.e.c.; leather and leather products; stone, clay, and glass products; primary metal industries; fabricated metal products; machinery, except

exectrical; electrical equipment and supplies; transportation equipment; instruments and related products; miscellaneous manufacturing industries.

Change in farm category is based on an eight-fold classification of farm type. The eight categories are as follows: cash-grain, tobacco, other field crop, vegetable, fruit and nut, poultry, dairy, and livestock other than poultry and dairy.

The unemployment rate refers to the percentage of the work force unemployed in a county. Specifically, the Census Bureau counts as unemployed all civilians not "at work" but looking for work during the four weeks preceding the census count and available to accept jobs in the civilian labor force. The minimal age for being considered in the work force was 14 in 1960 and 16 in 1970.

The female participation rate is the percentage of women who are in either the armed forces or civilian labor force. It includes women who are both employed and unemployed (see previous paragraph).

Percentage public relief recipients is the percentage of county residents receiving aid from either joint federal, state and local undertakings or from local programs without federal participation. Such aid includes old age assistance, medical assistance for the aged, aid to dependent children, the blind, and the permanently and totally disabled.

Three variables deal with institutionalized populations. Percentage military includes all residents who are in the armed services. Percentage college includes all those to age 34 enrolled in a college as a percentage of the entire population. Percentage institutionalized refers to all institutionalized individuals with the exception of those in either the armed forces or college dormitories. This variable encompasses such institutions as homes, schools, hospitals or wards for juveniles, the handicapped, mental and chronic diesease patients, and tuberculosis patients; homes for unwed mothers and for the aged and dependent; and correctional institutions.

Two variables refer to outlays from nonlocal governmekts. State revenues includes general revenue received from the state government, usually fiscal aid in the form of grants-in-aid and shared tax proceeds. Secondarily it also includes amounts received for services performed for one government by another on a reimbursement or cost sharing basis and payments received by the county in lieu of taxes. Federal outlays encompasses all federal funds received by local governments and individuals in a county except for those monies connected with "federal influence" activites. Such activities include the current market value of donated commodities, the original acquisition cost of donated surplus real and personal property, and the face value or contingent liability of guaranteed/insured loans.

# BIBLIOGRAPHY

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Beegle, J. A.; Marshall, Douglas; and Rice, Rodger. "Selected Factors Related to County Migration Patterns in the North Central States 1940-50 and 1950-60." Michigan State University Agricultural Experiment Station Quarterly Bulletin, 46 (November, 1963), 206-41.

Berry, Brian J.L.; and Pred, Allen. Central Place Studies: A Bibliography of Theory and Applications. Philadelphia: Regional Science Institute, 1965.

Blalock, Hubert M., Jr. Social Statistics. New York: McGraw-Hill, 1960.

Bogue, Donald J. Components of Population Change, 1940-50: Estimates of Net Migration and Natural Increase for Each Standard Metropolitan Area and State Economic Area. Oxford: Scripps Foundation, 1957.

Bright, Margaret L., and Thomas, Dorothy S. "Interstate Migration and Intervening Opportunities." American Sociological Review, 6 (December, 1941), 773-83.

Brown, Robert Harold. Political Areal Functional Organization: with special reference to St. Cloud, Minnesota. Chicago: University of Chicago Press, 1957.

Burford, Roger L. "An Index of Distance as Related to Internal Migration." Southern Economic Journal, 29 (October, 1962), 77-81.

Commission on Population Growth and the American Future. Population and the American Future. New York: The New American Library, 1972.

Duncan, Otis Dudley. "Human Ecology and Population Studies." The Study of Population, an Inventory and Appraisal. Edited by Philip M. Hauser and Otis Dudley Duncan. Chicago: University of Chicago Press, 1959.

Duncan, Otis Dudley, and Schnore, Leo F. "Cultural, Behavioral, and Ecological Perspectives in the Study of Social Organization." The American Journal of Sociology, 65 (September, 1959), 132-46.

Duncan, Otis Dudlye; Scott, W. Richard; Lieberson, Stanley; Duncan, Beverly D.; and Winsborough, Hal H. Metropolis and Region. Baltimore: Johns Hopkins, 1960.

Duncan, Otis Dudley, and Reiss, Albert J., Jr. Social Characteristics of Urban and Rural Communities, 1950. New York: John Wiley & Sons, 1956.

Federal Outlays, a report of the Federal Government's impact by State, County and large City, Fiscal Year 1970. Washington: U.S. Office of Economic Opportunity, n.d.

Fuguitt, Glenn V. "County Seat Status as a Factor in Small Town Growth and Decline." Social Forces, 44 (December, 1965), 245-51.

Gibbs, Jack P., and Martin, Walter T. "Toward a Theoretical System of Human Ecology." Pacific Sociological Review, 2 (Spring, 1959), 29-36.

Gordon, Robert A. "Issues in Multiple Regression." The American Journal of Sociology, 73 (March, 1968), 592-616.

Groth, Philip G. "Functional Classifications of Counties: Some Applications." Unpublished paper, Department of Rural Sociology, University of Wisconsin, Madison, May 26, 1972.

Hawley, Amos H. "Human Ecology." International Encyclopedia of the Social Sciences. Vol. 4, New York: MacMillan, 1967, 328-337.

Hawley, Amos H. Human Ecology: A Theory of Community Structure. New York: Ronald Press, 1950.

Irwin, Richard. "Nonmetropolitan Population Change: 1960-70." Paper prepared for presentation at the annual meeting of the Population Association of America, Washington, D.C., April 23, 1971.

Isbell, Eleanor Collins. "Internal Migration in Sweden and Intervening Opportunities." American Sociological Review, 9 (December, 1944), 627-39.

Fuguitt, Glenn V. "County Seat Status as a Factor in Small Town Growth and Decline." Social Forces, 44 (December, 1965), 245-51.

Jacobs, Jane. The Death and Life of Great American Cities. New York: Vintage, 1961.

King, Harriet, and King, Terry. "New Town, Mon Amour." The Chicagoan, November, 1973, pp. 78-83.

Lampard, Eric E. "Historical Aspects of Urbanization." The Study of Urbanization. Edited by Philip M. Hauser and Leo F. Schnore. New York: John Wiley & Sons, 1965.

Lemon, James T. "Urbanization and the Development of Eighteenth-Century Southeastern Pennsylvania and Adjacent Delaware." The William and Mary Quarterly, 3d ser., XXIV (October, 1967), 502-33.

Levitan, Sar A., and Houghteling, Louise D. Factors Affecting the Slower Growth of Missouri Population Compared with the United States. Rev. ed. Washington: Library of Congress Legislative Reference Service, 1961.

Lyford, Joseph P. The Talk in Vandalia: The Life of an American Town. New York: Harper, 1965.

Philbrick, Allen K. "Principles of Areal Functional Organization in Regional Human Geography." Economic Geography, 33 (October, 1956), 299-336.

Rand-McNally Road Atlas. Chicago: Rand-McNally, 1971.

Reiss, Albert J., Jr. "Functional Specialization of Cities." Cities and Society: The Revised Reader in Urban Sociology. Edited by Paul K. Hatt and Albert J. Reiss, Jr. New York: The Free Press of Glencoe, 1957.

Rutman, Gilbert L. "Migration and Economic Opportunities in West Virginia: A Statistical Analysis," Rural Sociology, 35 (June, 1970), 206-17.

Sly, David F. "Migration and the Ecological Complex." American Sociological Review, (October, 1972), 615-28.

Thomlinson, Ralph. Urban Structure: The Social and Spatial Character of Cities. New York: Random House, 1969.

U.S. Bureau of the Census. County and City Data Book, 1967. (A Statistical Abstract Supplement). Washington: Government Printing Office, 1967.

U.S. Bureau of the Census. U.S. Census of Agriculture, 1959. Washington: Government Printing Office, 1961.

U.S. Bureau of the Census. U.S. Census of Agriculture, 1964. Washington: Government Printing Office, 1967.

U.S. Bureau of the Census. U.S. Census of Agriculture, 1969. Washington: Government Printing Office, 1972.

U.S. Bureau of the Census. U.S. Census of County Business, 1967. Washington: Government Printing Office, 1970.

U.S. Bureau of the Census. U.S. Census of Governments, 1967. Washington: Government Printing Office, 1968.

U.S. Bureau of the Census. U.S. Census of Manufactures, 1967. Washington: Government Printing Office, 1971.

U.S. Bureau of the Census. U.S. Census of Population: 1950. Washington: Government Printing Office, 1952.

U.S. Bureau of the Census. U.S. Census of Population: 1960. Washington: Government Printing Office, 1964.

U.S. Bureau of the Census. U.S. Census of Population: 1970. Washington: Government Printing Office, 1971.

U.S. Department of Agriculture, Economic Research Service, Economic Development Division. The Economic and Social Condition of Rural America in the 1970's. Prepared for the U.S. Senate Committee on Government Operations. Washington: Government Printing Office, 1971.

Warner, Sam Bass, Jr. The Urban Wilderness. New York: Harper and Row, 1972.

Wirth, Louis. "Urbanism as a Way of Life." The American Journal of Sociology, 44 (July, 1938), 1-24.

Zuiches, James J. "In-Migration and Growth of Nonmetropolitan Urban Places." Rural Sociology, 35 (September, 1970), 410-20