

MIGRATION IN NORTH CENTRAL STATES IN  
RELATION TO SELECTED POPULATION  
CHARACTERISTICS

Thesis for the Degree of Ph. D.  
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WILLIAM D. EMERY  
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THESIS



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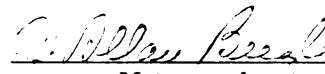
MIGRATION IN NORTH CENTRAL STATES IN  
RELATION TO SELECTED POPULATION  
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## ABSTRACT

### MIGRATION IN NORTH CENTRAL STATES IN RELATION TO SELECTED POPULATION CHARACTERISTICS

by William D Emery

Chapter I, "Introduction," is a statement of the problem and the variables to be utilized in the investigation. An ecological frame-of-reference is adopted to examine the 1,175 county units of the North Central Region over the 1950-1960 decade for migratory flows. The independent variables in the investigation are: (1) median family income; (2) median number of school years completed; (3) the percent in manufacturing of all persons employed; (4) percent in agriculture of all persons employed; (5) percent of females fourteen years of age and over in the labor force; (6) median age; (7) percent of the county population living in an urban area; (8) density; (9) population size; and (10) farm operator level-of-living. It is believed that those variables which are closely connected with the employment structure of an area will be most highly correlated with migration.

Chapter II, "Relation of Net Migration to Selected Population Characteristics; Simple Contingency Analysis," relates each of the independent variables to the dependent variable. Education, female employment, the percent employed in manufacturing, income, and the percent employed in



agriculture are closely correlated with migration flows.

Chapter III, "Relation of Net Migration to Selected Population Characteristics; Selected Cross Classifications," considers the level of net migration with selected combinations of the independent variables. The variables are found to explain better at the two extremes of our measures. The ones which are related to the dependent variable (migration) at all levels of measurement are agriculture employment, manufacturing employment, and female employment.

Chapter IV, "The Relationship of Selected Population Characteristics to Net Migration; Regression Analysis," shows the parameters when the least squares technique is applied to the data. The three independent variables most closely related to migration, independently of the effect of other variables included in the model, are percent employed in manufacturing, percent employed in agriculture, and percent females in the labor force. The total variance explained for the North Central Region ( $R^2$ ) is 0.7847. However, when only the more rural areas are considered, the variance explained is only 0.4199.

The conclusions are that migratory flows result from the presence of amenities and opportunities for employment. Mobility and wage determination are not single problems.

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## CHAPTER I

### INTRODUCTION

The present study is an attempt to delimit certain demographic and ecological conditions related to levels and patterns of net migration in the North Central Region. Migration is conceptualized as a spatial process which makes possible the redistribution of population within a system of county units. Several hypotheses will be tested which relate levels of net migration to the urbanization process and the adjustment of rural areas to increased technology. As a society increases in scale and moves from primary to tertiary activities, we expect to find changes in the distribution of skills, changes in the structure of the productive activities, and changes in the composition of the population. The frame of reference employed is that of human ecology.

#### Ecological Frame of Reference

The most distinctive feature of an ecological frame of reference is a single level of analysis in which properties of whole populations are at issue. The individual enters into ecological theory as a unit of measurement and not as an object of study, and the focus is on the adjustment of man to habitat as a process of community adaptation. The framework has been well stated as embracing four main referential concepts:

population, environment, technology, and organization, which define what may be called the "ecological complex." A population adjusts to its physical environment by means of a technology and pattern or organization. A definition of this domain or universe of inquiry is offered by Gibbs and Martin:<sup>1</sup>

. . . the boundaries of the universe of inquiry for human ecology should be drawn so as to include all the purely demographic characteristics of populations, geographical variables, the purely technological aspects of man's culture, and the different forms of sustenance organizations. In the case of demographic characteristics the sheer size of a population and its biological composition (sex and age) on the one hand set the minimal sustenance needs of the population, and on the other fix the limits of the manpower resources for an organized effort to obtain these needs. They also set the number of combinations and permutations that can occur in collective activities. Geographical variables tend to determine the least amount of collective effort that is necessary to meet the minimal sustenance needs of a given population. The purely technological aspects of a population's culture place limits on the type of resources that can be exploited and on the effectiveness of the exploitation. Finally, the absence or presence of certain forms of sustenance organization in a population may determine the presence of other forms of sustenance organizations. It should be noted that the variables incorporated in the universe of inquiry may also reflect or condition the consequences of different characteristics of sustenance organizations being present or absent.

Since man survives by collective exploitation of natural resources one would expect that these activities would be repetitive and regular and this pattern will constitute an organization. Although the rural sector is the primary focus of this thesis, it may not be viewed apart from the total

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<sup>1</sup>Jack P. Gibbs and Walter T. Martin, "Toward A Theoretical System of Human Ecology," Pacific Sociological Review, 2:33.





regional context. Martin<sup>2</sup> has noted that in a dynamic industrializing society a city grows through the development and extension of communication and transportation facilities whereby it taps an ever larger area for raw materials and for potential customers. This expansion increases the resource base of the urban area and enhances the number of job opportunities. It also orients the farmer to the urban area and speeds the use of modern methods in farming which leads to a declining need for workers in rural areas.

There have been many attempts to correlate relative differences in wage structure between urban and rural areas with migratory flows.<sup>3</sup> Johnson<sup>4</sup> investigated the differences in labor capacities between farm and nonfarm workers. Labor capacities were found to be poorly correlated with migratory flows. The one type of investigation which has yielded positive results is that of the relationship between out-migration

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<sup>2</sup>Walter T. Martin, "Ecological Change in Satellite Rural Areas," American Sociological Review, 22:175.

<sup>3</sup>See Calvin F. Schmid, Earl H. MacCannell, and Maurice Van Arsdol, Jr., "The Ecology of the American City," American Sociological Review, 23:392-401; T. W. Schultz, The Economic Organization of Agriculture (New York: McGraw Hill, 1968); Howard L. Parsons, "The Impact of Fluctuations in National Income on Agricultural Wages and Employment," Harvard Studies in Labor in Agriculture, No. 1 - HL (1952), p. 43.

<sup>4</sup>O. T. Johnson, "Functioning of the Labor Market," Journal of Farm Economics, 33:81-87.

and the level of nonfarm employment, the latter used as an index of employment opportunity. Not prices, therefore, but the existence of job opportunities (the opportunity to migrate) leads to a redistribution of the population. It may be concluded that national employment policy plays a strategic role in promoting agricultural adjustment in the economy. McDonald observes that:

The chief problem is to define "employment opportunity" in an economically significant way. The very concept of "opportunity" raises questions of market structure, of impediments and alternatives, and it is the nature of these which will explain why income differentials themselves do not effectively constitute "employment opportunity."<sup>5</sup>

This study views the economy of the North Central Region as a series of productive activities which are diverse, specialized, and interdependent; and each activity may be understood only as part of a whole. As a result of this interdependence, all activities together assume the character of a single, comprehensive activity. Within the region two different resource bases are evident. The industrial sector which rests upon mechanical forces and raw materials and the agricultural sector which is dependent upon soil, space, etc. Through time the urban sector has increased its share of the labor force from as little as less than 10 per cent to 90 per cent or more at a later time. It is the urban sector which expands and has an impact upon the rural areas. This thesis

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<sup>5</sup>Stephen L. McDonald, "Farm Outmigration as an Integrative Adjustment to Economics Growth," Social Forces, 34:121.

is concerned with employment opportunity, the mechanisms of urban growth, and the adjustment of the rural sector derived from the impact of this growth process. One explanation for the growth of urban areas is the theory of the export base.

### Export Base

There is a growing trend among students of the urban community to view the city as a dependent sub-economy in a broad system of urban communities. Its growth rests only partly in its own hands. Most of this work has focused upon some variation of the "export-base" theory of urban growth. Cities depend primarily upon their economic base. If a satisfactory operationalization could be found to define correctly and measure the economic base of cities and other administrative and ecological areas, much of each area's growth would be explained. Although the export base idea has been limited to use within urban areas, it has been repeatedly noted that even in agricultural areas the population size is limited to the number which the agricultural base will support. The assumption is that the area performs certain functions which result in the transfer of goods and services outside of the area itself. Of fundamental importance is the distinction between the economic effort which serves the local population and that which is exported outside the area to bring capital into the economy. Activity which brings money into the area is termed "basic" and

activity which involves the exchange of money within the economy is called "non-basic." The population building activities are those which bring money into the area from outside. A consequence of this is that an increase in export activity will bring an automatic increment in local service activities. That is to say, for a given number of workers engaged in export production there will be a corresponding number which will be added to the service industry of the community.

This idea has been well stated by Andrews:

The base is the part of an urban economy which is composed of activities whose principal function is that of exporting goods, services, or capital beyond the economic boundaries of the community. The economic complement of the base is made up of service activities. Service activities of the community are primarily engaged in internal trade which involves sales of goods, personal services, and capital to local base enterprises, employees of the base, other service enterprises, employees of the service enterprises, and employed persons within the community.<sup>6</sup>

There have been many attempts to operationalize the "export base" in a satisfactory way. Many problems have been encountered. One problem is female employment. The job unit becomes a less effective measure with large number of wives employed. There is no satisfactory way to measure output per worker over time and across populations. The size of the city is another confounding variable. The larger the city size, the larger the proportion of non-basic activity. Weimer

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<sup>6</sup>Richard Andrews, "Mechanics of the Urban Economic Base: the Problem of Base Measurement," Land Economics, 30:53.



and Hoyt<sup>7</sup> found that New York City, with a population of 12,500,000 had a ratio of 100 basic for each 215 non-basic workers. Madison, on the other hand, with a population of 110,000 had a ratio of 100 basic for each 82 non-basic workers. Large cities perform services for themselves that small cities do not.

This suggests that one must either examine a city very carefully to determine not only its total export activity for its trade area but also the services which it performs for a tributary area. The most widely used device to measure exports has been employment. Occupational information is readily available and the job unit is universally experienced.

Borchert<sup>8</sup> found population growth to be highly correlated with increments in manufacturing, military bases, and state government. The decline of the central city is also correlated with a decentralization of manufacturing. Wakeley and Nasrat<sup>9</sup> used manufacturing as a measure of job opportunities in the area. In each instance the percentage of population employed in manufacturing proved to be a good measure of employment opportunity. This thesis will not propose to

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<sup>7</sup>Arthur M. Weimer and Homer Hoyt, Principles of Urban Real Estate (New York: Ronald Press Co., 1948).

<sup>8</sup>John R. Borchert, The Urbanization of the Upper Midwest: 1930-1960, Urban Report Number 2, Upper Midwest Economic Study (1963).

<sup>9</sup>Ray E. Wakeley and Eldin Nasrat, "Sociological Analysis of Population Migration," Rural Sociology, 26:15-23.

operationalize the "export base" idea in a sophisticated way. However, it is expected to be of use as an organizing concept.

### Urbanization

Urban has been defined by the United States Census as a concentration of 2,500 inhabitants or more incorporated as cities and densely settled urban fringes whether incorporated or unincorporated. An unincorporated area must have a density of 1,500 persons per square mile to be considered urban. Most of the work on urbanization in sociology has followed this definition. There must be a trait or characteristic which does not disappear as cities increase in size, but this definition has the problem of making Bombay, India, just as urban as New York City. And it is difficult to see how urbanization could be used as an independent variable to study these two cities.

A second dimension, namely differentiation of function, is proposed here as a superior definition of urban. This is differentiation of function. The term implies the interdependence of dynamic individuals whose varied activities are coordinated in a single functional system. This idea has roots in Adam Smith, Comte, and Spencer in explaining social cohesion. It was Durkheim, however, in his Division of Labor in Society who made full use of the idea. He saw not only individuals engaged in specialized functions, but whole societies as well. He did not agree with Spencer that



an increment in size produced an automatic increment in heterogeneity. There must be a sufficient number of individuals in contact to act and react upon one another, so social density became an intervening variable. Hawley further develops this idea in his analysis of categoric units: "Although individual differences lie at the basis of the categorization or stratification that appears in local populations, it is the existence of categories which is the striking and in fact the significant manifestation of differentiation."<sup>10</sup> All of these categories are functionally differentiated segments of the whole. Each is an "occupational" division in which are classified all individuals who habitually perform the same or very similar functions. Those functions which are more important are the ones which affect the success of sustenance producing activities, and the number of occupational differences in an aggregate determines the number of categoric units that may appear. It is proposed that differentiation of function is a necessary condition for urbanization.

Since areas within the hinterland specialize in only a few activities, there must be a central place which mediates and controls the exchange of these areas. Weber saw the city developing primarily as a market place for such exchange and control. The size of the city depends largely

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<sup>10</sup>Amos H. Hawley, Human Ecology (New York: Ronald Press Co., 1950), Chapter 12.

upon the size of the market and the size of the market depends upon the level of production.

Gibbs and Martin<sup>11</sup> propose that urbanization depends upon bringing large quantities of goods from great distances. This supposes that urbanization is dependent upon the division of labor and level of technology.

The very fact of exchange means that different objects are being produced. This is a basic factor in occupational differentiation. Further division of labor is suggested by the fact that movement of materials also requires the establishment of commercial institutions and related occupations to processing to reduce their bulk or to preserve them.

This suggests a system of differentiated but functionally interdependent activities that are dependent upon production and exchange. With differentiation of function in the more urban areas there is an increment in employment opportunity. The urban area is then dependent upon other areas for materials, personnel, and markets for its products. It has, therefore, a great impact upon the satellite areas. As these satellite areas become urban oriented, increased agricultural efficiency and production allows a greater proportion of their population to engage in non-agricultural activity. Changing population density, sex, age, and occupational composition are then expected in the rural areas. We shall be primarily concerned with this adjustment in the more rural

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<sup>11</sup>Jack P. Gibbs and Walter T. Martin, "Ecological Change in Satellite Rural Areas," American Sociological Review, 22:173-183.

areas as the urban areas become more industrialized.

### The Problem and the Variables

The present study attempts to utilize a size-distance framework within which to analyze net migration over the 1950-1960 decade.<sup>12</sup> The 1175 county units of the North Central Region and Kentucky have been divided into: (1) counties containing all or a portion of an SMSA; (2) those which are adjacent to SMSA units; and (3) those which are not adjacent to an SMSA. The SMSA counties are classified according to size and the remaining ones are classified by the percent of the population living within an urban area and by density. The net migration data utilized in this analysis were computed by collaborators in the thirteen states comprising the North Central Region and Kentucky. The "residual method" for estimating net migration was utilized for the 1950-1960 decade. These data were supplied for the total county units of the individual states, arranged by metropolitan and non-metropolitan SEA's as of 1950.

There are some disadvantages in the use of total county units. It is quite possible that different parts of a country may belong to different ecological areas and be

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<sup>12</sup>The net migration data utilized in this analysis were computed by individual collaborators in the thirteen states comprising the North Central Region and Kentucky. Net migration was computed for both the 1940 to 1950 and 1950-1960 decade. The data for the 1940 to 1950 decade were run in the contingency analysis but were not included in this thesis.

experiencing opposite migratory flows. There are also some advantages in the use of the county as a unit. If population migration is to be considered as the movement of persons from one place of residence to another place of residence, there must be a social system of origin and a social system of destination. In this thesis the concept of the county as a place of residence and as a social system is basic to the definition of migration. Wakeley and Nasrat<sup>13</sup> justify the use of total county units in the following way:

The scientific basis for considering counties as social systems rests on a number of social characteristics which apply to counties. A county is a legal entity with a name. Membership in the county may be considered to be based on meeting legal residence requirements, being accepted as a voter, and playing county roles. Residence units are required to pay taxes for the support of county services used by county residents. Residents of a county are governed by county officials, belong to county wide organizations, and participate in county activities. They avail themselves of county welfare services, build and use systems of county roads, support and patronize the county unit of the agricultural extension service.

Withdrawal or migration from a county should reflect the condition of the total county system.

Each county in the region was categorized as of 1950 in one of the following categories: (1) Standard Metropolitan Area by size: (a) under 250,000; (b) 250,000 - 499,999; (c) 500,000 - 999,999; and (d) 1,000,000 or more; (2) Adjacent to an SMSA by urbanity: (a) under 25% urban; (b) 25.0 - 39.9% urban; (c) 40.0 - 54.9% urban; and (d) 55.0% urban and

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<sup>13</sup>Wakeley and Nasrat, op. cit., p. 17.

over; (3) Non-adjacent to an SMSA by urbanity: (a) no urban population; (b) under 25% urban; (c) 25.0 - 39.9% urban; (d) 40.0 - 54.9% urban; and (e) 55.0% urban and over.

This size-distance classification is based upon a view of the North Central Region as a set of metropolitan social and economic systems. The major cities, due to their size, centralization, and specialization of function are crucial in organizing the economy of their hinterlands. One manifestation of urban dominance is the city's power to attract migrants. Thus, it is expected that the classification represents a first approximation of the expected migration patterns in the Region.

This study will focus upon net migration as the dependent variable for the 1950-1960 decade in the North Central Region. Separate analysis will be made for each of the distance categories but the primary focus will be upon the non-adjacent county units. Much more attention has been given to urban growth than to its consequences for the more rural areas. The primary purpose of the North Central Committee is that of examining the more rural areas.

Both census and registration data have been utilized to compute net migration by the "residual method." Net increase has been subtracted from the total population change to obtain net migration for the ten year period. The only adjustment made on the data was for underregistration of

births. Net migration as a percent of the 1950 population then is the dependent variable used in this analysis. The absolute number will also be used in the multiple regression analysis.

Selected characteristics of county populations in 1950 which are considered to affect the process of urbanization as it has been defined and the level of migration for the rural areas are: (1) median family income; (2) median number of school years completed; (3) the percent in manufacturing of all persons employed; (4) percent in agriculture of all persons employed; (5) percent of females 14 years of age and over in the labor force; (6) median age; (7) percent of the county population living in an urban area; (8) density; (9) population size; and (10) farm operator level of living.<sup>14</sup>

### Income

The panacea for the solution to the low income problem among farm people is believed to be a rapid movement from farm to non farm employment. The income differential has been examined at length primarily by the agricultural economists.<sup>15</sup> Income per worker in agriculture from farming

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<sup>14</sup>These characteristics of the population were taken from the County and City Data Book, 1952 (Washington, D. C.: United States Government Printing Office, 1953).

<sup>15</sup>See Ben-David Moshe, "Farm-Non Farm Income Differentials, U. S. 1960" (unpublished Ph.D. dissertation, Michigan State University); Lowell E. Galloway, "Mobility of Hired Agricultural Labor," Journal of Farm Economics,



amounted to 61 percent of the annual average wage per employed factory worker for the years 1910 to 1914. However, the average for 1925 to 1929 had dropped to 44 percent of the wage of factory workers, and from 1954 to 1958 it rose slightly to 54 percent. There is no evidence of significant relative gains on either a per capita or per worker basis. While there have been significant gains in real income in agriculture in the past four decades, the rate of gain has probably little more than kept pace with that in the nonfarm economy. Despite heavy movement of the population, these differentials continue to exist. If migration is truly the answer to this income problem, then there is either an insufficient nonfarm demand for labor or other variables are operative as impediments to migration. It is also believed that farm workers who move to an urban occupation will have a much greater opportunity to improve their income. Hathaway and Perkins<sup>16</sup> show that about one-half of all persons changing from farm to nonfarm occupations experience a decrease in net earnings. They also show the average gain to be surprisingly low and the variance to be great.

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49:32-52; Dale E. Hathaway, "The Historical Record and Its Meaning," American Economics Association Papers and Proceedings, 50:379-391; and David H. Boyne, "Changes in the Income Distribution in Agriculture," Journal of Farm Economics, 47:2113-1224.

<sup>16</sup>Dale E. Hathaway and Brian B. Perkins, "Farm Labor, Migration and Income Distribution," American Journal of Agricultural Economics, 50:342-353.



The conclusion of Hathaway and Perkins is that persons in the most rural, low-income counties did not exhibit greater off-farm mobility than those in other areas. Moreover, the counties which were the greatest distance from urban areas experienced the least out movement from agriculture, and the greatest incentive to move was found in high income counties. These findings are consistent with a study conducted by Bowles on migration from rural-farm areas.<sup>17</sup>

Median family income, while suffering the deficiencies of any average obtained in this manner, is expected to reflect conditions of affluence in the counties of the region. Median family income values are inflated for areas in which more than one family member contributes to income. By controlling for type of area, however, rural and urban differences in patterns should be diminished. When income is related to net migration, it is expected that with each increment in family income the level of in-migration will rise in the SMSA's and adjacent areas. In the non-adjacent counties each increment in income will diminish the level of out-migration. This expectation is not consistent with the literature previously cited for several reasons. While the previous studies considered only the farm occupations in each county, the present paper is concerned with the total county. Secondly, income

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<sup>17</sup>Gladys K. Bowles, "Migration Patterns of the Rural Farm Population, Thirteen Economic Regions of the United States, 1940-1950," Rural Sociology, 22:1-11.

is so highly correlated with other variables such as age and type of employment that it is a misleading measure unless the effects of income are examined alone. In a multiple regression equation in which the effects of income on net migration have been isolated from its related variables, it is expected to have little relation to net movement of people.

### Median age

Median age is a summary statement of a population's age distribution and cannot be expected to express all nuances in the age structure. Generally, median age reflects varying birth rate levels as well as age selectivity of in- and out-migrants.

Age has repeatedly been shown to correlate significantly with migratory flows. Migration is selective of the young adults. Hathaway<sup>18</sup> found that older movers encounter more difficulties in obtaining and holding a job, and have relatively lower earnings when nonfarm employment is secured. Both short-run gains and long-run earning levels were significantly lower for workers over 44 years of age. They also experienced greater occupational instability. Hathaway concludes that age and previous employment status have been proven to be the most important determinants of off-farm mobility rates.

In the United States the median age of those in the

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<sup>18</sup>Dale Hathaway, op. cit.

professional occupations has declined slightly during the last two decades. From 1940 to 1960 the median age of the professional dropped from 38.7 to 38.2.<sup>19</sup> The trend for farmers has been in the opposite direction. The median age for farmers in 1940 was 46.6 and rose to 49.2 in 1960. The trend for farm laborers was in the same direction, rising from 24.9 to 31.2 over the two decades. This is a more reliable measure than median age of a county's population because only males in agriculture are considered.

It is expected that median age will be inversely related to levels of in-migration for SMSA's and adjacent areas, and will be inversely related to levels of out-migration for non-adjacent areas.

#### Percent employed in manufacturing

It is expected that employment opportunity will be the most important factor for the attraction of new population as well as the measure of the ability of an area to hold its population or to retard its departure. It has been stated that the "export base" theory will be used as an organizing principle and not as an hypothesis to be tested. Yet, manufacturing is a reasonably reliable measure of exports from an

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<sup>19</sup>U. S. Bureau of the Census, Sixteenth Census of the U. S.: 1940 (Washington: Government Printing Office, 1943), Vol. III, Pt. 1, Table 65; and U. S. Bureau of the Census, Census of Population: 1960, Final Report PC (1) - 1D (Washington: Government Printing Office, 1963), Table 204.

area. When high proportions of the population are employed in manufacturing, there is an increment in service activity. Moreover, we expect this increment to increase with population size. Therefore, areas having high proportions employed in manufacturing in conjunction with low proportions employed in agriculture are expected to have the highest in-migration rates, except for the largest metropolitan areas. Since workers entering manufacturing experience higher gains and less occupational instability, the migrant should also be more permanent. Vandiver<sup>20</sup> found that urban gains are most striking in those areas where rural losses were great. This is consistent with the Borchert<sup>21</sup> study which found an increasing tendency for business, service, and cultural activities of the large trade areas to be concentrated in a small number of major centers.

The automobile era has made the old ecological arrangement of many rural areas obsolete. When consolidation and centralization of many business functions occurs, there is an expanding of employment opportunity and further functional differentiation. Borchert noted that in general the larger a place was at the beginning of the automative era, the better was its chance to retain old functions and to add new ones.

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<sup>20</sup>Joseph S. Vandiver, "Some Population Trends in the More Rural States, 1940-1950," Rural Sociology, 16:154-163.

<sup>21</sup>John R. Borchert, op. cit.

Allen<sup>22</sup> found that the larger the proportion of the population employed in manufacturing the higher the scale of income. He also found value added from manufacturing to be significantly correlated with in-migration. In the non-adjacent areas, it is expected that only the counties containing high proportion of their population engaged in manufacturing activities will show in-migration with an inverse correlation in all other non-adjacent areas.

Percent of employed  
in agriculture

The concentration of population in and around the large urban centers with a concomitant movement of people out of the more rural areas has been well documented.<sup>23</sup> During the first half of the 1950-1960 decade the population of the United States grew by 11.8 million persons. All but 300,000 of this gain occurred in the SMSA's. Substantial numbers of people have also migrated from agriculture to these areas. Since 1940 more than 25 million persons have migrated from farms to urban areas. Moreover, the absolute number of migrants has been increasing through time.

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<sup>22</sup>Frances R. Allen, "Technological Development and Per Capita Income," American Journal of Sociology, 65:127-131.

<sup>23</sup>See Conrad Taeuber and Irene Taeuber, The Changing Population of the United States (New York: Wiley, 1958); and Otis Dudley Duncan and Albert J. Reiss, Jr., Social Characteristics of Urban and Rural Communities, 1950 (New York; Wiley, 1956).

In the 1920-1930 decade more than 6 million people left agriculture, a rate of 19 per cent of the beginning population. During the thirties only slightly over 3.5 million migrated, a rate of about 13 per cent. In the ten years from 1940 to 1950 the net migration exceeded 9 million persons, giving a rate of 31 per cent. It appears that the number of out-migrants during the 50-60 decade has been about the same as in the forties, so that the rate has probably exceeded one-third.<sup>24</sup>

Vandiver observed that poor employment opportunities from 1930-1940 resulted in an excessive number of young people in the rural areas, and that since 1940 the urban gains have been most striking where rural losses were great.

If low income regions can adjust to the urbanization process by moving their excess population out of the area, there should be an inverse correlation between the income differential and migratory flows. Yet, the poorer income areas do not improve their relative economic position through population loss. Where out-migration has occurred, its selectivity has created conditions which tend to retard the recombination of existing resources. Many variables are operative here. It has been previously stated that migration is selective of age. In 1920 the age group 25-34 comprised 21 percent of the agricultural labor force with 26 percent age 55 and over. In 1954 the 25 to 34 age group had decreased to 13 percent and 37 percent were 55 and over. The older farmers are less likely to apply innovative techniques, have lower educational levels, and have fewer years to receive a

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<sup>24</sup>Vandiver, op. cit., fn. 18.



return of their investments.<sup>25</sup> Maddox has noted that the costs to the area of origin do not appear to be serious. Yet, the loss of talent to the area, the cost of educating the young by farm families, lack of talent for business firms, and costs to educational institutions are great.

Bachmura<sup>26</sup> found that the rank correlation between median county income and in-migration is positive, high, and very significant. However, Cheng<sup>27</sup> found that in spite of a higher rate of out-migration from low-income regions the income disparity between the higher income regions in Michigan and the lower ones has increased. Job skills and capital investment are highly correlated and there must be a substitution of capital for labor which presupposes education, money for investment, and the motivation to innovate. Waldo<sup>28</sup> studied the effects of multiple job holding and income. The combinations tend to appear in the periphery of the more

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<sup>25</sup>James G. Maddox, "Private and Social Costs of the Movement of People out of Agriculture," American Economic Review, 50:392-402.

<sup>26</sup>F. T. Bachmura, "Migration and Factor Adjustment in Lower Mississippi Valley Agriculture: 1940-50," Journal of Farm Economics, 38:1027.

<sup>27</sup>Kenneth C. Cheng, "Economic Development and Geographical Wage Rates in Michigan 1940-1957" (unpublished Ph.D. dissertation, Dept. of Agricultural Economics, Michigan State University, 1959).

<sup>28</sup>A. D. Waldo, "The Impact of Outmigration and Multiple Jobholding upon Income Distribution in Agriculture," Journal of Farm Economics, 47:1235.



urbanized areas. He also found a correlation between income, multiple jobs, and skills.

It is expected that net out-migration will be positively correlated with percentages employed in agriculture and distance from large urban centers. The highly agricultural counties will lose more population through the migratory process than other areas.

Median years of  
school completed

In all areas of the region, levels of migration are expected to move from high out-migration to moderate in-migration with advancing levels of schooling. If functional differentiation is to occur in an area, an adequate population with sufficient skills to staff the functions is assumed. The need for educated people is evidenced by a comparison of median years of school completed for different occupational categories in the United States.

The educational differential between the occupations is very substantial. Moreover, it has not decreased in the past two decades. In 1950 the median years of school completed for professionals was 15.8 while farmers had a median of 8.3 years of school completed.<sup>29</sup> By 1965 the median was 16.3 years of school completed for the professional group and

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<sup>29</sup>Source: 1950: U. S. Bureau of the Census, Census of Population: 1950 (Washington: Government Printing Office, 1956), Vol. IV, Part 1, Chapter B, Table 10.

8.8 for the farm category. This lack of educational gain among farmers is largely due to the selectivity of the young in the migratory process.

When the total rural sector is compared to the urban for the United States, the differences are less imposing but quite significant. In 1940 residents of the urban areas had completed 8.7 years of school as compared to 7.7 for the rural farm residents. By 1960 these figures had risen to 11.1 for urban and 8.8 for rural. In the two decades the differences had become greater. This reflects both superior educational opportunity in the more urban areas and a movement of many educated people out of the rural areas. It would be expected that those perceiving less opportunity in farming would seek nonfarm areas for employment.

Shryock and Eldridge<sup>30</sup> found a consistent direct association between the percent of migrants and the years of school completed. Brunner's<sup>31</sup> work exhibited similar findings. Migration and educational status tend to be related to the degree that a higher proportion of the people with more education tend to move than of those with less. This is partially explained by the increased demand for skills as technological change occurs.

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<sup>30</sup>Henry S. Shryock and Hope T. Eldridge, "Internal Migration in Peace and War," American Sociological Review, 12:27-39.

<sup>31</sup>Edmund S. Brunner, "Internal Migration in the United States, 1935-40," Rural Sociology, 13:9-22.



Farm operator level  
of living

Farm operator level of living<sup>32</sup> is expected to be a good single predictor of net migration. If the adjustment of rural areas is contingent upon a recombination of resources and a closer functional relationship with the regional economy, the level of living of farm operators should indicate the success of this endeavor. The areas in which the farm operator level of living index is high should also be higher in education, income, and proportions of young people.

Since it would be expected that distance from an urban center would be reflected in agricultural organization, the areas which are adjacent to SMSA's are expected to exhibit a higher level of living index. It is also expected that this measure will be high in conjunction with other activities which add affluence to the area. That is, the higher the percent in manufacturing in conjunction with agriculture, the higher will be the level of living index.

Percent of females in  
the labor force

The percent of females employed in the labor force is expected to measure the industrial structure of the unit.

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<sup>32</sup>The index includes the following: (1) average value of sales per farm; (2) average value of land and buildings per farm; (3) percentage of farms with telephones; (4) percentage of farms with home freezers; and (5) percentage of farms with automobiles. See Margaret Jarman Hagood, Farm Operator Level-of-Living Indexes for Counties of the United States, 1930, 1940, 1945, and 1950 (Washington, D. C.: Bureau of Agricultural Economics, May 1952).

Large-scale enterprises concerned with marketing, sales, administration, etc. require a large amount of paper work and women are found in large proportions in these functions. It has been found by urban sociologists that employment of women is one of the best measures of differentiation within an area.

The percent of employed females has been shown to be a very sensitive measure of urbanity, being highly correlated with density and size of the community. This is consistent with the idea that the larger the community, the more it does for itself. Harden<sup>33</sup> found in a study of 116 communities in Illinois that the greatest increment in differentiation of function appeared between 750 and 1,000 persons. Professional people appear, commercialized recreation is found, and styles and fashions become important. It may be assumed that with this differentiation of function that there will be a demand for female skills. High employment of females would also appear to contribute to a favorable local milieu to which migrants would go. Hence, it is expected that percentages of females in the labor force will be directly related to levels of net migration. It is expected that in-migration will rise with increasing proportions of females in the labor force and out-migration rates will diminish with increasing proportions of females in the labor force.

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<sup>33</sup>Warren R. Harden, "Social and Economic Effects of Community Size," Rural Sociology, 25:204-211.

Urbanity, population  
size, density

If one is to relate urbanization to migratory flows, some attempt must be made to explain the growth of urban areas. Under what conditions does functional differentiation occur? This study is expected to give a partial answer to this question. If this can be done, we can predict from the 1950 data a large portion of the migratory trends for the 1950-1960 decade.

According to the export base theory, before functional differentiation can occur the following conditions must be met: (1) There must be sufficient exports to bring money into an area from outside to increase employment and create a multiplier effect within the economy; (2) There must be a minimum level of education in order to supply the skills for service activities; (3) There must be a sufficiently large population within the unit to supply the people to staff the functions; and (4) There must be an income level within the area which is indicative of purchasing power of the population beyond those things necessary for survival.

The most important variable is expected to be the proportion employed in manufacturing within the area in combination with proportions employed in agriculture. Since the two variables will measure in opposite directions, the greatest explanatory power will be gained by including the percent in agriculture with manufacturing. (In regression

analysis one puts a variable into the equation by leaving it out since all other variables must act upon the dependent variable before the partial correlation is computed by the least squares equation.)

The census classification of occupations includes:

(1) extractive industries (agriculture and mining), (2) manufacturing, (3) service, and (4) construction. Since mining and construction account for a small percent of employment in the region, the three important occupational categories are agriculture, manufacturing, and service. Since the data contain information on levels of agriculture and manufacturing, the level of the service industry may be ascertained with reasonable accuracy from combinations of the other two. Since it would be prohibitive to secure the large amount of information which would be necessary to operationalize the "export base" idea for 1175 county units, we assume that the variables which are important for functional differentiation to occur at certain levels or combinations of levels they will account for almost all the variance that we are able to explain.

Density and population size are highly correlated and are expected to be important under two conditions: (1) in areas which do not have a sufficient population to staff the functions of a differentiated economy there can be no development of a service economy. Even if such an area has a large export, the money is spent outside the area for services and

there is no multiplier effect within the economy. (2) In the largest SMSA's the population size reaches a point at which the metropolitan area becomes a self-contained unit. The division of labor becomes so great that the population uses its surplus. Such an area will be either stable or be classified by out-migration.

The extreme test of the "export base" theory will be for non-adjacent counties which are largely out-migration counties. If it is a useful concept, we expect that migratory flows from these units will be inversely correlated with varying levels of these key variables. Moreover, the correlation should be a linear one. If this proves to be true, then we will have approximately the same predictive ability with only three variables that is present with ten.

### Hypotheses

It is recognized that in order to state a systematic theory of migration that all the demographic, economic, and social conditions as well as the interactive system among these three classes of variables would need to be examined. It would also be necessary to show a process. We have only a partial list of the independent variables needed and we must impute a process from data which do not directly measure it. That is to say, our measure of job opportunity must be a combination of measures with income, female employment, percent in manufacturing and education being the most highly



correlated with an expanding economy.

Since it is expected that migration from one system to another system is a function of relative deprivation in the system of origin of the migrant, we infer these opportunities from demographic and ecological conditions within the county.

(1) Therefore, a measure of job opportunity is expected to be an approximation of migratory flows. Since we have no direct measure of functional differentiation, we shall assume that the higher its basic employment, the higher the non-basic with this ratio increasing as urbanity increases. The greater the employment in manufacturing income and educational levels of the area, the greater the ability of the area to hold its population or to attract migrants.

(2) Therefore, migration is expected to be positively correlated with the percent in manufacturing, median family income, level of living, percent of females in the labor force, education, density, urbanity, and population size and negatively correlated with median age and the percent of the population employed in agriculture. Since many of our variables are highly intercorrelated, it is logical to assume that a small number will account for most of the variance in a multiple regression equation. Moreover, those variables which indicate the job market will best explain this variance.

(3) Therefore, the percent employed in manufacturing,

the percent employed in agriculture, income and education will be most highly correlated with migration flows.

#### Method of investigation

The investigation of these data will proceed on three levels. First, the relationship of each variable to net migration for the three types of areas will be examined. Differing levels of net migration will be described for various levels of each independent variable. Secondly, we shall examine each level of net migration in relation of all combinations of each two of the independent variables in an effort to understand how combinations of two variables affect migration. Third, since this group of variables was compiled for the more rural areas and they are more appropriate for measuring migration in rural counties, we shall use multiple regression analysis to determine the total variance explained as well as the proportion of variance explained by each variable alone.

## CHAPTER II

### RELATION OF NET MIGRATION TO SELECTED POPULATION

#### CHARACTERISTICS: SIMPLE CONTINGENCY ANALYSIS

##### The North Central Region

The concern of this chapter is the first level of analysis. Migratory flows for the region will be described by metropolitan status, size and urbanity. We then examine the independent variables in relation to net migration for the area. It will be demonstrated later that there is a high correlation between these variables but it is useful to see how each variable varies independently with the dependent variable.

While the North Central Region (including Kentucky) gained in population from 1950 to 1960, the Region lost population from out-migration. That is, the natural increase for the region was more than the out-migration. Population increase for the entire region amounted to about 15 percent during the decade.

Table 1 indicates that net migration varied by states with Ohio, Michigan, Illinois and Indiana showing a gain, and Iowa, Kansas, Kentucky, Minnesota, Missouri, Nebraska, South Dakota, North Dakota and Wisconsin losing through out-migration. Ohio exhibited the greatest gain through net

TABLE 1

## NET MIGRATION 1950 TO 1960 IN THE NORTH CENTRAL STATES

| North Central States | Total Net Migration<br>1950-1960 | Net Migration as<br>Percent of 1950 Pop. |
|----------------------|----------------------------------|------------------------------------------|
| Illinois             | 140,527                          | 1.6                                      |
| Indiana              | 59,845                           | 1.5                                      |
| Iowa                 | -230,172                         | -8.8                                     |
| Kansas               | -39,570                          | -2.1                                     |
| Kentucky             | -380,259                         | -12.9                                    |
| Michigan             | 150,217                          | 2.4                                      |
| Minnesota            | -95,931                          | -3.2                                     |
| Missouri             | -125,038                         | -3.2                                     |
| Nebraska             | -122,541                         | -9.2                                     |
| North Dakota         | -105,418                         | -17.0                                    |
| Ohio                 | 408,086                          | 5.1                                      |
| South Dakota         | -94,232                          | -14.4                                    |
| Wisconsin            | -49,135                          | -1.4                                     |

migration, followed by Michigan, Illinois and Indiana. North Dakota had the greatest percent loss and the greatest absolute loss was from Kentucky. The smallest percent loss was from Wisconsin with the smallest real loss from Kansas. There are then four states showing a net gain of 758,675 from immigration and nine states losing 1,242,290 from out-migration. The net loss for the region was 483,621. The more industrial states gained or had a small loss with the more rural and less industrial ones showing a loss.

We have previously suggested that the flows of migration would be toward job opportunities and that these opportunities would be found in the more urban areas. This may best be demonstrated for the North Central States by dividing

them into metropolitan and non-metropolitan counties. Table 2 shows the results of this division.

With few exceptions in some individual states, metropolitan SEA's show gains and non-metropolitan SEA's show losses through net migration. The total metropolitan areas in Iowa lost through net-migration while total non-metropolitan areas in Michigan exhibited slight gains. The largest percent gain was in Nebraska for metropolitan areas and the largest real gain was in Ohio. Kentucky, Missouri and North Dakota lost 17 percent of their non-metropolitan population through migration. Three states: Ohio, Michigan and Indiana showed a small gain in non-metropolitan areas. Generally, the loss is much greater from the non-metropolitan area than is the gain in the metropolitan ones.

It is expected that the size distance classification should be a first approximation of patterns of migratory flow within the region. That is, high in-migration should be evident in the SMSA's, a lower rate of in-migration in the adjacent counties, and out-migration should characterize the non-adjacent areas. This is also consistent with the belief that job opportunity is the chief dynamic force. Table 3 shows the total North Central Region by these divisions.

#### Net Migration by Type of Area

Although the region gained over the decade by seven million people, it lost 1 percent of its 1950 population from

TABLE 2

NET MIGRATION 1950-1960 IN THE NORTH CENTRAL STATES  
BY METROPOLITAN AND NON-METROPOLITAN SEA STATUS IN 1950

| North Central States | Metropolitan | Net Mig. as Percent of 1950 Pop. | Non-Metropolitan | Neg. Mig. as Percent of 1950 Pop. |
|----------------------|--------------|----------------------------------|------------------|-----------------------------------|
| Illinois             | 277,688      | 4.5                              | -137,161         | -5.4                              |
| Indiana              | 74,559       | 4.8                              | -14,714          | 0.1                               |
| Iowa                 | -7,251       | -1.5                             | -222,901         | -10.5                             |
| Kansas               | 99,716       | 22.1                             | -139,286         | -9.6                              |
| Kentucky             | 19,464       | 2.7                              | -399,723         | -17.9                             |
| Michigan             | 146,236      | 3.5                              | 3,981            | 0.2                               |
| Minnesota            | 77,581       | 5.9                              | -173,512         | -10.5                             |
| Missouri             | 33,489       | 1.8                              | -158,527         | -7.6                              |
| Nebraska             | 32,817       | 7.9                              | -155,358         | -17.0                             |
| North Dakota         | -            | -                                | -105,418         | -17.1                             |
| Ohio                 | 291,947      | 5.8                              | 116,139          | 4.0                               |
| South Dakota         | -            | -                                | -94,232          | -14.4                             |
| Wisconsin            | 23,254       | 2.1                              | -72,389          | -3.1                              |

TABLE 3

## NET MIGRATION 1950-1960 IN THE NORTH CENTRAL STATES BY TYPE OF AREA

| Type of Area                | No. of<br>Counties | Population<br>1960 | Population<br>1950 | Net<br>Migration | Net Mig. as<br>Percent of<br>1950 Pop. |
|-----------------------------|--------------------|--------------------|--------------------|------------------|----------------------------------------|
| Total All Areas             | 1175               | 54,657,295         | 47,405,568         | -483,621         | - 1.0                                  |
| SMSA Areas Total            | 70                 | 28,656,625         | 23,302,201         | 1,069,480        | 4.6                                    |
| Adjacent Areas<br>Total     | 232                | 8,820,935          | 7,419,108          | 245,209          | 3.3                                    |
| Non-Adjacent<br>Areas Total | 873                | 17,179,735         | 16,684,259         | -1,808,760       | -10.8                                  |

net out-migration. As expected, the SMSA's show the largest real gain as well as the largest percent gain in population. The adjacent areas were beginning to experience the impact of industrial decentralization and experienced a slightly lower percent gain. The real gain for these areas, however, was only 25 percent of that for SMSA's. The more rural areas show a loss of 10.8 percent of their 1950 population.

With the exception of the very large SMSA's, we expect size and urbanity to be crucial factors in demographic redistribution. Table 4 has been constructed to demonstrate the relationship between SMSA size and levels of in-migration. All SMSA's exhibit gains during the decade. The larger the SMSA the larger the percent gain, with the exception of the one million or more category, with the third category having double the percent gain of the first. The twenty largest SMSA's have a smaller percent gain, but the numerical gain for this category accounts for more than half of the 23,302,201 migrants. The largest SMSA's, including Detroit and Chicago, actually lost population.

The trend in the adjacent areas is generally in the expected direction. However, the data do not show a neat linear relationship. Two things may be involved in this relationship. First, the measure of urbanity used here is based only upon population size. It is our belief that only when increased population is accompanied by greater



TABLE 4  
NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES FOR SMSA's, BY SIZE

| SMSA's<br>by Size | No. of<br>Counties | Population<br>1960 | Population<br>1950 | Net<br>Migration | Net Migration<br>as Percent of<br>1950 Pop. |
|-------------------|--------------------|--------------------|--------------------|------------------|---------------------------------------------|
| All SMSA's        | 70                 | 28,656,625         | 23,302,201         | 1,069,480        | 4.6                                         |
| Under 250,000     | 20                 | 3,419,230          | 2,792,308          | 83,269           | 3.0                                         |
| 250,000-499,999   | 17                 | 4,352,318          | 3,513,138          | 153,323          | 4.4                                         |
| 500,000-999,999   | 13                 | 5,252,826          | 4,221,893          | 255,320          | 6.0                                         |
| 1,000,000 or more | 20                 | 15,632,251         | 12,774,862         | 577,568          | 4.5                                         |

TABLE 5  
MIGRATION 1950-60 IN THE NORTH CENTRAL STATES FOR  
AREAS ADJACENT TO SMSA's BY URBANITY

| Adjacent Areas<br>by Urbanity | No. of<br>Counties | Population<br>1960 | Population<br>1950 | Net<br>Migration | Net Migration<br>as Percent of<br>1950 Pop. |
|-------------------------------|--------------------|--------------------|--------------------|------------------|---------------------------------------------|
| All Adjacent Areas            | 232                | 8,820,935          | 7,419,108          | 245,209          | 3.3                                         |
| Under 25% Urban               | 97                 | 2,071,031          | 1,805,592          | 4,439            | -0.0                                        |
| 25.0%-39.9% Urban             | 64                 | 2,226,205          | 1,848,036          | 106,162          | 5.7                                         |
| 40.0%-54.9% Urban             | 46                 | 2,288,578          | 1,921,922          | 69,239           | 3.6                                         |
| 55.0% Urban & Over            | 25                 | 2,235,121          | 1,845,558          | 70,247           | 3.8                                         |

specialization of function that the employment opportunities are provided. It is assumed that some areas of sufficient size to be classified as urban do not have this opportunity for growth. Second, we are postulating our explanation of growth for a developing area at a particular time in its history. The relationship between urbanity and growth was much more linear for the 1940-50 decade. Moreover, the relationship in the non-adjacent areas should offer proof of this rationale.

#### Urbanity and Net Migration

Table 6 indicates that non-adjacent areas show the expected relationship between urbanity and migration. Areas with less than 25 percent of their population in urban areas lost 18 percent of their 1950 population during the decade. Only in areas of relatively high urbanity do non-adjacent counties gain through net migration. Of the 873 non-adjacent counties, only 73 experienced a net gain. All areas with less than 40 percent urbanity actually lost population from 1950-60.

#### Relationship of net migration to selected characteristics of areas

This section seeks to relate the level of net migration to selected characteristics of counties in the North Central Region. It has been shown that the level of net

TABLE 6

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES  
FOR NON-ADJACENT AREAS, BY URBANITY

| Non-Adjacent<br>Areas by<br>Urbanity | No. of<br>Counties | Population<br>1960 | Population<br>1950 | Net<br>Migration | Net Migration<br>as Percent of<br>1950 Pop. |
|--------------------------------------|--------------------|--------------------|--------------------|------------------|---------------------------------------------|
| All Non-Adjacent<br>Areas            | 873                | 17,179,735         | 16,684,259         | -1,798,310       | -10.8                                       |
| No Urban Pop.                        | 387                | 3,252,446          | 3,474,582          | -645,211         | -18.6                                       |
| Under 25% Urban                      | 114                | 2,261,560          | 2,378,520          | -428,863         | -18.0                                       |
| 25.0%-39.9% Urban                    | 155                | 3,373,055          | 3,362,381          | -411,752         | -12.2                                       |
| 40.0%-54.9% Urban                    | 112                | 2,776,537          | 2,682,141          | -254,862         | -9.5                                        |
| 55.0% Urban or More                  | 105                | 5,516,137          | 4,786,635          | -57,622          | -1.2                                        |

migration for the 1950 to 1960 decade in the region is closely related to area types with gains of 4.6 percent of the 1950 population in SMSA's and a loss of 10.8 percent in non-adjacent areas. We now examine income, median schooling, percent employed in manufacturing, percent employed in agriculture, percent of females in the labor force, density and farm operator level of living in relation to net migration.

#### Median age

It has been suggested that median age is a summary statement of the age distribution within the county. It is theoretically possible for a large percent of the very young and the very old to have a median age similar to a county with a more normal distribution. However, according to Table 7 the relationship in the North Central data is as expected. For the Region as a whole there is a loss of 13.7 percent in counties having a median age of under 27.0 years; a gain of over 2 percent for those having an average age of from 27.0 to 30.9 years; and a loss of 4.7 for counties having a median age of 33.0 years and over. This curvilinear relationship seems to be a deviation from our expectations but this is not the case. We will show at a later time that counties of high median age are generally low in income and employment opportunities. They are, therefore, expected to lose population at a greater rate. Also, the high median age is a result of

TABLE 7

## NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES, BY MEDIAN AGE IN 1950

| Type of Area             | Median Age, 1950  |               |                 |                 |                 |                  |
|--------------------------|-------------------|---------------|-----------------|-----------------|-----------------|------------------|
|                          | Total All<br>Ages | Under<br>27.0 | 27.0 to<br>28.9 | 29.0 to<br>30.9 | 31.0 to<br>32.9 | 33.0 and<br>over |
| <u>Total All Areas</u>   |                   |               |                 |                 |                 |                  |
| No. of Counties          | 1,175             | 155           | 192             | 327             | 284             | 217              |
| 1960 Population          | 54,657,295        | 3,089,493     | 6,599,761       | 14,615,702      | 17,932,712      | 12,419,627       |
| Net Migr. 1950-60        | -483,621          | -399,883      | +95,689         | +327,213        | +31,198         | -537,838         |
| % Net Migr. 1950         | -1.0              | -13.7         | +1.8            | +2.7            | +0.2            | -4.7             |
| <u>SMSAs</u>             |                   |               |                 |                 |                 |                  |
| No. of Counties          | 70                | 2             | 13              | 25              | 23              | 7                |
| 1960 Population          | 28,656,625        | 437,085       | 2,488,477       | 6,456,022       | 10,538,290      | 8,736,751        |
| Net Migr. 1950-60        | +1,069,480        | +154,567      | +286,907        | +519,896        | +275,539        | -167,429         |
| % Net Migr. 1950         | +4.6              | +77.0         | +16.4           | +10.6           | +3.2            | -2.1             |
| <u>Adjacent Areas</u>    |                   |               |                 |                 |                 |                  |
| No. of Counties          | 232               | 11            | 27              | 75              | 71              | 48               |
| 1960 Population          | 8,820,935         | 324,709       | 1,352,288       | 3,278,619       | 2,661,302       | 1,204,017        |
| Net Migr. 1950-60        | +245,209          | -6,390        | +49,157         | +192,282        | +52,274         | -42,114          |
| % Net Migr. 1950         | +3.3              | -2.4          | +4.5            | +7.3            | +2.3            | -3.7             |
| <u>Nonadjacent Areas</u> |                   |               |                 |                 |                 |                  |
| No. of Counties          | 873               | 142           | 152             | 227             | 190             | 162              |
| 1960 Population          | 17,179,735        | 2,327,699     | 2,758,996       | 4,881,061       | 4,733,120       | 2,478,859        |
| Net Migr. 1950-60        | -1,798,310        | -548,060      | -240,375        | -384,965        | -296,615        | -328,295         |
| % Net Migr. 1950         | -10.8             | -22.5         | -9.4            | -8.4            | -6.6            | -12.5            |

\* Including Kentucky.

prior out-migration and the trend has not lessened to a large degree. These areas of high median age and high out-migration show approximately the same migratory patterns in 1950-60 as they did in 1940-50.

The SMSA's show the same expected pattern. Counties with a low median age had gains well above the average, with two counties gaining by a surprising 77 percent. It is interesting that the seven SMSA's with a median age of 33.0 and over had a net loss through migration.

The 232 adjacent counties have a near-normal distribution when categorized by age. One exception, however, is the large number of counties with a median age of 33.0 and over. The same pattern as that exhibited by the total region is evident for adjacent areas.

The non-adjacent counties also follow the expected pattern with high out-migration for lower median age counties and diminishing rates for each increment in age. Again, the exception to this is the older age counties. It is significant that of the 162 counties with a median age of 33.0 and over that only 3 have upper level incomes.

#### Median family income

The relationship of median family income and net migration is linear and significant. For the total region all categories which had less than \$3,400 per year median

TABLE 8

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY MEDIAN FAMILY INCOME IN 1950

| Types of Areas           | Median Family Income, 1950 |                 |                 |                   |                   |                               |
|--------------------------|----------------------------|-----------------|-----------------|-------------------|-------------------|-------------------------------|
|                          | Total All<br>Incomes       | Under<br>\$1800 | \$1800-<br>2199 | \$2,200-<br>2,599 | \$2,600-<br>2,999 | \$3,000-<br>3,399<br>and over |
| <b>Total All Areas</b>   |                            |                 |                 |                   |                   |                               |
| No. of Counties          | 1,175**                    | 177             | 193             | 272               | 250               | 183                           |
| 1960 Population          | 54,657,295                 | 2,349,294       | 2,681,624       | 5,102,044         | 6,511,192         | 12,149,720                    |
| Net Migr. 1950-60        | -483,621                   | -477,916        | -403,820        | -565,269          | -325,277          | -76,692                       |
| % Net Migr. 1950         | -1.0                       | -18.8           | -14.5           | -11.2             | -5.4              | -0.7                          |
|                          |                            |                 |                 |                   |                   | +6.7                          |
| <b>SMSAs</b>             |                            |                 |                 |                   |                   |                               |
| No. of Counties          | 70                         | —               | —               | 1                 | 4                 | 23                            |
| 1960 Population          | 28,656,625                 | —               | —               | 55,438            | 251,792           | 5,627,273                     |
| Net Migr. 1950-60        | +1,069,480                 | —               | —               | -1,554            | +1,339            | -69,260                       |
| % Net Migr. 1950         | +4.6                       | —               | —               | -3.2              | +0.6              | -1.4                          |
|                          |                            |                 |                 |                   |                   | +6.3                          |
| <b>Adjacent Areas</b>    |                            |                 |                 |                   |                   |                               |
| No. of Counties          | 232                        | 14              | 29              | 52                | 66                | 53                            |
| 1960 Population          | 8,820,935                  | 180,559         | 472,964         | 1,268,468         | 2,203,657         | 2,834,824                     |
| Net Migr. 1950-60        | +245,209                   | -28,445         | -14,276         | -52,330           | +5,813            | +130,522                      |
| % Net Migr. 1950         | +3.3                       | -14.8           | -3.2            | -4.5              | +0.3              | +5.6                          |
|                          |                            |                 |                 |                   |                   | +14.8                         |
| <b>Nonadjacent Areas</b> |                            |                 |                 |                   |                   |                               |
| No. of Counties          | 873**                      | 163             | 164             | 219               | 180               | 107                           |
| 1960 Population          | 17,179,735                 | 2,168,735       | 2,208,660       | 3,778,138         | 4,055,743         | 3,687,623                     |
| Net Migr. 1950-60        | -1,798,310                 | -449,471        | -389,544        | -511,385          | -332,429          | -137,954                      |
| % Net Migr. 1950         | -10.8                      | -19.1           | -16.6           | -13.3             | -8.7              | -4.2                          |
|                          |                            |                 |                 |                   |                   | +2.7                          |

\* Including Kentucky.

\*\* Includes 17 Nonadjacent Counties for which median family income in 1950 was not ascertained. These counties had a total population of 24,744 in 1960 and an out-migration of 4,941 between 1950 and 1960.



income in 1950 lost population during the decade. This does not say that all counties with less than \$3,400 lost population. If the 183 counties with \$3,000-3,999 are totaled as a group, the result is a net loss. The 642 counties with less than \$2600 median income experienced an absolute loss of almost 300,000 persons. There is an almost even increment of reduced migration for each increment in income. The county units with less than \$1,800 lost 18.8 percent and those with \$3,400 and above gained 6.7 percent.

The seventy SMSA counties gained by over one million persons but they, too, exhibited losses until the higher income category was reached. The adjacent counties progress from a 14.8 percent loss to a 14.8 percent gain at the two income extremes, and the non-adjacent counties progress from a 19.1 percent loss to a 2.7 percent gain as income is incremented. Only the twenty-three counties at the upper income level show a net gain.

#### Median schooling

We expected that median school years completed would be one of the best single predictive variables. It is highly correlated with income, age and residence patterns. The 159 counties in the region with under 8.4 years of school completed lost 23.2 percent of their population, with significant gains coming only in the higher education areas. The SMSA's had no units with less than 8.5 years of school completed and



TABLE 9

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY MEDIAN SCHOOL YEARS COMPLETED IN 1950

| Types of Areas           | Median School Years Completed, 1950 |           |            |           |                          |
|--------------------------|-------------------------------------|-----------|------------|-----------|--------------------------|
|                          | Total All Years                     | Under 8.4 | 8.5-8.9    | 9.0-9.4   | 9.5-9.9<br>10.0 and Over |
| <b>Total All Areas</b>   |                                     |           |            |           |                          |
| No. of Counties          | 1,175**                             | 159       | 559        | 159       | 107                      |
| 1960 Population          | 54,657,295                          | 2,299,260 | 12,578,616 | 7,436,016 | 10,399,987               |
| Net Migr. 1950-60        | -483,621                            | -584,043  | -1,163,254 | +16,454   | +73,089                  |
| % Net Migr. 1950         | -1.0                                | -23.2     | -9.6       | +0.3      | +0.8                     |
| <b>SMSAs</b>             |                                     |           |            |           |                          |
| No. of Counties          | 70                                  | —         | 12         | 13        | 9                        |
| 1960 Population          | 28,656,625                          | —         | 1,902,555  | 3,380,030 | 7,867,120                |
| Net Migr. 1950-60        | +1,069,480                          | —         | -200,191   | +172,229  | +131,815                 |
| % Net Migr. 1950         | +4.6                                | —         | -10.9      | +6.5      | +2.0                     |
| <b>Adjacent Areas</b>    |                                     |           |            |           |                          |
| No. of Counties          | 232                                 | 14        | 104        | 38        | 31                       |
| 1960 Population          | 8,820,935                           | 220,508   | 2,962,032  | 1,606,744 | 1,073,109                |
| Net Migr. 1950-60        | +245,209                            | -13,529   | -61,250    | +60,706   | +26,232                  |
| % Net Migr. 1950         | +3.3                                | -6.6      | -2.3       | +4.6      | +2.9                     |
| <b>Nonadjacent Areas</b> |                                     |           |            |           |                          |
| No. of Counties          | 873**                               | 145       | 443        | 108       | 67                       |
| 1960 Population          | 17,179,735                          | 2,078,752 | 7,714,029  | 2,449,242 | 1,459,758                |
| Net Migr. 1950-60        | -1,798,310                          | -570,514  | -901,813   | -216,481  | -84,958                  |
| % Net Migr. 1950         | -10.8                               | -24.7     | -11.8      | -9.1      | -6.2                     |

\* Including Kentucky.

\*\* Includes 2 nonadjacent counties for which median school years completed in 1950 was not ascertained. These counties had a total population of 1,415 in 1960 and an out-migration of 498 between 1950 and 1960.

only 12 with less than 9.0 years. The largest losses in this group were from four SMSA's of one million or more with less than 9.0 years of school. The adjacent and non-adjacent areas exhibit patterns similar to the total region. It is important that 588 of the 873 non-adjacent county units had less than 9.0 years of schooling. The relationship for all areas was the expected one.

Percent of females in  
the labor force

The percent of females employed in the labor force organizes the county units into the predicted way better than any previous variable. Moreover, the three type of areas are affected differently by similar percentages of females employed. The SMSA's show a net loss for one county with a low percent of females employed to a very high in migration for the categories 20 to 28.9 percent of females employed. Since high female employment occurs in the largest SMSA's, the categories drop to a loss of 2.1 percent and a gain of only 1.5 percent. This was the expected relationship in the larger areas. The adjacent areas have not become as self contained as the larger ones and the process of decentralization has not become noticeable. Migration patterns move nicely from minus 10.7 to a substantial gain with increasing levels of female employment. A drop in in-migration occurs only at the highest level of female employment. The

TABLE 10

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY PERCENT FEMALES IN LABOR FORCE IN 1950

| Type of Area             | Percent Females 14 and Over in Labor Force, 1950 |           |            |            |            |                                   |
|--------------------------|--------------------------------------------------|-----------|------------|------------|------------|-----------------------------------|
|                          | Total All Females in Labor                       | Under 17  | 17 to 19.9 | 20 to 22.9 | 23 to 25.9 | 26 to 28.9 29 to 31.9 32 and Over |
| <b>Total All Areas</b>   |                                                  |           |            |            |            |                                   |
| No. of Counties          | 1,175                                            | 247       | 247        | 248        | 199        | 131 61 42                         |
| 1960 Population          | 54,657,295                                       | 2,885,715 | 3,564,929  | 5,491,149  | 8,050,546  | 8,440,954 10,416,333 15,807,669   |
| Net Migr. 1950-60        | -483,621                                         | -727,542  | -458,469   | -180,148   | +294,894   | +454,494 -73,347 +206,497         |
| % Net Migr. 1950         | -1.0                                             | -22.7     | -12.8      | -3.6       | +4.5       | +6.7 -0.8 +1.5                    |
| <b>SMSAs</b>             |                                                  |           |            |            |            |                                   |
| No. of Counties          | 70                                               | —         | 1          | 5          | 13         | 14 18 19                          |
| 1960 Population          | 28,656,625                                       | —         | 55,438     | 784,824    | 2,466,669  | 3,384,471 7,528,242 14,436,981    |
| Net Migr. 1950-60        | +1,069,480                                       | —         | -1,554     | +176,398   | +388,323   | +461,109 -137,026 +182,230        |
| % Net Migr. 1950         | +4.6                                             | —         | -3.2       | +36.6      | +23.3      | +19.1 -2.1 +1.5                   |
| <b>Adjacent Areas</b>    |                                                  |           |            |            |            |                                   |
| No. of Counties          | 232                                              | 28        | 37         | 59         | 56         | 38 12 2                           |
| 1960 Population          | 8,820,935                                        | 485,584   | 734,397    | 1,672,072  | 2,495,823  | 2,035,572 1,086,189 311,298       |
| Net Migr. 1950-60        | +245,209                                         | -49,948   | -23,197    | +6,746     | +128,410   | +111,498 +68,209 +3,491           |
| % Net Migr. 1950         | +3.3                                             | -10.7     | -3.5       | +0.5       | +6.3       | +6.7 +7.9 +1.4                    |
| <b>Nonadjacent Areas</b> |                                                  |           |            |            |            |                                   |
| No. of Counties          | 873                                              | 219       | 209        | 184        | 130        | 79 31 21                          |
| 1960 Population          | 17,179,735                                       | 2,400,131 | 2,775,094  | 3,034,253  | 3,088,054  | 3,020,911 1,801,902 1,059,390     |
| Net Migr. 1950-60        | -1,798,310                                       | -677,594  | -433,718   | -363,292   | -221,839   | -118,113 -4,530 +20,776           |
| % Net Migr. 1950         | -10.8                                            | -24.8     | -15.1      | -12.0      | -7.6       | -4.4 -0.3 +2.4                    |

\* Including Kentucky.

non-adjacent areas are not affected by size and each increment in female employment is found with reduced levels of out-migration. The twenty-one county units with high female employment show an average gain of about 1000 per county for the decade.

Percent of employed  
in manufacturing

The percent employed in manufacturing in the Region was expected to be a sensitive measure of employment opportunity. It was also suggested that the measure would be most sensitive in combination with other variables.

The SMSA's conform generally to our expectations. The same block of approximately thirty SMSA's which have high urbanity, large population size, high females employed, and low in-migration exhibit a curvilinear relationship. The smaller SMSA's show a significant jump in in-migration with each gain in population size. The adjacent areas make significant gains beginning with 22 percent employed in manufacturing. As expected, the measure is most useful for non-adjacent areas. Those with under 2 percent employed in manufacturing lose over one-fourth of their population in the decade and the drop in out-migration is constant with growth in manufacturing. This suggests again that our measures are most useful at a particular time in the history of regional development.

TABLE 11

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY PERCENT EMPLOYED IN MANUFACTURING

| Types of Areas           | Percent of Employed in Manufacturing, 1950 |           |            |            |            |                           |
|--------------------------|--------------------------------------------|-----------|------------|------------|------------|---------------------------|
|                          | Total All<br>Employed                      | Under 2.0 | 2 to 11.9  | 12 to 21.9 | 22 to 31.9 | 32 to 41.9<br>42 and over |
| <u>Total All Areas</u>   |                                            |           |            |            |            |                           |
| No. of Counties          | 1,175                                      | 173       | 516        | 220        | 146        | 84                        |
| 1960 Population          | 54,657,295                                 | 1,114,276 | 9,028,110  | 6,914,332  | 10,893,083 | 16,190,281                |
| Net Migr. 1950-60        | -483,621                                   | -315,204  | -1,201,498 | -194,950   | +588,994   | +179,713                  |
| % Net Migr. 1950         | -1.0                                       | -25.3     | -13.3      | -3.1       | +6.7       | +1.3                      |
| <u>SMSAs</u>             |                                            |           |            |            |            |                           |
| No. of Counties          | 70                                         | —         | 1          | 11         | 20         | 19                        |
| 1960 Population          | 28,656,625                                 | —         | 83,102     | 1,787,871  | 5,705,459  | 12,082,643                |
| Net Migr. 1950-60        | +1,069,480                                 | —         | +1,737     | +104,830   | +573,694   | +14,969                   |
| % Net Migr. 1950         | +4.6                                       | —         | +2.5       | +7.4       | +13.5      | +0.1                      |
| <u>Adjacent Areas</u>    |                                            |           |            |            |            |                           |
| No. of Counties          | 232                                        | —         | 78         | 54         | 55         | 37                        |
| 1960 Population          | 8,820,935                                  | —         | 1,465,117  | 1,433,399  | 2,459,714  | 2,613,780                 |
| Net Migr. 1950-60        | +245,209                                   | —         | -105,461   | -41,144    | +121,018   | +203,020                  |
| % Net Migr. 1950         | +3.3                                       | —         | -7.5       | -3.1       | +6.0       | +10.0                     |
| <u>Nonadjacent Areas</u> |                                            |           |            |            |            |                           |
| No. of Counties          | 873                                        | 173       | 437        | 155        | 71         | 28                        |
| 1960 Population          | 17,179,735                                 | 1,114,276 | 7,479,891  | 3,693,062  | 2,727,910  | 1,493,858                 |
| Net Migr. 1950-60        | -1,798,310                                 | -315,204  | -1,097,774 | -258,636   | -105,718   | -38,276                   |
| % Net Migr. 1950         | -10.8                                      | -25.3     | -14.5      | -7.4       | -4.3       | -2.9                      |

\* Including Kentucky.

Percent of employed  
in agriculture

We expect the percent employed in agriculture to be negatively correlated with population gain. This should reflect both the low income and the low job opportunity structure. Areas with unusually high agricultural employment should show a loss regardless of any other combination of variables. Table 12 indicates the magnitude of this movement. For the region there was a gain of 2.9 percent at low levels of agriculture and a loss of 28 percent at high levels. This relationship is invariable for both adjacent and non-adjacent counties. The adjacent counties drop from a relatively high gain of 8.8 percent at the 11.0 to 26.9 level of agricultural employment to a loss of 16 percent when at least 59.0 percent are employed in agriculture. The non-adjacent counties move from a small loss to a substantial loss.

Farm operator level-of-living

The farm operative level-of-living index is not a direct measure of income but it is highly correlated with it. Some deficiencies of the measure are: (1) it is based upon national averages and does not account for regional variation, and (2) the average changes from decade to decade. Moreover, the expected correlation between the index and percent of the population employment in agriculture is not borne out. In the non-adjacent area, as proportions in



TABLE 12

**NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY PERCENT EMPLOYED IN AGRICULTURE**

| Types of Areas           | Percent of Employed in Agriculture, 1950 |            |              |              |                                  |
|--------------------------|------------------------------------------|------------|--------------|--------------|----------------------------------|
|                          | Total All<br>Employed                    | Under 10.9 | 11.0 to 26.9 | 27.0 to 42.9 | 43.0 to 58.9<br>59.0 and<br>Over |
| <b>Total All Areas</b>   |                                          |            |              |              |                                  |
| No. of Counties          | 1,175                                    | 125        | 256          | 306          | 369                              |
| 1960 Population          | 54,657,295                               | 32,598,758 | 10,659,296   | 6,026,285    | 4,530,723                        |
| Net Migr. 1950-60        | -483,621                                 | 937,650    | 112,459      | -481,345     | -816,721                         |
| % Net Migr. 1950         | -1.0                                     | 2.9        | 1.1          | -0.8         | -18.0                            |
| <b>SMSAs</b>             |                                          |            |              |              |                                  |
| No. of Counties          | 70                                       | 61         | 9            | --           | --                               |
| 1960 Population          | 28,656,625                               | 27,890,083 | 766,542      | --           | --                               |
| Net Migr. 1950-60        | 1,068,480                                | 954,109    | 115,371      | --           | --                               |
| % Net Migr. 1950         | 4.6                                      | 4.2        | 22.0         | --           | --                               |
| <b>Adjacent Areas</b>    |                                          |            |              |              |                                  |
| No. of Counties          | 232                                      | 17         | 87           | 80           | 42                               |
| 1960 Population          | 8,820,935                                | 1,948,767  | 4,279,843    | 1,934,734    | 606,197                          |
| Net Migr. 1950-60        | 245,209                                  | 82,768     | 300,183      | -45,366      | -83,445                          |
| % Net Migr. 1950         | 3.3                                      | 5.3        | 8.8          | -2.6         | -13.5                            |
| <b>Nonadjacent Areas</b> |                                          |            |              |              |                                  |
| No. of Counties          | 873                                      | 47         | 160          | 226          | 327                              |
| 1960 Population          | 17,179,735                               | 2,759,908  | 5,612,911    | 4,091,551    | 3,924,526                        |
| Net Migr. 1950-60        | -1,798,310                               | -99,227    | -303,095     | -435,979     | -733,276                         |
| % Net Migr. 1950         | -10.8                                    | -4.0       | -5.9         | -10.9        | -17.7                            |
|                          |                                          |            |              |              | 113                              |
|                          |                                          |            |              |              | 790,839                          |
|                          |                                          |            |              |              | -226,733                         |
|                          |                                          |            |              |              | -25.3                            |

\* Including Kentucky.

TABLE 13

NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR AREA TYPES,  
BY FARM OPERATOR LEVEL-OF-LIVING

| Types of Areas           | Farm Operator Level-of-Living |            |              |                |                |                         |
|--------------------------|-------------------------------|------------|--------------|----------------|----------------|-------------------------|
|                          | Total                         | Under 79.9 | 80.0 to 99.9 | 100.0 to 119.9 | 120.0 to 139.9 | 140.0 to 159.9 and Over |
| <u>Total All Areas</u>   |                               |            |              |                |                |                         |
| No. of Counties          | 1,175                         | 78         | 51           | 120            | 235            | 315                     |
| 1960 Population          | 54,657,295                    | 1,229,218  | 805,400      | 2,321,821      | 3,238,752      | 19,233,748              |
| Net Migr. 1950-60        | -483,621                      | -377,586   | -160,883     | -181,646       | -160,893       | 227,892                 |
| % Net Migr. 1950         | -1.0                          | -27.0      | -16.7        | -8.2           | -3.4           | 1.4                     |
|                          |                               |            |              |                |                | 0.7                     |
| <u>SMSAs</u>             |                               |            |              |                |                |                         |
| No. of Counties          | 70                            | —          | 1            | 3              | 6              | 28                      |
| 1960 Population          | 28,656,625                    | —          | 52,163       | 199,647        | 1,284,692      | 11,718,898              |
| Net Migr. 1950-60        | 1,068,480                     | —          | 6,397        | 17,612         | 203,324        | 479,737                 |
| % Net Migr. 1950         | 4.6                           | —          | -12.8        | -9.2           | 22.6           | 5.1                     |
|                          |                               |            |              |                |                | 3.2                     |
| <u>Adjacent Areas</u>    |                               |            |              |                |                |                         |
| No. of Counties          | 232                           | 3          | 3            | 15             | 39             | 71                      |
| 1960 Population          | 8,820,935                     | 62,189     | 45,548       | 401,674        | 959,022        | 3,176,224               |
| Net Migr. 1950-60        | 245,209                       | -10,411    | -2,161       | -6,503         | 9,174          | 144,666                 |
| % Net Migr. 1950         | 3.3                           | -16.8      | -5.3         | -1.8           | 1.1            | 5.6                     |
|                          |                               |            |              |                |                | 3.1                     |
| <u>Nonadjacent Areas</u> |                               |            |              |                |                |                         |
| No. of Counties          | 873                           | 75         | 47           | 102            | 190            | 216                     |
| 1960 Population          | 17,179,735                    | 1,167,029  | 707,689      | 1,720,500      | 2,995,038      | 4,338,626               |
| Net Migr. 1950-60        | -1,798,310                    | -367,175   | -132,325     | -157,531       | -373,391       | -396,511                |
| % Net Migr. 1950         | -10.8                         | -27.5      | -17.6        | -9.5           | -12.4          | -9.5                    |
|                          |                               |            |              |                |                | -6.5                    |

\* Including Kentucky

agriculture increase, the mean for the distribution of counties moves toward a higher level of living. This would tend to reduce the relationship between the index and migratory flows.

The simple relationship, however, is a good one. In the region, migration moves from a loss of 27 percent to a slight gain at the extremes of the index. The adjacent region moves from a loss of 16.8 to a gain at the extremes and the non-adjacent area indicates a reduced out-migration.

### Density

The density measure is shown in Table 14 for only the non-adjacent counties. Since there is a .90 correlation between density and population size, we shall not include the latter in tabular form. Table 14 indicates a trend in the expected direction, but not of the magnitude which was anticipated. The reduced out-migration is by only 14 percent at the two density extremes. Since the East North Central Region contains large areas which have very prosperous farming belts, some areas of low density have small out-movements.

### Summary

We have seen that only four of the thirteen states gained population from in-migration during the decade, with nine states losing from out-movement. Moreover, there has

TABLE 14  
NET MIGRATION 1950-60 IN THE NORTH CENTRAL STATES\* FOR  
NONADJACENT AREAS BY DENSITY

|                          | Density    |               |                 |                 |                 |                   |                   |
|--------------------------|------------|---------------|-----------------|-----------------|-----------------|-------------------|-------------------|
|                          | Total      | Under<br>24.9 | 25.0 to<br>49.9 | 50.0 to<br>74.9 | 75.0 to<br>99.9 | 100.0 to<br>124.9 | 125.0 and<br>Over |
| <u>Nonadjacent Areas</u> |            |               |                 |                 |                 |                   |                   |
| No. of Counties          | 873        |               | 402             | 297             | 95              | 34                | 18                |
| 1960 Population          | 17,179,735 | 3,722,601     | 5,503,321       | 2,895,598       | 1,560,835       | 1,015,552         | 2,481,828         |
| Net Migr. 1950-60        | -1,798,310 | -641,900      | -698,275        | -222,756        | -103,066        | -83,300           | -49,013           |
| % Net Migr. 1950         | -10.8      | -16.7         | -12.7           | -8.2            | -7.0            | -8.7              | -2.3              |

\* Including Kentucky.

been considerable re-distribution of people from non-metropolitan to metropolitan areas. The counties losing population in the greatest proportions are found to be both high and low in regard to median age. The income measure is powerful in a simple correlation but we expect other measures which are highly correlated with income to reduce the relationship in multiple regression. Education, for instance, is expected to hold its explanatory power while income will not. Female employment correlates well with migration because of its relationship to both income and the job structure of an area. In spite of the fact that educational levels drop as manufacturing increases, there is a slight increment in income with each increment in manufacturing. The latter is expected to be a good explanatory variable. The percent in agriculture is also a good measure of both income and job structure. Density and size are not as useful for the non-adjacent areas as they are for the entire region because of the relative lack of variance. In combination with other independent variables, however, they will probably be more useful predictors.

### CHAPTER III

#### RELATION OF NET MIGRATION TO SELECTED POPULATION CHARACTERISTICS; SELECTED CROSS CLASSIFICATIONS

This chapter considers the level of net migration with selected combinations of the independent variables. We shall show that some combinations of the variables retard out-migration or attract migrants better than others. This chapter represents another step in identifying the key variables in the analysis. The focus will be primarily upon non-adjacent areas with some comparisons with SMSAs and adjacent counties. Since all possible combinations of the variables would require seventy-eight tables, we have selected those which we feel to be most important. These are: education cross-classified by age, female employment, income, manufacturing, and agriculture; urbanity cross-classified by age, income, female employment, manufacturing, and education; income cross-classified by female employment, agricultural employment, and percent in manufacturing; percent employed in agriculture cross-classified by female employment and farm operator level of living.

Median Schooling and Selected  
Population Characteristics

Median schooling  
and median age

We have seen that migration is positively related to both median age and levels of education, with the former being a negative relationship. Table 15 shows the results for the 856 non-adjacent counties when these two variables are arranged in a contingency relationship.

The counties form a near-normal distribution where arranged by median years of schooling completed for each of the categories of median age, with 563 of the 856 counties in the 8.0-9.4 category. There is a surprising lack of counties at the higher educational levels with only 2 having an attainment of 10.5 years or more.

The distribution of median age is slightly skewed toward the older counties having a median age of 34.0 years and over. The distribution of median age is more meaningful, however, if it is examined in relation to educational attainment. Of the sixteen counties having under 7.0 years of school, eleven are under twenty-six years of age and only five are older. This pattern holds true for the category 7.0-7.4 years of education. The units with lowest education have more young children. One would expect that educational attainment would decrease as median age increases but this is not the case. Both median age and median schooling tend to cluster toward the median.

TABLE 15

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY MEDIAN AGE,  
NON-ADJACENT AREAS OF THE NORTH CENTRAL STATES, 1950

| Median Age  | Median Schooling |             |             |             |             |             |             |               |                |     | Total |
|-------------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|----------------|-----|-------|
|             | Under<br>7.0     | 7.0-<br>7.4 | 7.5-<br>7.9 | 8.0-<br>8.4 | 8.5-<br>8.9 | 9.0-<br>9.4 | 9.5-<br>9.9 | 10.0-<br>10.4 | 10.5 &<br>Over |     |       |
| Under 26    | 9                | 15          | 16          | 27          | 17          | 2           | 0           | 2             | 8              | 96  |       |
| 26.0-26.9   | 0                | 0           | 2           | 9           | 15          | 3           | 3           | 1             | 7              | 40  |       |
| 27.0-27.9   | 0                | 1           | 0           | 7           | 35          | 7           | 6           | 2             | 6              | 64  |       |
| 28.0-28.9   | 0                | 0           | 1           | 12          | 47          | 9           | 3           | 6             | 4              | 82  |       |
| 29.0-29.9   | 0                | 0           | 1           | 13          | 67          | 10          | 5           | 5             | 7              | 108 |       |
| 30.0-30.9   | 0                | 0           | 0           | 8           | 65          | 15          | 9           | 8             | 9              | 114 |       |
| 31.0-31.9   | 0                | 0           | 1           | 11          | 59          | 16          | 12          | 10            | 7              | 116 |       |
| 32.0-32.9   | 0                | 0           | 0           | 3           | 34          | 9           | 11          | 6             | 11             | 74  |       |
| 33.0-33.9   | 0                | 0           | 0           | 3           | 30          | 10          | 8           | 3             | 1              | 55  |       |
| 34.0 & over | 0                | 0           | 0           | 5           | 68          | 25          | 6           | 2             | 1              | 107 |       |
| Total       | 9                | 16          | 22          | 98          | 437         | 106         | 63          | 45            | 61             | 856 |       |



Table 16 shows the migration flows at varying levels of these two variables. The expected relationship is found to exist. With each increase in education there is a drop in out-migration. For the 145 counties with less than 8.5 years of schooling, there is a loss of 24.7 percent of their 1950 population. An increment of 8.5-8.9 years of schooling decreases the flow of out-migration to 11.8 percent, and at the highest level of education the loss is only 0.8 percent. When median schooling is held constant and age is varied, however, there is a significant influence from age only at the lowest educational levels. In the 8.5 median school category the under 29 age group lost 27.6 percent of the 1950 population during the 1950-1960 decade, and this loss drops as median age is increased. At all other levels of education there is no consistent relationship. The young are expected to migrate and it will be shown that the high median age counties are characterized by high proportions employed in agriculture.

For the region as a whole (Table 16), there is a movement from high out-migration to high in-migration as educational levels are increased. The 159 counties having less than 8.5 years of schooling lost 23.2 percent of their 1950 population; the 189 units with 10.0 or more years of schooling gained 6.7 percent or 1,174,631 people. The adjacent areas have a similar pattern. The surprising result is that

TABLE 16

**NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE  
NORTH CENTRAL STATES, BY MEDIAN SCHOOL YEARS COMPLETED AND MEDIAN AGE IN 1950**

| Median schooling#<br>and<br>type of area | Number<br>of<br>Counties | Population<br>in<br>1960 | Net Migration<br>1950-60 | Net Migration as Percent of 1950<br>Population by median age |               |        |               |        |               |                  |
|------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------------------------------------------|---------------|--------|---------------|--------|---------------|------------------|
|                                          |                          |                          |                          | Total                                                        | under<br>29.0 |        | 29.0-<br>30.9 |        | 31.0-<br>32.9 | 33.0 and<br>over |
|                                          |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| <u>M.S. under 8.5 yrs.</u>               |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| Total                                    | 159                      | 2,299,260                | -584,043                 | -23.2                                                        | -26.9         | -17.2  | -9.6          | -7.1   |               |                  |
| SMSA                                     | -                        | -                        | -                        | -                                                            | -             | -      | -             | -      |               |                  |
| Adjacent                                 | 14                       | 220,508                  | -13,529                  | -6.6                                                         | -12.7         | -14.4* | 2.8*          | -0.5*  |               |                  |
| Nonadjacent                              | 145                      | 2,078,752                | -570,514                 | -24.7                                                        | -27.6         | -17.5  | -13.8         | -10.4  |               |                  |
| <u>M.S. 8.5-8.9 yrs.</u>                 |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| Total                                    | 559                      | 12,578,616               | -1,163,254               | -9.6                                                         | -10.3         | -5.3   | -9.2          | -14.6  |               |                  |
| SMSA                                     | 12                       | 1,902,555                | -200,191                 | -10.9                                                        | 2.9*          | 5.5    | -5.2*         | -24.8* |               |                  |
| Adjacent                                 | 104                      | 2,962,032                | -61,250                  | -2.3                                                         | -1.7          | 4.4    | -8.7          | -4.9   |               |                  |
| Nonadjacent                              | 443                      | 7,714,029                | -901,813                 | -11.8                                                        | -13.4         | -11.4  | -9.9          | -12.8  |               |                  |
| <u>M.S. 9.0-9.4 yrs.</u>                 |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| Total                                    | 159                      | 7,436,016                | 16,454                   | .3                                                           | 5.4           | 1.1    | 0.9           | -9.2   |               |                  |
| SMSA                                     | 13                       | 3,380,030                | 172,229                  | 6.5                                                          | 11.9          | 5.1    | 5.2*          | -      |               |                  |
| Adjacent                                 | 38                       | 1,606,744                | 60,706                   | 4.6                                                          | 6.6           | 3.5    | 7.6           | 0.5    |               |                  |
| Nonadjacent                              | 108                      | 2,449,242                | -216,481                 | -9.2                                                         | -5.1          | -8.1   | -8.4          | -13.0  |               |                  |
| <u>M.S. 9.5-9.9 yrs.</u>                 |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| Total                                    | 107                      | 10,399,987               | 73,089                   | 0.8                                                          | 34.7          | -0.3   | 0.4           | -1.1   |               |                  |
| SMSA                                     | 9                        | 7,867,120                | 131,815                  | 2.0                                                          | 77.9*         | 2.5    | 0.6           | -0.5*  |               |                  |
| Adjacent                                 | 31                       | 1,073,109                | 26,232                   | 2.9                                                          | -2.7*         | 1.0    | 6.6           | -8.5*  |               |                  |
| Nonadjacent                              | 67                       | 1,459,758                | -84,958                  | -6.2                                                         | -13.8         | -2.0   | -4.8          | -12.3  |               |                  |
| <u>M.S. 10.0 yrs. &amp; over</u>         |                          |                          |                          |                                                              |               |        |               |        |               |                  |
| Total                                    | 189                      | 21,942,001               | 1,174,631                | 6.7                                                          | 11.3          | 11.5   | 2.8           | 2.1    |               |                  |
| SMSA                                     | 36                       | 15,506,920               | 965,627                  | 8.0                                                          | 22.0          | 14.0   | 4.0           | 3.1*   |               |                  |
| Adjacent                                 | 45                       | 2,958,542                | 233,050                  | 10.1                                                         | 9.5           | 15.8   | 6.9           | -5.0   |               |                  |
| Nonadjacent                              | 108                      | 3,476,539                | -24,046                  | -0.8                                                         | -1.5          | -0.8   | 0.4           | -7.5   |               |                  |

# Median school years completed not available for 2 counties in 1950.

\* Under 5 county units.

the SMSA counties with low education lost 10.9 percent of their 1950 population. The results show that four SMSAs having low education and high median age lost 24.8 percent during the decade. Moreover, at all educational levels the SMSAs of high median age show a slight loss or a very small gain. We must conclude that age is not an adequate predictor when education is controlled.

Median schooling and  
females in the labor force

The distribution of median education and percent of females employed is found in Table 17. The distribution for female employment is almost normal slightly skewed toward low employment. The mean for the non-adjacent areas is about 20 percent of all females fourteen years of age and over employed. We find that the extremely low female employment is located in counties having low educational levels. None of the counties which are low in education are also high in female employment. The highest percent of female employment is found for the 8.5-8.9 educational category and at the 17.0-19.9 percent category of female employment.

When the two variables are related to net migration, both median schooling and female employment prove to be powerful explanatory variables (Table 18). The effect of levels of schooling has been discussed, so we shall examine female employment at each level of education.

TABLE 17

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY THE PERCENT  
OF FEMALES IN THE LABOR FORCE, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

Percent of Females in Labor Force

| Median<br>Schooling | Under<br>8.0 | 8.0-<br>10.9 | 11.0-<br>13.9 | 14.0-<br>16.9 | 17.0-<br>19.9 | 20.0-<br>22.9 | 23.0-<br>25.9 | 26.0-<br>28.9 | 29.0-<br>31.9 | 32 &<br>over | Total |
|---------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------|
| Under 7.0           | 4            | 3            | 2             | 0             | 0             | 0             | 0             | 0             | 0             | 0            | 9     |
| 7.0-7.4             | 4            | 8            | 1             | 3             | 0             | 0             | 0             | 0             | 0             | 0            | 16    |
| 7.5-7.9             | 2            | 7            | 4             | 4             | 2             | 2             | 0             | 0             | 0             | 0            | 21    |
| 8.0-8.4             | 1            | 10           | 17            | 29            | 15            | 13            | 7             | 3             | 1             | 2            | 98    |
| 8.5-8.9             | 0            | 1            | 13            | 72            | 131           | 105           | 69            | 31            | 9             | 6            | 437   |
| 9.0-9.4             | 0            | 0            | 2             | 11            | 23            | 25            | 19            | 19            | 5             | 2            | 106   |
| 9.5-9.9             | 0            | 0            | 1             | 3             | 20            | 18            | 12            | 5             | 2             | 2            | 63    |
| 10.0-10.4           | 0            | 0            | 3             | 1             | 9             | 9             | 9             | 7             | 6             | 1            | 45    |
| 10.5 & over         | 0            | 2            | 0             | 5             | 6             | 9             | 13            | 12            | 7             | 7            | 61    |
| Total               | 11           | 31           | 43            | 128           | 206           | 181           | 129           | 77            | 30            | 20           | 856   |

TABLE 18

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH CENTRAL STATES, BY MEDIAN SCHOOL YEARS COMPLETED AND BY PERCENT FEMALES IN LABOR FORCE IN 1950

| Median schooling #<br>and<br>type of area | Number<br>of<br>Counties | Population<br>in<br>1960 | Net migration<br>1950-1960 | Net migration as percent of 1950 population<br>by percent females in labor force |               |               |               |                  |  |  |  |
|-------------------------------------------|--------------------------|--------------------------|----------------------------|----------------------------------------------------------------------------------|---------------|---------------|---------------|------------------|--|--|--|
|                                           |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
|                                           |                          |                          |                            | Total                                                                            | Under<br>17.0 | 17.0-<br>22.9 | 23.0-<br>28.9 | 29.0 and<br>over |  |  |  |
| <u>M.S. under 8.5 yrs.</u>                |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
| Total                                     | 159                      | 2,299,260                | -584,043                   | -23.2                                                                            | -27.9         | -13.7         | -12.8         | -19.3*           |  |  |  |
| SMSA                                      | -                        | -                        | -                          | -                                                                                | -             | -             | -             | -                |  |  |  |
| Adjacent                                  | 14                       | 220,508                  | -13,529                    | -6.6                                                                             | -12.5         | -4.3          | 8.8*          | -                |  |  |  |
| Nonadjacent                               | 145                      | 2,078,752                | -570,514                   | -24.7                                                                            | -29.0         | -14.7         | -17.2         | -19.3*           |  |  |  |
| <u>M.S. 8.5-8.9 yrs.</u>                  |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
| Total                                     | 559                      | 12,578,616               | -1,163,254                 | -9.6                                                                             | -17.3         | -10.8         | -3.9          | -15.7            |  |  |  |
| SMSA                                      | 12                       | 1,902,555                | -200,191                   | -10.9                                                                            | -             | -10.3*        | 8.0           | -21.3*           |  |  |  |
| Adjacent                                  | 104                      | 2,962,032                | -61,250                    | -2.3                                                                             | -9.6          | -2.0          | -1.8          | 6.0*             |  |  |  |
| Nonadjacent                               | 443                      | 7,714,029                | -901,813                   | -11.8                                                                            | -19.1         | -14.2         | -7.0          | -5.7             |  |  |  |
| <u>M.S. 9.0-9.4 yrs.</u>                  |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
| Total                                     | 159                      | 7,436,016                | 16,454                     | 0.3                                                                              | -16.2         | -7.7          | 4.8           | -0.1             |  |  |  |
| SMSA                                      | 13                       | 3,380,030                | 172,229                    | 6.5                                                                              | -             | -             | 13.8          | 1.1*             |  |  |  |
| Adjacent                                  | 38                       | 1,606,744                | 60,706                     | 4.6                                                                              | -10.1*        | -0.2          | 7.4           | 9.1*             |  |  |  |
| Nonadjacent                               | 108                      | 2,449,242                | -216,481                   | -9.2                                                                             | -21.5         | -10.5         | -6.7          | -9.0             |  |  |  |
| <u>M.S. 9.5-9.9 yrs.</u>                  |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
| Total                                     | 107                      | 10,399,987               | 73,089                     | 0.8                                                                              | -20.1         | 8.7           | -0.6          | 0.3              |  |  |  |
| SMSA                                      | 9                        | 7,867,120                | 131,815                    | 2.0                                                                              | -             | 77.9*         | 0.9*          | -0.3*            |  |  |  |
| Adjacent                                  | 31                       | 1,073,109                | 26,232                     | 2.9                                                                              | -15.3*        | -0.6          | 0.2           | 27.2*            |  |  |  |
| Nonadjacent                               | 67                       | 1,459,758                | -84,958                    | -6.2                                                                             | -21.4         | -12.6         | -3.5          | 4.2              |  |  |  |
| <u>M.S. 10.0 yrs. &amp; over</u>          |                          |                          |                            |                                                                                  |               |               |               |                  |  |  |  |
| Total                                     | 189                      | 21,942,001               | 1,174,631                  | 6.7                                                                              | -12.6         | 1.3           | 20.1          | 2.9              |  |  |  |
| SMSA                                      | 36                       | 15,506,920               | 965,627                    | 8.0                                                                              | -             | 95.7*         | 40.7          | 2.5              |  |  |  |
| Adjacent                                  | 45                       | 2,958,542                | 233,050                    | 10.1                                                                             | -16.7*        | 6.6           | 14.7          | 2.6              |  |  |  |
| Nonadjacent                               | 108                      | 3,476,539                | -24,046                    | -0.8                                                                             | -11.9         | -12.9         | -2.6          | 5.7              |  |  |  |

# Median school years completed not available for 2 counties in 1950.

\* Under 5 county units.

When schooling is held constant at 8.5-8.9, the proportion of loss drops from 29.0 percent to 19.3 percent as female employment increases. This relationship is invariable for all levels of median schooling and there is in-migration when education reaches 9.5 years and female employment reaches 29.0 percent. The largest drop in out-migration comes when an education level of 8.5 is reached.

The relationship is generally as expected for the region with the exception of the highest category of female employment. At the 8.5-8.9 education level the SMSAs show an 8.0 percent gain with 23.0-28.9 percent female employment and a minus 23.3 when female employment rises. In the 9.0-9.4 education category the SMSAs have a gain of 13.8 percent at 23.0-28.9 percent female employment and a gain of only 1.1 percent when female employment rises. At the highest level of education there is a gain of 40.7 percent for the second highest level of employment and a gain of only 2.5 percent at the highest levels. This pattern is invariable for all education categories. This relationship was expected because of the high correlation of female employment with urbanity. The adjacent areas continue to gain population with each increment in female employment. With one exception, then, both education and female employment are useful variables in accounting for migratory flows.

Median schooling  
and income

When education is crossed with income we find a normal distribution, with the mean for income about \$2,200 (Table 20). As expected, no non-adjacent county with an educational level of 9.0 years is in the lowest income categories and no county with low education is in the high income categories. More than half of the counties have from 8.5-9.4 years of education and income from \$2,000-\$4,000.

When we hold educational level constant and vary income, our expectation that income would be a poor explanatory variable proves true. Although there is some tendency for the \$3,000 and over category of income to retard out-migration, a significant pattern emerges only at the highest educational levels. It may be concluded that at low educational levels income has very little effect upon population loss. The higher the educational level the more increased income retards out-movement. At the 10.0 and over level of schooling there is a loss of 11.6 from the areas having less than \$2,200 income and a gain of 1.7 in areas with \$3,000 and over. Since most of the SMSAs have a median income of \$3,000 and over no statements can be made about them. In the adjacent areas, however, the income variable is more important. There is a clear relationship between level of income and the ability of the county to retard out-migration or to add new

TABLE 19

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY MEDIAN FAMILY INCOME,  
NON-ADJACENT AREAS OF THE NORTH CENTRAL STATES, 1950

| Median Schooling |              |             |             |             |             |             |             |               |                |       |
|------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|----------------|-------|
| Income           | Under<br>7.0 | 7.0-<br>7.4 | 7.5-<br>7.9 | 8.0-<br>8.4 | 8.5-<br>8.9 | 9.0-<br>9.4 | 9.5-<br>9.9 | 10.0-<br>10.4 | 10.5 &<br>over | Total |
| Under \$1,000    | 3            | 4           | 4           | 4           | 1           | 0           | 0           | 0             | 0              | 16    |
| \$1,000-1,399    | 6            | 9           | 11          | 34          | 12          | 0           | 0           | 0             | 0              | 72    |
| \$1,400-1,799    | 0            | 1           | 2           | 24          | 44          | 3           | 0           | 0             | 1              | 75    |
| \$1,800-2,199    | 0            | 2           | 3           | 19          | 113         | 20          | 4           | 2             | 1              | 164   |
| \$2,200-2,599    | 0            | 0           | 1           | 11          | 136         | 34          | 21          | 8             | 8              | 219   |
| \$2,600-2,999    | 0            | 0           | 0           | 4           | 93          | 31          | 22          | 12            | 18             | 180   |
| \$3,000-3,399    | 0            | 0           | 0           | 2           | 33          | 15          | 15          | 19            | 23             | 107   |
| \$3,400-3,799    | 0            | 0           | 0           | 0           | 5           | 2           | 1           | 4             | 9              | 21    |
| \$3,800 & over   | 0            | 0           | 0           | 0           | 0           | 1           | 0           | 0             | 1              | 2     |
| Total            | 9            | 16          | 21          | 98          | 437         | 106         | 63          | 45            | 61             | 856   |



TABLE 20

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH  
CENTRAL STATES, BY MEDIAN SCHOOL YEARS COMPLETED AND MEDIAN INCOME IN 1950

| Median schooling#<br>and<br>types of area | Number<br>of<br>Counties | Population<br>in<br>1960 | Net migration<br>1950-1960 | Net migration as percent of 1950 population,<br>by median family income |        |         |        |                  |  |  |  |
|-------------------------------------------|--------------------------|--------------------------|----------------------------|-------------------------------------------------------------------------|--------|---------|--------|------------------|--|--|--|
|                                           |                          |                          |                            | Under                                                                   |        |         |        |                  |  |  |  |
|                                           |                          |                          |                            | \$2200                                                                  | \$2599 | \$2600- | \$2999 | \$3000 &<br>over |  |  |  |
| <u>M.S. under 8.5 yrs.</u>                |                          |                          |                            |                                                                         |        |         |        |                  |  |  |  |
| Total                                     | 158                      | 2,297,747                | -556,350                   | -22.1                                                                   | -24.1  | -19.2   | -15.1  | -17.2*           |  |  |  |
| SMSA                                      | -                        | -                        | -                          | -                                                                       | -      | -       | -      | -                |  |  |  |
| Adjacent                                  | 14                       | 220,508                  | 13,529                     | -6.6                                                                    | -13.8  | 1.5*    | -4.9*  | -                |  |  |  |
| Nonadjacent                               | 144                      | 2,077,239                | -569,879                   | -24.7                                                                   | -24.6  | -25.8   | -25.0* | -17.2*           |  |  |  |
| <u>M.S. 8.5-8.9 yrs.</u>                  |                          |                          |                            |                                                                         |        |         |        |                  |  |  |  |
| Total                                     | 553                      | 12,569,571               | -1,160,113                 | -9.6                                                                    | -12.0  | -12.1   | -7.9   | -6.8             |  |  |  |
| SMSA                                      | 12                       | 1,902,555                | -200,191                   | -10.9                                                                   | -      | -3.2*   | 0.6*   | -12.8            |  |  |  |
| Adjacent                                  | 104                      | 2,962,032                | -61,250                    | -2.3                                                                    | -8.8   | -7.3    | -1.6   | 4.7              |  |  |  |
| Nonadjacent                               | 437                      | 7,704,984                | -898,672                   | -11.8                                                                   | -12.7  | -13.5   | -11.6  | -6.4             |  |  |  |
| <u>M.S. 9.0-9.4 yrs.</u>                  |                          |                          |                            |                                                                         |        |         |        |                  |  |  |  |
| Total                                     | 157                      | 7,430,801                | 15,227                     | 0.4                                                                     | 7.5    | -8.5    | -5.1   | 4.1              |  |  |  |
| SMSA                                      | 13                       | 3,380,030                | 172,229                    | 6.5                                                                     | -      | -       | -      | 6.5              |  |  |  |
| Adjacent                                  | 38                       | 1,606,744                | 60,706                     | 4.6                                                                     | 26.9*  | 0.6     | -0.5   | 6.7              |  |  |  |
| Nonadjacent                               | 106                      | 2,444,027                | -217,708                   | -9.2                                                                    | -13.9  | -13.1   | -6.8   | -7.1             |  |  |  |
| <u>M.S. 9.5-9.9 yrs.</u>                  |                          |                          |                            |                                                                         |        |         |        |                  |  |  |  |
| Total                                     | 103                      | 10,394,709               | 74,485                     | 0.9                                                                     | -16.6  | -7.4    | -3.4   | 1.9              |  |  |  |
| SMSA                                      | 9                        | 7,867,120                | 131,815                    | 2.0                                                                     | -      | -       | -      | 2.0              |  |  |  |
| Adjacent                                  | 31                       | 1,073,109                | 26,232                     | 2.9                                                                     | -16.1* | -6.5    | 0.6    | 8.0              |  |  |  |
| Nonadjacent                               | 63                       | 1,454,480                | -83,562                    | -6.1                                                                    | -16.7* | -7.7    | -6.4   | -4.0             |  |  |  |
| <u>M.S. 10.0 yrs. &amp; over</u>          |                          |                          |                            |                                                                         |        |         |        |                  |  |  |  |
| Total                                     | 187                      | 21,939,723               | 1,175,129                  | 6.8                                                                     | -11.6  | -8.4    | -0.2   | 7.7              |  |  |  |
| SMSA                                      | 36                       | 15,506,920               | 965,627                    | 8.0                                                                     | -      | -       | -      | 8.0              |  |  |  |
| Adjacent                                  | 45                       | 2,958,542                | 233,050                    | 10.1                                                                    | -      | -4.9*   | 4.5    | 12.1             |  |  |  |
| Nonadjacent                               | 106                      | 3,474,261                | -23,548                    | -0.8                                                                    | -11.6  | -9.3    | -3.4   | 1.7              |  |  |  |

# Median school years completed not available for 2 counties in 1950.

\* Under 5 county units.

members. We have previously stated that for the rural migrant job opportunity is the key to moving.

Median schooling and percent  
of employed in manufacturing

The contingency Table 21 indicates a high clustering of non-adjacent counties in low manufacturing categories. The mean for the region is about 9 percent employed in manufacturing. The national average in 1950 was 26 percent. No county units with low educational levels had high percentages employed in manufacturing and the highest percentages were at 8.5-8.9 level of education. Until this level of education is reached an addition to the level of school years also yielded increments in manufacturing. After this level was reached manufacturing decreased with higher educational levels.

When education is held constant and the percent employed in manufacturing is varied, manufacturing clearly influences migratory flows. Even at the lowest educational level out-migration drops sharply when manufacturing reaches 22 percent. In the 8.5-8.9 schooling category out-migration drops from 24.3 to 5.4 as manufacturing increases. At the 9.5-9.9 level of median school completed the drop is from -24.2 to 2.3 at the two extremes. It is very significant that when education has reached 10.0 and over that a loss of 22.6 percent of the 1950 population occurred in the lowest

TABLE 21

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY THE PERCENT OF  
EMPLOYED IN MANUFACTURING, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

Manufacturing

| Median<br>Schooling | Under<br>2.0 | 2.0-<br>6.9 | 7.0-<br>11.9 | 12.0-<br>16.9 | 17.0-<br>21.9 | 22.0-<br>26.9 | 27.0-<br>31.9 | 32.0-<br>36.9 | 37.0-<br>41.0 | 42 &<br>over | Total |
|---------------------|--------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|-------|
| Under 7.0           | 0            | 4           | 3            | 1             | 1             | 0             | 0             | 0             | 0             | 0            | 9     |
| 7.0-7.4             | 1            | 8           | 6            | 1             | 0             | 0             | 0             | 0             | 0             | 0            | 16    |
| 7.5-7.9             | 3            | 12          | 1            | 4             | 1             | 0             | 0             | 0             | 0             | 0            | 21    |
| 8.0-8.4             | 16           | 28          | 25           | 11            | 12            | 4             | 2             | 0             | 0             | 0            | 98    |
| 8.5-8.9             | 95           | 120         | 92           | 53            | 31            | 23            | 11            | 6             | 5             | 1            | 437   |
| 9.0-9.4             | 17           | 39          | 11           | 4             | 13            | 4             | 7             | 5             | 2             | 4            | 106   |
| 9.5-9.9             | 13           | 18          | 9            | 4             | 4             | 9             | 1             | 2             | 1             | 2            | 63    |
| 10.0-10.4           | 4            | 19          | 7            | 2             | 4             | 1             | 2             | 1             | 3             | 2            | 45    |
| 10.5 & over         | 8            | 27          | 7            | 6             | 3             | 3             | 4             | 1             | 2             | 0            | 61    |
| Total               | 157          | 257         | 161          | 86            | 69            | 44            | 27            | 15            | 13            | 9            | 856   |

TABLE 22

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH  
CENTRAL STATES, BY MEDIAN SCHOOL YEARS COMPLETED AND PERCENT EMPLOYED IN MANUFACTURING  
IN 1950

| Median Schooling#<br>and<br>Types of Area | Number<br>of<br>Counties | Population<br>in<br>1960 | Net migration<br>1950-1960 | Net migration as percent of 1950 population<br>by percent employed in manufacturing |       |       |        |       |                |
|-------------------------------------------|--------------------------|--------------------------|----------------------------|-------------------------------------------------------------------------------------|-------|-------|--------|-------|----------------|
|                                           |                          |                          |                            | Under                                                                               |       |       |        |       |                |
|                                           |                          |                          |                            | Total                                                                               | 2.0   | 11.9  | 21.9   | 31.9  | 32.0 &<br>over |
| <u>M.S. under 8.5 yrs.</u>                |                          |                          |                            |                                                                                     |       |       |        |       |                |
| Total                                     | 159                      | 2,299,260                | -584,043                   | -23.2                                                                               | -26.4 | -25.3 | -18.2  | -8.0  | 8.8*           |
| SMSA                                      | -                        | -                        | -                          | -                                                                                   | -     | -     | -      | -     | -              |
| Adjacent                                  | 14                       | 220,508                  | -13,529                    | -6.6                                                                                | -     | -16.8 | -8.3   | 17.4* | 8.8*           |
| Nonadjacent                               | 145                      | 2,078,751                | -570,514                   | -24.7                                                                               | -26.4 | -25.7 | -20.2  | -11.1 | -              |
| <u>M.S. 8.5-8.9 yrs.</u>                  |                          |                          |                            |                                                                                     |       |       |        |       |                |
| Total                                     | 559                      | 12,578,616               | -1,163,254                 | -9.6                                                                                | -24.3 | -13.5 | -7.4   | -1.9  | -7.6           |
| SMSA                                      | 12                       | 1,902,555                | -200,191                   | -10.9                                                                               | -     | -     | -      | -0.6  | -14.3          |
| Adjacent                                  | 104                      | 2,962,032                | -61,250                    | -2.3                                                                                | -     | -10.6 | -5.3   | 2.2   | 5.4            |
| Nonadjacent                               | 443                      | 7,714,029                | -901,813                   | -11.8                                                                               | -24.3 | -14.0 | -8.2   | -5.0  | -5.4           |
| <u>M.S. 9.0-9.4 yrs.</u>                  |                          |                          |                            |                                                                                     |       |       |        |       |                |
| Total                                     | 159                      | 7,436,016                | 16,454                     | 0.3                                                                                 | -21.1 | -10.0 | -4.4   | 2.2   | 4.8            |
| SMSA                                      | 13                       | 3,380,030                | 172,229                    | 6.5                                                                                 | -     | -     | -13.7* | 9.1*  | 5.9            |
| Adjacent                                  | 38                       | 1,606,744                | 60,706                     | 4.6                                                                                 | -     | -4.0  | 3.4    | 5.7   | 8.8            |
| Nonadjacent                               | 108                      | 2,449,242                | -216,481                   | -9.2                                                                                | -21.1 | -12.4 | -5.0   | -9.6  | -4.2           |
| <u>M.S. 9.5-9.9 yrs.</u>                  |                          |                          |                            |                                                                                     |       |       |        |       |                |
| Total                                     | 107                      | 10,399,987               | 73,089                     | 0.8                                                                                 | -24.2 | -9.2  | -1.5   | 2.3   | 2.2            |
| SMSA                                      | 9                        | 7,867,120                | 131,815                    | 2.0                                                                                 | -     | 2.5*  | 2.3*   | -     | 2.1            |
| Adjacent                                  | 31                       | 1,073,109                | 26,232                     | 2.9                                                                                 | -     | -5.3  | -4.9*  | 6.8   | 3.6            |
| Nonadjacent                               | 67                       | 1,459,758                | -84,958                    | -6.2                                                                                | -24.2 | -12.9 | -0.1   | -4.0  | 2.3            |
| <u>M.S. 10.0 yrs. &amp; over</u>          |                          |                          |                            |                                                                                     |       |       |        |       |                |
| Total                                     | 189                      | 21,942,001               | 1,174,631                  | 6.7                                                                                 | -22.6 | -3.7  | 5.8    | 14.0  | 5.6            |
| SMSA                                      | 36                       | 15,506,920               | 965,627                    | 8.0                                                                                 | -     | -     | 9.9    | 16.6  | 4.3            |
| Adjacent                                  | 45                       | 2,958,542                | 233,050                    | 10.1                                                                                | -     | -0.9  | 1.1    | 9.5   | 14.6           |
| Nonadjacent                               | 108                      | 3,476,539                | -24,046                    | -0.8                                                                                | -22.6 | -4.0  | 0.3    | 3.9   | 3.9            |

# Median school years completed not available for 2 counties in 1950.

\* Under 5 county units.

manufacturing category while gaining 3.9 percent in the highest one: the effect of median school years completed may be seen by looking at the totals for each level of education. For manufacturing under 2 percent, there is a loss of 24.7 percent of the population at the lowest education level and a loss of 0.8 at the highest.

The SMSAs show a consistent pattern of lowered in-migration at the highest manufacturing levels. At the 8.5-8.9 level of education there is an out-migration from SMSAs of 14.3 percent. The adjacent areas present an invariable pattern of gaining in population as manufacturing levels increase. When manufacturing is held constant for the region and the effect of education examined, there is little influence on migration for areas with less than 2.0 percent employed in manufacturing. However, at the 2.0-11.9 percent level of manufacturing there is a drop from 25.3 percent to -3.7 percent at the two extremes. There is a similar pattern for the remaining manufacturing categories.

Median schooling and percent  
of employed in agriculture

The distribution of education and agriculture (Table 23) indicates an inverse correlation between the two measures. Low educational attainment is correlated with high proportions in agriculture and the high education units have medium to low proportions in farm employment. The mean for agriculture for the region is about 42 percent.

TABLE 23

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY THE PERCENT OF  
EMPLOYED IN AGRICULTURE, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

Percent Employed in Agriculture

| Median<br>Schooling | Under<br>3.0 | 3.0-<br>10.9 | 11.0-<br>18.9 | 19.0-<br>26.9 | 27.0-<br>34.9 | 35.0-<br>42.9 | 43.0-<br>50.9 | 51.0-<br>58.9 | 54.0-<br>66.9 | 67.0-&<br>over | Total |
|---------------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------|
| Under 7.0           | 0            | 0            | 1             | 0             | 1             | 1             | 1             | 1             | 4             | 0              | 9     |
| 7.0-7.4             | 0            | 2            | 1             | 0             | 2             | 1             | 1             | 3             | 2             | 4              | 16    |
| 7.5-7.9             | 0            | 2            | 1             | 1             | 1             | 1             | 3             | 2             | 6             | 4              | 21    |
| 8.0-8.4             | 1            | 1            | 2             | 4             | 11            | 10            | 21            | 23            | 14            | 11             | 98    |
| 8.5-8.9             | 0            | 11           | 33            | 37            | 46            | 69            | 84            | 106           | 42            | 9              | 437   |
| 9.0-9.4             | 0            | 11           | 13            | 12            | 14            | 11            | 21            | 20            | 2             | 2              | 106   |
| 9.5-9.9             | 0            | 6            | 5             | 10            | 10            | 11            | 11            | 8             | 2             | 0              | 63    |
| 10.0-10.4           | 0            | 7            | 6             | 5             | 10            | 8             | 8             | 1             | 0             | 0              | 45    |
| 10.5 & over         | 0            | 6            | 14            | 15            | 6             | 12            | 6             | 1             | 1             | 0              | 61    |
| Total               | 1            | 46           | 76            | 84            | 101           | 124           | 156           | 165           | 73            | 30             | 856   |

When the level of education is held constant and agriculture varied (Table 24), the effect of proportions of agriculture is seen. At the lowest level of schooling there is no change in out-migration as the percent in agriculture is increased. In fact, the pattern is in the opposite direction. The higher the education the greater is the differential between the two extremes of agricultural employment. The more educated people are leaving highly agricultural areas. The relationship between these two measures is almost meaningless for highly urban areas.

Median schooling and farm  
operator level-of-living

Table 25 indicates a high correlation between education and farm operator level-of-living. There are no counties with low education and a high index of living and no high education counties with a low index of living. We have indicated previously that low median schooling, low level of living counties have a low median age as well. The high median age counties are also low in education and level of living. Generally, the level of living index is above the national average with only 127 counties of the 856 showing a low index.

When these two variables are crossed in Table 26 there is a slight tendency for level-of-living to retard out-migration at differing levels of education, but the relationship is not consistent. The region as a whole lost 31 percent

TABLE 24

**NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPE OF AREA IN THE NORTH CENTRAL STATES, BY MEDIAN SCHOOL YEARS COMPLETED AND PERCENT EMPLOYED IN AGRICULTURE**

| Percent Employed in<br>Agriculture and<br>Type of Area | Number of<br>Counties | Population<br>1960 | Net Migration<br>1950-1960 | Net Migration as Percent of Population by<br>Median School Years Completed |             |             |             |                |       |  |
|--------------------------------------------------------|-----------------------|--------------------|----------------------------|----------------------------------------------------------------------------|-------------|-------------|-------------|----------------|-------|--|
|                                                        |                       |                    |                            | Under                                                                      |             |             |             |                |       |  |
|                                                        |                       |                    |                            | 8.5                                                                        | 8.5-<br>8.9 | 9.0-<br>9.4 | 9.5-<br>9.9 | 10.0 &<br>over |       |  |
| <hr/>                                                  |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| % in agriculture<br>under 10.9                         |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| Total                                                  | 125                   | 32,598,758         | 937,610                    | 3.5                                                                        | -40.4       | -11.5       | 2.7         | 2.2            | 7.7   |  |
| SMSA                                                   | 61                    | 27,890,083         | 954,109                    | 4.2                                                                        | -           | -12.8       | 4.7         | 2.0            | 7.7   |  |
| Adjacent                                               | 17                    | 1,948,767          | 82,728                     | 5.3                                                                        | -           | 5.7         | 4.6         | 6.9            | 8.4   |  |
| Nonadjacent                                            | 47                    | 2,759,908          | -99,227                    | -4.0                                                                       | -40.4       | -8.7        | -6.9        | 4.9            | 5.7   |  |
| <hr/>                                                  |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| % in agriculture<br>11.0-26.9                          |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| Total                                                  | 256                   | 10,659,296         | 112,459                    | 1.2                                                                        | -24.0       | -2.7        | 3.7         | 1.1            | 7.5   |  |
| SMSA                                                   | 9                     | 766,542            | 115,371                    | 22.0                                                                       | -           | 14.0        | 59.0        | 2.5            | 18.8  |  |
| Adjacent                                               | 87                    | 4,279,843          | 300,183                    | 8.8                                                                        | 4.2         | 4.9         | 9.4         | 6.2            | 12.8  |  |
| Nonadjacent                                            | 160                   | 5,612,911          | -303,095                   | -5.9                                                                       | -30.0       | -7.0        | -5.9        | -5.5           | 0.6   |  |
| <hr/>                                                  |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| % in agriculture<br>27.0-42.9                          |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| Total                                                  | 306                   | 6,026,284          | -481,345                   | -8.7                                                                       | -15.3       | -7.7        | -4.4        | -7.8           | -11.2 |  |
| SMSA                                                   | -                     | -                  | -                          | -                                                                          | -           | -           | -           | -              | -     |  |
| Adjacent                                               | 80                    | 1,934,734          | -45,366                    | -2.6                                                                       | -6.4        | -4.0        | 4.4         | -3.4           | -6.0  |  |
| Nonadjacent                                            | 226                   | 4,091,551          | -435,779                   | -10.9                                                                      | -16.7       | -9.4        | -10.3       | -10.8          | -12.3 |  |
| <hr/>                                                  |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| % in agriculture<br>43.0-58.9                          |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| Total                                                  | 369                   | 4,590,723          | -816,721                   | 17.1                                                                       | -21.5       | -15.9       | -16.7       | -18.8          | -13.8 |  |
| SMSA                                                   | -                     | -                  | -                          | -                                                                          | -           | -           | -           | -              | -     |  |
| Adjacent                                               | 42                    | 606,197            | -83,445                    | -13.5                                                                      | -12.2       | -19.6       | -13.1       | -3.1           | -12.2 |  |
| Nonadjacent                                            | 327                   | 3,924,526          | -733,276                   | -17.7                                                                      | -21.7       | -16.5       | -16.2       | -20.2          | -16.2 |  |
| <hr/>                                                  |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| % in agriculture<br>59.0 and over                      |                       |                    |                            |                                                                            |             |             |             |                |       |  |
| Total                                                  | 119                   | 842,233            | -235,664                   | -24.7                                                                      | -25.9       | -23.4       | -27.4       | -23.3          | -23.1 |  |
| SMSA                                                   | -                     | -                  | -                          | -                                                                          | -           | -           | -           | -              | -     |  |
| Adjacent                                               | 6                     | 51,394             | -8,931                     | -16.0                                                                      | -12.9       | -17.9       | -           | -              | -     |  |
| Nonadjacent                                            | 113                   | 790,839            | -226,733                   | -25.3                                                                      | -26.5       | -23.8       | -27.4       | -23.3          | 23.1  |  |



TABLE 25

CONTINGENCY TABLE OF MEDIAN SCHOOLING CLASSIFIED BY FARM OPERATOR  
LEVEL-OF-LIVING, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

| <u>Farm Operator Level-of-Living</u> |               |               |               |                 |                 |                 |                 |                 |                 |       |  |  |  |  |  |  |
|--------------------------------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|--|--|--|--|--|--|
| Median<br>Schooling                  | Under<br>60.0 | 60.0-<br>79.9 | 80.0-<br>99.9 | 100.0-<br>119.9 | 120.0-<br>139.9 | 140.0-<br>159.9 | 160.0-<br>179.9 | 180.0-<br>199.9 | 200.0 &<br>over | Total |  |  |  |  |  |  |
| Under 7.0                            | 9             | 0             | 0             | 0               | 0               | 0               | 0               | 0               | 0               | 9     |  |  |  |  |  |  |
| 7.0-7.4                              | 11            | 3             | 2             | 0               | 0               | 0               | 0               | 0               | 0               | 16    |  |  |  |  |  |  |
| 7.5-7.9                              | 9             | 7             | 2             | 3               | 0               | 0               | 0               | 0               | 0               | 21    |  |  |  |  |  |  |
| 8.0-8.4                              | 11            | 18            | 22            | 27              | 15              | 4               | 1               | 0               | 0               | 98    |  |  |  |  |  |  |
| 8.5-8.9                              | 0             | 7             | 21            | 65              | 127             | 127             | 61              | 28              | 1               | 437   |  |  |  |  |  |  |
| 9.0-9.4                              | 0             | 0             | 0             | 3               | 28              | 39              | 28              | 7               | 1               | 106   |  |  |  |  |  |  |
| 9.5-9.9                              | 0             | 0             | 0             | 0               | 9               | 14              | 30              | 10              | 0               | 63    |  |  |  |  |  |  |
| 10.0-10.4                            | 0             | 0             | 0             | 0               | 1               | 12              | 21              | 11              | 0               | 45    |  |  |  |  |  |  |
| 10.5 & over                          | 0             | 0             | 0             | 3               | 1               | 16              | 26              | 15              | 0               | 61    |  |  |  |  |  |  |
| Total                                | 40            | 35            | 47            | 101             | 181             | 212             | 167             | 71              | 2               | 856   |  |  |  |  |  |  |

TABLE 26

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPE OF AREA IN THE NORTH  
CENTRAL STATES, BY FARM OPERATOR LEVEL-OF-LIVING AND MEDIAN SCHOOL YEARS COMPLETED

| Farm Operator<br>Level-of-Living<br>and Type of Area             | Number<br>of<br>Counties | Population<br>1960 | Net Migration<br>1950-1960 | Net Migration as Percent of Population<br>by Median School Years Completed |                                                    |       |       |      |      |
|------------------------------------------------------------------|--------------------------|--------------------|----------------------------|----------------------------------------------------------------------------|----------------------------------------------------|-------|-------|------|------|
|                                                                  |                          |                    |                            | Total                                                                      | Under 8.5 8.5- 8.9 9.0- 9.4 9.5- 9.9 10.0 and over |       |       |      |      |
|                                                                  |                          |                    |                            |                                                                            |                                                    |       |       |      |      |
| Farm Operator Level-<br>of-Living and Type<br>of Area under 79.9 |                          |                    |                            |                                                                            |                                                    |       |       |      |      |
| Total                                                            | 78                       | 122,918            | -377,586                   | -27.0                                                                      | -30.5                                              | -20.1 | -     | -    | -    |
| SMSA                                                             | -                        | -                  | -                          | -                                                                          | -                                                  | -     | -     | -    | -    |
| Adjacent                                                         | 3                        | 62,189             | -10,411                    | -16.8                                                                      | -16.8                                              | -     | -     | -    | -    |
| Nonadjacent                                                      | 75                       | 1,167,029          | -367,175                   | -31.2                                                                      | -31.2                                              | -20.1 | -     | -    | -    |
| % in Farm Operator<br>80.0-99.9                                  |                          |                    |                            |                                                                            |                                                    |       |       |      |      |
| Total                                                            | 51                       | 805,400            | -140,883                   | -16.7                                                                      | -20.2                                              | -13.0 | -     | -    | -    |
| SMSA                                                             | 1                        | 52,163             | -6,397                     | -12.8                                                                      | -                                                  | -12.8 | -     | -    | -    |
| Adjacent                                                         | 3                        | 45,548             | -2,161                     | -5.3                                                                       | -                                                  | -5.3  | -     | -    | -    |
| Nonadjacent                                                      | 47                       | 707,689            | -132,325                   | -17.6                                                                      | -20.2                                              | -14.0 | -     | -    | -    |
| % in Farm Operator<br>100.0-119.9                                |                          |                    |                            |                                                                            |                                                    |       |       |      |      |
| Total                                                            | 120                      | 2,321,821          | -181,646                   | -8.2                                                                       | -15.0                                              | -12.7 | -8.4  | -    | 1.5  |
| SMSA                                                             | 3                        | 199,647            | -17,612                    | -9.2                                                                       | -                                                  | 7.7   | -13.7 | -    | -    |
| Adjacent                                                         | 15                       | 401,674            | -6,503                     | -1.8                                                                       | 0.8                                                | -2.9  | 3.1   | -    | -    |
| Nonadjacent                                                      | 102                      | 1,720,500          | -157,531                   | -9.5                                                                       | -14.1                                              | -9.9  | 5.7   | -    | 1.5  |
| % in Farm Operator<br>120.0-139.9                                |                          |                    |                            |                                                                            |                                                    |       |       |      |      |
| Total                                                            | 235                      | 3,238,752          | -160,893                   | -3.4                                                                       | -15.1                                              | -11.5 | -3.5  | -2.2 | 43.3 |
| SMSA                                                             | 6                        | 1,284,692          | 203,324                    | 22.6                                                                       | -                                                  | 4.7   | -0.1  | -2.3 | 49.3 |
| Adjacent                                                         | 39                       | 959,022            | 9,174                      | 1.1                                                                        | -8.4                                               | -5.1  | 7.7   | -    | 27.1 |
| Nonadjacent                                                      | 190                      | 2,995,038          | -373,391                   | -12.4                                                                      | -16.5                                              | -14.5 | -9.0  | -2.1 | -0.4 |

TABLE 26--Continued

| Farm Operator<br>Level-of-Living<br>and Type of Area | Number<br>of<br>Counties | Population<br>1960 | Net Migration<br>1950-1960 | Net Migration as Percent of Population<br>by Median School Years Completed |       |             |             |             |                |  |  |  |
|------------------------------------------------------|--------------------------|--------------------|----------------------------|----------------------------------------------------------------------------|-------|-------------|-------------|-------------|----------------|--|--|--|
|                                                      |                          |                    |                            | Under 8.5                                                                  |       |             |             |             |                |  |  |  |
|                                                      |                          |                    |                            | Total                                                                      | 8.5   | 8.5-<br>8.9 | 9.0-<br>9.4 | 9.5-<br>9.9 | 10.0 &<br>over |  |  |  |
| % in Farm Operator<br>140.0-159.9                    |                          |                    |                            |                                                                            |       |             |             |             |                |  |  |  |
| Total                                                | 315                      | 19,233,748         | 227,892                    | 1.4                                                                        | -7.7  | 6.8         | 2.8         | 9.6         | 3.5            |  |  |  |
| SMSA                                                 | 28                       | 11,718,898         | 479,737                    | 5.1                                                                        | -     | 3.6         | 6.5         | 21.2        | 3.0            |  |  |  |
| Adjacent                                             | 71                       | 3,176,224          | 144,666                    | 5.6                                                                        | -0.1  | 1.5         | 9.4         | 1.6         | 11.6           |  |  |  |
| Nonadjacent                                          | 216                      | 4,338,626          | -396,511                   | -9.5                                                                       | -17.0 | -12.9       | -10.0       | -9.4        | 0.6            |  |  |  |
| % in Farm Operator<br>160.0 and over                 |                          |                    |                            |                                                                            |       |             |             |             |                |  |  |  |
| Total                                                | 376                      | 25,828,356         | 149,495                    | 0.7                                                                        | -11.6 | -11.8       | -1.7        | 0.0         | 10.0           |  |  |  |
| SMSA                                                 | 32                       | 15,401,225         | 410,428                    | 3.2                                                                        | -     | -24.8       | 9.5         | -0.3        | 10.4           |  |  |  |
| Adjacent                                             | 101                      | 4,176,278          | 110,444                    | 3.1                                                                        | -     | -4.0        | -1.0        | 4.5         | 8.7            |  |  |  |
| Nonadjacent                                          | 243                      | 6,250,853          | -371,377                   | -6.5                                                                       | -11.6 | -10.2       | -9.5        | -           | -              |  |  |  |



at the low level-of-living category and only 6.5 percent at the 160.0 and over level. Yet, we must observe the two extremes of the index to find this difference. The four middle categories of the index, when controlled for educational levels, make no difference in migration flows. However, the level of schooling does relate significantly to migration at each level of the index. That is, as education increases, out-migration decreases.

### Summary

Our investigation of the crosses between education and selected population characteristics has revealed it to be a good explanatory variable. There are rather consistent relationships between education and our variables in that both the old and the young median age counties are low in education and high in out-migration. At high levels of education, however, age is not a factor. The two very significant variables in relation to education were percentages employed in manufacturing and the level of female employment. Income and farm operator level-of-living proved to have little influence when controlled for education.

### Urbanity and Selected Population Characteristics

#### Urbanity and median age

Table 27 indicates that almost half of the non-adjacent counties have no urban population and that 379 have

TABLE 27

CONTINGENCY TABLE OF URBANITY CLASSIFIED BY MEDIAN AGE,  
NON-ADJACENT AREAS OF THE NORTH CENTRAL STATES, 1950

| Urbanity               | Under<br>25.0 | 26.0-<br>26.9 | 27.0-<br>27.9 | 28.0-<br>28.9 | 29.0-<br>29.9 | 30.0-<br>30.9 | 31.0-<br>31.9 | 32.0-<br>32.9 | 33.0-<br>33.9 | 34.0 & Total<br>over |     |
|------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------------|-----|
| No Urban<br>Population | 63            | 23            | 32            | 32            | 45            | 46            | 39            | 23            | 16            | 51                   | 370 |
| Under 10.0             | 2             | 0             | 0             | 1             | 0             | 1             | 1             | 0             | 1             | 3                    | 9   |
| 10.0-24.9              | 12            | 3             | 5             | 7             | 19            | 12            | 23            | 6             | 5             | 13                   | 105 |
| 25.0-39.9              | 11            | 2             | 9             | 16            | 18            | 23            | 27            | 14            | 16            | 19                   | 155 |
| 40.0-54.9              | 2             | 6             | 10            | 12            | 13            | 18            | 11            | 13            | 12            | 15                   | 112 |
| 55.0-70.9              | 6             | 4             | 5             | 12            | 9             | 12            | 8             | 11            | 3             | 5                    | 75  |
| 80.0 & over            | 0             | 2             | 3             | 2             | 4             | 2             | 7             | 7             | 2             | 1                    | 30  |
| Total                  | 96            | 40            | 64            | 82            | 108           | 114           | 116           | 74            | 55            | 107                  | 856 |

less than 10 percent of their population living in urban areas. The distribution is heavily skewed. When urbanity is crossed with age, we find the low urban counties to be quite over-represented in both young and old persons. We expect, therefore, that migration will be quite large from these counties regardless of any mitigation factors. The old and young constitute about one-third of all areas with no urban population. The median for age falls in the 30.0-30.9 age category.

When the two variables are shown in relation to migration there is a surprising consistency in the relationship (Table 28). With one exception, the under 10.0 urban group, out-migration decreases as levels of urbanity increase. The extra percent loss of the group with some urban population to 10 percent urban is thought to be attributable to the population size per county unit. They are relatively low on most of the independent variables and contain extra population to lose. There is also a tendency to lose the old and the young, with greater proportions of young people leaving the areas. The higher the urbanity the less influence from age differentials, but there is a consistent rise in out-migration at all urban levels when median age reaches 33.0 and over. At the highest level of urbanity the same pattern is evident that is found in SMSAs. Only the counties with high median ages are losing population at a significant rate.

TABLE 28

NET MIGRATION 1950-60 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS  
IN THE NORTH CENTRAL STATES, BY URBANITY AND MEDIAN AGE IN 1950

|                           | Number<br>of<br>Counties | Population<br>in<br>1960 | Net Migration<br>1950-1960 | Net migration as percent of 1950<br>population, by median age |       |           |       |                     |
|---------------------------|--------------------------|--------------------------|----------------------------|---------------------------------------------------------------|-------|-----------|-------|---------------------|
|                           |                          |                          |                            | Under 29.0                                                    |       | 29.0-30.9 |       | 31.0-33.0 &<br>over |
|                           |                          |                          |                            | Total                                                         | 29.0  | 30.9      | 32.9  |                     |
| No Urbanity               | 387                      | 3,252,446                | -645,211                   | -18.6                                                         | -25.6 | -13.4     | -14.5 | -15.5               |
| Urbanity<br>Under 10.0    | 9                        | 226,461                  | -67,779                    | -26.8                                                         | -34.3 | -15.9     | 0.6   | -12.6               |
| Urbanity<br>10.0-24.9     | 105                      | 2,035,099                | -361,084                   | -17.0                                                         | -24.7 | -15.6     | -10.8 | -14.3               |
| Urbanity<br>25.0-39.9     | 155                      | 3,373,055                | -411,752                   | -12.2                                                         | -17.4 | -11.3     | -8.9  | -11.0               |
| Urbanity<br>40.0-54.9     | 112                      | 2,776,537                | -254,862                   | -9.5                                                          | -9.7  | -7.9      | -7.0  | -14.1               |
| Urbanity<br>55.0 and over | 105                      | 5,516,137                | -57,622                    | -1.2                                                          | -0.2  | -0.5      | -0.7  | -7.4                |



Urbanity and income

Table 29 relating to urbanity and income shows a large cluster of low income counties in the no urbanity category. However, there are a surprising number of counties with relatively high income in this group. The more successful farm areas would be expected also to have a relatively high income. The table clusters on the diagonal with no low income, high urbanity areas and few high income low urbanity areas.

When net migration is examined with urbanity constant and income varied (Table 30), the same pattern is evident that was shown previously with the income measure. At low urbanity levels the income variable has no effect upon migration. In fact, only at the highest level of urbanity does income have a marked effect upon movement of people. This reinforces once again the proposition that for the more rural areas job opportunity rather than income differential is the key factor in migration.

Urbanity and the percent of females in the labor force

The cross tabulation of urbanity and female employment shows the 370 counties with no urban population to be distributed heavily in the direction of low female employment. The trend is toward larger proportions of females employed with increased urbanity the largest concentrations



TABLE 29

CONTINGENCY TABLE OF URBANITY CLASSIFIED BY MEDIAN FAMILY INCOME,  
NON-ADJACENT AREAS OF THE NORTH CENTRAL STATES, 1950

| Percent<br>Urbanity | Under<br>\$1,000 | \$1,000-<br>\$1,399 | \$1,400-<br>\$1,799 | \$1,800-<br>\$2,199 | \$2,200-<br>\$2,599 | \$2,600-<br>\$2,999 | \$3,000-<br>\$3,399 | \$3,400-<br>\$3,799 | \$3,800 Total<br>& over |
|---------------------|------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------------|
| No Urbanity         | 76               | 53                  | 42                  | 90                  | 93                  | 49                  | 22                  | 4                   | 1 370                   |
| Under 10.0          | 0                | 0                   | 3                   | 5                   | 1                   | 0                   | 0                   | 0                   | 9                       |
| 10.0-24.9           | 0                | 14                  | 12                  | 23                  | 24                  | 27                  | 5                   | 0                   | 105                     |
| 25.0-39.9           | 0                | 5                   | 13                  | 27                  | 48                  | 44                  | 18                  | 0                   | 155                     |
| 40.0-54.9           | 0                | 0                   | 5                   | 17                  | 37                  | 34                  | 18                  | 0                   | 112                     |
| 55.0-69.9           | 0                | 0                   | 0                   | 2                   | 13                  | 20                  | 30                  | 10                  | 75                      |
| 70.0 & over         | 0                | 0                   | 0                   | 0                   | 3                   | 6                   | 14                  | 7                   | 30                      |
| Total               | 16               | 72                  | 75                  | 164                 | 219                 | 180                 | 107                 | 21                  | 2 856                   |

TABLE 30

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS  
IN THE NORTH CENTRAL STATES, BY URBANITY AND MEDIAN INCOME IN 1950

| Urbanity     | Number<br>of<br>Counties | Population<br>in<br>1960 | Net Migration<br>1950-1960 | Net migration as percent of 1950<br>population, by median income |               |               |                      |       |
|--------------|--------------------------|--------------------------|----------------------------|------------------------------------------------------------------|---------------|---------------|----------------------|-------|
|              |                          |                          |                            | Under \$2200                                                     |               |               |                      |       |
|              |                          |                          |                            | Total                                                            | \$2200-\$2599 | \$2599-\$2999 | \$2999-\$3000 & over |       |
| No Urbanity* | 387                      | 3,252,446                | -645,211                   | -18.6                                                            | -18.0         | -18.2         | -20.0                | -23.2 |
| Under 10.0   | 9                        | 226,461                  | -67,779                    | -26.8                                                            | -28.6         | -15.0         | -                    | -     |
| 10.0-24.9    | 105                      | 2,035,099                | -361,084                   | -17.0                                                            | -21.2         | -15.0         | -11.3                | -14.3 |
| 25.0-39.9    | 155                      | 3,373,055                | -411,752                   | -12.2                                                            | -14.5         | -15.0         | -9.0                 | -9.1  |
| 40.0-54.9    | 112                      | 2,776,537                | -254,862                   | -9.5                                                             | -11.9         | -13.2         | -7.0                 | -5.1  |
| 55.0 & over  | 105                      | 5,516,137                | -57,622                    | -1.2                                                             | -16.5         | -3.2          | -3.8                 | 0.2   |

\* Income information not available for 17 counties.

being in the 14.0-19.9 category of employment and the mean at the 19.9 percent level. Generally the distribution clusters well on the diagonal.

When levels of net migration are considered with urbanity constant and female employment varied (Table 31), we have the extreme test of this variable as a measure. Since the two variables so nearly measure the same thing, removing the effect of urbanity should largely remove the effect of female employment. For the no urbanity category this is largely true. The thirty-four counties with 23.0-28.9 percent of female employment have an out-migration of only 3.5. This pattern is evident for the first four levels of urbanity. Also, throughout the first four levels of urbanity there is a rise in out-migration at the highest levels of female employment. Since there are so few counties involved in this phenomena we cannot make a general statement about it. However, the relationship is quite clear that higher levels of female employment reduce out-movement.

#### Urbanity and percent of employed in manufacturing

The distribution of urbanity and manufacturing shows that the large proportion of counties with no urbanity also cluster in the low manufacturing categories. The surprising fact indicated here is that so many high urban units also have low proportions in manufacturing. This quite possibly

TABLE 31

CONTINGENCY TABLE OF URBANITY CLASSIFIED BY THE PERCENT OF FEMALES  
EMPLOYED IN THE LABOR FORCE, NON-ADJACENT AREAS  
OF THE NORTH CENTRAL STATES, 1950

| Urbanity      | Percent Females in Labor Force |          |           |           |           |           |           |           |           |             |     | Total |
|---------------|--------------------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-----|-------|
|               | Under 8.0                      | 8.0-10.9 | 11.0-13.9 | 14.0-16.9 | 17.0-19.9 | 20.0-22.9 | 23.0-25.9 | 26.0-28.9 | 29.0-31.9 | 33.0 & over |     |       |
| No Urban Pop. | 11                             | 26       | 35        | 93        | 102       | 67        | 23        | 8         | 1         | 4           | 370 |       |
| Under 10.0    | 0                              | 2        | 0         | 3         | 2         | 1         | 0         | 1         | 0         | 0           | 9   |       |
| 10.0-24.9     | 0                              | 3        | 6         | 13        | 37        | 27        | 14        | 4         | 1         | 0           | 105 |       |
| 25.0-39.9     | 0                              | 0        | 2         | 15        | 37        | 51        | 36        | 10        | 3         | 1           | 155 |       |
| 40.0-54.9     | 0                              | 0        | 0         | 2         | 21        | 27        | 34        | 23        | 2         | 3           | 112 |       |
| 55.0-69.9     | 0                              | 0        | 0         | 2         | 6         | 8         | 16        | 22        | 17        | 4           | 75  |       |
| 70.0 & over   | 0                              | 0        | 0         | 0         | 1         | 0         | 6         | 9         | 6         | 8           | 30  |       |
| Total         | 11                             | 31       | 43        | 128       | 206       | 181       | 129       | 77        | 30        | 20          | 856 |       |

TABLE 32

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS  
IN THE NORTH CENTRAL STATES, BY URBANITY AND FEMALES IN LABOR FORCE IN  
1950

| Urbanity    | Number<br>of<br>Counties | Population<br>in<br>1960 | Net Migration<br>1950-1960 | Net migration as percent of 1950 pop-<br>ulation, by percent females in labor |            |           |                     |
|-------------|--------------------------|--------------------------|----------------------------|-------------------------------------------------------------------------------|------------|-----------|---------------------|
|             |                          |                          |                            | Total                                                                         | Under 17.0 | 17.0-22.9 | 23.0-28.9 &<br>over |
| No Urbanity | 387                      | 3,252,446                | -645,211                   | -18.6                                                                         | -23.1      | -17.0     | -3.5 -22.2          |
| Under 10.0  | 9                        | 226,461                  | -67,779                    | -26.8                                                                         | -33.6      | -13.8     | -15.9 -             |
| 10.0-24.9   | 105                      | 2,035,099                | -361,084                   | -17.0                                                                         | -27.5      | -14.6     | -11.1 -20.7         |
| 25.0-39.9   | 155                      | 3,373,055                | -411,752                   | -12.2                                                                         | -25.2      | -11.2     | -8.5 -14.1          |
| 40.0-54.9   | 112                      | 2,776,537                | -254,862                   | -9.5                                                                          | -22.5      | -11.4     | -7.9 -4.1           |
| 55.0 & over | 105                      | 5,516,137                | -57,622                    | -1.2                                                                          | -19.4      | -10.5     | -3.0 2.1            |

accounts for the out-movement of people from some high urban areas. The mean for manufacturing for the non-adjacent counties, about 7 percent employed, is also quite low. The number of county units in the area above the national average (about 70) is equal to the number of in-migration counties.

When levels of urbanity are held constant the impact of manufacturing upon the economy of the area may be seen. Even at the level of no urbanity where other variables have shown little differential the drop in out-migration is from -25.2 to -8.0 at a moderate level of manufacturing employment. At the level of under 10.0 percent urban population, the drop in out-migration is from -42.1 to -11.3 with two small increments in manufacturing level. Even at the highest urban level (54.0 and over) the ability to hold population increases from -23.6 to 0.3 as the manufacturing level increases. The interesting phenomena is that urbanity has little effect upon migration flows. At the 2.0 percent level of manufacturing in the no urban population category the loss is -25.2 percent. If one follows this level of manufacturing employment throughout the urbanity categories, there is little effect from increased urbanity. We may assume that urbanity is not our key variable, but rather the job structure of urban areas.

#### Urbanity and median schooling

The surprising fact shown by the cross tabulation of



TABLE 33

CONTINGENCY TABLE OF URBANITY CLASSIFIED BY THE PERCENT EMPLOYED  
IN MANUFACTURING, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

| Urbanity      | Under<br>2.0 | 2.0-<br>6.9 | 7.0-<br>11.9 | 12.0-<br>16.9 | 17.0-<br>21.9 | 22.0-<br>26.9 | 27.0-<br>31.9 | 32.0-<br>36.9 | 37.0-<br>42.9 | 42.0 &<br>over | Total |
|---------------|--------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------|
| No Urban Pop. | 141          | 125         | 52           | 25            | 19            | 6             | 2             | 0             | 0             | 0              | 370   |
| Under 10.0    | 1            | 2           | 3            | 2             | 1             | 0             | 0             | 0             | 0             | 0              | 9     |
| 10.0-24.9     | 4            | 37          | 38           | 10            | 7             | 7             | 2             | 0             | 0             | 0              | 105   |
| 25.0-39.9     | 5            | 57          | 31           | 21            | 21            | 9             | 6             | 4             | 0             | 1              | 155   |
| 40.0-54.9     | 5            | 32          | 20           | 19            | 10            | 9             | 3             | 7             | 5             | 2              | 112   |
| 55.0-69.9     | 1            | 16          | 12           | 5             | 9             | 8             | 11            | 3             | 6             | 4              | 75    |
| 70.0 & over   | 0            | 6           | 5            | 4             | 2             | 5             | 3             | 1             | 2             | 2              | 30    |
| Total         | 159          | 275         | 161          | 86            | 69            | 44            | 27            | 15            | 13            | 9              | 856   |

TABLE 34

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH CENTRAL STATES, BY URBANITY AND PERCENT EMPLOYED IN MANUFACTURING IN 1950

| Urbanity    | Number of Counties | Population in 1960 | Net Migration 1950-1960 | Net migration as percent of 1950 population, by percent employed in manufacturing |       |          |       |           |             |
|-------------|--------------------|--------------------|-------------------------|-----------------------------------------------------------------------------------|-------|----------|-------|-----------|-------------|
|             |                    |                    |                         | Under 2.0                                                                         |       | 2.0-11.9 |       | 12.0-21.9 |             |
|             |                    |                    |                         | Total                                                                             | 2.0   | 11.9     | 21.9  | 31.9      | 32.0 & over |
| No Urbanity | 387                | 3,252,446          | -645,211                | -18.6                                                                             | -25.2 | -18.4    | -6.1  | -8.0      | -           |
| Under 10.0  | 9                  | 226,461            | -67,779                 | -26.8                                                                             | -42.1 | -26.8    | -11.3 | -         | -           |
| 10.0-24.9   | 105                | 2,035,099          | -361,084                | -17.0                                                                             | -23.2 | -19.0    | -13.8 | -5.5      | -           |
| 25.0-39.9   | 155                | 3,373,055          | -411,752                | -12.2                                                                             | -21.0 | -15.9    | -7.9  | -7.1      | -5.9        |
| 40.0-54.9   | 112                | 2,776,537          | -254,862                | -9.5                                                                              | -18.8 | -12.4    | -11.5 | -3.7      | -3.6        |
| 55.0 & over | 105                | 5,516,137          | -57,622                 | -1.2                                                                              | -23.6 | -0.3     | -1.8  | -3.3      | 0.3         |

urbanity and educational level is the relatively normal distribution of education in the no urban category. There is a high correlation between the two variables but this category would certainly make the correlation less. The high levels of urbanity have no low education counties and with each increment in urbanity the mean shifts more toward the high education end of the scale. Generally there is a good clustering of the counties at the center of the distribution.

When urbanity is controlled and the effect of education noted at varying levels, education is very influential in retarding out-movement (Table 36). At the level of no urbanity there is a 40 percent difference in out-migration from the 8.5 median school level to the 10.0 and over category. This is a consistent pattern through all urbanity levels. At the highest level of urbanity the low education counties lost over 25 percent of their 1950 population during the decade, while the high education counties show a net gain.

### Summary

One of the problems of this study is seen in the urbanity measure. There are 387 counties having no urbanity in the region and, as with agriculture, little change in migration flows is evident when other variables change. That is, changes in income, female employment, education, or level of living do not significantly reduce out-flows for the no urban category. However, this is not true for age.

TABLE 35

CONTINGENCY TABLE OF URBANITY CLASSIFIED BY MEDIAN SCHOOLING,  
NON-ADJACENT AREAS OF THE NORTH CENTRAL STATES, 1950

| Urbanity      | Under<br>7.0 | 7.0-<br>7.4 | 7.5-<br>7.9 | 8.0-<br>8.4 | 8.5-<br>8.9 | 9.0-<br>9.4 | 9.5-<br>9.9 | 10.0-<br>10.4 | 10.5 &<br>over | Total |
|---------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|----------------|-------|
| No Urban Pop. | 8            | 10          | 14          | 63          | 195         | 33          | 22          | 12            | 13             | 370   |
| Under 10.0    | 0            | 2           | 0           | 1           | 6           | 0           | 0           | 0             | 0              | 9     |
| 10.0-24.9     | 1            | 2           | 4           | 13          | 66          | 8           | 7           | 2             | 2              | 105   |
| 25.0-39.9     | 0            | 2           | 3           | 15          | 87          | 24          | 11          | 6             | 7              | 155   |
| 40.0-54.9     | 0            | 0           | 0           | 5           | 56          | 20          | 14          | 8             | 9              | 112   |
| 55.0-69.9     | 0            | 0           | 0           | 1           | 25          | 13          | 5           | 13            | 18             | 75    |
| 70.0 & over   | 0            | 0           | 0           | 0           | 2           | 8           | 4           | 4             | 12             | 30    |
| Total         | 9            | 16          | 21          | 98          | 437         | 106         | 63          | 45            | 61             | 856   |

TABLE 36

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN  
THE NORTH CENTRAL STATES, BY URBANITY AND MEDIAN SCHOOL YEARS COMPLETED  
IN 1950

| Urbanity     | Number<br>of<br>Counties | Population<br>in<br>1960 | Net<br>Migration<br>1950-1960 | Net migration as percent of 1950 population, by median school years completed |       |       |          |       |       |                |
|--------------|--------------------------|--------------------------|-------------------------------|-------------------------------------------------------------------------------|-------|-------|----------|-------|-------|----------------|
|              |                          |                          |                               | Under 8.5                                                                     |       |       | 8.5- 9.4 |       |       | 10.0 &<br>over |
|              |                          |                          |                               | Total                                                                         | 8.5   | 8.9   | 9.0-     | 9.5-  | 9.9   |                |
| No Urbanity* | 387                      | 3,252,446                | -645,211                      | -18.6                                                                         | -24.4 | -16.3 | -15.1    | -18.0 | -15.9 |                |
| Under 10.0   | 9                        | 226,461                  | -67,779                       | -26.8                                                                         | -35.9 | -14.4 | -        | -     | -     |                |
| 10.0-24.9    | 105                      | 2,035,099                | -361,084                      | -17.0                                                                         | -26.1 | -14.8 | -15.0    | -14.5 | -0.9  | 95             |
| 25.0-39.9    | 155                      | 3,373,055                | -411,752                      | -12.2                                                                         | -22.8 | -11.4 | -10.0    | -6.8  | -7.4  |                |
| 40.0-54.9    | 112                      | 2,776,537                | -254,862                      | -9.5                                                                          | -14.6 | -10.8 | -8.2     | -8.8  | -5.3  |                |
| 55.0 & over  | 105                      | 5,516,137                | -57,622                       | -1.2                                                                          | -25.6 | -3.2  | -6.9     | 1.8   | 2.2   |                |

\* Median school information not available for 2 counties.

The no urban units are losing more population at the older and younger ages. Since there are no cases of low urbanity and high manufacturing, we must judge the effect of the latter on the areas with some urbanity. The relationship is significant. Moreover, the high urban areas with low manufacturing are generally losing population.

### Income and Selected Population Characteristics

We have suggested that counties with more amenities would have a greater ability to attract and to hold their population. However, since we have other variables which are highly correlated with income, it will be useful to hold income constant at varying levels and examine the effect of other selected variables. This section will examine the effect of the percent of females employed in the labor force, the percent employed in manufacturing, the percent employed in agriculture, and median age.

#### Income and percent of females in the labor force

The table of income and female employment shows a higher percent of female employment as income levels rise (Table 37). Two incomes are included in our median family income measure if wives are employed. The type of area is also important in providing female employment. The counties cluster nicely on the diagonal and about the mean, with no

TABLE 37

CONTINGENCY TABLE OF INCOME CLASSIFIED BY THE PERCENT OF  
FEMALES IN THE LABOR FORCE, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

| Income        | Percent Females in Labor Force |              |               |               |               |               |               |               |               |                |       |  |  |  |  |
|---------------|--------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------|--|--|--|--|
|               | Under<br>8.0                   | 8.0-<br>10.0 | 11.0-<br>13.9 | 14.0-<br>16.9 | 17.0-<br>19.9 | 20.0-<br>22.9 | 23.0-<br>25.9 | 26.0-<br>28.9 | 29.0-<br>31.9 | 32.0 &<br>over | Total |  |  |  |  |
| Under \$1000  | 5                              | 6            | 2             | 1             | 1             | 0             | 0             | 0             | 1             | 0              | 16    |  |  |  |  |
| \$1000-1399   | 5                              | 16           | 14            | 21            | 7             | 6             | 2             | 1             | 0             | 0              | 72    |  |  |  |  |
| \$1400-1799   | 0                              | 4            | 5             | 19            | 26            | 16            | 4             | 1             | 0             | 0              | 75    |  |  |  |  |
| \$1800-2199   | 1                              | 4            | 7             | 36            | 40            | 41            | 23            | 8             | 3             | 1              | 164   |  |  |  |  |
| \$2200-2599   | 0                              | 0            | 3             | 26            | 71            | 60            | 30            | 15            | 7             | 4              | 219   |  |  |  |  |
| \$2600-2999   | 0                              | 0            | 6             | 13            | 46            | 35            | 48            | 21            | 6             | 5              | 180   |  |  |  |  |
| \$3000-3399   | 0                              | 1            | 6             | 10            | 14            | 19            | 17            | 26            | 10            | 4              | 107   |  |  |  |  |
| \$3400-3799   | 0                              | 0            | 0             | 1             | 1             | 4             | 2             | 4             | 3             | 6              | 21    |  |  |  |  |
| \$3800 & over | 0                              | 0            | 0             | 1             | 0             | 0             | 0             | 1             | 0             | 0              | 2     |  |  |  |  |
| Total         | 11                             | 31           | 43            | 128           | 206           | 181           | 129           | 77            | 30            | 20             | 856   |  |  |  |  |

instances of low income and high female employment and no instances of high income and low female employment.

It is often suggested that the added income from the working wife is a factor in migration. We may see the results of migratory flows holding income constant at varying levels of female employment. According to Table 38, for income levels under \$2200, there is a drop from -24.5 to -8.6 with two additions to female employment levels and a rise to -17.0 at the highest level of employment in non-adjacent areas. The five counties involved in the rise are low income, low education, high female employment counties. It is not possible with our data to determine what employment these females are engaged in, but the type of area would indicate a high out-movement for the males in the unit. For the income level \$2200-2599 the drop in out-migration is from -27.1 to -6.0 at the extremes of female employment. A similar pattern is seen in the remaining two income categories.

The adjacent and SMSA areas show a similar pattern of reduced out-migration to in-migration with increased female employment, with one exception. At the highest income levels there is a marked reduction of population gain at high levels of female employment. This may be due to the changing nature of the metropolitan area as manufacturing moves out and the central city is used for finance, banking, etc.



TABLE 38

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH CENTRAL STATES BY MEDIAN FAMILY INCOME AND PERCENT OF FEMALES IN LABOR FORCE IN 1950

| Income#<br>and<br>Type of Area | Number<br>of<br>Counties | Population<br>1960 | Net<br>Migration<br>1950-1960 | Net migration as percent of 1950 popu-<br>lation, by percent females in labor<br>force |             |               |               |                |
|--------------------------------|--------------------------|--------------------|-------------------------------|----------------------------------------------------------------------------------------|-------------|---------------|---------------|----------------|
|                                |                          |                    |                               | Total                                                                                  | Under<br>17 | 17.0-<br>22.9 | 23.0-<br>28.9 | 29.0<br>& over |
| Income under \$2200            |                          |                    |                               |                                                                                        |             |               |               |                |
| Total                          | 370                      | 5,030,918          | -881,736                      | -16.6                                                                                  | -23.2       | -12.7         | -7.7          | -17.0          |
| MSA                            | -                        | -                  | -                             | -                                                                                      | -           | -             | -             | -              |
| Adjacent                       | 43                       | 653,523            | -42,721                       | -6.7                                                                                   | -11.3       | -5.1          | -0.8*         | -              |
| Nonadjacent                    | 327                      | 4,377,395          | -839,015                      | -17.9                                                                                  | -24.5       | -13.9         | -8.6          | -17.0          |
| Income \$2200-\$2599           |                          |                    |                               |                                                                                        |             |               |               |                |
| Total                          | 272                      | 5,102,044          | -565,269                      | -11.2                                                                                  | -22.1       | -11.5         | -7.9          | -6.0           |
| MSA                            | 1                        | 55,438             | -1,554                        | -3.2*                                                                                  | -           | -3.2*         | -             | -              |
| Adjacent                       | 52                       | 1,268,468          | -52,330                       | -4.5                                                                                   | -9.1        | -4.8          | -2.2          | -              |
| Nonadjacent                    | 219                      | 3,778,138          | -511,385                      | -13.3                                                                                  | -27.1       | -13.8         | -9.7          | -6.0           |
| Income \$2600-\$2999           |                          |                    |                               |                                                                                        |             |               |               |                |
| Total                          | 250                      | 6,511,192          | -325,277                      | -5.4                                                                                   | -21.2       | -8.0          | -3.6          | 0.9            |
| MSA                            | 4                        | 251,792            | 1,339                         | 0.6*                                                                                   | -           | -13.1*        | 24.8*         | -              |
| Adjacent                       | 66                       | 2,203,657          | 5,813                         | 0.3                                                                                    | -13.0*      | 1.8           | -0.5          | 3.2*           |
| Nonadjacent                    | 180                      | 4,055,743          | -322,429                      | -8.7                                                                                   | -24.0       | -13.3         | -6.4          | 0.5            |
| Income \$3000 and over         |                          |                    |                               |                                                                                        |             |               |               |                |
| Total                          | 266                      | 37,988,397         | 1,293,602                     | 4.2                                                                                    | -20.4       | 10.3          | 12.6          | 0.8            |
| MSA                            | 65                       | 28,439,395         | 1,069,695                     | 4.6                                                                                    | -           | 56.5*         | 20.8          | 0.2            |
| Adjacent                       | 71                       | 4,695,287          | 334,447                       | 9.0                                                                                    | -10.4*      | 4.2           | 11.2          | 6.7            |
| Nonadjacent                    | 130                      | 4,943,715          | -110,540                      | -2.6                                                                                   | -23.0       | -11.7         | -2.7          | 3.0            |

# Income not available for 17 counties having a 1960 population of 24,744 and a net out-migration of 4,941 between 1950 and 1960.

\* Under 5 county units.

Income and percent of  
employed in agriculture

The cross tabulation of income and percent in agriculture follows the general pattern of low income counties being high in agricultural employment with the mean of agriculture decreasing as income increases. However, the standard deviation rises with each increment in income. There are many counties with both high income and moderately high proportions in agriculture.

When income is controlled and levels of agriculture varied (Table 40), the pattern is invariable in the direction of greater out-migration with greater proportions employed in agriculture. Even at the highest income level we see a loss of 29.3 of the 1950 population during the decade. This is believed to be due to the changing structure of agricultural employment which leaves the young with few alternatives in the labor market. The huge effect of high agriculture may be seen in the non-adjacent areas with over 59 percent of the population in this employment category. At all levels of income there is about a 25 percent loss of population.

Income and percent of  
employed in manufacturing

The contingency of manufacturing and income shows a large number of the non-adjacent counties in low manufacturing categories. There is some shifting of the mean for manufacturing as income rises, but not the expected amount. This

TABLE 39

CONTINGENCY TABLE OF INCOME CLASSIFIED BY PERCENT OF  
EMPLOYED IN AGRICULTURE, NON-ADJACENT AREAS OF  
THE NORTH CENTRAL STATES, 1950

| Income        | Percent in Agriculture |              |               |               |               |               |               |               |               |                |       |  |  |     |
|---------------|------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------|--|--|-----|
|               | Under<br>3.0           | 3.0-<br>10.9 | 11.0-<br>18.9 | 19.0-<br>26.9 | 27.0-<br>34.9 | 35.0-<br>42.9 | 43.0-<br>50.9 | 51.0-<br>58.9 | 59.0-<br>60.9 | 67.0 &<br>over | Total |  |  |     |
| Under \$1000  | 0                      | 0            | 0             | 0             | 0             | 0             | 1             | 2             | 7             | 6              | 16    |  |  |     |
| \$1000-1399   | 0                      | 0            | 1             | 2             | 5             | 8             | 15            | 26            | 12            | 3              | 72    |  |  |     |
| \$1400-1799   | 0                      | 2            | 0             | 3             | 14            | 15            | 15            | 14            | 9             | 3              | 75    |  |  | 101 |
| \$1800-2199   | 1                      | 3            | 7             | 16            | 19            | 20            | 36            | 41            | 16            | 5              | 164   |  |  |     |
| \$2200-2599   | 0                      | 12           | 17            | 21            | 28            | 26            | 43            | 48            | 19            | 5              | 219   |  |  |     |
| \$2600-2999   | 0                      | 10           | 24            | 19            | 23            | 38            | 32            | 22            | 8             | 4              | 180   |  |  |     |
| \$3000-3399   | 0                      | 16           | 17            | 18            | 12            | 15            | 13            | 11            | 1             | 4              | 107   |  |  |     |
| \$3400-3799   | 0                      | 3            | 10            | 4             | 0             | 2             | 0             | 1             | 1             | 0              | 21    |  |  |     |
| \$3800 & over | 0                      | 0            | 0             | 1             | 0             | 0             | 1             | 0             | 0             | 0              | 2     |  |  |     |
| Total         | 1                      | 46           | 76            | 84            | 101           | 124           | 156           | 165           | 73            | 30             | 856   |  |  |     |

TABLE 40

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH CENTRAL STATES, BY MEDIAN FAMILY INCOME AND PERCENT EMPLOYED IN AGRICULTURE

| Percent<br>Employed in<br>Agriculture | Number<br>of<br>Counties | Population<br>in<br>1960 | Net<br>Migration<br>1950-1960 | Net migration as percent of 1950 popula-<br>tion, by median family income |                   |                   |                              |       |
|---------------------------------------|--------------------------|--------------------------|-------------------------------|---------------------------------------------------------------------------|-------------------|-------------------|------------------------------|-------|
|                                       |                          |                          |                               | Total                                                                     | Under \$2200      |                   |                              |       |
|                                       |                          |                          |                               |                                                                           | \$2200-<br>\$2599 | \$2600-<br>\$2999 | \$3000 Infor.<br>& over N.A. |       |
| <u>Under 10.9</u>                     |                          |                          |                               |                                                                           |                   |                   |                              |       |
| Total                                 | 125                      | 32,598,758               | 937,650                       | 3.5                                                                       | -35.9             | -11.2             | -5.1                         | 4.3   |
| SMSA                                  | 61                       | 27,890,083               | 954,109                       | 4.2                                                                       | -                 | -                 | -13.1                        | 4.3   |
| Adjacent                              | 17                       | 1,948,767                | 82,768                        | 5.3                                                                       | -                 | -                 | -9.1                         | 6.8   |
| Nonadjacent                           | 47                       | 2,759,908                | -99,227                       | -4.0                                                                      | -35.9             | -11.2             | -2.0                         | 2.6   |
| <u>11.0-26.9</u>                      |                          |                          |                               |                                                                           |                   |                   |                              |       |
| Total                                 | 256                      | 10,659,296               | 112,459                       | 1.2                                                                       | -18.0             | -6.5              | 1.5                          | 6.8   |
| SMSA                                  | 9                        | 766,542                  | 115,371                       | 22.0                                                                      | -                 | -3.2              | 24.8                         | 24.5  |
| Adjacent                              | 87                       | 4,279,843                | 300,183                       | 8.8                                                                       | -5.8              | -1.3              | 5.9                          | 12.5  |
| Nonadjacent                           | 160                      | 5,612,911                | -303,095                      | -5.9                                                                      | -19.6             | -8.3              | -4.9                         | -1.5  |
| <u>27.0-42.9</u>                      |                          |                          |                               |                                                                           |                   |                   |                              |       |
| Total                                 | 306                      | 6,026,285                | -481,345                      | -8.4                                                                      | -8.4              | -20.3             | -8.4                         | -7.5  |
| SMSA                                  | -                        | -                        | -                             | -                                                                         | -                 | -                 | -                            | -     |
| Adjacent                              | 80                       | 1,934,734                | -45,366                       | -2.6                                                                      | -0.2              | -2.6              | -4.6                         | -0.1  |
| Nonadjacent                           | 226                      | 4,091,551                | -435,979                      | -10.9                                                                     | -10.2             | -12.3             | -10.4                        | -9.2  |
| <u>43.0-58.9</u>                      |                          |                          |                               |                                                                           |                   |                   |                              |       |
| Total                                 | 369                      | 4,530,723                | -816,721                      | -17.1                                                                     | -12.3             | -16.5             | -16.0                        | -16.9 |
| SMSA                                  | -                        | -                        | -                             | -                                                                         | -                 | -                 | -                            | -     |
| Adjacent                              | 42                       | 606,197                  | -83,445                       | -13.5                                                                     | -13.8             | -12.6             | -16.4                        | -12.5 |
| Nonadjacent                           | 327                      | 3,924,526                | -733,276                      | -17.7                                                                     | -18.5             | -17.3             | -15.9                        | -18.0 |
| <u>59.0 and over</u>                  |                          |                          |                               |                                                                           |                   |                   |                              |       |
| Total                                 | 119                      | 842,233                  | -235,664                      | -24.7                                                                     | -24.3             | -25.7             | -22.3                        | -29.3 |
| SMSA                                  | -                        | -                        | -                             | -                                                                         | -                 | -                 | -                            | -     |
| Adjacent                              | 6                        | 51,394                   | -8,931                        | -16.0                                                                     | -16.0             | -                 | -                            | -     |
| Nonadjacent                           | 113                      | 790,839                  | -226,733                      | -25.3                                                                     | -25.1             | -25.7             | -22.3                        | -29.3 |

would largely account for the low number of in-migration county units in the non-adjacent areas. Although there are no high manufacturing counties in the low income categories the reverse does not hold true. Many of the relatively high income counties have very low proportions of people employed in manufacturing.

The migration flow in relation to levels of income and manufacturing is consistent in the direction of reduced proportions of people leaving as manufacturing increases. The non-adjacent units invariably lose less population as the percent of manufacturing increases. At the lower level of manufacturing, however, increased income has no effect on population loss. The areas with under 2 percent employed in manufacturing and under \$2200 income lost 27.6 percent of their population, while those at 2 percent manufacturing and \$3000 and over lost 28.2 percent. It is only at higher levels of manufacturing that income yields a reduced out-migration. This same relationship is evident at lower levels of manufacturing in the adjacent counties.

#### Summary of median family income

Even at low income levels we find that increased female employment retards population loss. The exceptions to this are counties in the lowest category of both income and education, and in SMSAs at the highest level of female

TABLE 41

CONTINGENCY TABLE OF INCOME CLASSIFIED BY PERCENT OF  
EMPLOYED IN MANUFACTURING, NON-ADJACENT AREAS  
OF THE NORTH CENTRAL STATES, 1950

| Income        | Percent Employed in Manufacturing |             |              |               |               |               |               |               |               |                |       |  |     |
|---------------|-----------------------------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|-------|--|-----|
|               | Under<br>2.0                      | 2.0-<br>6.9 | 7.0-<br>11.9 | 12.0-<br>16.9 | 17.0-<br>21.9 | 22.0-<br>26.9 | 27.0-<br>31.9 | 32.0-<br>36.9 | 37.0-<br>41.9 | 42.0 &<br>over | Total |  |     |
| Under \$1000  | 2                                 | 9           | 3            | 0             | 2             | 0             | 0             | 0             | 0             | 0              | 16    |  |     |
| \$1000-1399   | 3                                 | 28          | 25           | 12            | 3             | 1             | 0             | 0             | 0             | 0              | 72    |  |     |
| \$1400-1799   | 7                                 | 23          | 20           | 17            | 6             | 2             | 0             | 0             | 0             | 0              | 75    |  | 104 |
| \$1800-2199   | 31                                | 53          | 44           | 14            | 13            | 6             | 3             | 0             | 0             | 0              | 164   |  |     |
| \$2200-2599   | 57                                | 60          | 28           | 27            | 22            | 13            | 6             | 2             | 3             | 1              | 219   |  |     |
| \$2600-2999   | 36                                | 55          | 28           | 12            | 15            | 15            | 9             | 7             | 2             | 1              | 180   |  |     |
| \$3000-3399   | 18                                | 40          | 9            | 2             | 8             | 6             | 7             | 5             | 6             | 6              | 107   |  |     |
| \$3400-3799   | 3                                 | 6           | 4            | 2             | 0             | 1             | 2             | 0             | 2             | 1              | 21    |  |     |
| \$3800 & over | 0                                 | 1           | 0            | 0             | 0             | 0             | 0             | 1             | 0             | 0              | 2     |  |     |
| Total         | 157                               | 275         | 161          | 86            | 69            | 44            | 27            | 15            | 13            | 9              | 856   |  |     |



TABLE 42

NET MIGRATION 1950-1960 AS A PERCENT OF THE 1950 POPULATION FOR TYPES OF AREAS IN THE NORTH CENTRAL STATES, BY MEDIAN FAMILY INCOME AND PERCENT EMPLOYED IN MANUFACTURING

| Income #<br>and<br>Type of Area | Number<br>of<br>Counties | Population<br>in<br>1960 | Net<br>Migration<br>1950-60 | Net migration as percent of 1950 popula-<br>tion by percent employed in manufacturing |           |          |           |           |             |
|---------------------------------|--------------------------|--------------------------|-----------------------------|---------------------------------------------------------------------------------------|-----------|----------|-----------|-----------|-------------|
|                                 |                          |                          |                             | Total                                                                                 | Under 2.0 | 2.0-11.9 | 12.0-21.9 | 22.0-31.9 | 32.0 & over |
| <u>Income under \$2200</u>      |                          |                          |                             |                                                                                       |           |          |           |           |             |
| Total                           | 370                      | 5,030,918                | -881,736                    | -16.6                                                                                 | -27.6     | -18.1    | -10.4     | -7.0      | -           |
| SMSA                            | -                        | -                        | -                           | -                                                                                     | -         | -        | -         | -         | -           |
| Adjacent                        | 43                       | 653,523                  | -42,721                     | -6.7                                                                                  | -         | -7.0     | -8.2      | -3.7      | -           |
| Nonadjacent                     | 327                      | 4,377,395                | -839,015                    | -17.9                                                                                 | -27.6     | -19.4    | -10.8     | -9.2      | -           |
| <u>Income \$2200-\$2599</u>     |                          |                          |                             |                                                                                       |           |          |           |           |             |
| Total                           | 272                      | 5,102,044                | -565,269                    | -11.2                                                                                 | -24.7     | -15.0    | -6.7      | -4.8      | -5.6        |
| SMSA                            | 1                        | 55,438                   | -1,554                      | -3.2*                                                                                 | -         | -        | -         | -3.2*     | -           |
| Adjacent                        | 52                       | 1,268,468                | -52,330                     | -4.5                                                                                  | -         | -9.9     | -3.7      | 2.0       | 1.8*        |
| Nonadjacent                     | 219                      | 3,778,138                | -511,385                    | -13.3                                                                                 | -24.7     | -16.3    | -7.9      | -7.7      | -10.8       |
| <u>Income \$2600-\$2999</u>     |                          |                          |                             |                                                                                       |           |          |           |           |             |
| Total                           | 250                      | 6,511,192                | -325,277                    | -5.4                                                                                  | -22.4     | -9.4     | -6.3      | 0.3       | -0.6        |
| SMSA                            | 4                        | 251,792                  | 1,339                       | 0.6*                                                                                  | -         | -        | -         | 0.6*      | -           |
| Adjacent                        | 66                       | 2,203,657                | 5,813                       | 0.3                                                                                   | -         | -4.8     | -4.2      | 6.1       | 0.4         |
| Nonadjacent                     | 180                      | 4,055,743                | -332,429                    | -8.7                                                                                  | -22.4     | -10.6    | -7.6      | -4.5      | -1.7        |
| <u>Income \$3000 and over</u>   |                          |                          |                             |                                                                                       |           |          |           |           |             |
| Total                           | 266                      | 37,988,397               | 1,293,602                   | 4.2                                                                                   | -28.2     | -5.0     | 5.1       | 10.6      | 3.1         |
| SMSA                            | 65                       | 28,349,395               | 1,069,695                   | 4.6                                                                                   | -         | 2.5*     | 7.4       | 14.4      | 2.2         |
| Adjacent                        | 71                       | 4,695,287                | 334,447                     | 9.0                                                                                   | -         | -9.5     | 3.4       | 7.6       | 12.0        |
| Nonadjacent                     | 130                      | 4,943,715                | -110,540                    | -2.6                                                                                  | -28.2     | -4.7     | 0.1       | -1.7      | -0.1        |

# Income not available for 17 counties having a 1960 population of 24,744 and a net out-migration of 4,941 between 1950 and 1960.

\* Under 5 county units.



employment. Increased income has little effect on counties with high agricultural employment. We have suggested previously that these areas lose population regardless of other characteristics. Increments in income also have little influence when counties are low in manufacturing employment. Even in counties with moderate agricultural levels there is a population loss if manufacturing is low.

### Summary

The data presented indicate that agricultural and manufacturing employment, female employment, urbanity, education, age, and income are related to migration. The above list is in an order of decreasing importance. Several important weaknesses in our formulation of the problem have become evident. For the non-adjacent areas of the region with no urbanity, which is almost half of the non-adjacent counties, none of our population characteristics affect migratory flows. We conclude, then, that our measures are related to only those counties with some urban population. A second problem is related to the first. When the no urban counties are ignored, the deviation of our measures becomes very small. If a variable is to explain, it must vary. The third problem will be presented in the following chapter. Many of our measures are so highly inter-correlated that the true effect of the variable may not be seen in this kind of presentation.

## CHAPTER IV

### THE RELATIONSHIP OF SELECTED POPULATION CHARACTERISTICS TO NET MIGRATION; REGRESSION ANALYSIS

This chapter is concerned with viewing the effects of our independent variables on migration flows by using multiple regression techniques. We first examine the areas classified by level of migration and our independent variables; and secondly we present the results of the least squares equations.

Table 43 is an attempt to summarize the distribution of the non-adjacent counties comprising the North Central Region for each of the variables at varying levels of migration. This will allow some explanation of interaction effects. Moreover, since these are the crosses that will go into the arithmetic of multiple regression, the table will be useful in helping to explain the regression results. The classification into categories has resulted in an uneven distribution of counties. This is produced by the large majority of the units having out-flows for the decade. The "high out-migration" category includes 273 counties having a loss of 20 percent or more. The "moderate out-migration"

TABLE 43

SELECTED CHARACTERISTICS OF THE POPULATION, CLASSIFIED  
BY VARYING LEVELS OF NET MIGRATION, NON-ADJACENT  
AREAS, NORTH CENTRAL STATES, 1950

| Migration | Age         |            |      | Income        |            |      |
|-----------|-------------|------------|------|---------------|------------|------|
|           | Age         | No.<br>Co. | %    | Income        | No.<br>Co. | %    |
| Hi-Out    | Under 29.0  | 162        | 59.3 | Under \$2200  | 138        | 50.5 |
|           | 29.0-30.9   | 52         | 19.1 | \$2200-2599   | 76         | 27.8 |
|           | 31.0-32.9   | 24         | 8.8  | \$2600-2999   | 37         | 13.6 |
|           | 33.0 & over | 35         | 12.8 | \$3000 & over | 22         | 8.1  |
|           |             | 273        |      |               | 273        |      |
| Mod.-Out  | Under 29.0  | 84         | 18.5 | Under \$2200  | 160        | 35.2 |
|           | 29.0-30.9   | 132        | 29.1 | \$2200-2599   | 120        | 26.4 |
|           | 31.9-32.9   | 122        | 26.9 | \$2600-2999   | 105        | 23.1 |
|           | 33.0 & over | 116        | 25.6 | \$3000 & over | 69         | 15.2 |
|           |             | 454        |      |               | 454        |      |
| Stable    | Under 29.0  | 25         | 26.3 | Under \$2200  | 22         | 23.2 |
|           | 29.0-30.9   | 31         | 32.6 | \$2200-2599   | 20         | 21.1 |
|           | 31.0-32.9   | 33         | 34.7 | \$2600-2999   | 32         | 33.7 |
|           | 33.0 & over | 6          | 6.3  | \$3000 & over | 21         | 22.1 |
|           |             | 95         |      |               | 95         |      |
| In        | Under 29.0  | 11         | 32.4 | Under \$2200  | 7          | 20.6 |
|           | 29.0-30.9   | 7          | 20.6 | \$2200-2599   | 3          | 8.8  |
|           | 31.0-32.9   | 11         | 32.4 | \$2600-2999   | 6          | 17.6 |
|           | 33.0 & over | 5          | 14.7 | \$3000 & over | 18         | 52.8 |
|           |             | 34         |      |               | 34         |      |

TABLE 43--Continued

| Migration | Median Schooling |           |      | Female Employment |         |      |
|-----------|------------------|-----------|------|-------------------|---------|------|
|           | Median Schooling | No. Co.   | %    | Female Emp.       | No. Co. | %    |
| Hi - Out  | Under 8.5        | 86        | 31.5 | Under 16.9        | 136     | 49.8 |
|           | 8.5-8.9          | 124       | 45.4 | 17.0-22.9         | 109     | 39.9 |
|           | 9.0-9.4          | 25        | 9.2  | 23.0-28.9         | 25      | 9.2  |
|           | 9.5-9.9          | 20        | 7.3  | 29.0 & over       | 3       | 1.1  |
|           | 10.0 & over      | <u>18</u> | 6.6  |                   |         |      |
|           |                  | 273       |      |                   | 273     |      |
| Mod.-Out  | Under 8.5        | 51        | 11.2 | Under 16.9        | 67      | 14.8 |
|           | 8.5-8.9          | 261       | 57.5 | 17.0-22.9         | 241     | 53.1 |
|           | 9.0-9.4          | 64        | 14.1 | 23.0-28.9         | 126     | 27.8 |
|           | 9.5-9.9          | 28        | 6.2  | 29.0 & over       | 20      | 4.4  |
|           | 10.0 & over      | <u>50</u> | 11.0 |                   |         |      |
|           |                  | 454       |      |                   | 454     |      |
| Stable    | Under 8.5        | 3         | 3.2  | Under 16.9        | 8       | 8.4  |
|           | 8.5-8.9          | 48        | 50.5 | 17.0-22.9         | 28      | 29.5 |
|           | 9.0-9.4          | 14        | 14.7 | 23.0-28.9         | 43      | 45.3 |
|           | 9.5-9.9          | 10        | 10.5 | 29.0 & over       | 16      | 16.8 |
|           | 10.0 & over      | <u>20</u> | 21.1 |                   |         |      |
|           |                  | 95        |      |                   | 95      |      |
| In        | Under 8.5        | 4         | 11.8 | Under 16.9        | 2       | 5.9  |
|           | 8.5-8.9          | 4         | 11.8 | 17.0-22.9         | 9       | 26.5 |
|           | 9.0-9.4          | 3         | 8.8  | 23.0-28.9         | 9       | 26.5 |
|           | 9.5-9.9          | 5         | 14.7 | 29.0 & over       | 18      | 52.8 |
|           | 10.0 & over      | <u>18</u> | 52.8 |                   |         |      |
|           |                  | 34        |      |                   | 34      |      |

TABLE 43--Continued

| Migration | Manufacturing |            |      | Agriculture |            |      |
|-----------|---------------|------------|------|-------------|------------|------|
|           | Mfg.          | No.<br>Co. | %    | Agr.        | No.<br>Co. | %    |
| Hi - Out  | Under 2.0     | 124        | 45.4 | Under 10.9  | 5          | 1.8  |
|           | 2.0-11.9      | 127        | 46.5 | 11.0-26.9   | 14         | 5.1  |
|           | 12.0-21.9     | 20         | 7.3  | 27.0-42.9   | 39         | 14.3 |
|           | 22.0-31.9     | 1          | 0.4  | 43.0-58.9   | 132        | 48.4 |
|           | 32.0 & over   | <u>1</u>   | 0.4  | 59.0 & over | <u>83</u>  | 30.4 |
|           |               | 273        |      |             | 273        |      |
| Mod.-Out  | Under 2.0     | 33         | 7.3  | Under 10.9  | 20         | 4.4  |
|           | 2.0-11.9      | 271        | 59.7 | 11.0-26.9   | 87         | 19.2 |
|           | 12.0-21.9     | 94         | 20.7 | 27.0-42.9   | 150        | 33.0 |
|           | 22.0-31.9     | 39         | 8.6  | 43.0-58.9   | 177        | 39.0 |
|           | 32.0 & over   | <u>17</u>  | 3.7  | 59.0 & over | <u>20</u>  | 4.4  |
|           |               | 454        |      |             | 454        |      |
| Stable    | Under 2.0     | 0          | 0    | Under 10.9  | 13         | 13.7 |
|           | 2.0-11.9      | 21         | 22.1 | 11.0-26.9   | 43         | 45.3 |
|           | 12.0-21.9     | 34         | 35.8 | 27.0-42.9   | 30         | 31.5 |
|           | 22.0-31.9     | 26         | 27.4 | 43.0-58.9   | 9          | 9.5  |
|           | 32.0 & over   | <u>14</u>  | 14.7 | 59.0 & over | <u>0</u>   | 0    |
|           |               | 95         |      |             | 95         |      |
| In        | Under 2.0     | 0          | 0    | Under 10.9  | 9          | 26.5 |
|           | 2.0-11.9      | 17         | 50.0 | 11.0-26.9   | 16         | 47.1 |
|           | 12.0-21.9     | 7          | 20.6 | 27.0-42.9   | 6          | 17.6 |
|           | 22.0-31.9     | 5          | 14.7 | 43.0-58.9   | 3          | 8.8  |
|           | 32.0 & over   | <u>5</u>   | 14.7 | 59.0 & over | <u>0</u>   | 0    |
|           |               | 34         |      |             | 34         |      |

TABLE 43--Continued

| Migration | Level of Living |            |      | Urbanity    |           |      |
|-----------|-----------------|------------|------|-------------|-----------|------|
|           | Level of Living | No. Co.    | %    | Urbanity    | No. Co.   | %    |
| Hi - Out  | Under 79.9      | 56         | 20.5 | No Urb.     | 207       | 75.8 |
|           | 80.0-99.9       | 19         | 7.0  | Under 10.0  | 2         | 0.7  |
|           | 100.0-119.9     | 33         | 12.1 | 10.0-24.9   | 25        | 9.2  |
|           | 120.0-139.9     | 58         | 21.2 | 25.0-39.9   | 22        | 8.1  |
|           | 140.0-159.9     | 66         | 24.2 | 40.0-54.9   | 13        | 4.8  |
|           | 160.0 & over    | <u>41</u>  | 15.0 | 55.0 & over | <u>4</u>  | 1.5  |
|           |                 | 273        |      |             | 273       |      |
| Mod.-Out  | Under 79.9      | 17         | 3.7  | No Urb.     | 138       | 30.4 |
|           | 80.0-99.9       | 25         | 5.5  | Under 10.0  | 6         | 1.3  |
|           | 100.0-119.9     | 43         | 9.5  | 10.0-24.9   | 69        | 15.2 |
|           | 120.0-139.9     | 102        | 22.5 | 25.0-39.9   | 111       | 24.4 |
|           | 140.0-159.9     | 115        | 25.3 | 40.0-54.9   | 78        | 17.2 |
|           | 160.0 & over    | <u>151</u> | 33.3 | 55.0 & over | <u>52</u> | 11.5 |
|           |                 | 454        |      |             | 454       |      |
| Stable    | Under 79.9      | 0          | 0    | No Urb.     | 17        | 20.0 |
|           | 80.0-99.9       | 2          | 2.1  | Under 10.0  | 1         | 1.1  |
|           | 100.0-119.9     | 19         | 20.0 | 10.0-24.9   | 9         | 9.5  |
|           | 120.0-139.9     | 16         | 16.2 | 25.0-39.9   | 20        | 21.1 |
|           | 140.0-159.9     | 24         | 25.3 | 40.0-54.9   | 18        | 20.0 |
|           | 160.0 & over    | <u>34</u>  | 35.8 | 55.0 & over | <u>30</u> | 31.6 |
|           |                 | 95         |      |             | 95        |      |
| In        | Under 79.9      | 2          | 5.9  | No Urb.     | 8         | 23.5 |
|           | 80.0-99.9       | 1          | 2.9  | Under 10.0  | 0         | 0    |
|           | 100.0-119.9     | 6          | 17.6 | 10.0-24.9   | 2         | 5.9  |
|           | 120.0-139.9     | 5          | 14.7 | 25.0-39.9   | 2         | 5.9  |
|           | 140.0-159.9     | 7          | 20.6 | 40.0-54.9   | 3         | 8.8  |
|           | 160.0 & over    | <u>13</u>  | 38.2 | 55.0 & over | <u>19</u> | 55.9 |
|           |                 | 34         |      |             | 34        |      |

group of 454 counties shows a loss of 5 percent to 20 percent of their 1950 population. There are 95 relatively "stable migration" units having a loss up to 5 percent or a gain up to 5 percent. Finally, a "high in-migration" group of 34 counties gained over 5 percent through migration in the decade. The results of this classification are shown in Figures 1 through 4.

The high-out migration category exhibits a pattern of low urbanity, low median age, low income, low female employment, and low manufacturing. None of the counties have low proportions in agriculture and only 20 percent have a low standard of living. This category has a moderately high frequency of counties with low manufacturing, low education, and low female employment. The only variable which is high is the percent of employed in agriculture. The moderate-out migration counties generally do not show as large proportions at the extremes of our measures as in the case of high out-migration counties. A very high percentage of counties are at a moderately low in female employment, education, and manufacturing. Less than 25 percent of the stable counties are at the extreme of our measures, with the percent employed in agriculture being moderately low and median schooling being high. The in-migration group shows a surprisingly large percentage of counties with moderately low agriculture and manufacturing. This is not completely unexpected.

Percent of Non-Adjacent Counties in the North Central Region,  
Classified by Low to High Range on Selected Variables

Figure 1. High-Out Migration

Figure 2. Out-Migration

Figure 3. Stable

Figure 4. In-Migration



## HIGH OUT-MIGRATION

Percent  
of Counties

100

80

60

40

20

0

Low

Moderately  
LowModerately  
High

High

Range of Variable

Urbanity

K Mig.

K Schooling

K Income

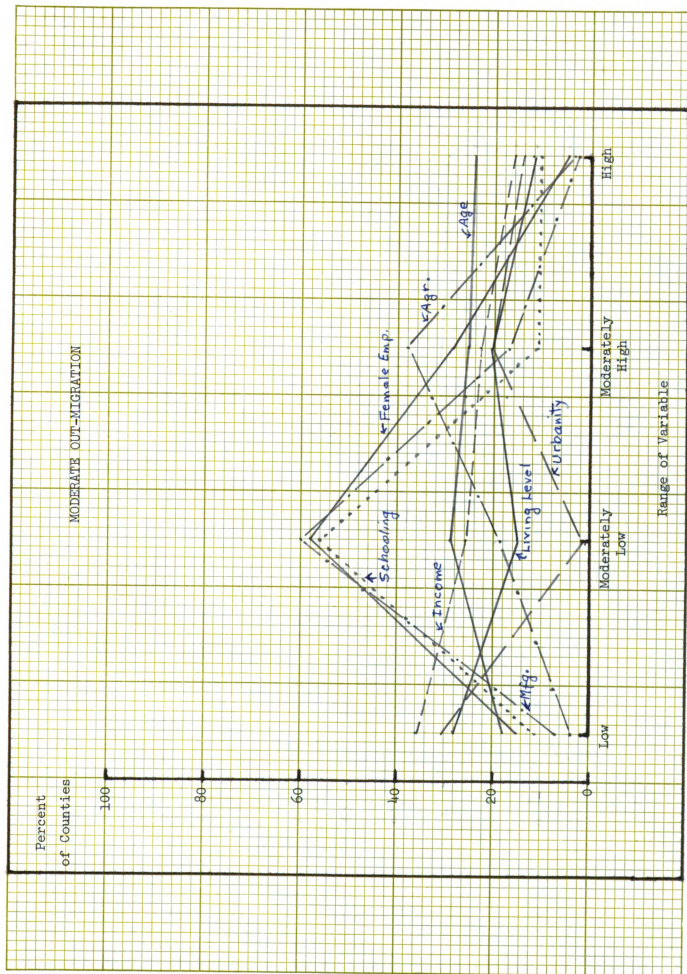
K Agr.

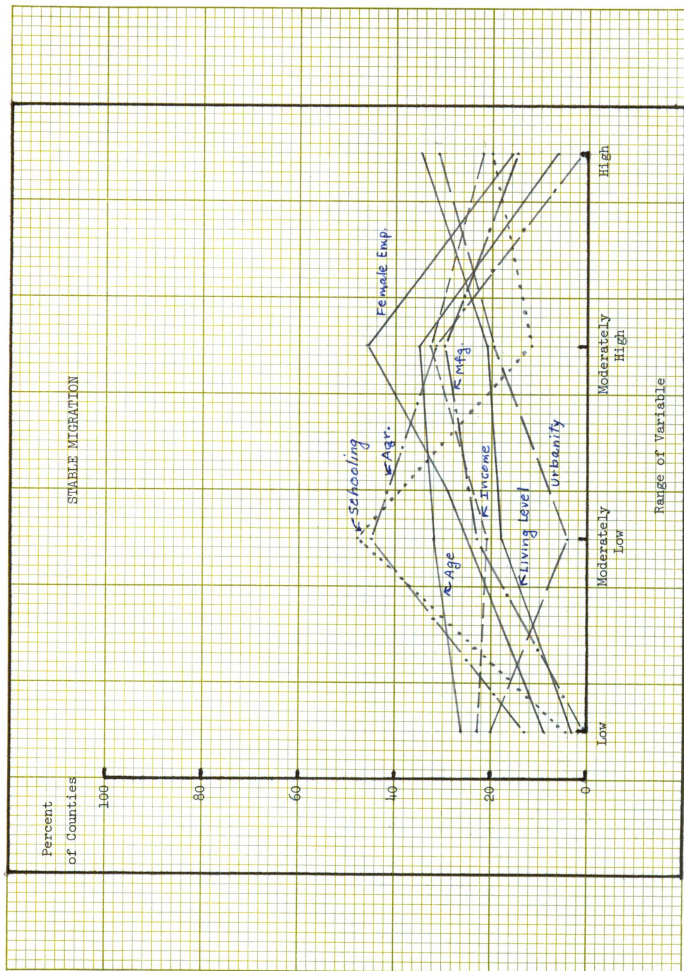
Age

K Living level

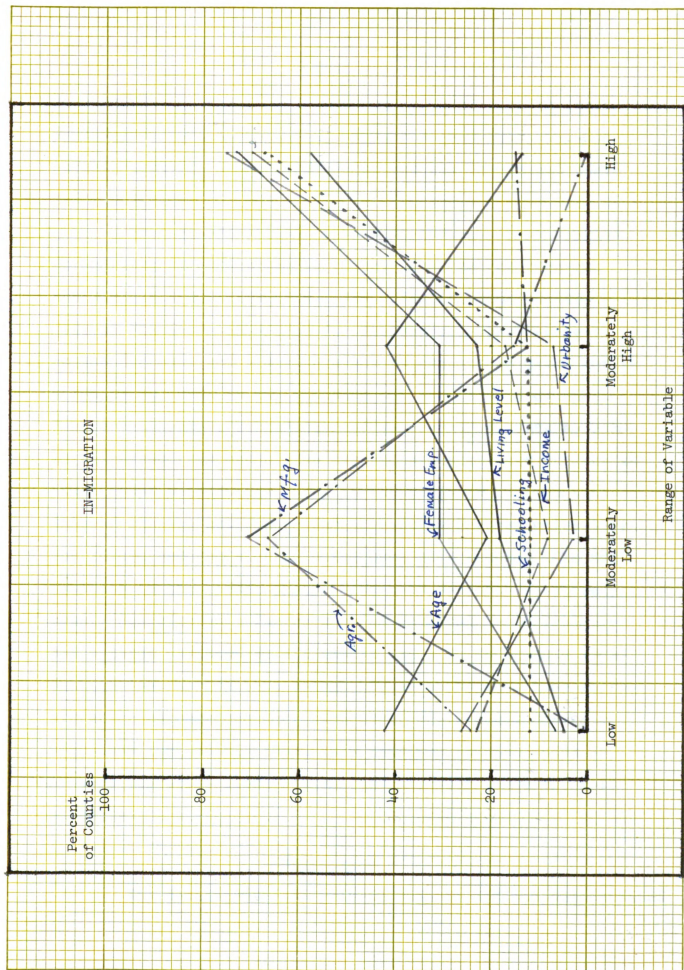
K Female Emp.

100-100000











In-migration counties have large proportions high in female employment, income, education, urbanity, and farm operator level-of-living; large proportions are low in age and agriculture.

When we examine the variables through the migration categories, we find urbanity to vary most at the high-out and high-in classifications. Its variance drops considerably at the two middle levels. Age shows a large variance in the high-out and a moderate one in the stable group but is practically level in the moderate out and high-in groups. Female employment, schooling, and manufacturing vary together in all categories except the high-in group and are present in about equal proportions. The income variable is important only at the two extremes. The high-out migration units have low income and the high-in units have high income. The 500 counties in the middle groups have this variable relatively evenly distributed. The percent of employed in agriculture has a large variance at all levels, with an invariable movement to less agriculture as out-migration becomes less or in-migration becomes greater. The level-of-living index is a very poor indicator. There is a tendency for the index to measure migration flows but only at the high-in level is it effective.

### Regression

The contingency analysis in Chapter III has demonstrated





that the relationship between the dependent variable (migration) and the independent variables are reasonably linear.

The correlation ratio coefficient,  $ETa$ , defined by

$P_{y/x} = 1 - E \left( \frac{y^2/x}{y^2} \right)$  is the limiting form of the correlations between the dependent variable ( $Y$ ) and increasing powers of the independent variables ( $X_i$ ). In each case  $P_{y/x}$  was not much higher than  $Y^2_{xy}$ , and the linear assumption may therefore be justified. This alleviates the necessity of including powers of the independent variables higher than the first power.

The next step of our analysis is the expression of migration as a linear function of the independent variables by means of a least squares regression equation. The function has the form  $\hat{Z}_y = \sum_{k=1}^K b_k \hat{Z}_{x_k}$  where  $\hat{Z}_y$  is the estimated standardized value of the dependent variable based on the values of  $K$  independent variables. The amount of total variance of migration accounted for by its relationship with the independent variables is represented in a subsequent table by  $R^2$ . The correlation of observed values of the dependent variable with its estimated values determined by the least squares approximation is represented by  $R$ . The standard error of estimate,  $s$ , is a measure of the variance of the dependent variable unaccounted for by the independent variables. It is defined by  $Se = \sqrt{MS_E}$ , where  $MS_E$  is the mean sum of squares of differences between the estimated value of the dependent

variable for each observation and the average value of the variable for all observations. The statistic,  $F$ , is used for testing whether all variables taken together have no effect on the dependent variable. It has  $R$  degrees of freedom in the numerator and  $N-K-1$  degrees of freedom in the denominator, where  $K$  equals the number of independent variables and  $N$  equals the number of observations. The Beta weights,  $b_i$ , are the coefficients of the standardized values of the independent variables in the regression equation, determined by the least squares method so that the difference between observed and estimated values of the dependent variables will be a minimum. The test statistic,  $F_i$ , is used for testing whether the true Beta weight of variable  $X_i$  equals zero, i.e., whether that variable has no influence on the dependent variable. The partial correlation coefficients represent the correlation between the dependent variable with the variation accounted for by all variables except  $X_i$  removed.

Two cautions regarding interpretation of the data should be made. First, although the least squares method of regression does not require that the variables be normally distributed, the distribution of the test statistic,  $F$ , assumes a normal distribution of variables. The distribution of values of migration does not entirely satisfy this requirement but the very large  $N$  assures that the observed Beta is very close to the "true" weights. The second point is that

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a correlation requires two things of the variables: (1) that the values of one vary in some non-random manner with the other, and (2) that both variables have different values among the observations. If all observations have the same values for one of the variables, there can be no correlation between them. The effect is the same where values assigned to the variables are chosen in such a manner that discrimination among observations is low. These comments are directed primarily to the low correlation between migration and age. The use of the median age for each county may not be a sufficiently sensitive measure of age as it is related to migration.

The same phenomena accounts for the large drop in the amount of variance explained when we consider only the non-adjacent counties. The relative homogeneity of the area does not provide as much variation of the independent variables as does the entire North Central Region.

The zero-order correlation matrix for the region indicates relatively high inter-correlations for some of the variables. Income is most highly correlated with education and female employment, and relatively highly correlated with size, urbanity, and manufacturing. There is also a high inverse correlation with the percent of employed in agriculture. In addition to income, education is correlated with female employment, urbanity, and size. It is inversely

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correlated with agriculture. Manufacturing is highly related to size, urbanity, and female employment. Manufacturing exhibits a very high .75 inverse correlation with agriculture. Female employment is correlated with urbanity and urbanity is correlated with size.

The regression statistics have an  $R^2$  of .78 (Table 44). That is, 78 percent of the variance from the mean may be explained by this combination of variables. The partial correlations indicate that size is the best variable. This is expected since the SMSAs are receiving a very large proportion of the migration from areas having no-urban population. Agriculture is the second most important variable, with urbanity and education contributing almost as much to the  $R^2$ . Income and age contribute little. The variance for these variables has been picked up by size and urbanity.

Multiple regression as a technique yields weights for each of the variables which maximize the relationship of that variable to the dependent variable. As a result some variables which have significant zero-order correlation with the dependent variable may receive small or zero beta weights. This is likely to occur when several independent variables are highly correlated with each other in addition to being significantly correlated with the dependent variable. The independent variables have significant common variance but little or no unique variance with the dependent variable: one

7-1-19

TABLE 44

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON EIGHT ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
1175 COUNTIES OF THE NORTH CENTRAL STATES, 1950-1960

A. Zero-Order Correlation Matrix

Variable

|           |        |        |       |       |           |      |       |      |  |
|-----------|--------|--------|-------|-------|-----------|------|-------|------|--|
| Income    | 1.00   |        |       |       |           |      |       |      |  |
| Education | 0.21   | 1.00   |       |       |           |      |       |      |  |
| Mfg.      | 0.35   | 0.24   | 1.00  |       |           |      |       |      |  |
| Agr.      | -0.46  | -0.42  | -0.75 | 1.00  |           |      |       |      |  |
| Fem. Emp. | 0.55   | 0.51   | 0.50  | -0.25 | 1.00      |      |       |      |  |
| Age       | -0.001 | 0.18   | 0.10  | -0.16 | 0.22      | 1.00 |       |      |  |
| Urban     | 0.41   | 0.42   | 0.47  | -0.41 | 0.68      | 0.16 | 1.00  |      |  |
| Size      | 0.42   | 0.43   | 0.62  | -0.62 | -0.62     | 0.15 | 0.89  | 1.00 |  |
|           | Income | Educa. | Mfg.  | Agr.  | Fem. Emp. | Age  | Urban | Size |  |

B. Regression Statistics

| <u>Variable</u>   | <u>Beta<br/>Weights</u> | <u>Partial<br/>Correlation<br/>Coefficients</u> | <u>Significance<br/>Level</u> |
|-------------------|-------------------------|-------------------------------------------------|-------------------------------|
| Income            | -0.00                   | 0.01                                            | 0.43                          |
| Education         | -0.05                   | -0.09                                           | 0.16                          |
| Manufacturing     | 0.12                    | 0.16                                            | <0.0005                       |
| Agriculture       | -0.18                   | -0.20                                           | <0.0005                       |
| Female Employment | 0.08                    | 0.11                                            | 0.0001                        |
| Age               | -0.00                   | -0.01                                           | 0.42                          |
| Urban             | 0.08                    | 0.17                                            | <0.0005                       |
| Size              | 0.66                    | 0.75                                            | <0.0005                       |

$$R^2 = 0.7847$$



TABLE 45

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON NINE ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

A. Zero-Order Correlation Matrix

Variable

|           |       |       |       |           |      |       |      |          |      |  |
|-----------|-------|-------|-------|-----------|------|-------|------|----------|------|--|
| Income    | 1.00  |       |       |           |      |       |      |          |      |  |
| Education | 0.62  | 1.00  |       |           |      |       |      |          |      |  |
| Mfg.      | 0.16  | 0.11  | 1.00  |           |      |       |      |          |      |  |
| Agr.      | -0.38 | -0.35 | -0.67 | 1.00      |      |       |      |          |      |  |
| Fem. Emp. | 0.51  | 0.47  | 0.39  | -0.45     | 1.00 |       |      |          |      |  |
| Age       | 0.02  | 0.22  | 0.13  | -0.17     | 0.21 | 1.00  |      |          |      |  |
| Urban     | 0.46  | 0.38  | 0.50  | -0.72     | 0.59 | 0.12  | 1.00 |          |      |  |
| Size      | 0.10  | 0.04  | 0.62  | -0.59     | 0.31 | 0.10  | 0.56 | 1.00     |      |  |
| F.O.L.L.  | 0.73  | 0.64  | 0.01  | -0.11     | 0.43 | 0.35  | 0.25 | 0.02     | 1.00 |  |
| Income    | Edu.  | Mfg.  | Agr.  | Fem. Emp. | Age  | Urban | Size | F.O.L.L. |      |  |

B. Regression Statistics

| <u>Variable</u>   | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
|-------------------|-------------------------|----------|-------------------------------|
| Income            | 0.07                    | 0.32     | 0.17                          |
| Education         | 0.18                    | 0.36     | <0.0005                       |
| Manufacturing     | 0.21                    | 0.51     | <0.0005                       |
| Agriculture       | -0.15                   | -0.55    | 0.008                         |
| Female Employment | 0.18                    | 0.47     | <0.0005                       |
| Age               | 0.08                    | 0.20     | 0.01                          |
| Urban             | 0.03                    | 0.47     | 0.46                          |
| Size              | 0.13                    | 0.43     | 0.001                         |
| F.O.L.L.          | -0.04                   | 0.22     | 0.44                          |

$$R^2 = 0.4199$$

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of them must necessarily receive less weight than the other. Almost always the variables which show the highest zero correlation with the dependent variable will receive the largest weight if the independent variables are highly correlated with each other. In the case of income and education, we find education with a slightly higher correlation with migration and thus the larger beta. The same explanation holds for female employment and urbanity. Both are correlated at .47 with migration but female employment receives the variance. Thus it is quite possible for a variable to have an insignificant beta and still make a significant contribution to the variance predicted.

#### Non-adjacent areas

The three independent variables most closely related to migration, independently of the effect of other variables included in the model, are percent employed in manufacturing, percent employed in agriculture, and percent females in the labor force. The second of these, however, has a large amount of variability among observation in relation to its mean and therefore has a lower F statistic. The next most important variables are median years of school completed and size. Although the amount of variance and the Beta weights of median age and median family income are approximately the same, the higher degree of variability among observations in regard to

income casts some degree of doubt on its true influence. The other variables add a negligible amount of reduction in the variance.

It is believed that many of the variables in this matrix may be deleted without seriously reducing the level of explanation. The following parameters delete variables one at a time based upon the magnitude of the Beta weight. We should better understand the suppressing relationships as we delete variables that are highly correlated with other variables.

There are two levels of explanation which are possible with this kind of analysis. The first focuses upon understanding the key variables in the analysis. That is, which variables explain most of the variance? A second level is to explain the conditions under which an area gains or loses population at a particular level. The following parameters focus upon the first level of explanation.

The first variable to be deleted (Table 46) is urbanity. This is not surprising because of the high intercorrelation of this measure with income, education, manufacturing, and female employment. Moreover, each of these variables are highly correlated with the dependent variable. The surprise is that our  $R^2$  only drops from 0.4199 to 0.4195. There is a slight shift in the betas. Farm operator level of living is the second deletion (Table 47). It is highly

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TABLE 46

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON EIGHT ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL STATES,  
1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Income                       | 0.07                    | 0.32     | 0.20                          |
| Education                    | 0.17                    | 0.36     | <0.0005                       |
| Manufacturing                | 0.21                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.14                   | -0.55    | 0.01                          |
| Female Employment            | 0.17                    | 0.47     | <0.0005                       |
| Age                          | 0.08                    | 0.20     | 0.01                          |
| Size                         | 0.13                    | 0.43     | 0.001                         |
| F.O.L.L.                     | -0.04                   | 0.22     | 0.47                          |

$$R^2 = 0.4195$$

TABLE 47

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON SEVEN ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL STATES,  
1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Income                       | 0.04                    | 0.32     | 0.30                          |
| Education                    | 0.16                    | 0.36     | <0.0005                       |
| Manufacturing                | 0.21                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.15                   | -0.55    | 0.003                         |
| Female Employment            | 0.17                    | 0.47     | <0.0005                       |
| Age                          | 0.07                    | 0.20     | 0.01                          |
| Size                         | 0.12                    | 0.43     | 0.001                         |

$$R^2 = 0.4191$$

2-1

correlated with income and female employment and again there is not a significant drop in  $R^2$ . With the deletion of income (Table 48) there is a noticeable gain in the betas but still no change in  $R^2$ . Age and size are deleted in that order and our betas for manufacturing and agriculture have the greatest gain. There is still not a significant drop in  $R^2$  with four variables left in the matrix. The loss of education in Table 51 causes the first slight loss of variance explained. The betas for manufacturing, female employment and manufacturing, however, show a slight redistribution of values. In Table 52 the two most important variables are female employment and agriculture.

Each of these two variables is indicative of the two important determinants of migration: income and type of area. The areas of high female employment are those areas with high proportions in the service industry. They are also among the units with the highest incomes. The reverse is true for areas high in agriculture. They are very low in services as well as low in income. Female employment is highly correlated with income, education, manufacturing and urbanity. Agriculture has a high negative correlation with each of those measures. The dimensions of our variables may best be illustrated, however, with the use of factor analysis.



TABLE 48

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON SIX ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Education                    | 0.18                    | 0.36     | <0.0005                       |
| Manufacturing                | 0.21                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.17                   | -0.55    | <0.0005                       |
| Female Employment            | 0.18                    | 0.47     | <0.0005                       |
| Age                          | 0.06                    | 0.20     | 0.018                         |
| Size                         | 0.12                    | 0.43     | 0.001                         |

$$R^2 = 0.4184$$

TABLE 49

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON FIVE ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Education                    | 0.18                    | 0.36     | <0.0005                       |
| Manufacturing                | 0.20                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.20                   | -0.55    | <0.0005                       |
| Female Employment            | 0.17                    | 0.47     | <0.0005                       |
| Size                         | 0.12                    | 0.43     | 0.001                         |

$$R^2 = 0.4127$$

TABLE 50

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON FOUR ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Education                    | 0.16                    | 0.36     | <0.0005                       |
| Manufacturing                | 0.25                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.25                   | -0.55    | <0.0005                       |
| Female Employment            | 0.18                    | 0.47     | <0.0005                       |
| $R^2 = 0.4045$               |                         |          |                               |

TABLE 51

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON THREE ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

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| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Manufacturing                | 0.20                    | 0.51     | <0.0005                       |
| Agriculture                  | -0.31                   | -0.55    | <0.0005                       |
| Female Employment            | 0.25                    | 0.47     | <0.0005                       |
| $R^2 = 0.3871$               |                         |          |                               |

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TABLE 52

LINEAR REGRESSION OF NET CHANGE ATTRIBUTABLE TO MIGRATION  
UPON TWO ECOLOGICAL-DEMOGRAPHIC VARIABLES: DATA FOR  
856 NON-ADJACENT COUNTIES OF THE NORTH CENTRAL  
STATES, 1950-1960

---

| <u>Regression Statistics</u> |                         |          |                               |
|------------------------------|-------------------------|----------|-------------------------------|
| <u>Variables</u>             | <u>Beta<br/>Weights</u> | <u>r</u> | <u>Significance<br/>Level</u> |
| Agriculture                  | -0.43                   | -0.55    | <0.0005                       |
| Female Employment            | 0.27                    | 0.47     | <0.0005                       |
| $R^2 = 0.3655$               |                         |          |                               |

### Factor Analysis

The next step in the analysis is a representation of the relationships among all variables by use of a Factor Analysis Model. The Factor Pattern consists of  $K+1$  equations, one for each of the independent variables and one for the dependent variable of the Regression Model. The Factor Analysis Model does not consider any variable as dependent with respect to other variables; all variables are dependent with respect to the Factors. The general form of the equation is:  $Z_u = \sum_{c=1}^K F_c + e_u$  where  $Z_u$  is the estimated standardized value of the  $u$ th variable,  $F_c$  is the Factor Loading for the variable on the  $c$ th Common Factor,  $F_c$  is the value of the common factor,  $e_u$  is the Factor Loading on the

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TABLE 53

FACTOR LOADING MATRIX FOR NINE VARIABLES,  
NON-ADJACENT AREAS OF THE NORTH  
CENTRAL STATES, 1950

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|                   | <u>Factor 1</u> | <u>Factor 2</u> | <u>Factor 3</u> |
|-------------------|-----------------|-----------------|-----------------|
| Urbanity          | 0.7879          | 0.2983          | 0.0086          |
| Size              | 0.8259          | 0.1382          | -0.0419         |
| Migration         | 0.6849          | 0.2301          | -0.1832         |
| Age               | 0.1017          | 0.0908          | -0.9601         |
| Income            | 0.1563          | 0.8607          | 0.1729          |
| Education         | 0.1754          | 0.7627          | -0.1983         |
| Female Employment | 0.5447          | 0.5612          | -0.0858         |
| Manufacturing     | 0.8229          | -0.0469         | -0.0356         |
| Agriculture       | -0.8072         | -0.0371         | -0.0214         |
| Farm Opr. L.L.    | 0.0295          | 0.8304          | -0.3262         |

Unique Factor for the variable and is the value of the Unique Factor for the th variable.

Table 53 represents a three factor solution. Factor one is composed of urbanity, size, migration, manufacturing with female employment being loaded about even on factors one and two.

Factor 1, comprised of size, employment in manufacturing, urbanity, females in the labor force, migration, and low agricultural employment, appears to represent a clustering of variables measuring an area's urban-industrial potential. While our referent is the non-adjacent, rural portions of the region, this factor loading suggests the characteristics of the SMSAs or the developing areas adjacent to them.

Factor 2, consisting of income, education, farm operator level of living, and female employment, appears to represent a series of personal characteristics rather than those associated by type of area. Female employment, it should be noted, appears in both factor loadings.

Factor 3 has only one high inverse loading from age. This is difficult to interpret. While we know of the selectivity of young in net out-migration from rural areas, our measure of median age is an inadequate measure contained in an age structure.

Summary

The data indicate that urbanity, income, manufacturing, female employment, and education are significantly related to migration. Moreover, these variables cluster together at high or low levels at differing levels of population movement. The variable which caused the most static in the system is urbanity. Varying levels of the independent variables have little effect upon migration in areas with no urban population. It was believed that the elimination of the no urban counties from the data deck would significantly raise  $R^2$  for the non-adjacent areas. However, this only eliminated the extreme of our measures and the variance become too small to present. The variables generally cluster upon those variable measures which are characteristic of the type of area and those which are characteristic of income.



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## CHAPTER V

### SUMMARY AND CONCLUSIONS

We have approached the problem from two perspectives. The first has been to relate each variable to net migration in a contingency analysis and through regression techniques. The second approach has been to suggest some organizing concepts which we believed to be operative in the data. We now review our conceptual framework and summarize the results of the investigation.

This study utilized an ecological frame of reference in which we use county units and selected properties of them as building blocks. This unit is considered to be a subsystem of a larger region in which the process of population redistribution is taking place. We suggest that in-migratory flows result from the presence of amenities and opportunities for employment. Growth, or lack of growth, then, is attributable to a combination of ecological and demographic characteristics which are indicative of an expanding market in certain sectors. Our belief is that an expanding basic economy will create an expanding service sector. Moreover, these conditions of growth will be highly variable in relation to our independent variables.



### Summary of the Variables

#### Urbanization

We believed that increasing levels of urbanization would reflect differing levels of the movement from a dominantly agricultural economy to an industrial one. That is, a movement from an economic base of agriculture to manufacturing with its concomitant service component. Increasing specialization and differentiation of function create employment opportunities. At the highest levels of urbanization we anticipated reduced levels of in-migration. We therefore expected the size-distance classification to be a first approximation of migratory flows.

We found this to be true not only for counties but for states as well. The more urbanized and industrialized states showed net gains while the less urbanized ones showed a net loss.

In the SMSAs the expected relationship was found. The category of 250,000 and under gained 3.0 percent and the 500,000 to 999,999 category gained 6 percent. However, the twenty SMSAs of one million or more gained only 4.5 percent. The covariation of urbanity and migration is more random for the adjacent areas. All areas with less than 25.0 percent urban population suffered a very slight loss through net migration during the decade and the category of 25.0 to 39.9 exhibited the greatest gain. The flows for areas with more

than 40.0 percent urban were randomly distributed. The chief problem here is that this growth is closely tied to areas adjacent to SMSAs and we did not include this variable in our analysis because of the original set-up of the data. For the non-adjacent areas the pattern is as expected. Areas with no urbanity lost 18.6 percent and the out-flows became less with each increment in urbanization. The only surprise for this variable is the lack of ability of any combination of other measures to retard population loss. These unique cases are not evident in the analysis because of the aggregation of the data.

In the multiple regression analysis urbanity was significant for the total region. That is, with all areas included so the range of the variable was quite great, urbanity was an important variable. The extremely high beta for size in this matrix plus the correlation between size and urbanity of .89 should have "washed out" the beta completely. In the non-adjacent counties, however, income, manufacturing and female employment do take the variance and urbanity is not significant.

#### Median age

Median age was expected to be a summary statement of a population's age distribution. There is some weakness in the measure but it has proven to be a more sensitive indicator

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then we believed it to be. One explanation for this could be that the more rural areas are extreme enough in the clustering of young and old age groups that the averaging effect of the median measure is overcome. When related to net migration, the age measure correlates differently according to the type of area. The younger median age of SMSAs had the greatest gain and those with a median age of 33.0 and over lost population. The adjacent and non-adjacent units had similar patterns of the highest losses at both extremes of young and old. We expected high out-migration for the youngest age categories but we did not anticipate the loss for the older median age counties. The out-migration from the older counties is difficult to explain. Generally we find low education, moderately high agriculture, and low income to be significantly associated with high median age counties. In the non-adjacent units the most significant relationship is between urbanity and age. A very large proportion of the counties with no urban population which are losing population are high median age counties.

In the regression analysis age has the smallest zero-order correlation with the dependent variable in the matrix; yet the beta indicates a significant contribution to the explained variance for the non-adjacent areas. It is not a significant variable for the region. This suggests that the age variable is important only for the very young and old

1



counties and that the distribution is quite random for counties between the extremes.

Percent employed  
in manufacturing

Manufacturing was believed to be the most important indicator of the economic base of an area. We expected, then, that larger percentages employed in manufacturing would be indicative of the presence of amenities or the relative affluence of the population. The relationship was generally invariable for the three types of areas. The manufacturing variable was a more sensitive measure for the non-adjacent and adjacent counties, however, than for the SMSAs. It is believed that a mature industrial economy is more dependent upon its developed service economy. The adjacent areas would move from a high population loss to a relatively high gain and the non-adjacent areas would move from a high loss to a small population gain as manufacturing increases.

The increased importance of manufacturing is also reflected in the regression equations. The beta for the region is .12 as compared to .21 for the non-adjacent areas. This is also reflected in the high zero-order correlation for the non-adjacent counties.

An exception in the data which is largely hidden in the aggregation of data is a drop in growth at the highest level of manufacturing in the non-adjacent region. There is

a slight drop in education at very high levels of manufacturing but income increases.

### Agriculture

Because of the continuing trend for mechanizing agriculture to lessen proportions in agricultural employment, we expected high employment in this category to be indicative of large loss through migration. Since the variable is highly correlated with urbanity, the expectation was that at the zero-order level it would be highly correlated negatively with migration but would not be an important measure in the regression equation. The first assumption was correct. The non-adjacent areas with more than 59.0 percent of their 1950 population employed in agriculture lost over 25 percent of their population during the decade. The second assumption, however, was false. In multiple regression the larger beta goes to the variable with the highest zero-order correlation with the dependent variable. Agriculture and migration have a  $-0.55$  correlation while urbanity and migration are correlated at  $0.47$ . In the least squares equation this variable has a beta of  $0.15$ . When the suppressor variables are removed in the least squares deletion, it is the most important variable with a beta of  $-.43$ .

### Percent of female employment

Female employment was expected to be related to both

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the industrial base of an area and the level of income. The expectation was true for the adjacent and non-adjacent areas with both going from high out-migration to positive flows as female employment increased. The relationship for the SMSAs was curvilinear with both low and high percentages of female employment being rather stable and moderate levels of female employment having a high gain. These SMSAs are also the largest in size and other factors are probably operative such as decentralization of industry and general decline of the central city.

In the factor loading matrix female employment is almost evenly divided upon the income and type of area dimensions. And in the regression equation it proves to be the second most powerful explanatory variable.

### Education

The education variable proved to be most effective in explaining migration at the high and low median years of schooling. For the categories between the extremes of the measure the explanatory power was much less. The SMSAs with medians of less than 8.9 years of school completed lost almost 11 percent of their 1950 population while gaining 8.0 percent at high education levels. The adjacent units are similar in relation to migration when only the extremes are considered but the distribution is somewhat random in the

middle categories of education. The non-adjacent pattern is invariable from high out to stable with each increment in education.

The regression equation shows nothing when the entire region is examined. This is probably due to the curvilinear relationship in the SMSAs and the adjacent areas. In the non-adjacent areas the beta is .18, which is the highest beta of the matrix. When the suppressor variables are taken away by deletion only manufacturing, female employment, and percent in agriculture prove to be more important.

#### Farm operator level-of-living

Farm operator level-of-living is highly correlated with income and it demonstrates some ability to explain migration flows at the zero-order level. The high out-migration units are lowest in the index but the relationship is not a good one at higher levels of the measure. In the regression equation the beta is not significant, and the zero-order correlation is low. Generally it is a non-useful variable when income and education are included in the matrix.

#### Income

The income measure is more closely related to migration than was anticipated based on the simple contingency analysis. The relationship is invariable from high out-migration to in-migration with each increment of income. Yet,



when controlled for education, the income increment did not reduce migration at varying levels of education. Moreover in the regression equation with other variables held constant, income makes an insignificant contribution to the variance. Many of the nuances of the income measure became lost in the aggregated data. Income, for instance, had no influence on county units with no urbanity. The income variable exhibited a greater variance from its mean than any variable in the matrix and its true influence is questionable.

#### Relationship of the Variables

We hypothesized that those measures most closely related to an expanding economy would best predict flows of migration. Our greatest difficulty has been one of adequately measuring job opportunity. An easy way out of the dilemma would be to use jobs filled as a measure of this concept. That is to say, if a large number of people move into an area during the decade, it could be assumed to be in response to employment opportunities. However, we are unable to measure "jobs filled" and we have no way to separate labor force members from non-members.

The alternative has been to suggest that expanding economies exhibit different population characteristics than stable or declining ones. Education, income, and female employment were at high levels in areas characterized by immigration. It is interesting that moderate gain through

in-migration are high in manufacturing employment. Yet, those areas having the greatest migration gain are low in both manufacturing and agriculture. This suggests a high service economy and is consistent with our expectation that the non-basic activity is the population building function of the system.

There is a movement in economics to resurrect the classical economic view of migration. The advocates of this view assert that the entire economy must be viewed as a system. Internal movement is believed to be a function of income differentials within the system. In this view the population characteristics are important because they are related to income. When one speaks of wages he speaks of mobility.

It is our conclusion that mobility and wage determination are not a single problem. To assume a completely free market is to ignore a number of important considerations. A large portion of population movement is from non-pecuniary motives. Moreover, the flow of information is not sufficient for a rational, free market to operate. There are also many objective barriers to free movement. There is a certain amount of risk and uncertainty involved in geographic mobility. Information gaps leave many contingencies of the move unknown. Age and family responsibilities become important factors in this decision. Young and single persons, particularly single females, are more prone to assume the risk. Furthermore, many



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of the movers are unemployed at the time they decide to migrate. We may not assume that persons who are already employed are automatically attracted by higher wage structures in other areas. If the change is necessitated to secure employment which is lacking in one's present location the change is made regardless of risk. Our data indicate that job opportunity rather than income differentials attract migrants or cause them to leave an area. Reynolds<sup>35</sup> makes a relevant statement on the job vacancy thesis.

Movement between areas, like movement between employers, typically has a negative origin. It stems from a lack of adequate economic opportunity in one's present location. For farm boys, this means primarily lack of opportunity to own or rent a farm. For urban workers, it means primarily unemployment. Once an individual's attachment to his home area has been disrupted in this way, his direction of movement seems to be determined largely by distance, by personal relationships and by availability of jobs.

We cannot, however, throw out the conventional economic model of migration. There is a heavy correspondence between in-migration and above average income levels. We may assume that in a semi-urbanized labor market that within a given region similar skills will command similar wages, but higher levels of income are indicative of an expanding economy. The differences in median family income levels, then, can be attributed to the type of economy within the unit. There is still some expansion of blue collar employment but this

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<sup>35</sup> Lloyd G. Reynolds, The Structure of Labor Markets (New York, 1951), p. 242.



growth is being dwarfed by the very large growth in white collar occupations. It is this kind of growth that requires high levels of education and high female employment. Increments in income become a result of the maturation of an area.

This argument is equally valid if we focus our attention on the county of origin. Other variables such as manufacturing and education consistently show a greater ability to hold population than income levels when other variables are controlled. Income is somewhat randomly distributed on high out-migration counties and the variance is great. It is our conclusion, then, that the same conditions which influence migration are influencing income as well.

### Discussion

As indicated in the summary, the effort to establish relationships between selected variables and patterns of net migration for types of areas in the North Central Region has been profitable. However, the mode of analysis and the nature of our data are not without problems. The first relates to the conceptualization of system. Ideally an appropriate systemic referent would have been an interdependent economic system made up of constituent counties for which we have origin and destination data. While the North Central Region probably is best viewed as a series of interdependent economic systems, we have conceived the total region as a system but have focused primarily on the non-adjacent areas--the hinterland. A major problem then is the



failure to identify more appropriate systemic referents, to aggregate counties within them, and to have at hand origin and destination flows specific to these economic markets.

The county unit of analysis makes sense in many respects, but in others it does not. It is an administrative unit but not necessarily an economic one. At times there may be different processes for different parts of a county and these become lost in the average. Commuting to work could create serious problems in relating income, education, etc., to the economic base. In such instances the dominant center should be related to the bedroom county to understand its characteristics.

A very serious problem is lack of a historical perspective for the area. I strongly suggest that a future student include the 1960 and 1970 population characteristics plus the 1960 to 1970 migration and look at the changes through time.

Another problem which came to my attention quite late in the study was the "mushy" concept of the service sector of the economy. At varying levels of maturity in an area the content of this concept changes. A service sector built upon an agricultural surplus is not the kind of service economy which results from manufacturing.

Many of the finer relationships become lost in the aggregation of this data. For example, a few counties with



very high measures on a particular variable are collapsed with a large number with moderately high measures. It is believed that a study which included a major SMSA and its hinterland could be studied in much greater detail as to its changing economic structure in relation to a changing economic base. Such a study would include detailed information about the labor force as well as characteristics of the population. Moreover, the changes could be viewed through a historical perspective. Finally, many of our variables explained well only at the extremes of the measures. If the population was very low on the scale of income, urbanity, etc., the relationship to out-migration was very high. If the measure of these characteristics was high, in-migration was high. Only education, manufacturing, female employment, and percent in agriculture were consistent in explaining at all levels of the variable. This indicates a need for further research and investigation.





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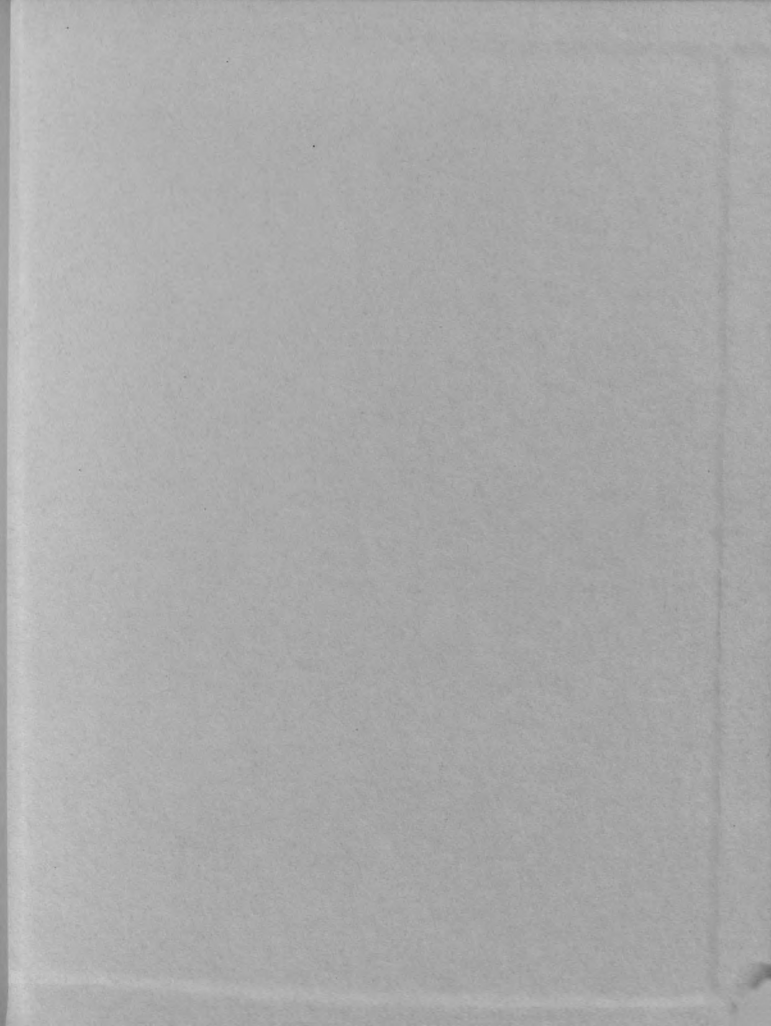
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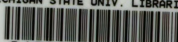
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