THE RELATIONSHIP OF LOCATION, AND ECONOMIC CHANGE TO NET MIGRATION IN NONMETROPOLITAN COUNTIES OF THE U.S. 1970-1975

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Introduction

After decades of decline America's nonmetropolitan counties have recently experienced rapid rates of population growth largely as a result of positive rates of net migration. High rates of net migration have not been restricted to the margins of the nation's metropolitan regions but have occurred in less densely populated parts of the nation in areas distant from metropolitan concentration as well. The purpose of this paper is to examine the association between economic, spatial and amenity variables and net migration for a random sample of non-metropolitan counties for the period 1970 to 1975. Separate analyses are conducted for counties in each of the nation's four major census regions in order to determine whether national trends disguise substantially different regional migratory experiences.

Population Decentralization, Migration and Nonmetropolitan Areas.

A reversal in traditional migration patterns during the 1970s resulted in high rates of population growth for many nonmetropolitan areas of the U.S. Not surprisingly, the renewed vitality of nonmetropolitan America has attracted considerable attention in the demographic, geographic, and regional development literatures [2,18,20,21,24,27,35]. Emphasis has been on documenting the turnabout in migration flows rather than on understanding forces that underlie the increased attractiveness of nonmetropolitan areas as migration destinations.

Examination of the literature reveals several issues relating to the nature and spatial attributes of nonmetropolitan growth and migration. The first involves the degree to which the expansion of the metropolitan influence is responsible for revitalizing nonmetropolitan areas. The question of metropolitan spillover versus rural renaissance is one aspect of this larger issue [18]. In spatial terms, nonmetropolitan growth has not been confined to the margins of the nation's SMSAs, but has occurred in heretofore more isolated rural regions as well [2, 34]. In areas immediately surrounding SMSAs, population growth and inmigration have been linked to "direct" metropolitan influences like commuting, second home recreational development and the diffusion of innovation [16]. In more out of the way places, population growth has resulted from energy exploitation, recreational expansion and industrial development. Although the roots of these latter processes can be found in metropolitan areas, connections are less direct and, therefore, more difficult to trace [1, 16].

Perhaps the best understood of the associations between metropolitan and forces of nonmetropolitan growth is the process of manufacturing decentrali-

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zation. Thompson's "filtering-down" theory of manufacturing development posits that as industries mature and their functions become more routinized, the locational emphasis shifts from external economies and sophisticated infrastructures to low cost labor availability [26]. In recent years, nonmetropolitan areas with large pools of surplus labor became increasingly attractive to more mature industrial operations. In addition, the trend toward branch plant operations situated so as to exploit large pools of unskilled and semiskilled labor further stimulated industrial expansion in nonmetropolitan areas [6].

A second issue concerns the relative importance of economic factors in causing reorientation of migration flows in the U.S. Traditionally, migration has been viewed as a mechanism of adjustment whereby labor shifts from low to high wage regions or, in a broader sense, from economically depressed to economically active regions. Within this context, inducements to inmigration are high wages, high overall regional income, low unemployment and rapid growth in job opportunities. To what extent is nonmetropolitan migration a function of the same processes that originally attracted migrants to metropolitan areas? Has a changing geography of economic opportunity in the U.S. given rise to a reorganization of population distribution and migration flows? A very preliminary and inconclusive investigation by Morrison and McCarthy [18] found a significant negative relationship between growth in earnings and change in net migration for nonmetropolitan counties between 1970 and 1975. The results imply that high gains in net migration occurred in counties experiencing low income growth, a result which is contrary to the traditional notion of inmigration as a response to posive income change. Moreover, there was not a significant relationship between 1971 income levels and net migration change, indicating that increased migration was not in the direction of high income counties. The potentially important effects of employment change and unemployment were not investigated; as a result, their roles in recent migration shifts remain unclear.

Historically, the neoclassical model of migration as a response to wage, earnings and other economic differentials has proven to be a less than adequate predictor of interregional population movement [23]. This realization has led to the introduction of noneconomic variables like temperature, population density, and pollution levels into migration models [25]. Noneconomic, "quality of life" factors are thought to be particularly significant in attracting population to nonmetropolitan areas of the U.S., and recent evidence in the literature provides a behavioral basis for this contention. Fuguitt and Zuiches [9] queried a sample of Americans and found a decided preference for residence in small towns and rural areas. Reasons cited include quality of life factors such as less crime, quality air and water and a better place for raising children. Those who expressed preference for big city life did so on the basis of a totally different package of attributes; they identified higher wages or salaries, better job opportunities and contact with a variety of people as primary considerations in their locational preferences.

A third issue involves whether or not there is regional variation in the nonmetropolitan growth experience and whether it affects the migration process. An early discussion of this point suggests that the nature of the relationships between population and economic growth and accessibility to metropolitan centers depends on what region is studied. Blumenfeld [4] noted that overall national trends may reflect the presence of a very strong association in only one region. It is also possible that national trends disguise conflicting

regional experiences and factors that are important determinants of migration in one region are insignificant in others.

Investigations of the nonmetropolitan migration process have been primarily national in scope and have largely ignored the regional experience. More recently, studies have begun to focus on individual regions but, for the most part, they have been conducted for diffuse purposes, at varying levels of spatial aggregation (the South as opposed to a two-county region in Northern Michigan), and they incorporate a different set of explanatory variables [1, 5, 14, 19, 21, 22]. One noteworthy exception is a study of the relationship between growth in manufacturing employment and net migration among nonmetropolitan counties. The results indicated that high wage manufacturing had a greater influence on net migration than low wage manufacturing, but the differential was limited to the South [14]. There is a clear need for more studies of this type that evaluate regional variations in the nonmetropolitan migration process.

The Study Model

The study model was formulated to address some of the questions raised in the previous section. How important are economic forces in influencing population redistribution or is migration related to other noneconomic factors? Does proximity to SMSAs enhance the chance for population growth and inmigration? Are there significant regional differences in the correlates of net migration? In the study model net migration is viewed as the dependent variable, and a set of economic, amenity and locational factors serve as independent, expanatory variables. The study model is presented in equation 1.

$$(1) \quad NET_i = a + b_1 Y_i + b_2 EM_i + b_3 MAN_i + b_4 UN_i + b_5 DIST_i +$$

$$b_6 INTER_i + b_7 COM_i + b_8 DENSITY_i + b_9 REC_i$$

Where

NET_i = Rate of net migration for county i between 1970 and 1975 (32)

Y_i = Per capita income in county i in 1979 (39)

EM_i = Percent change in total employment in county i between 1970 and 1975 (30)

MAN_i = Percent change in employment in the manufacturing sector in county i between 1970 and 1975 (30)

UNi = Rate of unemployment in county i in April, 1970 (28)

$DIST_i$ = Distance between the geographic center of county i and the nearest SMSA (state highway maps)

$INTER_i$ = 1 if any portion of a U.S. interstate highway passes through county i; 0 if a U.S. interstate highway does not pass through county i (state highway maps)

COM_i = the proportion of county i's population that commutes to work in a SMSA (28)

$DENSITY_i$ = Persons per square mile in county i in 1970 (29)

REC_i = Proportion of all homes in county i that are second homes (28)

Surrogates for economic prosperity include: per capita income, unemployment rate, total employment growth and growth in manufacturing employment. Although these variables are by no means exhaustive of the factors that represent economic health and growth, they are rather standard indicators of economic well-being and have often been incorporated into models of migration [3, 8, 10, 11, 12, 13]. Net migration is expected to be greatest in counties with high levels of income, low unemployment rates, rapid growth in total employment and rapid growth in manufacturing employment. The relative importance of these economic factors should provide insight into the role of economic change in population redistribution.

Metropolitan influence will be evaluated with three locational variables, distance to the nearest SMSA, commuting to SMSAs and proximity to the interstate system. The validity of distance as a surrogate for the degree of metropolitan impacts presupposes that metropolitan influence has distance decay properties. Since transport costs are related to distance, the intensity of metropolitan impacts like commuting, recreational activity and agglomeration economies should decline with distance from SMSAs. Moreover, metropolitan areas are major markets for industrial goods and proximity to them lowers the distribution costs of goods manufactured in nonmetropolitan areas.

Where physical and other barriers impede interaction, straight-line mileage between two places may not be a satisfactory indicator of accessibility. As a result, the proportion of a county's population that commutes to an SMSA has been included in the model as a surrogate for the actual amount of interaction with metropolitan places. Obviously, commuting is only one form of metropolitan impact on nonmetropolitan areas, but it does provide an indication of the extent to which the nonmetropoitan county is in functional contact with SMSAs. A significant positive association between commuting and net migration would lend credence to the argument that nonmetropolitan growth is related to metropolitan influence.

Integration into the U.S. interstate highway system is a third dimension of the accessibility of nonmetropolitan counties *vis a vis* SMSAs. The federal interstate system was originally conceived to connect the nation's major cities and, thus, an accessible location relative to this system eases contact and communication with SMSAs. To the extent that metropolitan areas are markets for energy and industrial products and origin areas for recreational visitors to nonmetropolitan areas, accessibility to metropolitan areas should enhance the potential for population and economic growth in nonmetropolitan areas. Accessibility to the interstate system was incorporated in the study model by the inclusion of a dummy variable. A county was assigned a value of 1 if a federal interstate highway passed through any part of its territory; it received a 0 if not.

In terms of attracting migrants, a potentially significant aspect of nonmetropolitan life involves ephemeral qualities like open space, clean air and a more related lifestyle. Needless to say, these qualities are extremely difficult to quantify and, in addition, relevant amenity variables at one scale may be insignificant at different scales. Lamb [16] refers to the influence of climatic variables at an interregional scale, but at a small scale, the presence of unique natural factors like mountains, oceans or lakes may be more relevant in

directing the flow of migrants [9].

In addition to population density, another measurable component of nonmetropolitan amenities relates to its recreational usage. The proportion of all housing which are second homes was included in the model as a surrogate for natural amenities. This assumes, of course, that second home development occurs in areas of natural attraction. Although second home development can be viewed as having economic overtones, it will be interpreted here primarily as an amenity factor.

Data

The primary source of migration data is the Census Bureau's *Current Population Reports-Population Estimates*[32]. Unfortunately, migration information from this series is plagued by several serious limitations which make the results of this analysis necessarily tenuous. In the *Population Estimates* series, net migration represents that portion of population growth that is unexplained after the effects of birth and death have been taken into account. Thus, reliable net migration data presupposes accurate birth, death and total growth information. Moreover, the census procedure of rounding to the nearest 100 can seriously alter estimates for very small or sparsely populated counties with 10,000 inhabitants or less. Whenever possible, the complete set of 1975 preliminary estimates of county population and net migration data were double checked with a set of 1975 final estimates and appropriate adjustments were made. Several large errors were spotted and corrected through this procedure.

A second difficulty with the data set involves the use and interpretation of net migration patterns. The advantages of analyzing gross inmigration and outmigration have been extensively discussed in the literature, and this issue has been specifically raised regarding nonmetropolitan county data [21, 27]. Similar net migration rates can result from different gross migration experiences, and the determinants of inmigration and outmigration are frequently different. Justification for the use of net migration is that it indicates whether the overall effect of migration has been to increase or decrease the size of the county's population.

A random sample of 408 counties was chosen from the population of 2489 U.S. nonmetropolitan counties. The sample was regionally stratified since only 5 percent of all nonmetropolitan counties are in the Northeast, but the Northeast contains almost 15 percent of the U.S. nonmetropolitan population. The number of counties chosen from each region was a function of that region's composition of the total nonmetropolitan population of the U.S.

Findings

Parameters of the study model were estimated using a step-wise least squares procedure. The relationships between dependent and independent variables were evaluated for all 408 study counties. The results failed to confirm the hypotheses with the exception of the employment growth-net migration association. A possible explanation is that different regional experiences give rise to conflicting national migration patterns. As a result, study counties were subdivided into four regional groupings and separate analyses were conducted for each. The results are displayed in Table 1. Correlation matrices indicated that correlations between independent variables were not exces-

sively large. Thus, the problem of multicollinearity is probably minimal.

Employment growth proved to be significant in three of the four regional migration models. Its coefficients were in the expected positive direction indicating that the highest rates of net migration occurred in counties experiencing the largest employment growth. This suggests that employment opportunity is an important determinant of migration to nonmetropolitan counties. People may initially see nonmetropolitan locations as appealing for other than job availability, but retention of inmigrants to nonmetropolitan counties is related to their ability to generate job opportunities.

One troubling aspect about the association between employment growth and net migration is the potential for simultaneous equations bias in estimating regression parameters. In reality, employment growth and migration are mutually dependent processes meaning that employment growth is induced by inmigration just as inmigration is generated by high rates of employment growth. All that can legitimately be deduced from the results of this analysis is that a relationship between net migration and employment growth existed during the study period for all four regions. The direction of causality is not clear at this time.

TABLE 1. Results of Correlation and Regression Analysis for Nonmetropolitan Counties with Net Migration as the Dependent Variable.*

Independent Variables	Regions			
	Northeast	North Central	South	West
Y	$b_1 = .01$ (F = 7.1)	---	---	---
EM	---	$b_2 = 5.8$ (F = 4.5)	$b_2 = 12.8$ (F = 24.2)	$b_2 = 25.3$ (F = 10.6)
MAN	$b_3 = 18.7$ (F = 10.0)	---	---	$b_3 = -4.7$ (F = 3.9)
UN	$b_4 = -1.2$ (F = 2.6)	$b_4 = 1.8$ (F = 30.7)	$b_4 = -1.4$ (F = 15.7)	---
DIST	---	---	---	---
INTER	---	---	$b_6 = 2.3$ (F = 2.3)	---
COM	$b_7 = .21$ (F = 3.4)	$b_7 = .17$ (F = 4.2)	$b_7 = .06$ (F = 2.6)	---
DENSITY	$b_8 = -.02$ (F = 5.9)	---	$b_8 = -.02$ (F = 2.7)	---
REC	---	---	$b_9 = 142.4$ (F = 14.7)	---
r^2	.43	.35	.27	.26
n	70	118	177	43

*All regression coefficients included in the table were significantly different from zero at a .05 level of confidence.

--- Indicates that the variable did not contribute significantly to the explanatory power of the model.

In the case of growth in manufacturing employment, the analysis yielded conflicting regional results. In the Northeast there was a positive association between net migration and growth in manufacturing employment while in the West the relationship was significant but in a negative direction. On an average, Northeast study counties experienced decline in manufacturing employment of seven percent. Inmigration was associated with the retention of manufacturing employment rather than the attraction of new activity.

In the West, the negative association between net migration and growth in manufacturing employment is difficult to interpret in light of traditional views of labor migration. The results indicate that net migration was highest in counties that had little or negative growth in manufacturing. Heaton and

Fuguitt contend that high levels of manufacturing may detract from the quality of life to the extent that unhappy persons leave and potential inmigrants choose alternative destinations [14]. In addition, the nonmetropolitan West has little chance of benefiting from return migration so that new manufacturing enterprises are more likely to draw from the existing population than attract previous residents who would qualify as inmigrants. However, any interpretation of these results is qualified by the fact that the base of manufacturing employment in the nonmetropolitan West is small so that an increase of 40 or 50 employees might result in very large percentage increases in manufacturing employment but would have a negligible effect on attracting new residents or retaining old ones.

A second conflicting regional trend was for the unemployment coefficient to be significantly different from zero and in the expected negative direction in the Northeast and South but in an unexpected positive direction in the North Central region. The relationship between unemployment and migration fits the traditional view of migration as a mechanism of adjustment and as a reflection of changing patterns of economic activity in the Northeast and South, but in the North Central region, high unemployment rates were associated with net inmigration. One plausible explanation is that, because of their age, migrants to nonmetropolitan North Central counties were unresponsive to local unemployment rates and were attracted to depressed areas with scenic or other amenity attributes. For those beyond retirement age, unemployment rates are not relevant to their assessment of a place. Indeed, high unemployment rates may be attractive if associated with a lower standard of living. An example of this process is the inmigration of retirees to Northern Michigan, a region that has been economically depressed since the exodus of the mining and lumbering industries of the 1930s and 1940s.

Another possible interpretation is that inmigrants (either return migrants or first-timers) compete successfully for jobs where they are increasing. The unemployed are uneffected by new economic activity because they lack the skills and training necessary for employment. The result is that unemployment rates are not influenced by the expanding economic base. Inmigration and high unemployment can occur simultaneously [15].

Among the spatial variables, the existence of commuting was the most pervasive determinant of positive rates of net migration. In all regions except the West, the number of commuters to SMSAs was associated with net migration. The failure of Western counties to conform to the trend was expected since Western counties tend to be really very large. As a result, commuting to SMSAs from neighboring nonmetropolitan counties entails excessively long trips.

It is noteworthy that actual distance to SMSAs was statistically insignificant in all the regional study models. Apparently, functional interaction in the form of commuting was a better measure of the spatial spread of metropolitan influence than physical proximity.

Accessibility to the interstate system proved to be significant only in the South. The significant positive relationship indicates Southern counties that were integrated into the national highway system experienced the highest rates of net migration. Much of the South has traditionally been regarded as peripheral to the heartland core of the national space-economy. In recent years the South has experienced a resurgence in economic and population growth, but this has occurred differentially across space. It appears that

counties in an advantageous location *vis a vis* the national highway system have been affected most as evidenced by the positive association between proximity to the interstate and net migration among Southern counties.

Variation in population density was statistically significant and in the expected negative direction in only the Northeast model. The Northeast may be the only major region where population density is high enough to encourage outmigration. In other regions of the country, density in nonmetropolitan counties was generally low and the differentiation between sparse and moderately sparse was of little relevance in locational decision making.

Variation in second home development contributed significantly to the explanatory power of only the Southern model. Net migration was highest in counties that had the largest proportion of second homes. To the extent that this variable acts as a surrogate for environmental amenities, migration in the South was in the direction of amenity-rich counties.

Summary and Conclusions

The purpose of this paper was to address a number of questions that have arisen as a result of the recent resurgence of population growth and inmigration in nonmetropolitan areas of the U.S. To what extent do economic variables explain differential rates of net migration? Does proximity to metropolitan areas or accessibility to the interstate system influence a county's rate of net migration? Are low density, amenity-rich counties more attractive than higher density counties with less second home development? These issues are addressed separately for each major census region.

On the whole, the economic variables were most successful in explaining the variation in net migration rates among nonmetropolitan counties. However, it is not possible to discern from the analysis whether migration responded to the changing geography of economic opportunity or whether the reversal of traditional migration patterns altered the distribution of economic growth and development. Whatever the direction of the relationship, it appears clear that economic growth and migration continued to be interrelated processes.

With regard to the spatial expression of migration in nonmetropolitan areas, physical proximity to SMSAs was unrelated to the pattern of net migration. This was evidenced by the failure of distance to SMSAs to contribute significantly to the explanatory power of any of the regional models. Instead, functional interdependence with SMSAs in the form of commuting was a determinant of net migration in three of the four study models. In the West, the large areal extent of counties probably accounts for the failure of commuting to exert an influence on growth and migration in nonmetropolitan counties.

The results of the analyses clearly show that different forces operated in the four regions to account for variation in net migration. One troubling aspect of this whole question is the very large size and enormous diversity of the four census regions. A clearer picture of the forces that have made nonmetropolitan counties attractive migration destinations will necessitate examination of the nonmetropolitan migration experience at geographic scales as small as U.S. states.

All four regional study models failed to explain very much of the variation in net migration rates in nonmetropolitan counties during the study period. One might conclude that factors not included in the models were responsible for

the low r^2s. The amenity variables, population density and second home development were admittedly weak. Variable differentiating aspects of scenery, topography, nearness to water or growth in the recreation industry might yield more insight into the impact of natural amenities.

A conclusion that can be reached from this study is that the trend in nonmetropolitan migration is extremely complex. Nonmetropolitan counties that operated under very different economic, locational and environmental circumstances experienced positive rates of net migration during the study period.

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