To the Graduate Council:

I am submitting herewith a dissertation written by Allen Ray Arbogast entitled "Nonmetropolitan Viability in the East South Central Census Division of the United States." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Geography.

Thomas L. Bell

Thomas L. Bell, Major Professor

We have read this dissertation
and recommend its acceptance:

Bruce C. Ralston

C. L. Aiken

Samuel E. Wallace

Accepted for the Council:

L. Evan Pell

Vice Chancellor
Graduate Studies and Research

NONMETROPOLITAN VIABILITY IN THE EAST SOUTH CENTRAL CENSUS DIVISION OF THE UNITED STATES

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Allen Ray Arbogast

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ABSTRACT

The purpose of this study was to examine the patterns and characteristics of nonmetropolitan viability in a sample of towns in the East South Central Census Division of the United States. A total of 103 nonmetropolitan places were examined. In order to test for the significance of size of place, the 103 nonmetropolitan places were divided into two size categories; 4,000 to 6,000 and 6,000 to 13,500 population. In analyzing the characteristics of the nonmetropolitan places, eighteen social, economic, and retail sales variables were examined for each town. To further examine factors associated with nonmetropolitan viability, six towns in Tennessee were selected for indepth study.

The viability of places studied was examined using the traditional population change criterion and the less used retail sales change criterion. In addition, viability was measured by absolute change of population and retail sales in the towns, and by change relative to the change in the region. Correlation and discriminant analyses were employed in determining the relationships between population and retail sales change in the towns and eighteen selected socioeconomic variables. In order to account for and explain the spatial patterns of growth and decline, the study region was subdivided into physical provinces and economic areas.

The major findings of the research were that spatial patterns of viability in the study region differed according to whether the population or retail sales change definition was used. The differing spatial patterns of viability were further substantiated by the weak

relationship between population change and retail sales volume change. When the vibility of the towns was determined by relative change, rather than absolute change, still different spatial patterns emerged. Caution should, therfore, be taken when determining how to measure and define nonmetropolitan viability.

In the section which correlated the eighteen socioeconomic variables to the viability of the towns, several dominant relationships emerged. Growing towns tended to have populations with low employment, high numbers of industrial workers, high median family income, and high sales volumes of medium and high order retail functions.

The discriminant analyses were used to determine if nonmetropolitan viability could be predicted given a selected set of socioeconomic variables. The highest prediction success rate for the growing and declining towns occurred when viability was measured by absolute change of retail sales. It is believed that absolute retail sales change is the most efficient definitional criterion for viability because retail trade areas are not sensitive to corporate boundaries. Because the Census Bureau uses the corporate boundary in determining nonmetropolitan growth and decline, suburbanization of population and retail sales establishments adjacent to the corporate boundary are not accounted for and false viability impressions emerge. On the other hand, if a town annexes an adjacent suburban area, false growth is implied. By breaking the corporate boundary, retail sales change gives a more accurate impression of nonmetropolitan growth and decline than population change.

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CHAPTER 1

NONMETROPOLITAN VIABILITY

Introduction

The viability of nonmetropolitan towns and cities has been an important research theme in geography, rural sociology, sociology, and economics for a major part of this century. Academic and governmental concern with the growth and decline of nonmetropolitan places is a function of the historical growth of the American urban system. American small towns and rural areas were hinterlands for the economic growth and development of a young nation entering the urban-industrial age. Urban development varied regionally, however, with certain regions becoming predominately urban long before other regions. The New England Geographic Division, for example, recorded 72.5 percent of its population as residing in urban places in 1900. The East South Central and Pacific Geographic Divisions recorded 15.0 and 46.4 percent urban inhabitants in 1900, respectively (Table 1).[1] Table 1 further illustrates that the degree of regional urbanization varies temporally. The population shift from rural to urban-metropolitan places was highlighted by the 1920 census which for the first time in the nation's history reported a majority of the population residing in urban places.[2] Deep concern over the future of nonmetropolitan places

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[1]United States Department of Commerce, Statistical Abstract of the United States, 1920, Washington: United States Government Printing Office (1921), p. 49.

[2]Calvin Beale, "Demographic Trends of the U.S. Rural Population," The Development of Rural America, George Brinkman (editor), Lawrence: University Press of Kansas, (1974), p. 33.

TABLE 1

DISTRIBUTION OF URBAN POPULATION BY GEOGRAPHIC DIVISION: 1900-1920

Geographic Division	Percent Urban Population 1900	1910	1920
New England	72.5	76.3	79.2
Middle Atlantic	65.2	71.0	74.9
East North Central	45.2	52.7	60.8
West North Central	28.5	33.3	37.7
South Atlantic	21.4	25.4	31.0
East South Central	15.0	18.7	22.4
West South Central	16.2	22.3	29.0
Moutain	32.3	36.0	36.4
Pacific	46.4	56.8	62.4

Source: United States Department of Commerce, Statistical Abstract of the United States, 1920 Washington: United States Government Printing Office, (1921), p. 49.

and people who inhabited them emerged as the great migrations of rural people to urban areas continued through the late 1940's and 1950's.[3] The area that was for so long the impetus for urban growth, small town America, appeared doomed. The uncertainty of nonmetropolitan America's future pricked the curiosity of researchers who attempted to explain rural decline and interpret what the future for nonmetropolitan places might hold. Most of the concern over the fate of nonmetropolitan places was centered on the future of the smaller places, less than 20,000 inhabitants. The larger nonmetropolitan places were generally not experiencing decline problems as severe as their smaller nonmetropolitan counterparts.

An article entitled "Mayor Cries 'Wolf' to Save His Town" recently appeared in the Knoxville News-Sentinel.[4] The article dealt with the problems Four Oaks, North Carolina was experiencing with losses in population and retail establishments. In the article, the mayor was quoted as saying that his town needed industry to employ men as well as women. The textile industries in the town provided employment, but they were not large employers of men. Men in Four Oaks had to either accept low paying jobs locally, or commute substantial distances to find meaningful employment. Four Oaks' mayor felt that if the town could attract an industry that employed men, the local people would stay and the town would become viable. The feelings of the mayor of Four Oaks are similar to the feelings of many

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[3]Beale, p. 36.

[4]The Knoxville News-Sentinel (UPI), "Mayor Cries 'Wolf' to Save His Town," Friday, March 3, 1978, p. 2.

politicians and decision makers. It is for this reason that interest into what perpetuates economic growth in nonmetropolitan places has been an important part of nonmetropolitan viability studies.

Although nonmetropolitan places have been the focus of a substantial amount of research, identification of the processes of growth and decline have been elusive. Confusion exists as to what the salient characteristics of nonmetropolitan viability are over space and what factors may account for or be symptomatic of the growth and decline of specific places. This study focuses on certain social, economic, and retail sales characteristics of selected nonmetropolitan places in the East South Central Census Division (ESCCD) of the United States. The purpose of focusing attention on a limited number of nonmetropolitan places in one Census division is that factors associated with, and the processes involved in, their growth and decline may emerge which would otherwise be lost in a study encompassing numerous places from several geographic regions (Figure 1). In order to facilitate an understanding of the typology of the nonmetropolitan based on growth and decline characteristics, physical and economic subregions of the ESCCD are utilized. The subregional delimitation of the region is not undertaken as a goal unto itself, but as a means of placing the nonmetropolitan places into smaller working units than the larger ESCCD. By examining the basic viability characteristics of the subregions in which the nonmetropolitan places are located, better explanations as to the processes, characteristics, and spatial patterns of the viability of

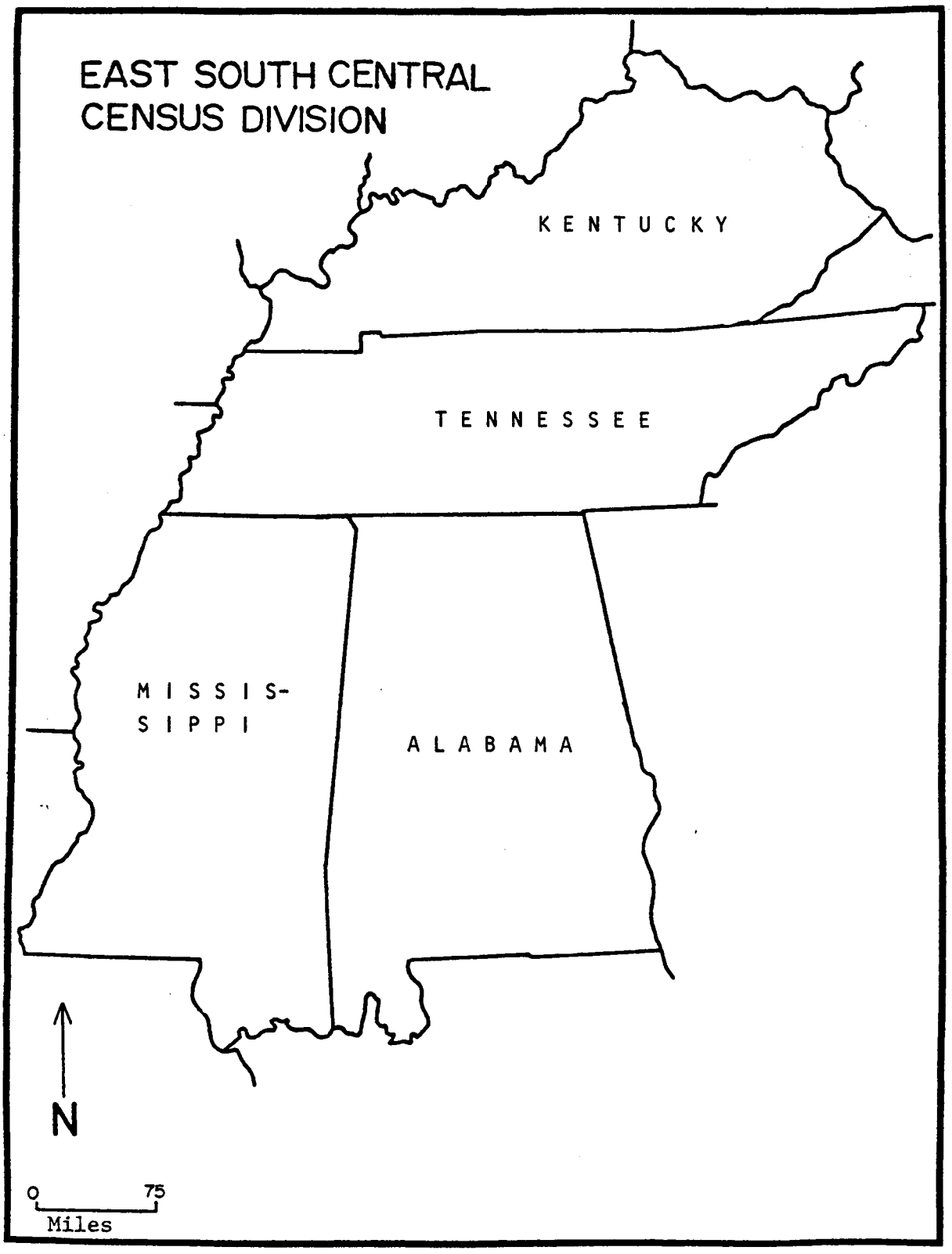

Figure 1. Four States Which Comprise the East South Central Census Division

individual, or groups of nonmetropolitan places may emerge. Few nonmetropolitan studies have put viability into a subregional context. This study, by placing the sample of nonmetropolitan places in the study region into subregions, will contribute to a better understanding of nonmetropolitan viability in the ESCCD.

Evolution of Nonmetropolitan Research

The concern over the fate of nonmetropolitan places, loosely referred to as small towns, can be traced back to the geographic and rural sociology literature of the nineteenth century. Although the present research makes no attempt to document this historical concern, it is important to understand that interest over the fate of nonmetropolitan places has permeated the thinking of researchers for some time. Fletcher expressed this anxiety as early as 1895 and his was by no means the earliest article concerned with the decline of small towns.[5]

A significant amount of nonmetropolitan research has taken place in geography, with much of the research of other disciplines being of direct geographic interest. The literature reflects the research consensus arrived at several decades ago; nonmetropolitan places are declining and have been for some time. Although evidence of a nonmetropolitan revival since about 1970 is documented, the earlier consensus of wide spread nonmetropolitan decline still exists, as evidenced by a recent article by Kovacik, who states the purpose of his paper as: ". . .to direct attention to a ubiquitous southern

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[5]Henry J. Fletcher, "The Doom of the Small Town," Forum, Vol. 19 (1895), pp. 214-223.

landscape feature, the declining small town."[6] Researchers have attributed village decline to a wide variety of factors, such as: size of village or town; distance to a larger center; suburbanization; loss of retail specialization; and lack of county seat status.

There are two basic types of nonmetropolitan studies in the literature; studies that describe the socioeconomic results of growth or decline; and, studies that attempt to isolate the processes responsible for the growth or decline of nonmetropolitan places. The actual separation of the two types of nonmetropolitan studies is difficult because even if the relationship of a variable (e.g., percent of labor force in manufacturing) can be established as it relates to the growth of a place, often it can not be proven if the characteristics of that variable are causes or effects of the town's growth.

Few authors have addressed the problem of why certain towns of similar size remain viable and grow while others decline. If the growth or viability of some small towns is mentioned, it is usually within the context of explaining why other towns have declined. For example, Beale assessed overall demographic trends in the United States. Small towns were put into a rural regional framework and spatial population trends were defined with primary emphasis on decline.[7] When nonmetropolitan growth was finally mentioned, Beale

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[6]Charles F. Kovacik, "The Declining Small Southern Town," West Georgia College Studies in the Social Sciences, Vol. XVI (June, 1977), p. 41.

[7]Calvin Beale, "Demographic Trends of the U.S. Rural Population," The Development of Rural America, George Brinkham (editor), University of Kansas Press, (1974), pp. 33-34.

stated that: "if nonmetropolitan areas can maintain the conditions that attracted and retained nonfarm population in the 1960's, the overall nonmetropolitan growth will continue to approach the national growth average."[8] No mention was made as to what the conditions of growth and population retention were during the 1960's.

Defining what population limits distinguish small towns from other nonmetropolitan places is a subjective, and often ambiguous, undertaking. The nonmetropolitan literature offers little guidance in delimiting population size boundaries for hamlets, villages, small towns, towns, and cities. Size categories for places are established in the central place literature, but the large census categories have been used most often. Not only are there conflicting size categories for towns considered in the literature, but a single author will often utilize conflicting size definitions for the various town types in different articles. Fuguitt in a 1965 paper, for example, defined a small town as a place with a population of between 1,000 and 10,000 inhabitants.[9] In a 1972 paper, Fuguitt, in studying the demographic aspects of small American towns, used an upper limit of 2,500 inhabitants for defining small towns. Not only had the size limit for a small town changed, but he used the terms small town and village interchangably in the paper's introduction.[10] In a more recent

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[8] Beale, p. 36.

[9] Glenn Fuguitt, "County Seat Status as a Factor in Small Town Growth and Decline," Social Forces, Vol. 44 (Dec., 1965), pp. 245-251.

[10] Glenn Fuguitt, "Some Demographic Aspects of the Small Town in the United States," Rural Sociology, Vol. 12, No. 2 (1972), p. 147.

paper that Fuguitt coauthored with Johansen (1975), a village was defined as a place with fewer than 2,500 inhabitants.[11] The village definition used in the Fuguitt and Johansen paper had the same upper limit as the small town definition used in Fuguitt's 1972 paper.

The importance of the size of the nonmetropolitan places being studied has also been a reoccurring theme in nonmetropolitan research. Hart and Salisbury, in attempting to identify factors influencing population change in Middle Western villages, stated that many villages had lost most or all of their central place functions, but the population of the villages had remained stable or grown. The larger places studied in the Hart and Salisbury article tended to have a greater chance for population increases over time than the smaller places.[12] Tarver and Beale, in their studies of southern nonmetropolitan towns, found that size of place was the most critical variable in the growth of a nonmetropolitan center.[13] In a 1963 article, Northam assessed the importance of size of place and changes in the towns' economic base to growth and decline.[14] Northam found

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[11]Glenn V. Fuguitt and Harley E. Johansen, "The Social Characteristics of Villages in the United States," Center for Demography and Ecology University Wisconsin-Madison, CDE Working Paper, (April, 1975),75-9, p. 1.

[12]J.F. Hart and N.E. Salisbury, "Population Change in Middle Western Villages: A Statistical Approach," Annals of the Association of American Geographers, Vol. 55, No. 1 (March 1965), pp. 140-160.

[13]James Tarver and Calvin Beale, "Population Trends of Southern Nonmetropolitan Towns: 1950-1960," Rural Sociology, Vol. 33 (1968), pp. 19-29.

[14]Ray Northam, "Declining Urban Centers in the U.S.: 1940-1060," Annals of the Association of American Geographers, Vol. 53 (1963), pp. 50-59.

that the temporal changes in the economic base of a town were relatively unrelated to population changes in the towns studied, but the original size at the beginning of the study period was an important factor in the growth of the towns. Fuguitt also recognized the importance of the size of nonmetropolitan places to their growth potential, but added spatial and temporal qualifications to the importance of town size.[15] As noted by Fuguitt, growth patterns of nonmetropolitan places not only varied according to size categories of the places, but according to what region of the United States the places were located, how far from metropolitan centers they were, and during which decade the analysis was conducted.

County seat status as an influencing factor in the growth of places has also been given considerable attention in the geographic and rural sociology literature. Researchers who have used county seat status as a determining factor in nonmetropolitan viability hypothesize that towns which are county seats will attract governmental services and become the hub of the service activities in the county. County seat towns will, therefore, have a growth advantage over other towns and central places in the county. Tarver and Beale found county seat status to be one of the least important variables associated with nonmetropolitan viability in the South, and unimportant if the towns were less than 5,000 population.[16] Fuguitt

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[15]Glenn V. Fuguitt, "The Places Left Behind: Population Trends and Policy for Rural America," Rural Sociology, Vol. 36 (Dec., 1971), p. 461.

[16]James Tarver and Calvin Beale, "Population Trends of Southern Nonmetropolitan Towns: 1959-1960," Rural Sociology, Vol. 33 (1968), pp. 19-29.

found county seat status relatively unimportant to small town growth in an earlier study.[17]

A main problem associated with the ambiguousness of studies that assess the role of county seat status as a viability factor of nonmetropolitan places is that the county is a regional unit and the county seat is a place situated in that unit. The factors and processes which affect the viability of the county seat are often portions of the larger factors affecting the viability of the county or larger unit. To understand the viability characteristics of the county seat, therefore, the forces affecting the viability of the subregion should also be understood.

While most authors have considered only one or two variables which may affect nonmetropolitan viability, Gerald Hodge utilized numerous variables in attempting to predict trade center viability in the Great Plains.[18] Hodge studied trade center viability in the Great Plains in order to understand the overall trade center system and allow for improved planning of the space-economy of the region. Change in the retail service level was Hodge's criteria for measuring trade center viability in the Great Plains. Hodge's study included the variables which occured most often in the literature, but related these variables to retail service level change. Hodge concluded that small trade centers were declining faster than large centers, but

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[17]Glenn Fuguitt, "County Seat Status as a Factor in Small Town Growth and Decline," Social Forces, Vol. 44 (Dec., 1965), p. 251.

[18]Gerald Hodge, "The Prediction of Trade Center Viability in the Great Plains," Papers of the Regional Science Association, Vol. 15 (1965), pp. 87-115.

whereas he had expected an increasing rate of decline for each successively lower rank of center the data did not corroborate his expectations. The middle group of convenience centers was declining most rapidly, especially when they were located at a distance of no more than ten miles from large centers. Beyond the ten mile proximity "zone of attrition," the decline of trade centers reduced. The data analysis indicated that the ten mile zone of decline was widening and would extend farther from the large centers in the future. Small trade centers beyond a ten mile zone, however, appeared "safe" from decline. Hodge also observed that small trade centers were spaced farther apart and large centers were spaced closer together at the end of the study period than at the beginning.

A review of the literature illustrates that nonmetropolitan viability studies have concentrated more on the relationships between selected variables which can be used to measure nonmetropolitan viability than on the actual structural relationships between viability variables which may combine to describe the processes responsible for nonmetropolitan growth and decline. Subregional viability patterns in which the nonmetropolitan places are located have often been overlooked as explanatory possibilities for the patterns of viability of specific places. Because much of the literature has not attempted to describe the interrelationships among the independent variables which constitute nonmetropolitan viability and place them into a regional and subregional framework, confusion exists as to what factors may or may not be important to the growth of nonmetropolitan places.

Definitions

Variable use of such terms as "viability," "growth," "decline," and "small town," associated with the failure of many studies to distinguish between absolute and relative growth and decline makes a comparison of research results in the literature difficult. Because of this problem, a review of the use of these terms in past research is undertaken and operational definitions for this research provided.

Viability. Webster defines viability as "the state of being able to survive under conditions of wide geographical distribution." The term viable is further defined as "being able to live;" specifically, "at the stage of development that will permit development under normal conditions."[19] Nonmetropolitan researchers have traditionally considered those towns that gained population over time to be viable and those which lost population over time to be nonviable. This implicit or explicit choice of definitional criterion for viability is very similar to Webster's definition. An interpretation problem arises, however, in determining what "wide geographical distribution" and "normal conditions" in Webster's definition mean. Problems of scale which "wide geographic distribution" refers to are common to geography. Research on nonmetropolitan places is often at the regional scale with the results aggregated up to the national scale, or at the national scale with regional differences generalized away.

The definition presented by Webster also included the phrase "under normal conditions." Since "normal conditions" may vary both

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[19] Webster's New Twentieth Century Dictionary, Unabridged, 2nd Edition New York: Collins-World Publishers (1977), p. 2035.

spatially and temporally, confusion arises in the nonmetropolitan literature because of the lack of clarification or standarization of what "normal" means.[20] Viability can, for example, be described as a continuum from towns with high population losses to high population gains (other viability surrogates can replace population change). Where a town falls along this population change continuum represents the degree to which that town is viable compared to other towns in the study. The scale of inquiry one choses bears directly on the applicability of the research results. It is because of the variations endemic to scale changes in nonmetropolitan research that confusion and differing research results emerge in the literature. Results of research may also vary from one regional study to the next simply because of the inherent differences in the two regions. Regional (and scale) differences are, therefore, a major problem that should not be overlooked in nonmetropolitan research.

The present study uses viability in a fashion similar to that just described, as a comparative measure of the growth and decline of nonmetropolitan places. Change in population, however, is not the only surrogate used for measuring viability in this study. Change in the volume of retail sales for nonmetropolitan places is also used in defining viability and is contrasted to the viability of the nonmetropolitan places as measured by population change. By using change in the volume of retail sales for towns in the study region to measure viability, the economic aspect of viability will be highlighted along with the population aspect of viability.

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[20]For example, Beale, p. 8.

Absolute Viability. The absolute viability of nonmetropolitan towns is measured by percent changes in population (1960-1970) and volume of retail sales (1963-1972) in the study area. The absolute measurement is simply the percentage change from one census enumeration period to the next. Absolute change for this study is, therefore, the percentage increase or decrease of a places population or retail sales volume over time.

Relative Viability. The relative viability of nonmetropolitan places in the study region is measured using the same surrogates as absolute change. The differences in the two measurements is that the relative viability of a place is measured relative to the viability of the census division of which it is a part. Relative viability is, therefore, based upon the change in population and retail sales for individual towns compared to the average change in population and retail sales in the entire East South Central Census Division.

Urban. The U.S. Bureau of the Census defines the urban population as those people living in: 1) places of 2,500 inhabitants or more incorporated as cities, villages, boroughs, and towns; 2) unincorporated places of 2,500 inhabitants or more; and 3) other territory, incorporated or unincorporated, included in urbanized areas.[21]

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[21]U.S. Bureau of the Census, Census of Population 1970, Vol. 1, Part 1, Section A, U.S. government Printing Office, Washington, D.C. (1970), p. x.

Rural. In all urban and rural definitions, the U.S. Census Bureau considers the population not classified as urban to constitute the rural population.[22]

Metropolitan. The U.S. Bureau of the Census defines the metropolitan population of the United States as those inhabitants living in cities of 50,000 or greater and surrounding areas--SMSA's.[23]

Nonmetropolitan. As defined by the U.S. Bureau of the Census, the nonmetropolitan inhabitants of the United States are those persons living outside of a SMSA.[24]

Size Categories. Many nonmetropolitan studies have utilized the size categories established by the United States Bureau of Census. The Census size categories are very large. At the upper end of the size category continuum, the availability of aggregate data makes their use very attractive. The Census Bureau groups nonmetropolitan places into the following population size categories: less than 500; 500-999; 1,000-2,499; 2,500-9,999; 10,000-49,000. It is this categorical breakdown of place that most researchers use. The lower size groups are small enough to allow fairly specific generalizations concerning population change in the towns studied. The two upper size categories are so large, however, that variations in the processes which influence population change may occur within the categories,

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[22]Census of Population, I, p. x.

[23]Census of Population, I, p. xiv.

[24]Census of Population, I, p. xiv.

limiting the value or reliability of the generalizations which are made concerning the factors associated with population change. The problem encountered when analyzing data from these large population categories is, or may be, one of confounding or self-cancelling factors.

In the East South Central Census Division (ESCCD) of the United States, there are 414 urban places with populations in excess of 2,500 (Figure 2). The size distribution of the 414 urban places is heavily skewed toward the smaller places; 371 (89.3 percent) of all the places have populations of less than 25,000. In order to maximize the reliability of the data analyses in this research two small size categories of nonmetropolitan places in the ESCCD were selected for analysis: 1) 4,000 to 6,000; and 2) 9,000 to 13,500 population. During the study period, there were 60 towns in the 4,000 to 6,000 size category and 43 towns in the 9,000 to 13,500 size category. The selection of these two size categories, like the defining of what constitutes a small town, is subjective. The two size categories are small enough, however, to enable specific generalizations to be made between the two size groups. The larger size category, 9,000 to 13,500, has a greater population range in order to generate enough cases for meaningful statistical comparison with the small town size group. The upper limit of both size categories is equal to one and one half times the lower limit.

Study Area

The East South Central Census Division is a four state subregion within the 16 states designated as the "South" by the United States Census Bureau. Many large areal units such as the East South Central

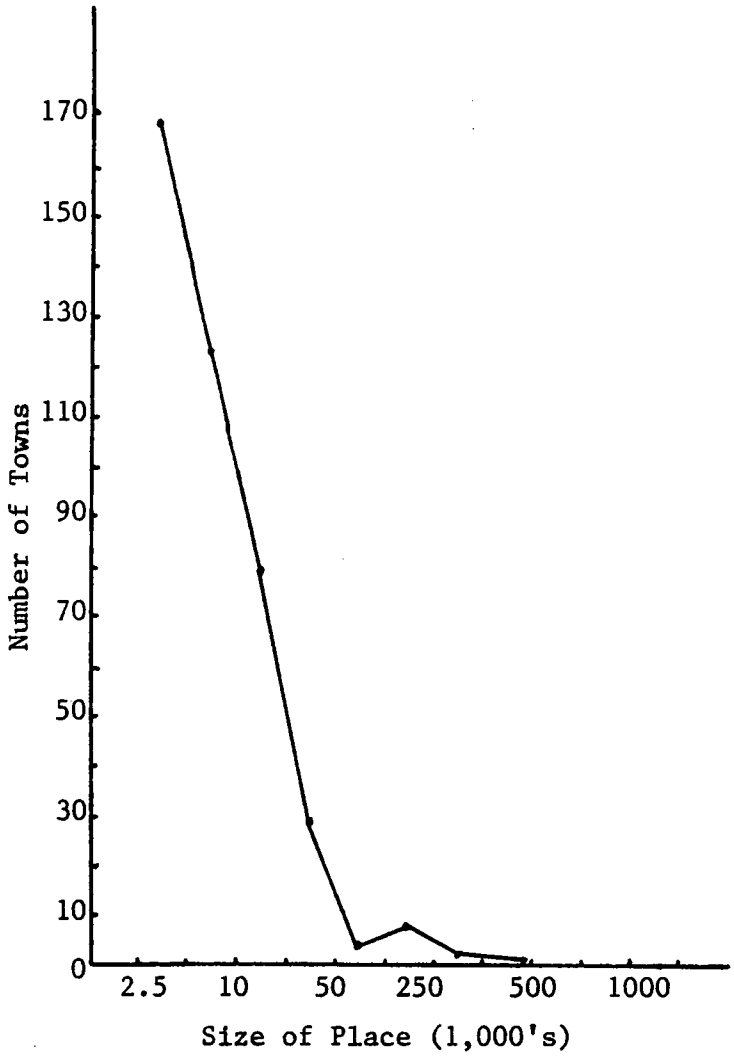

Figure 2. Frequency Distribution of Urban Places in the ESCCD

Census Division (ESCCD) present difficulties in analysis because of the physiographic, social, and economic differentiation within the region. Hart, in discussing the regional delimitation of the South by the United States Census Bureau states:

> The location of the boundaries of any region is determined by the definition of the region, and no one has or ever will be able to come up with a completely satisfactory definition of the South.[25]

Hart's statement concerning the regional delimitation of the South also holds true for the ESCCD. The ESCCD is a regionally diverse unit comprised of Mississippi, Alabama, Kentucky, and Tennessee. Topographic, economic, and cultural differences are easily discernable as one moves from the Alabama-Mississippi Gulf Coast to the Mississippi Delta and then on through the Coastal Plains, Southern Piedmont, Applachian Ridge and Valley, Appalachian Coal Fields, and finally onto the Southern Interior Uplands (Figure 3).

The ESCCD was traditionally a rural-agricultural region and the imprint left by two centuries of agricultural tradition is still present. The predominance of rural living persisted in the region until 1970. The United States' population was reported predominately urban in the 1920 census.[26] The ruralness of the population in the ESCCD varies spatially with Mississippi being predominately rural in the 1970 census.[27] The urban population of the South has been growing

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[25]John F. Hart, The South, New York: D. Van Nostrand Company (1976), p. 23.

[26]U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1970, Bicentennial Edition, Part 2, U.S. Government Printing Office, Washington, D.C. (1975), p. 102.

[27]U.S. Bureau of the Census, County and City Data Book, 1972, U.S. Government Printing Office, Washington, D.C. (1973), p. 15.

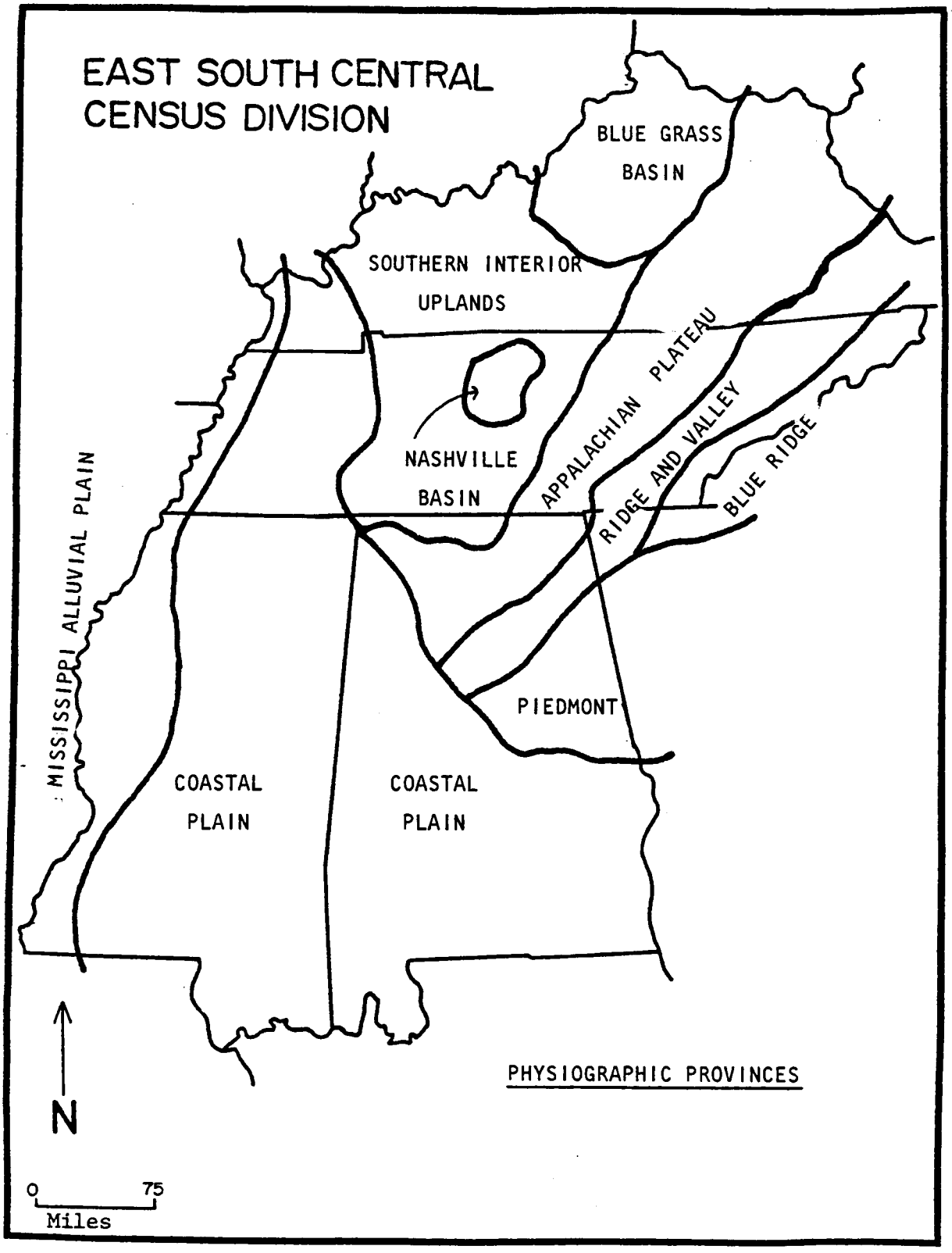

Figure 3. Physiographic Provinces of the East South Central Census Division

steadily since 1920 when only 28 percent of the population resided in urban places. By 1970, 65 percent of the South's population resided in urban places.[28] In 1970, 54.6 percent of the population of the ESCCD resided in urban places while 73.5 percent of the nation's population resided in urban places.[29]

The number of urban places in the ESCCD in 1970 illustrates the heavy concentration of inhabitans in nonmetropolitan places (Table 2). Although one can expect a large number of nonmetropolitan places in the region, the paucity of major metropolitan centers probably impedes economic development of the region. The disportionate number of small towns compared to the number of cities led Hart to characterize the South as a region of "small towns."[30]

Educational attainment, median family income, and the number of families below the low income level in the ESCCD, compared to the number of low income families in the United States, further illustrates the lagging nature of the region's economy. In 1970, the median number of school years completed by residents of the ESCCD was 10.5 years compared to 12.1 in the United States. The median family income in the ESCCD was more than 2,000 dollars lower than the nation's median family income level in 1969 ($7,166 and $9,586 respectively). While only 10.7 percent of the nations' families were

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[28]Hart, p. 16.

[29]County and City Data Book (1977), p. 3.

[30]Hart, p. 14.

TABLE 2

NUMBER OF PLACES BY SIZE CATEGORY IN THE EAST SOUTH CENTRAL CENSUS DIVISION

Size of Place	Kentucky	Alabama	Mississippi	Tennessee	Total
1,000,000 +	-	-	-	-	-
500,000-1,000,000	-	-	-	1	1
250,000-500,000	1	1	-	1	3
100,000-250,000	1	3	1	2	7
50,000-100,000	2	2	-	-	4
25,000-50,000	6	8	8	6	28
10,000-25,000	21	21	15	22	79
5,000-10,000	28	41	23	31	123
2,500-5,000	44	47	36	42	169
Total					414

Source: U.S. Burea of the Census, Census of Population: 1970, Vol. 1, Characteristics of the Population, U.S. Government Printing Office, Washington, D.C. (1973).

below the low income level in 1969, 21.0 percent of the ESCCD's families were below the low income level.[31]

The lagging nature of the economy in the ESCCD is further witnessed by the outmigration of its residents. Since many economists view migration as a personal investment, the volume of people moving from the region over a long period of time is an excellant indicator of the viability of the region's economy.[32] Long and Hansen state that between 1870 and 1950, the South experienced an almost continual outmigration of its residents.[33] During the 1920's and 1930's, 16.5 million people lived on farms in the South (more than 40 percent of the population of the entire region). By 1970, the South's farm population had declined to less than 3 million people, or about 4.7 percent of the population.[34] The number of people residing on farms in the South constituted 36 percent of the total United States farm population in 1970. Between 1960 and 1970, the ESCCD lost 48.6 percent of its farm population while the United States lost 38.3 percent.[35]

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[31]Larry H. Long and Kristin A. Hansen, "Trends in Return Migration to the South," Demography, Vol. 12, No. 4 (Nov., 1975), p. 602.

[32]Michael J. Greenwood, "Research on Internal Migration in the United States: A Survey," Journal of Economic Literature, Vol. 19, p. 397.

[33]Long and Hansen, p. 602.

[34]Hart, p. 11

[35]City and County Data Book, p. 4.

Since 1950, the outmigration from the ESCCD has slowed and many parts of the region are now experiencing population growth from in-migration. Although the region's population growth rate was only 6.3 percent between 1960 and 1970 compared to the 13.3 percent growth of the nation, the net migration rate for the region was -5.3 percent compared to the 1.8 percent rate for the nation.[36] The disparitities of the population growth rates between the ESCCD and the rest of the nation had not ended, but the rates were closer together than in previous decades.

The manufacturing employment increased in the ESCCD while the farm population and employment decreased. Prior to 1950, manufacturing employment in the ESCCD was either below or approximately equal to farming employment with the disparity between the two being greater before and during the first half of the twentieth century. In 1950, manufacturing employment represented 18.4 percent of the labor force in the ESCCD compared to 25.9 percent for the United States. By 1970, however, manufacturing employment in the ESCCD comprised 28.1 percent of the labor force opposed to 25.9 for the United States.[37] The ESCCD between 1960 and 1970, therefore, had a rapid increase in manufacturing employment. Not only did the region catch up in relation to the United States in the proportion of the labor force employed in manufacturing, but surpassed it.

The East South Central States present a unique opportunity to investigate nonmetropolitan viability because of the present and past

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[36] City and County Data Book, p. 2.

[37] City and County Data Book, 1952 and 1977, pp. 3 and 4.

trends in migration, agricultural change, and industrial growth. The "new" South, as it is often referred to, is a mixture of old and new growth patterns. Industry is relocating in the South because of the locational advantages associated with the climate and labor market. The American people, as a general rule, presently perceive the South as a favorable place to live. The images of a poor agricultural economy, slow moving people, lack of services, the Klu Klux Klan, and hot summers have given way to images of new industrial and institutional growth, opportunity (social and economic), and lower heating bills. With the increases in population and personal income in the ESCCD, nonmetropolitan places have in many instances experienced a revival of their retail functions and growth of their economy.

Although the ESCCD has experienced a nonmetropolitan revival since 1950, the reversal is not universal and the region is, therefore, a mixture of nonmetropolitan growth and decline, the old and the new. In the ESCCD, it is possible to observe and investigate nonmetropolitan places at both ends of the viability continuum; rapid growth to long term decline.

Data Sources

Primary and secondary data are used for analyses of the selected nonmetropolitan places in the study region. The primary data includes direct field observation and interviews with informed persons in selected towns. The secondary data is collected primarily from United States Census reports; but data from other state and federal agencies are also used.

The information pertaining to responses of informed persons and field observation is described at some length in a following chapter and will, therefore, be only briefly mentioned at this point. The rationale for including field work as part of the research procedure in this dissertation is to observe first hand the nature and vitality of a few small towns which are part of the study region. Impressions gleaned from direct field observation and informed person interviews are considered to be an important part of nonmetropolitan research. The justification for employing field work is well established in the geographical literature. The direct value of field work is both implicit and explicit. Questions and answers concerning nonmetropolitan viability may emerge from the field work which might otherwise be lost in the analysis of secondary data.

The secondary data for this research are collected from the following sources: U.S. Census of Population: 1960 and 1970; U.S. Census of Retail Trade: 1963 and 1972; U.S. Statistical Abstract; U.S. County-City Data: 1972; and, the Tennessee Department of Economic and Community Development. The vast majority of the data used for statistical analyses are obtained from the U.S. Census of Population and the U.S. Census of Retail Trade. The census' are used as the secondary data sources because they are the most readily available source of social and economic data for nonmetropolitan places in the United States. The availability of the U.S. Census materials has resulted in their widespread use in nonmetropolitan research, facilitating the comparison of the findings of this research to the findings of past nonmetropolitan research.

Research Goals and Methods

The primary goals of this research are:

1. To establish the extent of demographic/economic growth and decline of the nonmetropolitan places in the study region;
2. To explain and illustrate the viability patterns of the selected nonmetropolitan places in the East South Central Census Division. Viability patterns will be assessed at the regional and subregional levels;
3. To establish the relationship of selected socioeconomic and retail sales variables to the viability of nonmetropolitan places in the study region;
4. To determine the possibility of predicting the viability of nonmetropolitan places in the ESCCD using selected socioeconomic and retail sales variables;
5. Conduct field work and collect additional data in selected towns that may confirm, further refine, or add additional understanding to the viability characteristics highlighted during the previous analyses.

The five research goals outlined above facilitate the spatial analysis of nonmetropolitan viability in the two size categories of places selected. These levels of analysis are used in describing and explaining: 1) the spatial viability patterns of nonmetropolitan places within the ESCCD taken as a unit; 2) the spatial viability pattern of selected nonmetropolitan places as they relate to the physical provinces of the ESCCD; and 3) the spatial viability pattern of selected nonmetropolitan places as they relate to homogeneous economic areas based on internal labor sheds (BEA's).

The two surrogates used to define nonmetropolitan viability are population change and retail sales volume change. Population change is used as a viability surrogate because it is the traditional viability measure used in the nonmetropolitan literature. Retail sales volume change is used as a second viability surrogate because it is an economic measure of nonmetropolitan viability. The volume of retail sales is assumed to be a measure of the size of a town's tributary area and, therefore, be positively related to the population size of the town. If this is the case, towns with high population growth rates will also have high retail sales volume growth rates. This assumption is tested in Chapters 2 and 3 using correlation analyses. This assumption is based on measuring the viability of nonmetropolitan places with regard to absolute population and retail sales volume changes. Data used in these analysis comes from the U.S. Census of Population (1970) and the U.S. Census of Retail Trade (1972).

Relative changes in population and retail sales volume are measures of the individual towns' growth or decline compared to the mean growth or decline of those variables in the ESCCD. Use of the regional mean for comparison of the nonmetropolitan places, shifts the defined point for growth or decline. Because of the shift in the viability definition, the number of towns in the growing or declining categories change. The resultant viability patterns in turn change with the definitional change. It was previously stated that the relative viability of nonmetropolitan places, because of the regional comparison, was a more accurate measure of nonmetropolitan viability than absolute measures. It is hypothesized, using the regional comparison, that the relationship between relative population change

and retail sales volume change will be stronger, the higher the population increase the higher the retail sales increase, than that found using absolute measures. Associated with this hypothesis is the expectation that regional viability patterns will be more clearcut in the subregional BEA areas and/or the physiographic areas than the region taken as a whole. Correlation analyses are used to test these relationships in Chapters 2 and 3.

In order to place the 103 nonmetropolitan places into a regional and subregional framework, Chapter 2 examines selected socioeconomic characteristics at the BEA level. The population viability of the BEA's which constitute the ESCCD is examined in a similar fashion as the viability of the selected nonmetropolitan places in the ESCCD. Because individual nonmetropolitan places are linked economically to their surrounding region and are not isolated free-standing economic units, it is hypothesized that the vast majority of nonmetropolitan places studied will be growing if the BEA they are contained within is growing, and declining if the BEA is declining. This hypothesis is tested in Chapter 2. It is assumed that the spatial viability patterns of the selected nonmetropolitan places will be more closely associated with the BEA regions than with the physiographic regions. This assumption is put forward because the BEA's are homogeneous economic regions and the physical regions are not based on any economic, social, or political criteria.

After the spatial patterns of viability in the ESCCD have been examined and the relationships between population and retail sales volume change have been established, selected socioeconomic and retail sales variables for the 103 nonmetropolitan places are analyzed in an

attempt to isolate salient viability characteristics (Chapter 3). The purpose of analyzing the socioeconomic and retail sales variables is to better understand the characteristics of nonmetropolitan viability in the selected places in the study region. A series of correlation analyses are performed on eighteen independent socioeconomic and retail sales variables in Chapter 3. An explanation of the criteria used for selecting these variables, expected relationships of the variables to nonmetropolitan viability, and hypotheses are presented in Chapter 3.

One goal of this research is to see if the viability of nonmetropolitan places can be predicted given certain socioeconomic and retail sales variables. If the nonmetropolitan viability of the selected places in the ESCCD can be predicted using the eighteen independent variables presented in Chapter 3 (or a smaller number of variables), a contribution to economic development policy will be achieved. Chapter 4 uses discriminant analysis to linearly combine the salient independent variables into a discriminant function which predicts the a posteriori probability of each selected town to be growing or declining. If this section of the research is successful, it may prove to be an important preliminary step in the delimitation of target towns or areas for the allocation of state and federal economic development funds.

To complement the statistical analyses of the socioeconomic and retail sales data, several case study towns are selected in Chapter 5 for further analysis. In addition to adding to or clarifying the results of the statistical analyses results, the analysis of the case study towns will provide an opportunity to examine the relationships

discussed in the previous chapters. Field work is undertaken in the towns selected for case study in an attempt to elicit responses from informed persons as to their perceived reasons for their towns' growth or decline. Retail growth patterns and consumer shopping patterns for the case study towns will be examined to aid in the explanation of the towns retail viability. A description of the data collected and field work method is provided in Chapter 5.

CHAPTER 2

SUBREGIONAL ECONOMIC VIABILITY IN THE EAST SOUTH CENTRAL CENSUS DIVISION

Introduction

Most nonmetropolitan research efforts have not considered the viability of nonmetropolitan places within an explanatory subregional framework. By omitting the subregional viability characteristics of the study region, spatial variations of the factors related to, or associated with, the growth and decline of selected nonmetropolitan places may prove to be unexplainable or tenuous. The primary use of population change in defining whether a nonmetropolitan place is viable or not may be misleading if the purpose of the research is to examine the economic growth and decline of specific places. At the regional scale of examination, population change is generally a component of economic viability, not a total measure. To utilize population as the surrogate for viability at the town level may, therefore, be misleading. The purpose of this chapter is to examine the subregional variations of viability in the ESCCD and place the sample of nonmetropolitan places selected for further study within this subregional framework. The viability of the nonmetropolitan places sampled will be determined by the traditional population change method and by change in the volume of retail sales over time.

The most widely used method of measuring nonmetropolitan viability is absolute change of a qualifying variable, such as population or employment characteristics, over time. The viability of nonmetropolitan places can also be analyzed by comparing population

change in the places under investigation to the overall growth characteristics of the region or subregion in which they are located (i.e., their relative change). In studies concerned with overall patterns of nonmetropolitan growth, it is also possible to measure the growth of specific places in terms relative to the average growth in a given region. By using the relative growth characteristic of the nonmetropolitan places in a region, a yardstick for comparing the viability of individual towns is provided. The rank order of the towns under investigation does not change in this situation but, their individual growth characteristics can be compared to the norm of the region allowing for a different perceptual interpretation of their viability characteristics.

Subregions of the East South Central Census Division

Most nonmetropolitan studies are regional in character simply by the fact that researchers choose a sample of places to study from a particular regional unit, often a fairly large regional unit. In such studies, the economic characteristics of the region decline in importance after the initial selection of the places to be studied is accomplished. Because nonmetropolitan places are not isolated free standing economic units, their viability may be strongly linked to the viability of the region or subregion in which they reside. This dissertation uses a physiographic and economic subregional approach to analyze the spatial viability characteristics of the nonmetropolitan places selected for examination. While the subregions of the East South Central Census Division are not the primary units with which this study is concerned, they provide a framework within which to place the nonmetropolitan places selected for study.

Physiographically, the ESCCD can be divided into at least nine subregions (Figure 3, page 20). The physical provinces are important in explaining the long term historical patterns of economic development in the region, especially in the subregions which were (are) economically tied to resource base activities. For example, the viability of towns in the Appalachian Plateau may best be explained by discussing the economy of the physiographic region as opposed to the relationship of the coal regions' nonmetropolitan places to the economy of the nearest SMSA. The physical subregional delimitation may fall short, however, when explaining present economic patterns in the more urbanized areas of the region. The Coastal Plain is, for example, a fairly homogeneous physical unit. The economic differentiation of subareas in the Coastal Plain, however, may be markedly different for various cultural, political, and economic reasons. Subregionalizations based on economic similarities within the region may add an additional degree of explanation to the causes of nonmetropolitan viability within the region which would otherwise be obfuscated by the physical regionalization.

The Basic Economic Areas (BEA's) of the United States, as defined by the Bureau of Economic Analysis, United States Department of Commerce, are used in this research. The Bureau of Economic Analysis divides the United States into 173 functional BEA units centered on SMSA's, or on the largest urban center in the subregion if there is no SMSA in that area. Each BEA is a functional economic unit based on

commodity flows, commuting patterns, and retail trade patterns.[38] Since place of work and place of residence are important considerations in the delimitation of the BEA's, each BEA has an internal labor shed homogenity.[39] The criteria used in the delimitation of the BEA's are especially relevant and useful in analyzing and implementing economic development programs because a laborshed represents a real world manifestation of economic behavior.

The ESCCD is comprised (in whole or part) of twenty-two BEA's (Figure 4). Only twenty-one BEA's will be included in this analysis because none of the sample towns which were included for study are located in the Alabama county which is part of the Pensacola, Florida BEA. All other BEA regions in the study area are included for study whether or not they contain a sample town. The variation of economic viability in the twenty-one BEA's is illustrated in Table 3. By comparing the viability characteristics illustrated in Table 3 to the location of the BEA's shown in Figure 4, it becomes obvious that a significant spatial variation of socioeconomic viability patterns exists in the ESCCD. The percent of the population of each BEA residing in urban places, for example, ranges from a low of 30.2 percent in the Bristol, Virginia-Tennessee BEA to a high of 74.6 percent in the Cincinnati, Ohio-Kentucky-Indiana BEA (Figure 5). In all cases, the BEA's with the highest percentage of urban residents are located on the outward margin of the ESCCD. It is within the

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[38]Richard J. Olsen and G.W. Westley, Cumulations to OBE Areas, Oak Ridge National Laboratory, U.S. Atomic Energy Commission (December, 1974), p. 4.

[39]Olsen, p. 3.

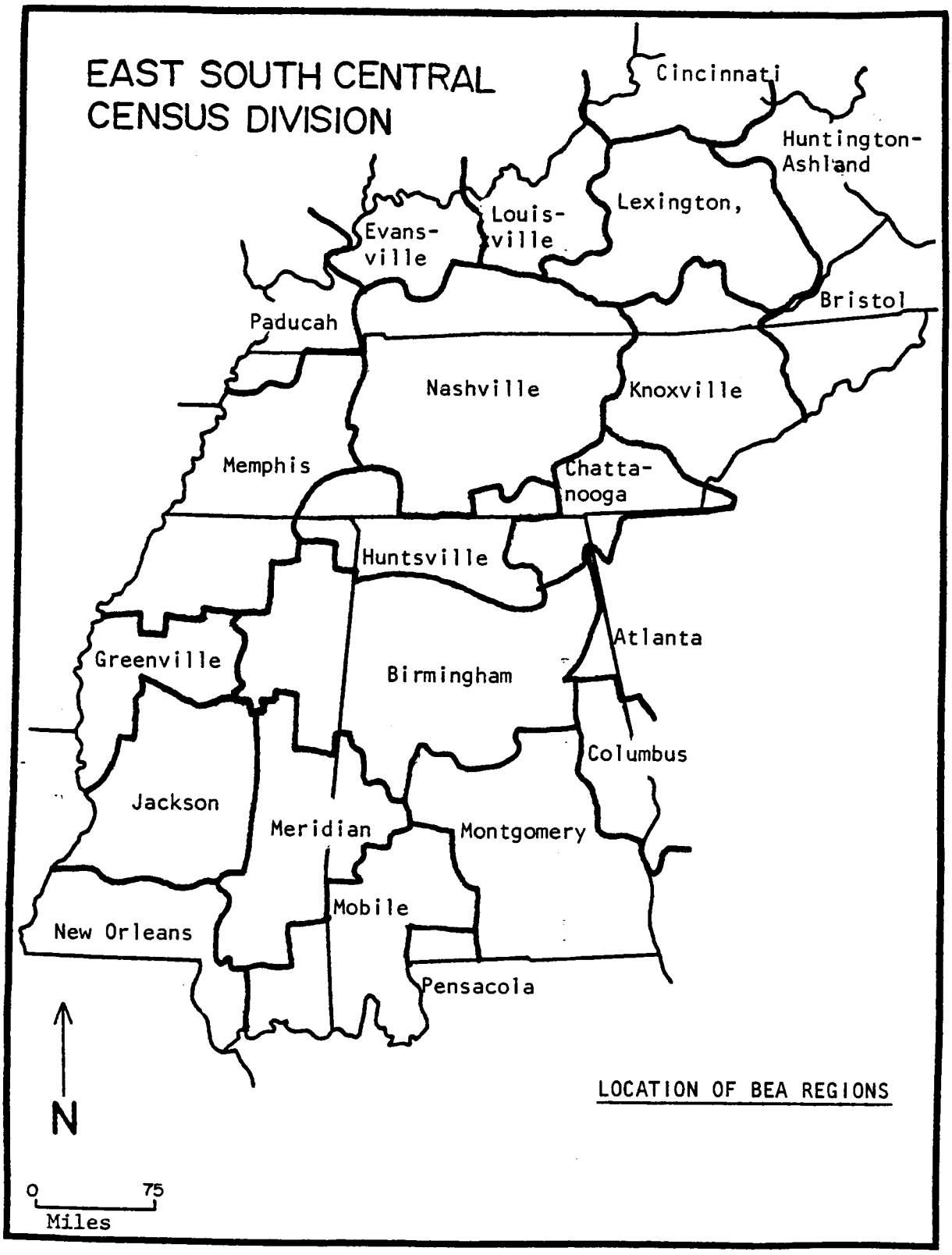

Figure 4. BEA Subregionalization of the ESCCD

TABLE 3

SELECTED CHARACTERISTICS OF BEA's

Variable Name	Location and Variable Values		
	Montgomery, AL	Birmingham, AL	Memphis, TN
Population 1970			
Population 1970	669,577	1,680,017	1,613,906
Percent Change 1960-1970	686,950	1,725,325	1,700,509
Percent Urban	2.6	2.7	5.4
Rural NonFarm Population	54.78	58.74	61.86
Education 1970			
Mean of county median school years completed	10.68	10.76	10.39
Percent completed less than 5 years of school	13.5	9.79	12.30
Percent completed high school or more	41.67	40.43	39.33
Percent completed 4 years of college or more	8.13	7.47	7.34
Labor Force 1970			
Percent of civilian labor force unemployed	3.66	4.54	5.70
Percent employed in manufacturing	23.26	30.42	25.35
Percent employed in wholesale and retail trade	18.90	19.29	20.42
Mineral Industries 1967 (number)	32	216	65
Income			
Percent of families with income less than $3,000	21.59	18.36	21.07
Percent of families with income of $25,000 +	2.08	2.23	2.62
Mean of county median income	6,664.30	7,253.62	6,977.01
Percent of families below the low income level	24.56	20.10	23.66
Per Capita money income	2,151.53	2,331.45	2,250.70
Agriculture 1969			
Total number of farms	18,320	36,047	46,079
Percent of all land that is in farms	54.38	40.47	75.99
Average Size of farms	264.03	160.35	228.76
Total value of farm products sold ($1,000)	163,863	308,131	474,013

TABLE 3 (Cont.)

Variable Name	Location and Variable Values		
	Huntsville, AL	Chattanooga, TN	Nashville, TN
Population 1970			
Population 1970	552,868	650,550	1,280,840
Percent Change 1960-1970	671,340	719,074	1,426,029
Percent Urban	24.1	10.5	11.3
Rural NonFarm Population	50.14	47.60	56.75
Education 1970			
Mean of county median school years completed	10.87	10.29	10.47
Percent completed less than 5 years of school	8.68	10.32	9.69
Percent completed high school or more	44.49	37.85	39.99
Percent completed 4 years of college or more	9.25	6.33	7.72
Labor Force 1970			
Percent of civilian labor force unemployed	5.19	3.65	3.83
Percent employed in manufacturing	30.95	41.95	28.71
Percent employed in wholesale and retail trade	17.44	16.18	18.23
Mineral Industries 1967 (number)	34	71	159
Income			
Percent of families with income less than $3,000	17.53	15.39	17.24
Percent of families with income of $25,000 +	2.44	2.03	2.55
Mean of county median income	7,848.06	7,604.49	7,447.54
Percent of families below the low income level	18.19	16.82	17.91
Per Capita money income	2,448.43	2,446.01	2,490.08
Agriculture 1969			
Total number of farms	23,231	15,407	65,594
Percent of all land that is in farms	57.26	37.47	67.13
Average Size of farms	141.23	127.34	132.80
Total value of farm products sold ($1,000)	140,948	135,185	301,485

TABLE 3 (Cont.)

Variable Name	Location and Variable Values		
	Knoxville, TN	Bristol, TN	Huntington-Ashland WV-KY
Population 1970			
Population 1970	876,239	786,862	1,422,430
Percent Change 1960-1970	904,804	762,204	1,309,983
Percent Urban	3.3	-3.1	-7.9
Rural NonFarm Population	42.36	30.20	35.42
Education 1970			
Mean of county median school years completed	10.20	9.54	10.22
Percent completed less than 5 years of school	12.17	12.60	9.35
Percent completed high school or more	38.01	33.63	38.30
Percent completed 4 years of college or more	7.53	5.85	6.02
Labor Force 1970			
Percent of civilian labor force unemployed	5.27	5.29	5.89
Percent employed in manufacturing	30.401	29.94	20.29
Percent employed in wholesale and retail trade	18.64	17.04	19.47
Mineral Industries 1967 (number)	293	782	1,639
Income			
Percent of families with income less than $3,000	21.44	19.60	19.86
Percent of families with income of $25,000 +	1.91	1.47	1.64
Mean of county median income	6,618.03	6,645.66	6,995.78
Percent of families below the low income level	23.54	21.42	21.30
Per Capita money income	2,119.59	2,119.59	2,204.28
Agriculture 1969			
Total number of farms	26,381	293.23	197.79
Percent of all land that is in farms	34.38	44.44	24.55
Average Size of farms	89.57	82.02	146.58
Total value of farm products sold ($1,000)	86,3058	80,967	52,581

TABLE 3 (Cont.)

Variable Name	Location and Variable Values		
	Lexington, KY	Louisville, KY	Evansville, IN-KY
Population 1970			
Population 1970	708,258	1,087,484	747,948
Percent Change 1960-1970	753,335	1,220,9501	771,027
Percent Urban	6.4	12.3	3.9
Rural NonFarm Population	42.28	71.46	50.62
Education 1970			
Mean of county median school years completed	9.98	11.16	11.01
Percent completed less than 5 years of school	11.57	5.49	4.93
Percent completed high school or more	37.31	44.58	44.99
Percent completed 4 years of college or more	8.73	7.98	6.13
Labor Force 1970			
Percent of civilian labor force unemployed	4.59	4.29	4.74
Percent employed in manufacturing	20.82	32.41	27.80
Percent employed in wholesale and retail trade	17.13	19.12	18.96
Mineral Industries 1967 (number)	373	77	1,107
Income			
Percent of families with income less than $3,000	22.41	10.75	14.24
Percent of families with income of $25,000 +	2.20	3.29	2.19
Mean of county median income	6,746.95	9,002.24	8,033.32
Percent of families below the low income level	24.19	11.07	13.35
Per Capita money income	2,247.06	2,861.81	2,545.38
Agriculture 1969			
Total number of farms	40,675	28,985	26,000
Percent of all land that is in farms	62.79	71.75	70.52
Average Size of farms	114.98	133.28	194.77
Total value of farm products sold ($1,000)	221,865	192,143	302,035

TABLE 3 (Cont.)

Variable Name	Location and Variable Values		
	Cincinnati, OH-KY	Paducah, KY	Springfield, MO
Population 1970			
Population 1970	1,744,122	580,891	791,307
Percent Change 1960-1970	1,889,103	558,526	830,385
Percent Urban	8.3	-3.9	4,9
Rural NonFarm Population	74.60	39.23	45.52
Education 1970			
Mean of county median school years completed	11.49	9.80	11.25
Percent completed less than 5 years of school	4.16	10.04	4.21
Percent completed high school or more	47.01	36.16	46.95
Percent completed 4 years of college or more	9.37	5.35	6.48
Labor Force 1970			
Percent of civilian labor force unemployed	3.91	5.96	4.49
Percent employed in manufacturing	33.62	23.60	23.53
Percent employed in wholesale and retail trade	19.37	20.57	21.43
Mineral Industries 1967 (number)	74	57	234
Income			
Percent of families with income less than $3,000	9.27	22.61	19.67
Percent of families with income of $25,000 +	4.14	1.78	1.77
Mean of county median income	9,845.39	6,334.58	6,568.98
Percent of families below the low income level	9.20	21.91	17.67
Per Capita money income	3,067.97	2,213.23	2,348.13
Agriculture 1969			
Total number of farms	30,024	26,750	47,851
Percent of all land that is in farms	72.31	66.40	67.57
Average Size of farms	133.66	204.11	235.27
Total value of farm products sold ($1,000)	207,425	259,684	403,442

TABLE 3 (Cont.)

Variable Name	Location and Variable Values		
	Greenville, MS	Jackson, MS	Meridian, MS
Population 1970			
Population 1970	556,184	489,061	402,076
Percent Change 1960-1970	506,552	510,415	393,068
Percent Urban	-8.9	4.4	-2.2
Rural NonFarm Population	45.31	54.11	39.73
Education 1970			
Mean of county median school years completed	9.73	11.01	10.69
Percent completed less than 5 years of school	17.15	11.00	12.27
Percent completed high school or more	34.78	46.04	40.79
Percent completed 4 years of college or more	6.62	10.26	7.14
Labor Force 1970			
Percent of civilian labor force unemployed	6.53	3.86	4.32
Percent employed in manufacturing	25.28	20.71	27.00
Percent employed in wholesale and retail trade	18.08	18.71	18.09
Mineral Industries 1967 (number)	206	160	218
Income			
Percent of families with income less than $3,000	29.76	23.16	25.59
Percent of families with income of $25,000 +	1.75	2.52	1.45
Mean of county median income	5,394.23	6,710.22	5,849.02
Percent of families below the low income level	34.00	26.99	29.31
Per Capita money income	1,777.02	2,108.34	1,893.79
Agriculture 1969			
Total number of farms	12,439	14,893	15,045
Percent of all land that is in farms	50.06	56.15	37.65
Average Size of farms	372.46	249.30	175.67
Total value of farm products sold ($1,000)	223,322	175,524	77,770

TABLE 3 (Cont.)

Variable Name	Location and Variable Values			
	Mobile, AL	New Orleans, LA	Columbus, GA-AL	Atlanta, GA
Population 1970				
Population 1970	664,860	1,884,489	462,051	1,793,931
Percent Change 1960-1970	724,148	2,148,608	488,069	2,296,712
Percent Urban	9.0	14.0	5.6	28.0
Rural NonFarm Population	65.26	70.05	66.17	64.34
Education 1970				
Mean of county median school years completed	11.13	10.87	10.59	11.15
Percent completed less than 5 years of school	9.16	10.75	13.24	8.36
Percent completed high school or more	44.52	43.77	39.35	44.70
Percent completed 4 years of college or more	7.51	9.58	8.37	11.25
Labor Force 1970				
Percent of civilian labor force unemployed	4.97	5.17	3.83	2.90
Percent employed in manufacturing	26.13	17.23	32.87	27.00
Percent employed in wholesale and retail trade	19.52	21.03	17.32	20.59
Mineral Industries 1967 (number)	45	1,151	17.00	58.00
Income				
Percent of families with income less than $3,000	16.77	17.11	14.85	10.91
Percent of families with income of $25,000 +	2.03	3.29	2.04	4.28
Mean of county median income	7,355.65	7,961.34	7,118.66	9,374.82
Percent of families below the low income level	19.94	19.90	21.12	12.15
Per Capita money income	2,257.71	2,457.27	2,282.19	3,031.26
Agriculture 1969				
Total number of farms	8,077	18,975	5,8224	22,551
Percent of all land that is in farms	25.69	32.50	37.78	33.42
Average Size of farms	221.37	218.81	281.35	144.30
Total value of farm products sold ($1,000)	58,209	174,934	69,944	308,131

Source: Olsen, Cumulations to OBE Areas (1974).

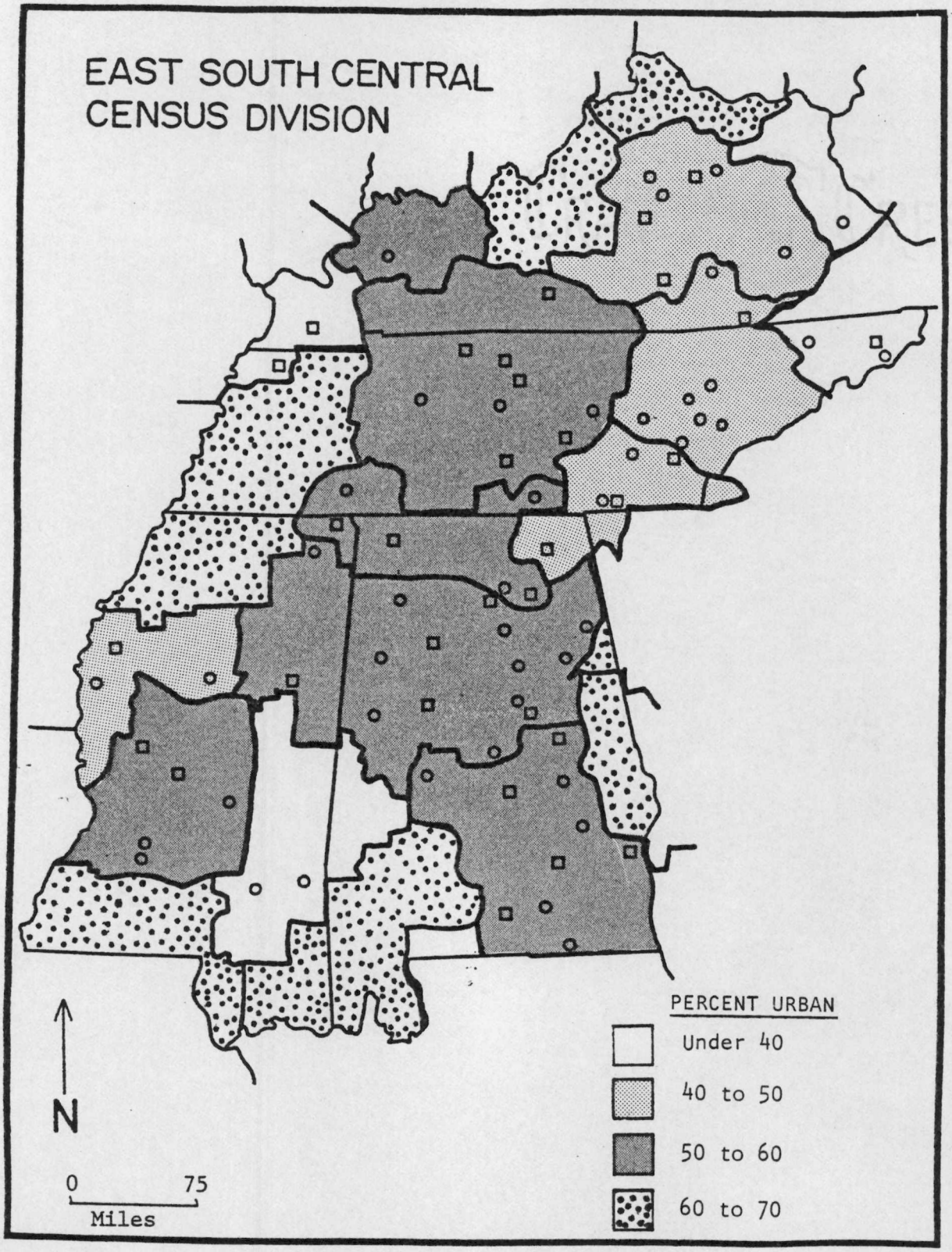

Figure 5. Characteristics of BEA's

BEA's with the highest percentage of urban residents that population growth in the ESCCD was the greatest between 1960 and 1970. Furthermore, all the BEA's with less than 50 percent of their residents residing in urban places declined in population between 1960 and 1970 (Figure 5). The remaining three variables listed in Figure 5 indicate a variety of relationships to percent population change 1960-1970 and percent urban resident in 1970 in the twenty-one BEA's. There appears to be a strong positive relationship between education, family income, and unemployment levels in the BEA's which have declining populations and low percentages of urban residents. This can partially be explained by large numbers of the most capable inhabitants of the rural BEA's migrating to urban areas in search of better social and economic opportunities. A major cause of regional outmigration may be the lack of economic opportunities, in the form of adequate paying jobs. In this situation, the best educated, younger portion of the population leaves. Of the people left, many are poorly educated, and either underemployed or unemployed. The BEA's which are intermediary between high and low percentage of population change and residents residing in urban places are the most difficult cases to postulate relationships between viability and the education, employment, and income variables (Figure 5, and Table 2, page 22). These BEA's are difficult to categorize and explain because the old agrarian or decline patterns are interspersed with new patterns which are pulling the area into the urban era. The BEA's with high population gains (1960-1970) and high numbers of urban residents

(1970), generally have more educated residents, less unemployment, and higher median family incomes.

From the relationships described above, it is expected that in the following chapters the sample of nonmetropolitan places in the BEA's will exhibit similar viability--socioeconomic relationships as were found at the BEA level. The BEA's with declining populations and high percentages of rural residents will have high concentrations of declining nonmetropolitan places. Furthermore, it is expected that the BEA's with high population growth rates and a high percentage of urban residents will have more viable nonmetropolitan places than the rural BEA's. Because distance, in the form of commuting patterns and commodity distribution, is part of the BEA delimitation, an examination of the distance viability relationships between the selected nonmetropolitan places and larger places is undertaken.

Relationship Between Nonmetropolitan Viability And Distance to Larger Places

Distance between nonmetropolitan places and larger nonmetropolitan and metropolitan places is important to the delimitation of BEA units. A distance-decay function affecting labor sheds and wholesale-retail distribution patterns, is assumed in the theoretical justification of BEA units. The importance of proximity of nonmetropolitan places to larger places as a growth stimulus is also an integral part of modern economic theory. Growth pole strategies argue that regions with lagging economies will benefit by spending money and energy on carefully selected growth centers within

the region.[40] The implications of the growth pole theory are that as the growth pole develops economically, the surrounding region will at some point begin to enjoy the spillover effects of the favorable economic growth the growth pole is experiencing. The concepts of growth pole strategies are inherently spatial in nature. Places closest to the growth pole should benefit before places at greater distances from the center. The spatial diffusion of economic growth from the growth pole is similar to the traditional theories of economic growth based on the heartland-hinterland (core-periphery) relationship. The mechanism which stimulates economic growth in both the heartland-hinterland relationship and the growth pole theory is the regional system linked by export-base multipliers.[41] Growth, in the context of growth pole theory, filters outward from metropolitan regions (heartland) to nonmetropolitan regions (hinterland). In the framework provided by growth pole theory, one can expect those nonmetropolitan places closest to larger population centers to be growing fastest. This idea is, however, not linked solely to growth pole theory. Northam, in 1963, postulated that distance to larger urban centers was a primary factor in the growth of smaller places in the United States.[42]

Berry has suggested that since World War II a change has occurred

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[40]Niles Hansen, "Criteria for a Growth Center Policy," Regional Policy: Readings in Theory and Applications, J. Friedmann and W. Alonso (Editors), Cambridge, Mass.: MIT Press, (1975).

[41]Brian J. L. Berry, Growth Centers in the American Urban System, (Cambridge, Mass.: Ballinger Publishing Company, 1973), p. 8.

[42]Northam, "The Places Left Behind," p. 12.

in the nature of economic growth that no longer stresses the core-periphery relationships of growth, but the importance of . . . "service industries in the traditional tertiary and modern quarternary sectors."[43] Growth in the spatial system that Berry suggests is not externally induced as in earlier classical theories. In Berry's model of growth, such things as transportation networks, communication networks, accessibility, services, and retail specialization--factors which might loosely be called amenity resources--become the impetus for growth within a region. The periphery in this model is the lagging-outlying area surrounding the towns at distances too great to immediately share in the prosperity of the urban growth centers. Distance to large (prosperous) centers is, therefore, an important factor in the growth of smaller places.

To test the relationship between population change/retail sales change and distance to larger places in the ESCCD correlation analyses are used. Distances from the 103 towns selected for study to larger places are measured by straight line distances between points (Figure 6). Straight line distance between the study towns and larger places was preferred to road mileage and travel time because of the uncertainty associated with the standardization of these measures. The problem associated with determining accurate travel times between two points is one of standardizing measurements. Actual road mileage between two points has the added drawback that difficulty in travel and travel time are excluded leaving the distance-decay function between points questionable. Although straight line distances do not

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[43]Berry, p. 8-9.

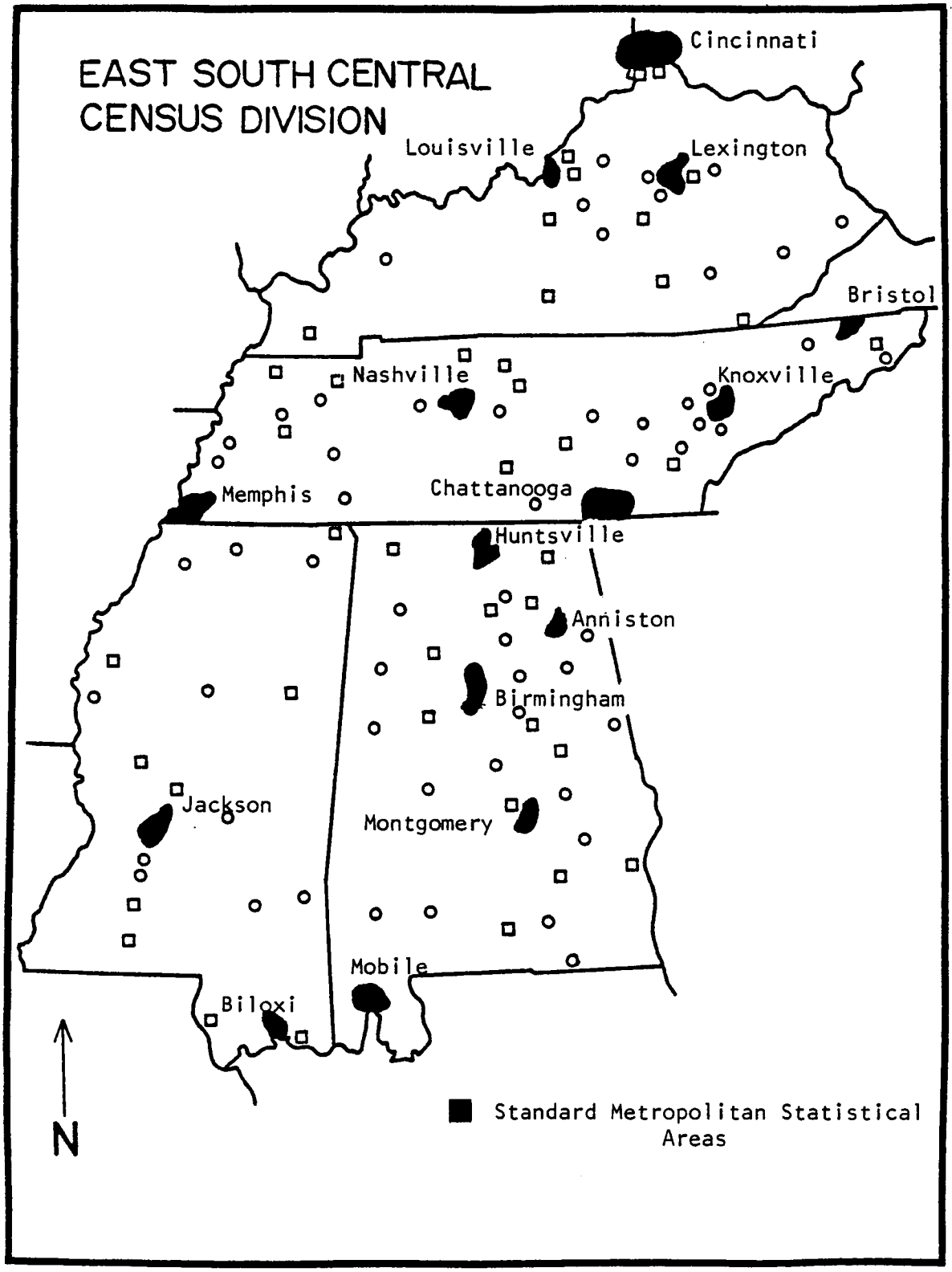

Figure 6. Location of SMSA's Relative to Selected Towns in Study Region

incorporate the real life effects of distance and travel time, it is felt that this standard measure of distance is the most expedient method of measuring the relationship between distance to larger places and viability. If a situation occurs in which a SMSA is closer to the nonmetropolitan place being considered than to a place of 20,000-49,000, the distance to the SMSA is used for the computation of both correlation coefficients. This method is employed because economic theory states that rational economic behavior is a function of time (travel time) and cost (cost in time and energy). Rational behavior would, in this situation, dictate shopping at the closer-larger place. The results of the correlation analyses testing the distance-viability relationship are shown in Table 4. Four correlation analyses were performed using percentage change in population (1960-1970) and retail sales volume (1963-1972) in determing the relationship of town viability to distance to places of 20,000-49,000 and over 50,000 population. All of the correlation coefficients (r) were less than r=.30, indicating a very weak relationship between viability and distance to nearest larger place.

An explanation for the weak viability-distance relationship is that in the East South Central Census Division the heartland-hinterland relationship has not greatly diminished, at least at the time the data were collected. The Southeastern region of the United States was considered a lagging region through the 1960's. In this situation, one would expect to see primary activities still an important element in the regional economy. While this is at least partially the case in the study region, there was, during the study

TABLE 4

Correlation Analyses of Town Viability
and Distance to Larger Places

	Distance to Nearest Town of 20,000-49,000	Distance to Nearest Town Larger to 50,000
Percent Pop. Change 1960-1970	r=.27	r=.24
Percent Retail Sales Change 1963-1972	r=.14	r=.19

period considerable industrial, business, service and retirement relocation in the area. Perhaps the location of these economic sectors of the economy had not been of long enough duration for the filtering of the economic growth benefits to reach outside of the major growth centers.

Absolute Viability

In the East South Central Census Division, there are 103 towns and cities in the size categories of 4,000-6,000 and 9,000-13,500 (Figure 2, page 18). In absolute terms, between 1960 and 1970, twenty of the 103 towns (19.4 percent of the total) lost population. The average population change for the towns studied was a 21.3 percent increase in population with a range of -8.4 to 182.7 percent (Table 5, Figure 7).

No strong spatial pattern of growing and declining towns (measuring viability in absolute terms) emerges at the BEA level of investigation. The largest number of sample towns declining in any BEA is two (Figure 7). One explanation for the uninterpretable pattern of declining towns is the small number of towns (20) which declined in absolute terms. There is, however, one area where a slight concentration of declining towns is apparent; the area of the Birmingham and Montgomery BEA's (area 1). This concentration of declining towns roughly coincides with the physiographic delimitation of the Southern Piedmont Province (Figure 3, page 20). The Southern Piedmont is an area that has experienced outmigration and agricultural decline. If one further superimposes the absolute viability patterns of the selected nonmetropolitan places in the ESCCD on the regional physiographic map (Figure 3, page 20) an additional area of declining

TABLE 5

Percentage Change in Population and Retail Sales
For Towns and Cities in the Study Area

Town	Population 1970	% Changes Population 1969-70	% Changes Retail Sales 1963-72
	Alabama		
Arab	4399.	47.2	123.1
Childersburg	4831.	-1.1	21.0
Clanton	5868.	3.3	46.5
Elba	4634.	7.2	33.4
Fayette	4568.	8.1	69.5
Geneva	4398.	14.5	53.2
Haleyville	4134.	10.5	104.1
Jackson	5957.	20.1	64.7
Marion	4289.	12.7	19.6
Monroeville	4846.	33.4	51.4
Oneonta	4390.	6.1	33.3
Oxford	4361.	21.0	450.7
Pell City	5381.	29.2	103.1
Piedmont	5063.	5.6	32.6
Pleasant	5090.	64.4	378.9
Roanoke	5251.	-0.7	35.7
Tallassee	4809.	-2.5	546.6
Union Spring	4324.	16.7	79.9
Albertville	9963.	20.8	133.5
Andalusia	10092.	-1.7	45.3
Eufaula	9102.	8.9	73.7
Jasper	10798.	0.0	87.1
Nortport	9435.	79.9	87.4
Scottboro	9324.	44.6	115.3
Alexander City	12358.	-6.0	24.7
Cullman	12601.	15.8	36.4
Prattville	13165.	98.2	181.2
Sheffield	13115.	-2.8	19.7
Sylacauge	12255.	-4.7	34.6
Troy	11482.	12.2	71.5
	Mississippi		
Booneville	5895.	69.4	51.9
Crystal Springs	4180.	-7.0	69.4
Ellisville	4643.	1.1	30.7
Forest	4085.	4.3	46.0

TABLE 5 (Cont.)

Town	Population 1970	% Changes Population 1969-70	% Changes Retail Sales 1963-72
	Mississippi (cont.)		
Hazelhurst	4577.	34.6	23.2
Holly Spring	5728.	1.9	72.9
Leland	6000.	-4.7	-10.2
Senatobia	4247.	30.3	97.6
Yanesboro	4368.	12.2	34.4
Winona	5521.	28.9	62.2
Ocean Springs	9580.	90.6	267.5
Brookhaven	10700.	8.2	32.9
Canton	10503.	8.2	52.0
Picayune	10467.	33.6	75.0
Cleveland	13327.	31.0	23.1
Corinth	11581.	1.1	58.5
McComb	11969.	-0.4	76.6
Starkville	11369.	25.7	81.9
Yazoo	11688.	4.0	06.7
	Kentucky		
Bardstown	5816.	21.2	49.7
Elsmere	5161.	12.0	50.5
Hazard	5459.	-8.4	64.9
Lebanon	5528.	14.9	14.4
London	4337.	7.5	66.9
Ludlow	5815.	-6.7	-02.3
Mt. Sterling	5083.	-5.3	45.5
Nicholasville	5829.	36.4	31.9
Pikeville	4576.	-3.7	29.9
Providence	4270.	13.2	57.0
Shelbyville	4182.	-7.6	34.3
Versailles	5679.	39.9	23.5
Jeffersontown	9701.	182.7	122.1
Mayfield	10724.	-0.4	29.4
Somerset	10436.	46.7	140.1
Danville	11542.	28.1	15.9
Elizabethtown	11748.	21.9	115.5
Erlanger	12676.	79.2	136.0
Florence	11661.	99.8	389.3
Glasgow	11301.	12.2	33.7

TABLE 5 (cont.)

Town	Population 1970	% Changes Population 1969-70	% Changes Retail Sales 1963-72
	Tennessee		
Middlesboro	11878.	-5.8	63.3
St. Matthews	13152.	50.5	290.8
Winchester	13402.	31.6	00.0
Clinton	4794.	-3.0	93.0
Covington	5801.	9.5	44.0
Crossville	5381.	15.3	73.9
Dayton	4361.	24.6	48.2
Dickson	5665.	12.7	93.2
Erwin	4715.	46.9	83.2
Jefferson City	5124.	12.6	23.7
Lenoir City	5324.	6.9	61.5
Lexington	4955.	25.7	81.5
McKenzi	4873.	28.9	41.6
Riply	4794.	26.8	20.4
Rockwood	5259.	-1.6	72.3
Rogersville	4045.	29.6	-86.4
Savanna	5576.	29.2	55.9
Signal Mtn.	4839.	41.8	20.6
Smyrna	5698.	57.8	59.8
Sparta	4930.	9.3	59.2
Sweetwater	4340.	4.7	62.7
Trenton	4226.	0.0	-03.2
Winchester	5211.	9.5	26.1
McMinnville	10662.	18.3	78.2
Paris	9892.	6.1	100.8
Springfield	9720.	5.4	44.6
Athens	11790.	-2.6	57.3
Elizabethton	12269.	12.7	56.5
Gallatin	13093.	1.0	107.8
Shelbyville	12262.	15.2	33.1
Humboldt	10066.	18.7	33.0
Lebanon	12492.	18.8	56.5
Red Bank	12715.	18.0	79.0
Union	11925	34.9	37.7

Source: U.S. Census of Population, 1970; U.S. Census of Retail Trade, 1972.

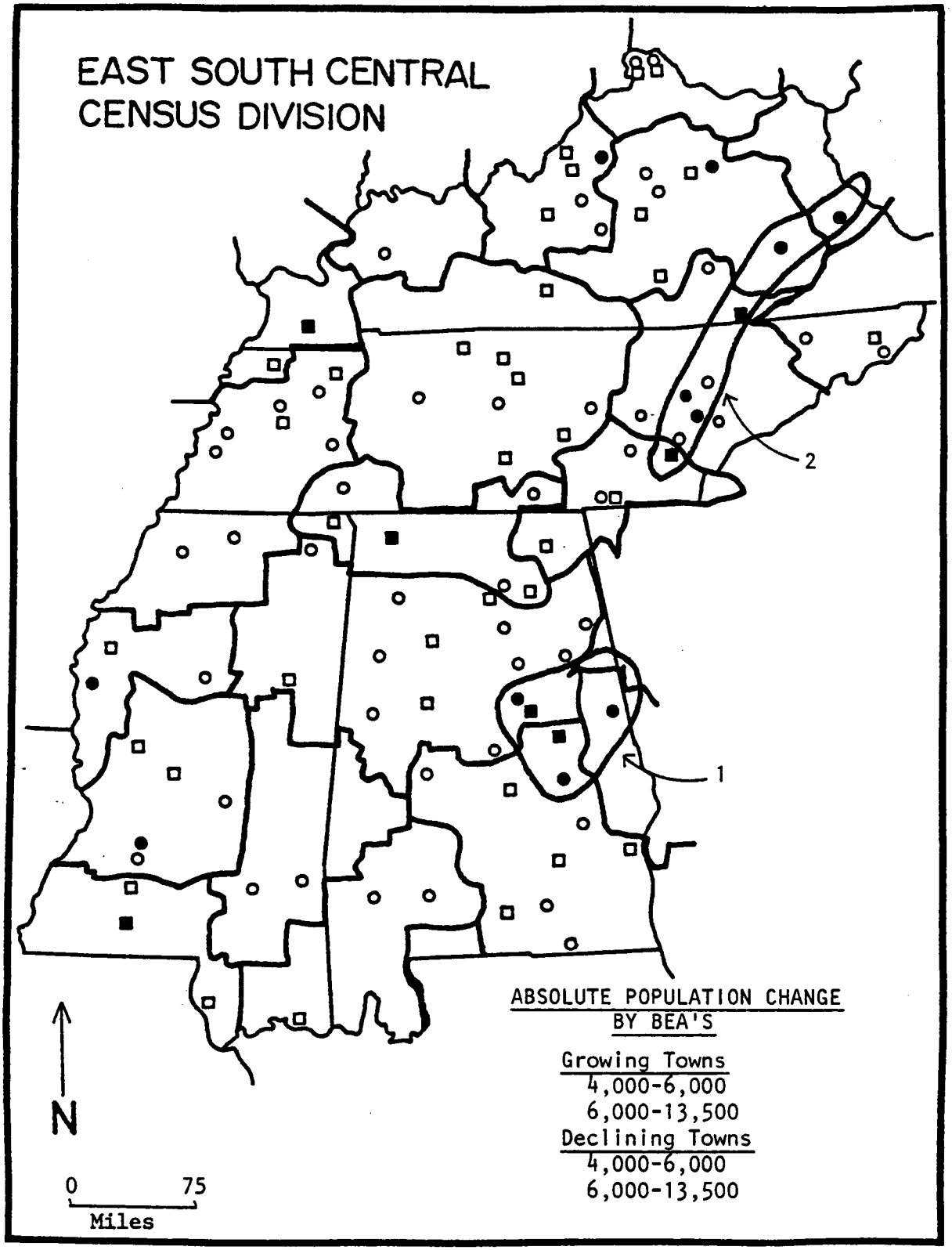

Figure 7. Absolute Population Change Patterns of Places by BEA Region

towns, within the Appalachian Plateau, emerges (area 2). Hazard, Pikeville, and Middlesboro, Kentucky, declining towns, are within the coal area of the Applachian Plateau Province, which during the study period was depressed.

The viability of nonmetropolitan places has more than a demographic dimension. Fuguitt attributed the focus of academic and governmental efforts on rural problems over the last several decades to a general increase in awareness of such socioeconomic issues as poverty, race, environment, and the problems our large cities have experienced.[44] While population change is an important element of these problems, economic aspects are equally important and should not be overlooked. If one can accept the premise that towns exist to offer goods and services to local and surrounding populations, it follows that a town's viability can, and possibly should, be measured by economic factors. A method of measuring the economic viability of a town is by temporal changes in its volume of retail sales.

Several technical problems arise when using retail sales data. First, retail data are more difficult for the researcher to collect because it is not as assessible as other types of socioeconomic data. The most easily accessible source of retail data is the U.S. Bureau of the Census. Unfortunately for temporal comparability, the Retail Census and the Population Census are published in different years. Although the difference in the publishing times of the two Census' means they are not strictly comparable, the difference is not great

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[44]Glenn Fuguitt, "Places Left Behind: Population Trends and Policy for Rural America," Rural Sociology, Vol. 36 (Dec., 1971), pp. 449-450.

enough to make comparisons meaningless. Second, inflation of the dollar over time means data from one retail census to the next are not strictly comparable. For this study, inflation differences between the 1963 and 1972 retail census years were compensated for by the use of Consumer Price Indices which adjust the data to constant dollars for the base year 1967.[45]

Adjusting the retail sales volume changes to constant dollars involves separate adjustment factors for the two collection years. The first set of adjustments are based on the assumption that the dollar value in 1967 is equivalent to 0.917 of the value of the 1963 dollar. Total sales volume for each town and the sales volume for nine functional classifications of retail sales establishments are divided by 0.917 to adjust the 1963 data to 1967 dollar equivalents. The 1972 sales figures are adjusted by dividing the 1972 amounts by 1.253 for conversion to 1967 dollar equivalents.

Using percent change in the volume of retail sales as the surrogate for absolute viability in the study area, only four of the 103 towns (3.9 percent of the total) declined (Figure 8). Not only did the percentage of towns defined as declining decrease, but two of the towns that declined, according to their level of retail sales, had not declined in population between 1960 and 1970. As illustrated by Figure 9, with only four declining towns, there is no spatial clustering of declining towns with respect to BEA Regions. There is also no clustering according to physiographic provinces. Only two

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[45] U.S. Statistical Abstract, U.S. Bureau of the Census (1976, U.S. Government Printing Office, Washington, D.C.

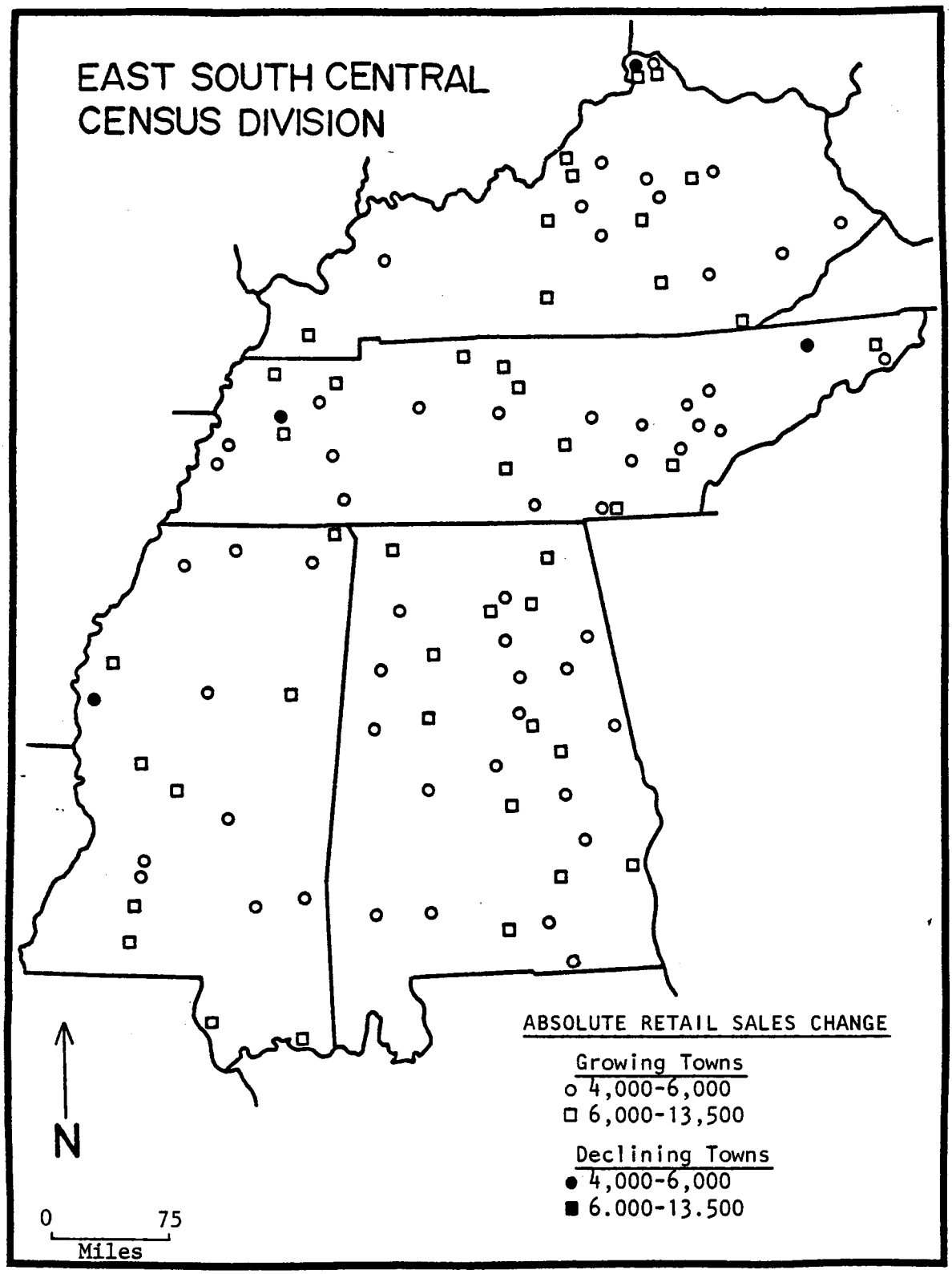

Figure 8. Absolute Retail Sales Change of Towns in Study Region

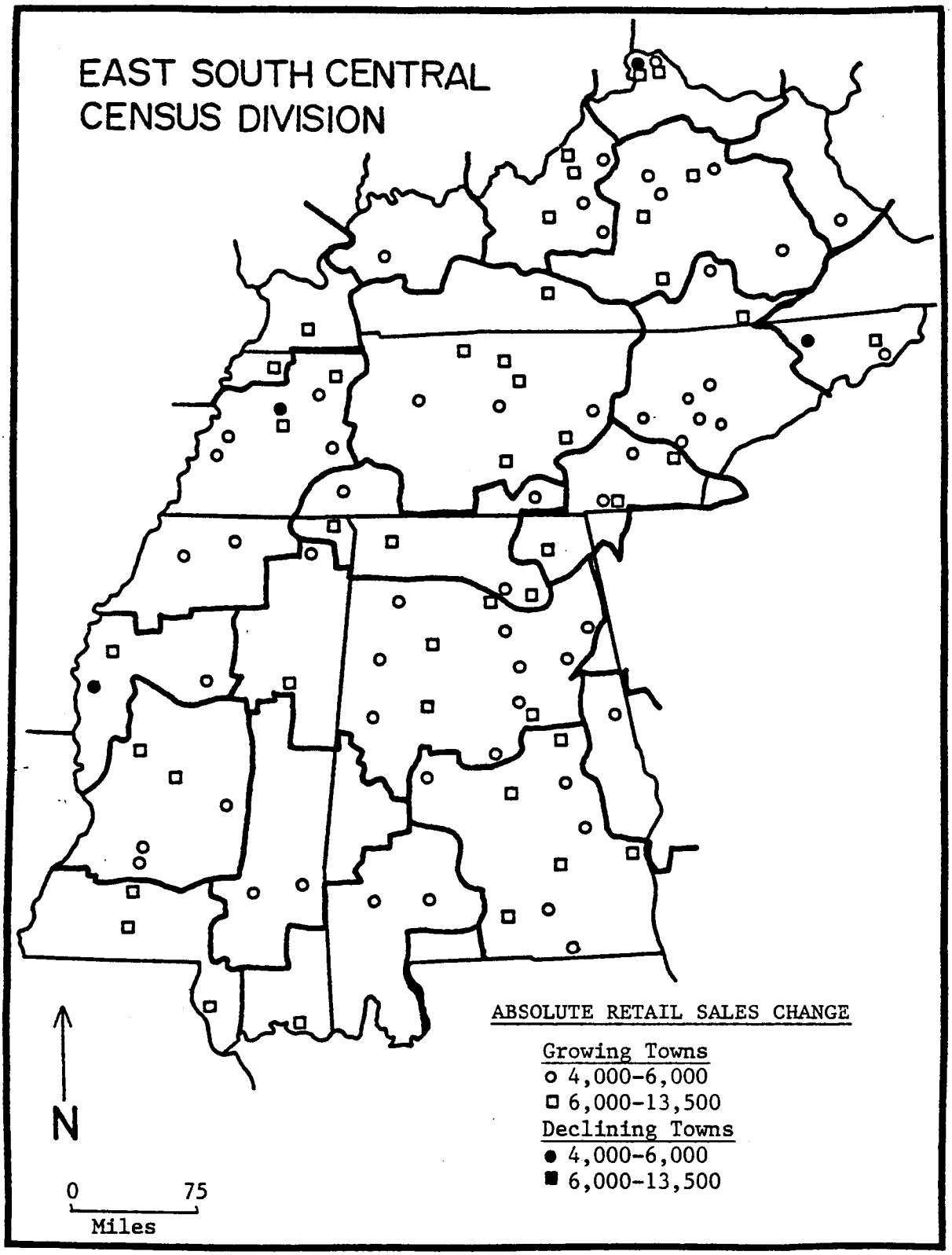

Figure 9. Absolute Retail Sales Change, Patterns of Places by BEA Region

towns had corresponding decline characteristics using population and retail sales data. The average change in the volume of retail sales for all of the 103 sampled towns was a 75.8 percent increase with a range of -86.4 to 546.6 percent (Table 5).

Relative Viability

Up to this point, the viability of nonmetropolitan places in the two size categories selected for study in the East South Central Census Division has been evaluated according to absolute growth or decline in population and retail sales. By using the same variables as in the absolute viability analysis different patterns of nonmetropolitan viability emerge if growth and decline are defined by changes relative to the region's change (Figures 10 and 11). The importance of interregional differentation has been recognized in previous studies. Beyer's, for example, found interregional differences when he examined income and employment characteristics in the United States.[46] Beyers attributed variations in income increases in the United States to the fact that different regions at the beginning of the study period lagged behind other regions in average personal income. During the study period, the regions which lagged behind (the Southeast was one lagging region) at the beginning of the period gained ground relative to the regions which initially had higher personal incomes. Increases in basic industries did not necessarily accompany the increases in personal income. The same type of situation may well be operative at the intraregional scale in the

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[46]William B. Beyers, "Contemporary Trends in the Regional Economic Development of the United States," Professional Geographer, Vol. 31, No. 1 (Feb., 1979), pp. 34-44.

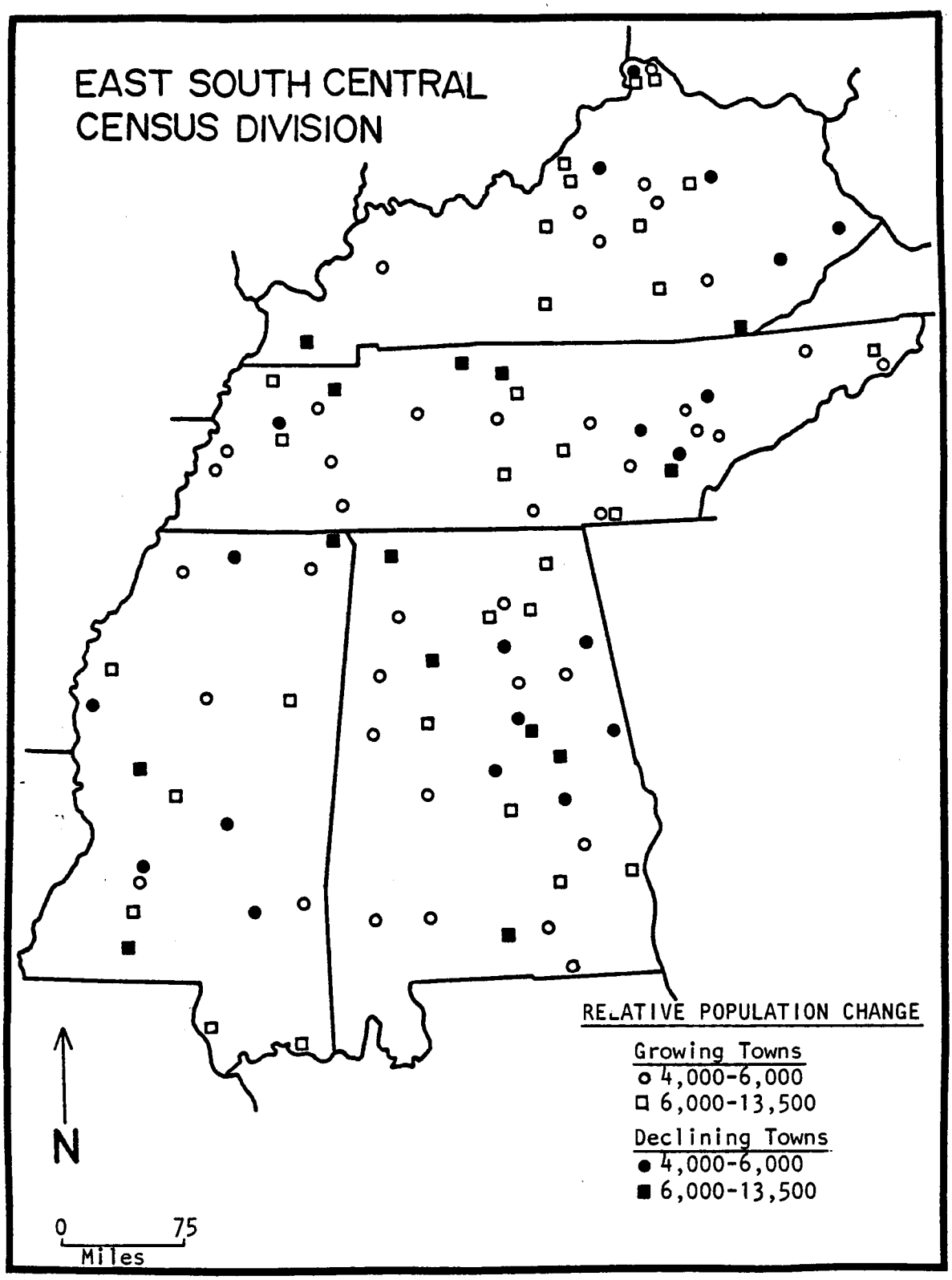

Figure 10. Relative Population Change of Towns in Study Region

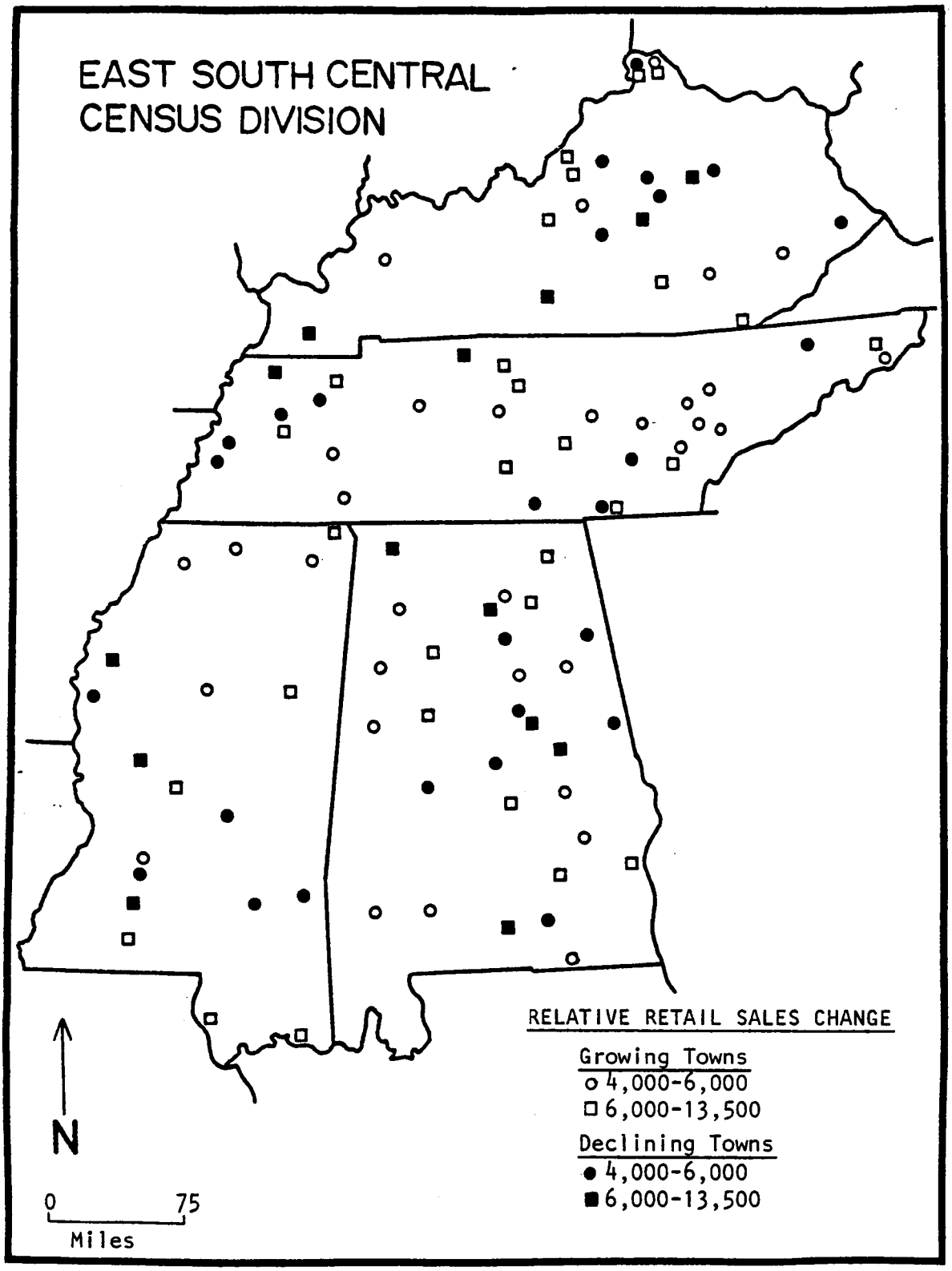

Figure 11. Relative Retail Sales Change of Towns in Study Region

East South Central Census Division. Certain towns in which personal income was low at the beginning of the study period may have gained relative to the region without necessarily catching up.

The average population change between 1960 and 1970 for the four state study region was a 6.3 percent increase. Using the 6.3 percent change in population as the relative cutoff between growth and decline, 34 of the 103 towns (30.1 percent) declined (Figure 11). With regard to relative decline in retail sales, a still different pattern of viability emerges. In the study region, the average retail sales volume growth was 49.15 percent. In relative terms, 43 of the 103 (42.2 percent) nonmetropolitan places studied declined in volume of retail sales (Figure 12). This is also a much higher rate of decline than those derived either by an absolute population or retail sales change (Table 6).

Although it is difficult to establish clearcut relative regional viability patterns for the sample towns in the ESCCD, several general spatial patterns emerged. The BEA's which contain a cluster of towns growing in relative population are the Lexington and Louisville, Kentucky BEA's (area 1, Figure 12). The Montgomery and Birmingham, Alabama BEA's contain a cluster of declining towns (area 2, Figure 12). All the BEA's that contained a high number of towns which were growing relative to the region, except the Lexington, Kentucky BEA, had over 50.0 percent urban residents in 1970. The two BEA's which had the highest gains in population of the four from 1960 to 1970, Mobile and Louisville, also had the highest percentages urban residents in 1970. The Lexington, Kentucky BEA which had the lowest

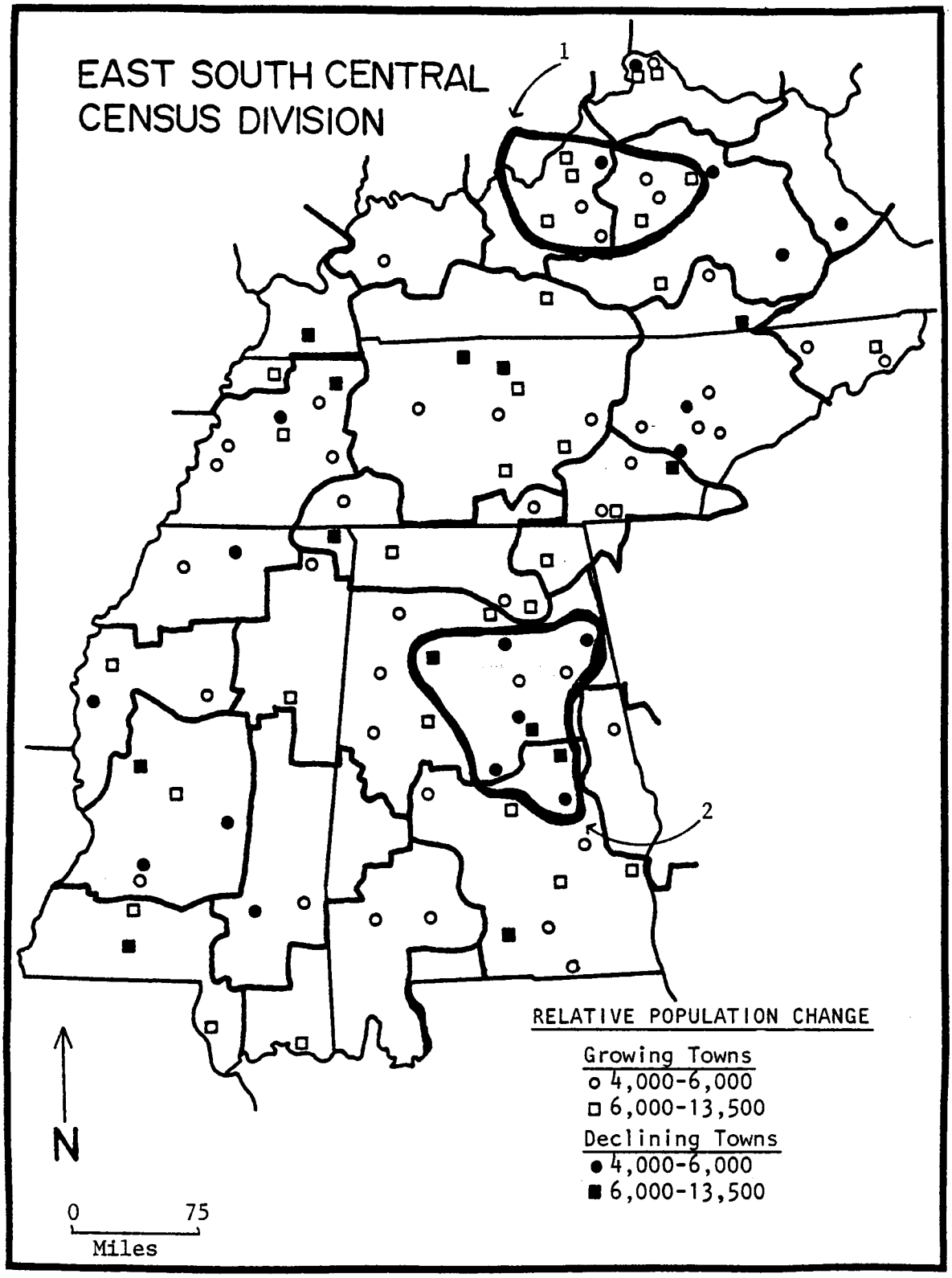

Figure 12. Relative population Change of Places in BEA Regions

TABLE 6

VIABILITY AS MEASURED BY ABSOLUTE AND RELATIVE CHANGE

	Absolute Change (no. and percent)	Relative Change (no. and percent)
Growth by Population Change	83 80.6%	69 69.9%
Decline by Population Change	20 29.4%	34 30.1%
Growth by Retail Sales Change	99 96.1%	60 51.8%
Decline by Retail Sales Change	4 3.9%	43 42.2%

percent urban residents of the four BEA's had the highest value of farm products sold in 1969. The Bluegrass Basin, in which most of the Lexington BEA is located, is an area of prime agricultural land. Property values in the Bluegrass Basin are sufficiently high that agriculture and associated activities have not declined over time, but have actually impeded other types of economic growth. As farms became larger and more mechanized, displaced farm workers left the region causing population decline in certain districts, but increase in nearby towns. There still remained, however, a large number of rural inhabitants. The Mobile, Alabama BEA with one of the highest percentages of urban residents of the four BEA's had the lowest value of farm products sold (Table 2, page 22). The Mobile, Alabama BEA was also the only BEA of the four with a higher average rate of unemployment (1970) than the ESCCD.

The Birmingham, Alabama and Jackson, Mississippi (areas 2 and 3) BEA's contain at least partial clusters of towns which declined with respect to relative population change (Figure 12). Both of these BEA's had smaller population growth rates than the ESCCD as a whole. The Birmingham and Jackson BEA's, however, did have greater than 50 percent of their residents residing in urban places in 1970. Both BEA's also had high percentages of families below the low income level (1970) and relatively high values of farm products sold (1969).

If the spatial pattern of relative population change in the selected ESCCD towns is superimposed on the physiographic regionalization of the ESCCD, additional clustering occurs (Figure 13). The declining towns in the Birmingham, Alabama BEA fit rather nicely into the Southern Piedmont region with less mixing of viability

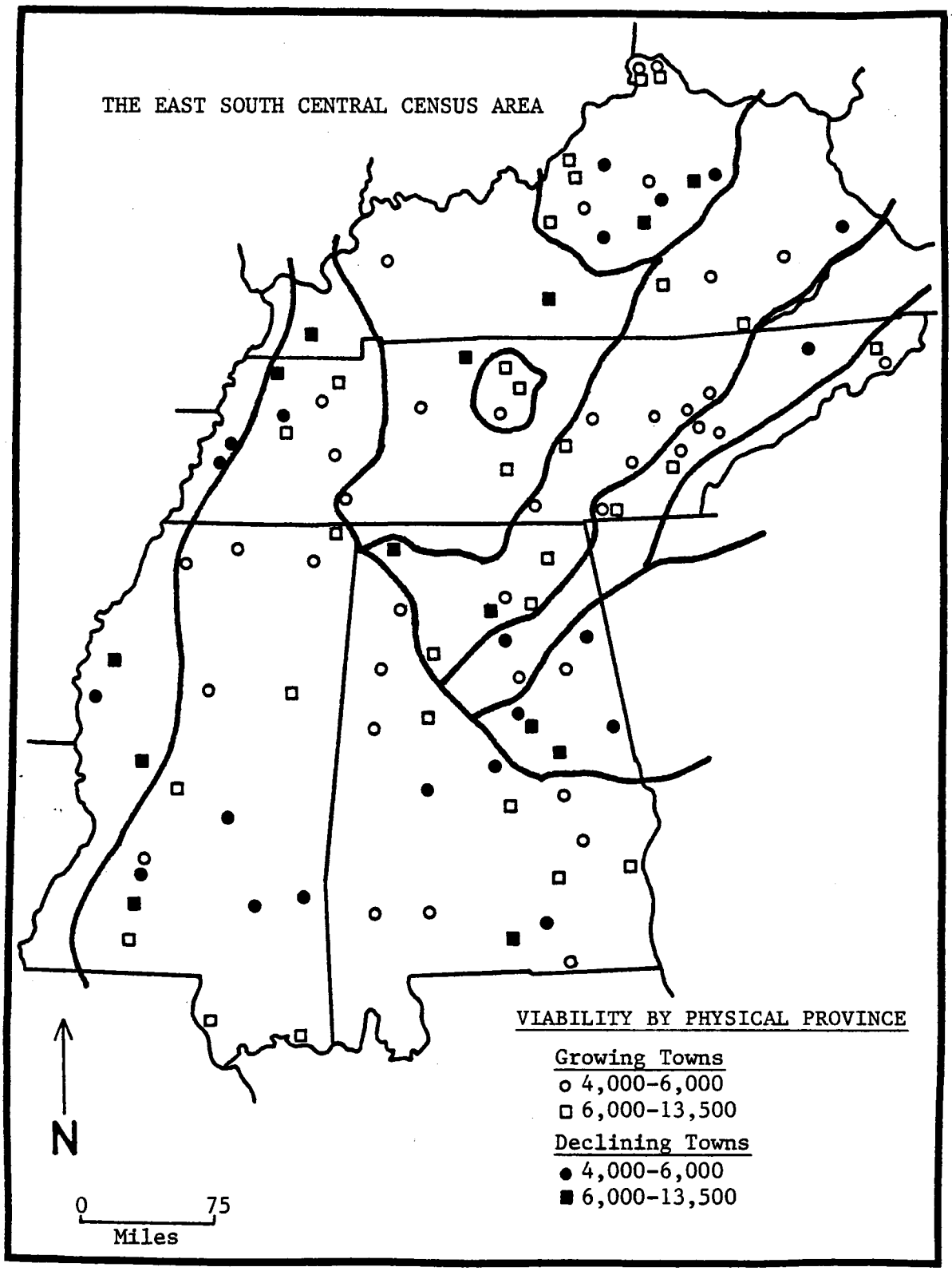

Figure 13. Viability of Towns by Physical Province

groups than with the BEA region (Figure 12). The same sorting out of the town viability occurs for the growing towns in the Bluegrass Basin. The Lexington, Kentucky and the Birmingham, Alabama BEA'S both have high values of farm products sold, but different patterns of nonmetropolitan viability. This can be explained by the differing types of agriculture and industrialization that developed in the two regions. The agriculture in the Lexington, Kentucky area developed on fertile soils with considerable diversification while the agriculture in the Alabama Piedmont area of Birmingham, Alabama developed on relatively poor agricultural soils and was historically devoted to the cotton economy at the almost total exclusion of other cash crops. When the cotton economy on the Piedmont failed, a transition to other forms of agriculture was very difficult and large numbers of rural people left the region. The Piedmont was also an area of early southern industrialization. Industrialization initially consisted almost singly of textile mills and associated industry. Each town which was large enough had a textile mill which employed the majority of the population. Wages were (are) low and the economic growth of these one industry towns was slow. [47] The Coastal Plain Province exhibits a mixture of town viability types, but there seem to be additional subregional patterns within the Coastal Plain based on state boundaries. The nonmetropolitan places in the Coastal Plain of Alabama tend to be growing relative to the region, the places in southern Mississippi tend to be declining, the towns in northern Mississippi and southwestern Tennessee tend to be declining, and the places in the Kentucky portion of the Applachian Plateau also tend to be declining. While the physiographic regionalization of the ESCCD

aids in the delimitation of viability clusters of nonmetropolitan places, or perhaps even uncovers some patterns that were disguised by the BEA boundaries, it is within the less urbanized areas which are more oriented toward primary activities that the physiographic regions are better than the BEA's in capturing the regional variability in viability patterns.

The spatial patterns of relative retail sales change for the towns in the study region varies from the patterns of relative population change. The Lexington and Louisville, Kentucky, and the eastern portions of the Birmingham and Montgomery, Alabama BEA's exhibit distinct concentrations of declining towns (Figure 14). In the Lexington, Kentucky BEA, there is a very high concentration of declining towns with respect to relative retail sales volume change. All of the Lexington BEA towns, except one, Winchester, were growing in relative population. The relative viability pattern of towns in the Louisville, Kentucky, and Birmingham and Montgomery, Alabama BEA's exhibit similar spatial patterns as in the relative population change analysis. Similar explanations for the concentrations of growing and declining towns in the aformentioned BEA's hold true in this analysis as in the previous analysis except for the Lexington, Kentucky BEA. The spatial concentration of declining places in the Lexington, Kentucky BEA more nearly meets expectations using relative changes in retail sales volume. The Lexington BEA lost 6.4 percent of its

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[47]Donald J. Bogue and Calvin L. Beale, Economic Areas of the United States, The Free Press of Glencoe, Inc.: New York (1961), pp. 509-510 and 712-720.

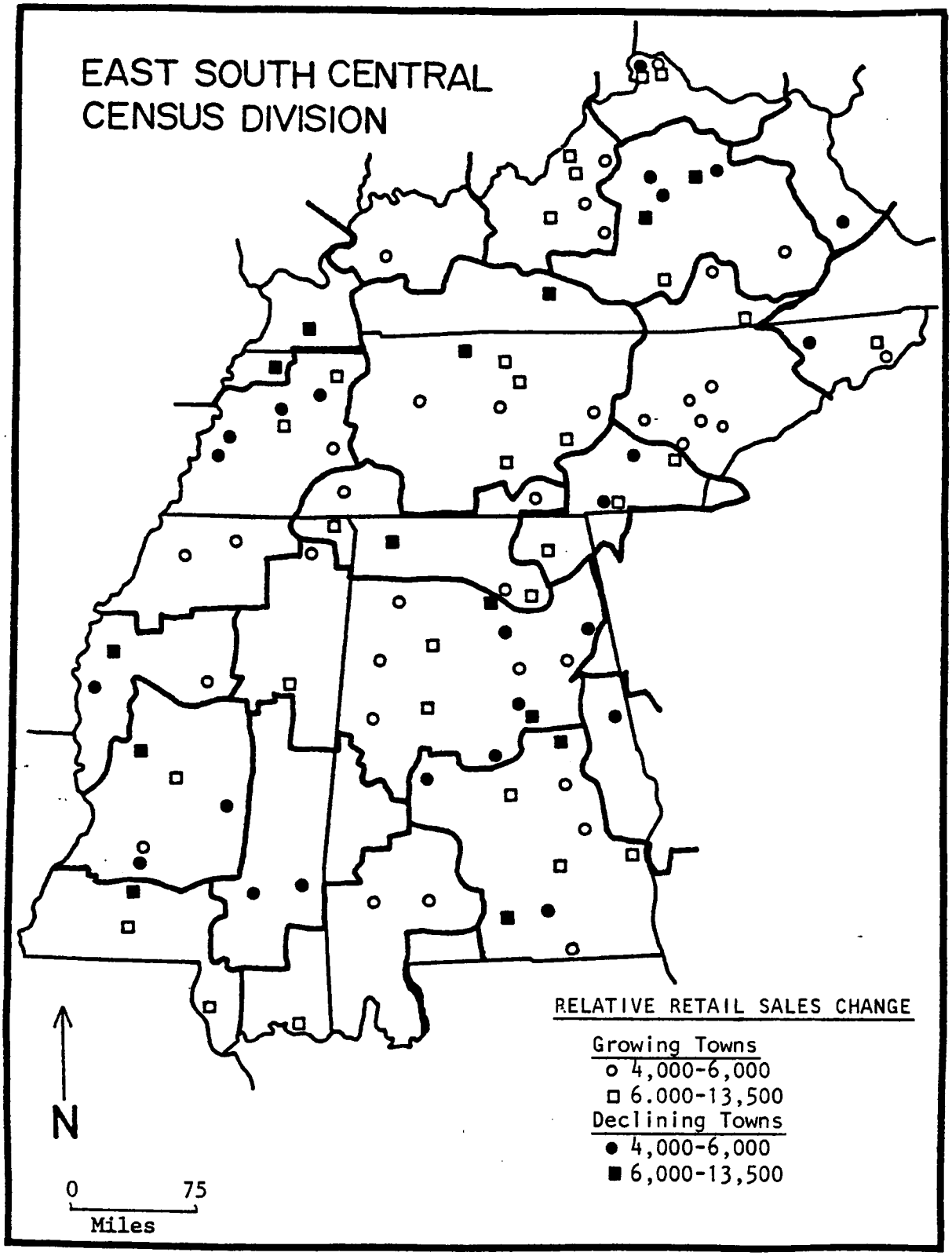

Figure 14. Relative Retail Sales Change Patterns of Places by BEA Region

population between 1960-1970, had less than 50.0 percent urban inhabitants (1970), had a high percentage of low income families (1970), a low overall education level (1970), and an average unemployment rate (1970). Overall, similar patterns of nonmetropolitan viability occur with both relative population and retail sales change, if only one of the measures is selected a somewhat better interpretation occurs using the relative retail sales volume patterns. Ideally, both measures of viability should be used. Using relative retail sales change patterns and superimposing them on the regional physiographic map, the concentration of declining towns in the Kentucky portion of the Appalachian Plateau, which was present in the population analysis, is replaced by a concentration of growing places along the Ridge and Valley Province. The Ridge and Valley Province is an area of easy northeast-southwest transportation and consequently was settled early. Because the valleys were rich agricultural lands, farming also developed. As towns were established to serve the farm population and travelers, industries also developed making the region economically viable.[48]

Relationship Between Changes in Population and Retail Sales Volume

The disparities between rates of growth and decline as measured by population and retail sales volume and their associated spatial patterns, both in absolute and relative terms, leads to the questioning of what the actual relationship is between population and

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[48]Bogue and Beale, p. 107

retail sales change. To test this relationship, a correlation analysis was used.

The relationship between population change (1960-1970) and retail sales volume change (1963-1972) show the two to be relatively weakly related having an r value of 0.35 (significant at the .001 level). The two variables are not related strongly enough to warrant the assumption that population change can accurately indicate or predict the economic viability of nonmetropolitan towns and cities in the study area. To further test the relationship between changes in population and retail sales, correlations were computed for towns that had grown or declined in relative terms (Table 7). The correlations which indicated the strongest relationships between population and occured in those towns which were growing at higher rates than the East South Central Census Region as a whole. Although weak correlations were found for growing towns, the correlation coefficients for the declining towns indicate virtually no relationship between population change and retail sales change. The weak correlations between population and retail sales volume for the declining towns can possibly be explained by the argument presented by Beyers.[49] If, as Beyers suggests, personal incomes in a region are increasing rapidly because they were at low levels (compared to the region) initially, discretionary income would also increase having a positive effect on retail sales. The effect of higher discretionary incomes in an area would not be reflected in population increases. This is perhaps the case in the East South Central Census Division.

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[49]Beyers, pp. 35-36

TABLE 7

CORRELATIONS OF POPULATION CHANGE TO RETAIL SALES CHANGE IN GROWING AND DECLINING TOWNS

Analysis	Absolute Correlation Analysis of Population change to Retail Sales Change	Relative Correlation of Population Change to Retail Sales Change
Declining Towns	-.02*	-.12
Growing Towns	.42	.28

*Number of cases too small to be a reliable coefficient.

The East South Central Census Division is an area that lagged economically until the mid to late 1960's. Since the late 1960's and early 1970's, the southern states have been experiencing an inmigration of industry and business. The economic climate of the south is changing and the benefits to the entire region may not show up statistically for some time.

Summary

Several definitions of nonmetropolitan viability were examined at three levels of investigation in this chapter. Nonmetropolitan viability was first defined by population change and then by retail sales change over time. In addition, absolute and relative measures were employed in assessing the population and retail viability of the 103 selected nonmetropolitan places in the study region. Nonmetropolitan viability patterns were then examined at the regional scale (ESCCD) and the subregional scale (BEA's and physiographic areas). The socioeconomic characteristics of the BEA's were examined to determine if explanations as to the patterns of viability in the selected nonmetropolitan places emerged. In turn, the viability characteristics of the nonmetropolitan places were put into the BEA and physiographic framework in search of spatial patterns and possible explanations. The influence of distance from the selected nonmetropolitan places to larger nonmetropolitan places and SMSA's on viability was examined using a corrrelation analysis. The distance-viability relationship was examined because of the difinitional criteria of the BEA's and the emphasis on the influence of distance on viability in the literature.

Analysis of population and retail sales volume change in the

nonmetropolitan places in the ESCCD reveals definite intraregional viability patterns which are linked to selected social and economic characteristics of the subregions to which they belong. The BEA's with the highest population growth rates were along the perimeter of the ESCCD and economically tied to long established or dynamic SMSA's (Atlanta, New Orleans, Cincinnati). The BEA's with the highest population gains, as a general rule, had higher percentages of urban inhabitants and a more highly educated population. The BEA's with the largest numbers of families below the low income level were also the BEA's which had lost population between 1960-1970, or had gained only slightly. From the data analysis, BEA's with growing and declining populations exhibited both high and low numbers of families below the low income level. In the BEA's which were experiencing high population growth, there was an associated high percentage of high income families. While a positive relationship exists between population growth and distance of a place to larger places, the relationship is weak and offers little in terms of viability explanation. This result is especially interesting in light of the definitional criteria for BEA areas which stresses distance relationships.

The viability patterns of the 103 selected nonmetropolitan places generally fit into the BEA subregionalization. Where patterns of declining or growing towns did not fit the BEA subregionalization pattern, the physiographic delimitation more closely approximated the shape of the clusters. The physical subregionalization was the most appropriate subregionalization for the Appalachian Plateau area which is a resource extraction area and the Bluegrass Basin area which is an

agricultural area. The spatial viability patterns which evolved using relative measures of population and retail sales volume change in the nonmetropolitan places tended to fit more neatly into the subregionalizations than absolute viability patterns. Only absolute retail sales change, however, lacked any real clustering of declining towns and this was because of the small number of towns which declined in this particular categorization. The two relative viability measures tended to add extra emphasis to two of the clusters of places declining in absolute population; the Birmingham-Montgomery, Alabama BEA's and the Appalachian Plateau area.

The following chapter examines the relationships between the viability of the nonmetropolitan places selected for study in the ESCCD and various socioeconomic and retail sales variables. It is hoped that the relationships which evolve through the following analyses will build upon those which were described in the present chapter.

CHAPTER 3

THE VIABILITY CHARACTERISTICS OF SELECTED NONMETROPOLITAN PLACES IN THE EAST SOUTH CENTRAL CENSUS DIVISION

Introduction

Preliminary indications that the viability of nonmetropolitan places in the ESCCD is spatially related to subregional social, economic, and physiographic variations are established in Chapter 2. The purpose of this chapter is to expand upon those preliminary relationships in an attempt to determine if certain selected socioeconomic and retail sales variables are more closely associated with nonmetropolitan places which are growing in population and retail sales volume as opposed to those places which are declining. By analyzing selected variables which are associated with nonmetropolitan viability in the ESCCD, the characteristics of viability in the region may be better understood.

In order to determine the relationships between the selected socioeconomic and retail sales variables and changes in population and retail sales volume, a series of correlation analyses are performed. Eighteen socioeconomic and retail sales variables are selected to correlate with changes in population and retail sales. Of the eighteen variables selected, nine are retail sales variables and nine are socioeconomic variables.

The nine retail sales variables consist of the retail breakdown by type of function found in the U.S. Retail Census (Table 8). The nine retail variables range from low order to high order functions.

TABLE 8

RETAIL ESTABLISHMENT VARIABLES

Low Order Functions	Medium Order Functions	High Order Functions
Food Stores	General Merchandise	Automotive Sales
Eating Facilities	Building Materials	Furniture
Service Stations	Drug Stores	
	Apparel	

The use of these retail categories facilitates placing the nonmetropolitan places into a central place framework by assessing the relative significance of the changes in the types of goods a place offers. The importance of certain types of retail establishment functions to the growth and decline of nonmetropolitan places may also emerge from this approach. It is expected that medium and high order functions will tend to be more highly correlated with growing towns because of large numbers of families will have the discretionary income to purchase these goods. High discretionary incomes in a town are determined, for this analysis, by median family incomes and the number of families making high salaries. These relationships are discussed in greater detail in the following discussion of socioeconomic variables. Low order functions should not exhibit a strong positive or negative relationship to nonmetropolitan viability as these functions are basic necessities and would be the last retail functions to exit from the hierarchy of central functions.

The nine population variables were selected because they represent a cross-section of socioeconomic variables (Table 9). The education variables are used as indicators of the leadership potential and quality of the labor force for particular nonmetropolitan places. It is postulated that towns possessing populations with a high educational attainment are better able to attract and keep industry, not only because of better civic leadership, but also because of a more talented and educated labor pool. High positive correlations are expected between the two education variables and the growth of nonmetropolitan places as measured by changes in population and retail sales volume.

TABLE 9

SUBGROUPS OF SOCIOECONOMIC VARIABLES

Education	Employment	Income
Median School	Nonworker Ratio	Median Income
4 yrs. of High School	Females in Work Force	Income Below Poverty Level
	Labor Force Unemployed	Income $15,000 or Greater
	Labor Force in Manufacturing	

The employment variables are used to ascertain the relationship between the structure of the labor force of the nonmetropolitan places and their growth characteristics. Places with high percentages of workers in manufacturing are expected to be high growth towns. This expectation is an outgrowth of the importance that past researchers have placed on manufacturing employment as a prerequisite for economic growth. The higher the percentage of the labor force unemployed, the lower the place's growth rate is expected to be as measured by population and the volume of retail sales. Towns with high unemployment rates should be economically depressed. Towns with expanding economies should have an increasing number of job openings and, therefore, low unemployment rates. Because expanding economies should be enlarging their basic activities, high employment in manufacturing is expected to have a positive relationship with retail sales and population change. The relationship between the percentage of females in the labor force and nonmetropolitan viability can be approached from two points of view. First, a high percentage of females in the labor force for a town may indicate an unhealthy economy. In this situation, the females are employed in low paying, or part-time, jobs to supplement the family income. Females working to supplement the family income was the case in Four Oaks, North Carolina where the economic base of the town did not provide adequate male employment.[50]

In some towns, however, female employment may be a result of a dynamic economy. In towns where female employment indicates a healthy

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[50]Knoxville News-Sentinel, p. 2.

economy, one would expect a highly educated and qualified population. Female employment in this instance is a result of the qualified female pursuing a career or seeking autonomy outside of the family. Distinguishing between the types of towns where high female employment is present can be difficult. For this study, correlations between the percentage of women in the work force in growing and declining towns is the method employed. The expectation is that the least viable as well as the more viable towns will have high positive correlations with females in the work force. This would represent a bipolar distribution of women in the work force. If this relationship does not evolve, it may be due to a bipolar distribution of females in the work force in each of the towns. In this case, women from the higher and lower income families wold be working (same reasons as for growing and declining towns). The result, at this level of investigation, would be a self cancelling relationship at the town level which would be reflected at the regional level.

The income characteristics of the population of the nonmetropolitan places are expected to reflect the economic viability of the towns. Places with high median incomes and high numbers of families with incomes greater than $15,000 per year are expected to be highly correlated, in a positive way, with increases in population and retail sales. Towns with large numbers of people making incomes in excess of $15,000 and towns and high median incomes have more people with large discretionary incomes which can be used to purchase high order goods and services. Places with large numbers of families below the poverty level are expected to be the towns that are declining because of the lack of discretionary income to support high order

functions. If this is true, it is further anticipated that declining towns will have low correlation coefficients between population and retail sales growth and the volume of sales in high order functions.

Four correlation analyses for the 103 towns in the study area were performed using percent change in population (1960-1970) and percent change in the volume of retail sales (1963-1972) as the dependent variables and the eighteen socioeconomic and retail variables as the independent variables (Tables 8 and 9). The first correlation analysis was performed on the 103 towns as a group; measuring change in absolute terms. The correlation analysis based on absolute change was not divided into growing and declining towns because of the small number of towns that declined. The second analysis divided the nonmetropolitan places into two viability groups. The first group consisted of those places which had declined in population relative to the population change in the East South Central Census Division. The second group consisted of those towns that had grown in population relative to the study region. The third correlation analysis was performed on the basis of relative change in the volume of retail sales of the nonmetropolitan places. Two groups of towns (those that experienced relative growth in retail sales and those that experienced decline) were separated out for the third analysis just as in the second analysis. The final correlation analysis divided the 103 nonmetropolitan places into two groups based on population size. The first group consisted of towns with 1970 populations between 4,000 and 6,000 inhabitants and the second group was towns with between 9,000 and 13,500 inhabitants. The eighteen socioeconomic variables were then correlated to the rates of change in

population and retail sales volume for the towns. Four correlation analyses are performed because the structural relationships between the viability of the 103 nonmetropolitan places studied may become more clear if as many alternative categorical subsets of the places as possible are used. The relationships between the viability of the places and the employment variables, for example, may prove to be weak when all of the towns are grouped together and viability is measured by relative change in population. The relationships between these variables and viability may become more clear, however, if the nonmetropolitan places are divided into growing and declining categories.

Results of Analysis Using Absolute Change in Population and Retail Sales

The correlation analysis between the eighteen independent variables and absolute changes in population and retail sales volume exhibits a mixture of results (Table 10). In Table 10, correlation values of less that +0.10 were omitted because of their insignificance and to reduce the clutter in the table. Nonmetropolitan places were not divided into growing and declining categories for this analysis because of the small number of places that declined in absolute terms.

Percent change in population (1960-1970) correlated above the 0.10 level on nine variables. The highest coefficients for the population variables were four years of high school (r=.49, sig. level of .001), median income (r=.46, sig. level of .001), and families with incomes of $15,000 or more (r=.32, sig. level of .001). Absolute population change was weakly correlated to the number of females in the work force (r=.13, sig. level of .001) and percentage of the labor

TABLE 10

Correlation Analysis Using Absolute Changes in Population and Retail Sales

Variable	Population Change r value	Retail Sales Change r value
Total Retail Sales	.35 (.001)*	
% Change General Merchandise Sales	-.13 (.157)	
% Change Apparel Sales		.16 (.135)
% Change Furniture Sales	.21 (.058)	.27 (.023)
% Change Drug Store Sales	.46 (.003)	.46 (.003)
4 Years High School 1970	.49 (.001)	.20 (.021)
Females (%) in Work Force 1970	.13 (.100)	
Labor Force Unemployed 1970	-.14 (.080)	
Labor Force in Manufacturing 1970		.12 (.125)
Median Income 1970	.46 (.001)	.31 (.001)
Income 15,000+ 1970	.32 (.001)	.18 (.032)

*Significance Levels

the work force (r=.13, sig. level of .001) and percentage of the labor force unemployed (r=.14, sig. level of .080).

Expectations were that growing towns would correlate most strongly with the education and employment variables. One of the two education variables behaved as expected, the percentage of the towns' population aged 25 or older which had completed high school, but the r value of the median school years completed variable was insignificant. Towns with high numbers of people with four years of high school education or more were the towns which tended to be growing the fastest. The expectation of a strong relationship between a qualified local leadership (measured by education) and nonmetropolitan growth is, therefore, partially verified. The expectation that growing towns also have a highly educated labor force is also substantiated. The employment variables show either weak or insignificant correlations with population change, which was expected. Manufacturing employment was expected to be significantly correlated to viability, but the r values were insignificant. Two of the three income variables had significant r values when correlated to absolute population change. In the sample, median family incomes and the number of families with incomes of $15,000 or more proved to be significant indicators of viability. The income below poverty level variable although insignificant, r=-.07, deviated in the direction expected.

When absolute population change was correlated with the nine retail establishment variables, there was a division between low and high order functions. High order functions tended to have higher coefficients with growing towns. This substantiates the expectation that growing towns are towns where high order functions are most in

demand, or still available. The correlation coefficient for the relationship between median income and viability in the towns also validates the assumption that towns with high median incomes are the places where people have sufficient discretionary income to purchase high order goods. Automobile sales (r=.51, sig. level of .001) had the strongest correlation with retail sales change in the towns studied. The correlation of automobile sales further validates the above two expectations. The highest r values for the retail functions are for percent change in furniture sales (r=.21 and .27) and drug store sales (r=.46 and .46) (Table 10). Since growing towns were significantly correlated to high income levels, the r values of furniture and drug store sales most likely represent relatively high discretionary incomes in the growing towns which allow the people to purchase more new furniture and better health care than the people in declining towns. The value of the general merchandise variable was negative (r=-.13). This low negative coefficient may indicate that as towns grow, the goods offered by general merchandise stores become available in larger, more specialized stores putting the general merchandise store at a competitive disadvantage.

Viability of Nonmetropolitan Places Measured by Relative Population Change

Using relative population change as the dependent variable, the correlation analyses between growing and declining towns exhibits a very distinct separation of significant variables. Nine variables have significant coefficients above the $\pm$ 0.10 level for declining towns compared to twelve significant variables for growing towns (Table 11).

TABLE 11

Correlation Analysis Using Relative Changes in Population for Growing and Declining Towns

Variable	Declining		Growing	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Median School Years			.39 (.001)	.39 (.001)
4 Years or More High School	-.20 (.132)*		.50 (.001)	.27 (.013)
Worker-Nonworker Ratio				
Percent Females in Labor Force				-.13 (.151)
Percent Labor Force Unemployed			-.21 (.043)	-.19 (.060)
Percent Labor Force in Manufacturing	.23 (.241)	.26 (.074)		
Median Income	-.19 (.146)	.12 (.254)	.48 (.001)	.35 (.001)
Percent Families Below Poverty Level			-.51 (.001)	-.43 (.001)
Percent of Families With Incomes of $15,000 or More	-.29 (.051)	-.11 (.268)	.32 (.004)	.24 (.024)
Percent Change Building Material Sales	-.62 (.006)	-.18 (.258)	.24 (.104)	.39 (.018)
Percent Change Gen. Merchandise Sales		.14 (.284)		.75 (.001)
Percent Change Food Sales			.36 (.001)	.65 (.001)
Percent Change Automobile Sales	-.14 (.267)	.39 (.043)	.48 (.165)	.50 (.001)
Percent Change Service Station Sales				.52 (.001)

TABLE 11 (cont.)

Variable	Declining		Growing	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Percent Change Apparel Sales	.18 (.226)	.11 (.334)		.88 (.001)
Percent Change Furniture Sales	.28 (.108)		.12 (.242)	.36 (.017)
Percent Change Eating Estab. Sales			.12 (.190)	.14 (.164)
Percent Change Drug Store Sales	-.32 (.147)	.36 (.112)	.59 (.002)	.46 (.016)

*Significance Levels

The most significant variable for towns which have declined relative to the region was percentage change in building material sales (r=0.62, sig. level of .006). This negative correlation with population change could be expected because declining towns would not be experiencing any significant growth in the building industry. The coefficient for change in building material sales for the growing towns was positive (r=.24, sig. level .104); expected under the same assumption. When retail sales volume change in the towns was correlated with the socioeconomic variables, the r value for declining towns was r=-0.18 and the value was r=0.39 for growing towns. Although the correlation coefficients differed using different viability surrogates, the deviations were in the expected direction. All of the retail sales variables had correlation coefficients greater than $\pm$ 0.10 when correlated with retail sales change in the growing towns; five of these coefficients were above $\pm$ 0.50 with significance levels of .001 (Table 11). The retail establishment variables correlated more highly with retail sales volume change in the growing towns than in the declining towns. This is probably because the relative population change definition of viability eliminates those towns which were growing marginally in population and classified them as declining. The result is a more cohesive group of growing towns and more clearcut relationships between the retail sales functions and viability. High and low order functions had significant correlations with percentage change in retail sales volume. In the growing towns, this can be explained by the moderately significant correlations that the income variables also had with change in retail sales volume. Larger numbers of people in growing towns (of equal size) have

discretionary incomes which enable them to purchase necessities as well as optional goods, services, and luxuries. In the growing towns, the socioeconomic variables tended to be more significant when correlated to population change. The education and income variables strongly substantiate the earlier hypotheses concerning an educated labor force and high personal incomes.

Although the towns declining relative to the region displayed several significant variables when correlated to population and retail sales change, the r values were relatively low. The growing towns, however, displayed a large number of high r values (Table 11). It seems that the variables used in this analysis were better able to describe the expected characteristics of growing towns than the previous analyses. Declining towns appear to be more difficult to categorize by using correlation analyses. A possible explanation for this is that the income patterns and shopping behavior of the residents differ spatially within the region depending on the degree to which the towns are declining.

Viability of Nonmetropolitan Places Measured by Relative Retail Sales Change

A correlation analysis was run between the independent variables and relative change in the towns' volume of retail sales. The towns were classified as growing if their total retail sales volume increased greater than that of the retail sales volume of the East South Central Census region. Towns were considered declining if their change in retail sales volume was less than that of the study region. In Table 12, correlation coefficients of less than $\pm$ 0.10 were omitted. Correlation analyses were performed between the variables

TABLE 12

Correlation Analysis Using Relative Changes in Retail Sales Volume

Variable	Declining		Growing	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Median School Years 1970	.28 (.032)*			
4 Years or More High School 1970	-.31 (.019)		.55 (.001)	.24 (.036)
Worker-Nonworker Ratio 1970			-.11 (.197)	
Percent Females in Labor Force 1970	.15 (.159)		.15 (.128)	
Percent Labor Force Unemployed 1970		-.15 (.169)	-.18 (.091)	-.13 (.165)
Percent Labor Force in Manufacturing 1970		.22 (.076)		.15 (.125)
Median Income 1970	.31 (.019)		.57 (.001)	.43 (.001)
Percent Families Below Poverty Level 1970	-.17 (.135)		-.11 (.203)	
Percent of Families With Incomes of $15,000 or More 1970	-.31 (.019)		.42 (.001)	.32 (.007)
Percent Change Building Material Sales	-.50 (.011)			.19 (.249)
Percent Change Gen. Merchandise Sales			-.19 (.134)	
Percent Change Food Sales	.31 (.023)			
Percent Change Automobile Sales	-.11 (.310)	.28 (.104)	.20 (.139)	.49 (.002)

TABLE 12 (cont.)

Variable	Declining		Growing	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Percent Change Service Station Sales				
Percent Change Apparel Sales		.36 (.048)	.15 (.235)	
Percent Change Furniture Sales	.22 (.137)		.13 (.244)	.19 (.115)
Percent Change Eating Estab. Sales	.30 (.045)			
Percent Change Drug Store Sales	-.14 (.284)	.40 (.042)	.70 (.002)	.38 (.084)

*Significance Levels

and changes in population and retail sales volumes. The variables which had significant correlations with relative population change and relative retail sales volume change differed significantly.

Examining the correlations for growing and declining towns with regard to population change, a fairly important separation of the independent variables occurs. Both the growing and declining towns had r values of greater than $\pm$ 0.10 on twelve variables. The variables with the significant r values, however, varied greatly as did the degree of significance of their coefficients. The most significant variables in the declining towns were building material sales, food sales, eating establishment sales, the adult population obtaining four years of high school, median school years completed, median income, and the number of families with incomes of $15,000 or greater (Table 12). While many of the same variables had high correlations with both changes in population and retail sales volume, overall, the r values and significance levels differed greatly. Four of the r values for the declining towns were above $\pm$ 0.40. Of the retail functions, building material sales (r=0.50) was most significant for the declining towns, but was insignificant for the growing towns. For the growing towns, drugstore sales were most significant (r=0.70), but proved moderately significant for declining towns (r=-0.14). The population variables were generally more strongly correlated to viability than the retail establishment variables. There was, in almost all cases, higher correlation coefficients for the growing towns than for the declining towns (Table 12). Overall, the results of this analysis were more confusing and less interpretable than the previous analyses. Four of the variables

(high school, median income, families with incomes in excess of $15,000, and drug store sales) had correlation coefficients in excess of r=0.30 for both growing and declining towns. Expectations were that these variables would exhibit different relationships to the viability categories. Although it is difficult to discern what the cause of this deviation from the expected may be, two explanations come to mind. The easiest explanation is that the independent variables are poor indicators of nonmetropolitan viability. This explanation, however, is untenable in light of past research. The other explanation is that defining nonmetropolitan viability by relative change in retail sales volume somehow induces unrealistic statistical results. The possible problem in defining viability by relative retail sales volume change emerges from combining a strictly local phenomenon to a regional average. In other words, while certain aspects of nonmetropolitan viability may be better understood in a regional, or subregional, framework, retail sales change is more closely linked to local viability changes. If this is the case, then a more interpretable set of correlation coefficients should emerge from an analysis based on absolute retail sales change. The absolute retail sales change analysis was presented in the first part of this chapter. In that analysis, all of the independent variables exhibited correlation coefficients that deviated in the expected directions, although they were not always as strong as was expected.

Correlation Analysis by Size Groups

The correlation analyses performed on the aggregate data in this section were divided into groups by population size categories. The first group of towns, referred to as "small," were those towns with

populations in 1970 of between 4,000 and 6,000 inhabitants. The second group of towns, referred to as "large," were those towns with populations between 9,000 and 13,500 inhabitants in 1970. The terms "small" and "large" are used to differentiate between the two size categories in this study. Their use does not infer a generic classification of town sizes. Two analyses were performed on each group; one by relative population change, and one by relative retail sales volume change (Table 13).

Table 13 illustrates the diversity of results among the four groups. As in the previous correlation analyses, correlation coefficients of less than $\pm$ 0.10 were omitted from the table. The coefficient deviations between small and large towns display the same type of mixture as found in the previous analyses; considerable diversity between the two groups. The coefficients for the variables of the small towns, when correlated to absolute population change, were all below the 0.40 level. When the variables were correlated with percent change in retail sales volume for small towns, several variables stood out as significant. Apparel sales (correlated with retail sales change) had the highest r value found in this and any previous analysis, 0.933. Only eating establishment sales and building material sales had coefficients below r=0.32. The correlations for changes in population and retail sales volume had r values that were insignificant (below the 0.40 level). The large towns displayed similar variable correlations to the small towns with a few exceptions. Whereas, apparel sales were by far the strongest independent variable in the small towns (correlated with retail sales

TABLE 13

Correlation Analysis By Size Groups

Variable	Small		Large	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Median School Years	.32			
4 Years or More High School	.39	.01	.56	.48
Worker-Nonworker Ratio			-.11	
Percent Females in Labor Force	.15			
Percent Labor Force Unemployed	-.12	-.13	-.17	-.14
Percent Labor Force in Manufacturing	-.11	.28	-.10	-.19
Median Income	.36	.16	.54	.53
Percent Families Below Poverty Level	-.17	-.12	-.12	-.06
Percent of Families With Incomes of $15,000 or More	.24		.46	.62
Percent Change Gen. Merchandise Sales	-.24	.49	-.19	
Percent Change Food Sales	-.27	.53	-.10	
Percent Change Automobile Sales	.17	.41	+.20	.54
Percent Change Service Station Sales		.32		

TABLE 13 (cont.)

Variable	Small		Large	
	% Change Pop.	% Change Ret. Sales	% Change Pop.	% Change Ret. Sales
Percent Change Apparel Sales		.93	-.14	
Percent Change Furniture Sales			.20	.39
Percent Change Eating Estab. Sales	.20			
Percent Change Drug Store Sales	.26	.40	.54	.44

change), it proved insignificant in the large towns. In small towns, this may result from individuals purchasing clothes as a first priority as incomes rise and discretionary incomes increase. Apparel is perhaps the most affordable luxury for people in this situation. This assertion is partially substantiated by the income and employment variable coefficients in the small town category analysis (viability measured by absolute change in retail sales). In this analysis, general merchandise sales had a high correlation coefficient (r=.49). The median income, unemployment, and percentage of families below the low income level which deviated in the expected direction, did not have strong correlation coefficients with viability. These three variables all indicate weak positive relationships to growth. The general merchandise sales variable coefficient indicates the general viability of the small towns, but from earlier assumptions, growth in these small towns has not progressed to the point where more specialized retail establishments have replaced the general merchandise store. Also, only three of the retail variables in the large towns had r values exceeding $\pm$ 0.10, when correlated to retail sales change, while six of the retail variables were above $\pm$ 0.10 in the small towns.

Summary

The correlation analyses used in this chapter helped demonstrate the relationship between the independent growth variables and changes in population and retail sales volume in the ESCCD. By correlating the independent variables with changes in population and retail sales volume, it became evident that the significance of specific variables used in describing nonmetropolitan viability varied according to how viability was defined.

The results of the analyses were mixed, but several trends did evolve. The major trend in the correlation analyses was that median family income, percent of the adult population with four years of high school, and automobile sales were the most consistent variables having high correlations with the viability of nonmetropolitan places in the study region. From the analyses, automobile sales seems to be a fairly reliable indicator of viability in the towns surveyed. The reason for automobile sales being important in the analysis of growth and decline of nonmetropolitan places in the ESCCD is that new automobiles are not generally purchased when the economy is unstable for a short period of time, and especially if there is little hope for economic improvement in the future. Because towns that are declining are generally unstable economically, the volume of automobile sales over time for specific small towns is usually low. Towns that are growing have healthier economies with higher median family incomes and, therefore, have larger total amounts of discretionary income to spend on high order functions. Towns that are growing and have high median family incomes also appear to have larger numbers of people with four years of high school education. These relationships are also evident at the subregional BEA level of investigation, as was demonstrated in Chapter 2. An examination of the data for several of the nonmetropolitan places in the study illustrate the weak correlation between percent females in the labor force and viability. For example, Arab, Alabama had an increase of 47.2 percent in population between 1960 and 1970 and had 41.0 percent females in the labor force in 1970. Chilton, Alabama had a -1.1 percent increase in population between 1960 and 1970 with 36.7 percent of the labor force

made up by females. Yazoo, Mississippi had a 4.0 increase in population between 1960 and 1970 with 44.0 percent of the labor force made up of females. From the data, no clear division of viability and females in the labor force is discernable. As postulated earlier, this may be a result of a bipolar distribution of females in the work force within the individual towns which obfuscates the true relationships involved.

Both surrogates used for defining viability, change in population or change in retail sales volume, are helpful in describing the characteristics of nonmetropolitan viability in the study region. Both viability surrogates, for example, add to the understanding of the relationships between socioeconomic variables and viability in nonmetropolitan places. In the analyses which divided the towns in the study region into small and large size categories, the retail establishment variables were more highly correlated to viability than the socioeconomic variables in the small towns. In the small towns, the sales volume of the low order functions appear to be important measures of the town's viability. From a christaller type central place framework this would be expected as higher order functions are relatively unimportant in small towns. In the small towns which are growing economically, therefore, the low order functions would stand out as dominant. In the larger size category of towns, the importance of retail sales to viability becomes more complex. In the larger towns, the income and education of the local population become more important to viability than aspects of retail sales. In these towns, the income characteristics are significant measures of viability because higher incomes indicate more buying power, and often the

presence of industries or other activities with high pay scales. As the viability of the town grows, there is need of a highly trained segment of the population with the educational skills necessary to work in and manage local industries. Both population change and retail sales change in the towns contribute to the total understanding of the relationship between viability and the independent variables used to measure viability. The size category breakdown is equally important in this analysis because if the towns are grouped together without regard to size, the results may be ambiguous because of the self-cancelling effect of the different processes working in the different size towns.

The analyses which based viability in the ESCCD on relative population and retail sales change strengthens the assumption that growing towns have a more highly educated population with more high income families and fewer people below the poverty level. Building material sales in declining towns had a high negative correlation with population change in both of these analyses; evidence that declining towns are not good markets for building materials because of a poor economic atmosphere.

Interpreting the results of all of the correlation analyses requires that the variables be looked at within the individual analysis itself in addition to how each of the individual variables' correlation coefficients varied from one analysis to the next. Because of this, patterns of strong correlations which might predict or describe economic change in the small towns are difficult to isolate. In a one way analysis, such as those presented in this chapter, interpretation is further impaired because the variables do

not act as individual viability indicators. The variables act in conjunction with one another to form an interrelated set of variables that describe the viability characteristics in the nonmetropolitan places. The ESCCD, discussed in Chapters 1 and 2, is growing economically after nearly a century of lagging behind the major growth trends of the United States. As illustrated in Chapter 2, economic development and urbanization in the ESCCD varies spatially. Because the growth patterns which are presently being observed for the region are relatively new, coupled with the fact that some subareas of the region are not experiencing growth to the same degree, a mixed pattern of relationships between nonmetropolitan viability and the variables associated with viability emerged in this Chapter.

The next chapter attempts to examine the variables which were used in this chapter and combine them into meaningful groups of variables which can be used to predict viability in the nonmetropolitan places studied. The variables which have the higher correlation coefficients in this chapter are expected to be the most significant contributors to the discriminant functions in the following analyses.

CHAPTER 4

PREDICTION OF NONMETROPOLITAN VIABILITY IN THE EAST SOUTH CENTRAL CENSUS DIVISION

Introduction

The previous chapters examined selected independent variables and discussed actual and potential relationships between the independent variables and viability. While linear relationships were established in these analyses, the interrelationships of the variables and the degree to which single variables were able to account for nonmetropolitan viability were not established. This chapter attempts to linearly combine the independent viability variables used in the preceding chapters. In so doing, viability variations in the selected nonmetropolitan places in the study region can be explained by these variables. The available variables which are most important in the explanation of viability will be isolated, thereby reducing the total number of variables required for analysis. In addition, this chapter attempts to establish the feasibility of predicting the viability of selected nonmetropolitan places using a small number of variables. This will enable decision makers to quickly assess the development needs of specific places or areas. The technique employed for this purpose is discriminant analysis. It is felt that an added benefit of the analysis is that if the capability of nonmetropolitan places in the ESCCD cann be predicted a better understanding of viability will emerge.

Discriminant analysis determines which of the sample variables are most significant in explaining and predicting nonmetropolitan

viability. Once the predictions are made by the discriminant analysis technique and the towns are grouped as correctly or incorrectly classified by the discriminant function, the spatial pattern of the correctly and incorrectly classified towns can be mapped and spatial patterns examined. Spatial growth or decline patterns may facilitate further explanation and understanding of the factors associated with nonmetropolitan viability in the study region.

Discriminant Analysis

Discriminant analysis is the technique which is used in determining the salience of independent variables to the explanation of viability. Significant variables will be isolated for growing and declining nonmetropolitan places based on absolute and relative viability definitions. Significant variables will also be isolated by grouping the 103 nonmetropolitan places studied in the ESCCD into small (4,000-6,000) and large (9,000-13,500) population size categories. The towns are analyzed according to size to determine if a better viability prediction rate occurs. If a better predictive rate occurs, the significant variables which are selected may add further to nonmetropolitan viability.

The purpose of discriminant analysis is to weight and linearly combine the discriminating variables so the growing towns are statistically distinct from the declining towns. The discriminating variables are assigned weights such that the linear discriminant function (LDF) obtained maximizes the distinctness of the two a priori groups. The "discriminant function" takes the form of

$$D_i = d_{i1} Z_i + d_{i2} Z_2 + \ldots + d_{ip} Z_p$$

where D_i is the score on the discriminant function $_i$, d's are the weighting coefficients, and the Z's are the standardized values of the p discriminating variables used in the analysis.[51]

Four discriminant analyses are performed on the data collected for the 103 towns in the study area. The first discriminant analysis is based on absolute changes in population, the second on relative changes in population, the third on absolute retail sales volume change, and the fourth on relative retail sales volume change. In each analysis, the towns are divided into growing and declining categories. After these four discriminant analyses are accomplished, the 103 towns are divided into two groups according to their size and the same four analyses are performed on each size category. The purpose of repeating the four discriminant analyses on each size category is to determine the effect of size of place on the variable makeup of the linear discriminant functions which are derived from the analyses. Isolation of the effects the size of place may have on research results will aid in interpreting the results of previous nonmetropolitan research which are often conflicting, and also add an additional degree of understanding viability to the ESCCD.

The degree of success which the discriminant function has in discriminating between growing and declining towns can be assessed using several statistics. The eigenvalue is a measure of the relative importance of the discriminating ability of the function; the higher

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[51]Norman H. Nie, et al., Statistical Package for the Social Sciences, 2nd edition, McGraw-Hill, New York (1975), p. 435.

the better the function. The canonical correlation is a measure of The the discriminant function's ability to discriminate between the two town groups; the closer to $\pm$ 1.00, the better the discrimination. standardized discriminant coefficients are useful in determining which of the variables that make up the discriminant function are most important. The standardized coefficients are expressed in decimal form and can be directly compared to each other; if one coefficient is twice as large as another coefficient, it is twice as important in its discriminating ability. A technique which is useful in visually portraying the separation of the groups is a histogram on which the discriminant scores for each town in the two groups are plotted. Overlap, or distinctness, of the two groups is shown by this technique. The last table which will be used in describing the success of discriminating between the growing and declining towns is a "confusion" matrix. This matrix illustrates the number of towns which are correctly and incorrectly classified by the discriminant analysis.

All eighteen of the variables collected for the 103 towns studied are used in each of the following discriminant analyses. These eighteen variables are listed and described on pages 79 and 81 of Chapter 3. High order functions are expected to be most significant in growing towns and relatively insignificant in declining towns. Low order functions are expected to be associated with both viability groups, but to be more significant in the declining group. The reason for this is that as a town loses population or retail sales functions, the high order functions should be the first to drop out of the economic structure, as threshold levels diminish. Expectations are that the socioeconomic variables in the discriminant functions will

follow the general pattern established by the correlation analyses (Chapter 3). Median family income, percentage of families below the poverty level, labor force unemployed, and percentage of adult population with four years of high school are expected to be the primary contributors to the discriminant functions of the analyses.

Discriminating Between Growing and Declining Towns When Viability is Measured by Absolute Change in Population

The variables selected to make up the discriminant function and their coefficients when viability is measured by absolute change in population are given in Table 14. In all, nine variables contribute to the discriminant function. Seven of the nine discriminating variables deal with aspects of the retail environment and the other two variables deal with employment characteristics. The four most important variables in their order of discriminatory powers are: females in the work force in 1970; percent change in service station sales; worker-nonworker ratio in 1970; and, percent change in building material sales. Although these four variables fit earlier expectations, they were not considered to be the most likely variables to make up the discriminant function.

With the exception of females in the labor force (r=0.13) the four most significant variables in the discriminant function had correlation coefficients of less than 0.10 in Chapter 3. Because of the inconclusive correlation coefficients for females in the labor force and the insignificance of the other three coefficients, it was assumed that other variables would constitute the LDF in this analysis. Also, the four variables were not thought to be the

TABLE 14

Standardized Discriminant Function Coefficients: Town Viability Measured by Absolute Population Change

Variable	Standardized Discriminant Coefficient
1. Worker-Nonworker Ratio	.424
2. Females in Work Force 1970	.597
3. Percent Change Bldg. Material Sales	- .411
4. Percent Change General Merchandise Sales	.365
5. Percent Change Automobile Sales	- .304
6. Percent Change Service Station Sales	- .444
7. Percent Change Apparel Sales	- .320
8. Percent Change Furniture Sales	- .293
9. Percent Change Eating Establishment Sales	.286

measures of employment and retail sales characteristics that best described the differences between growing and declining towns.

The eigenvalue and canonical correlation for the absolute population change analysis were 0.262 and 0.456, respectively. These values indicate a moderate ability to discriminate between growing and declining towns. The ability to discriminate between growing and declining towns is best illustrated by the frequency distribution of towns in each of the a priori classes depicted by their standardized LDF coefficient (Figure 15). The frequency figure illustrates the degree of separation between the two types of towns; a moderate separation. The distance between the growing and declining town centroids is 1.11 standard distance units (Figure 15). The centroid separation is fairly good and further illustrates the moderate ability to discriminate between the two groups of towns. The confusion matrix illustrates the number of towns correctly, and incorrectly, classified. Overall, approximately 69.9 percent of the towns were correctly classified as either growing or declining as predicted by the discriminant function (Table 15).

Means for the variables which constitute the LDF are given in Table 16. As Table 16 illustrates, eight of the discriminant function variables had higher means for growing towns than for declining towns. Building material sales was the only variable with a higher mean change in declining towns between 1963 and 1972. The original expectation was that building material sales would be high in growing towns and low in declining towns. Building material sales did prove to be an important variable in the makeup of the discriminant

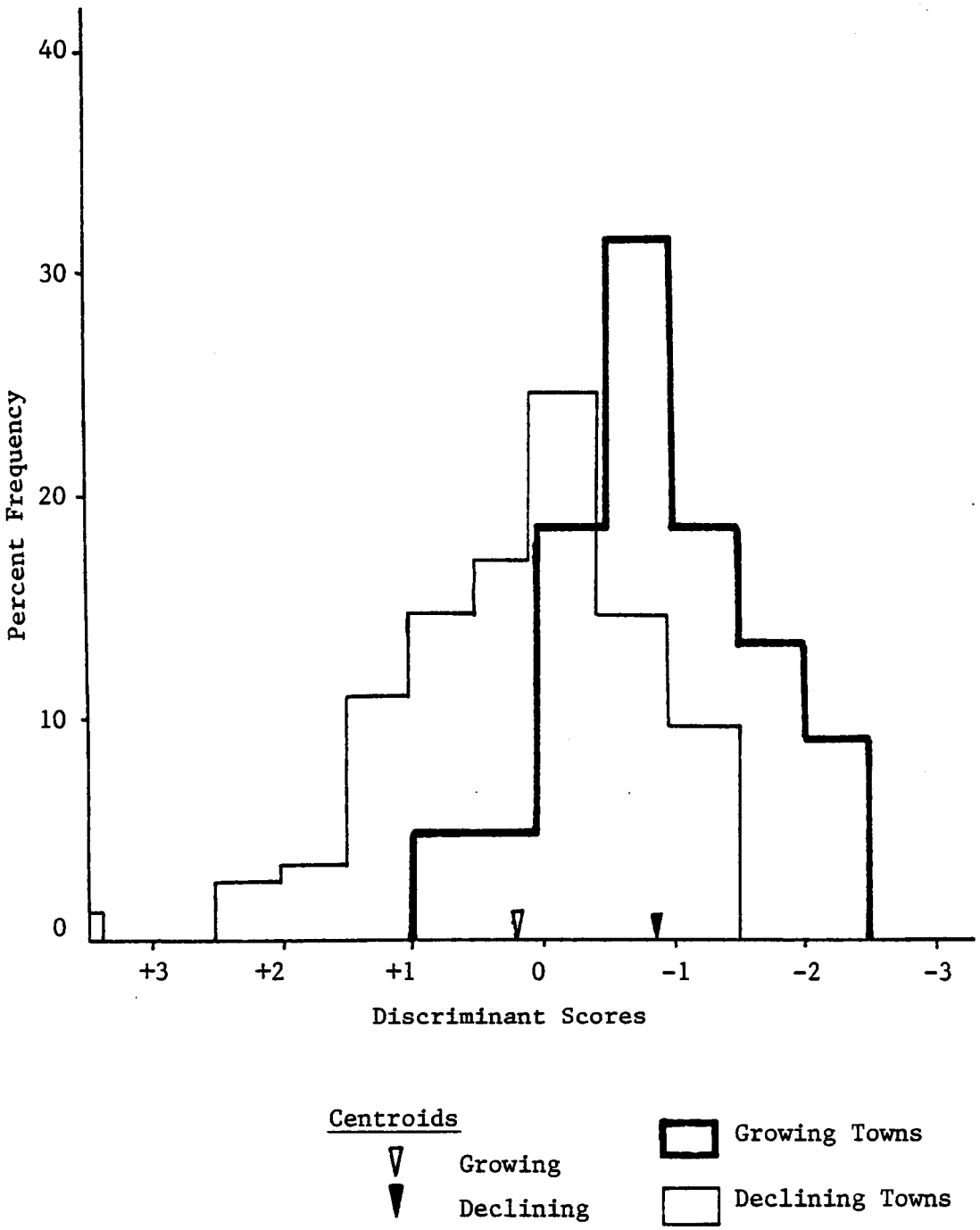

Figure 15. Frequency Distribution of Discriminant Scores: Town Viability Measured by Absolute Change in Population

TABLE 15

Confusion Matrix

Actual Group	# of Cases	Predicted Group Membership Declining	Growing
Declining	22	17 77.3%	5 22.7%
Growing	81	26 32.1%	55 67.9%

69.9 percent of the towns correctly classified.

TABLE 16

Means for Discriminant Function Variables Used to Explain Viability Grouping Defined by Absolute Change in Population

Variable	Mean Declining Towns	Mean Growing Towns
Nonworker-Worker Ratio (1970)	1.57	2.17
% Females in Labor Force (1970)	41.22	42.58
% Change Building Material Sales*	127.24	51.26
% Change Automobile Sales*	90.22	166.35
% Change Service Station Sales*	79.21	296.46
% Change Apparel Sales*	42.84	472.11
% Change Furniture Sales*	63.95	109.45
% Change Eating Establishment Sales*	66.05	239.57

*1963-1972

function, but the mean change for declining and growing towns was exactly opposite from what was expected. Many building material establishments may have fairly large tributary areas enabling them to remain viable even when the town in which they are located is declining. The two employment variables in the analysis were worker-nonworker ratio and percent of females in the labor force. Means for these two variables deviated between growing and declining towns in the expected directions.

Summary of Findings

Measuring nonmetropolitan viability by absolute changes in population is the most frequently used technique found in the geographic and rural sociology literature. As indicated by Figure 15, the ability to differentiate between growing and declining towns using a discriminant analysis on absolute population change was moderately successful. The analysis predicted group membership and correctly classified 69.9 percent of the towns (Table 15). The distribution of misclassified towns appears to be random, not displaying a heavy concentration in any area (Figure 16 and 17). Twenty-two of the 31 misclassified towns, however, are located in BEA's with lower population increases than the ESCCD.

The results of the analysis are generally as predicted. Building material sales had means for growing and declining towns contrary to previous hypotheses. An explanation for the deviation of building material sales from the expected is difficult to explain from the information available in this analysis. Johansen, in an earlier study of villages in the United States, suggested that building trades are

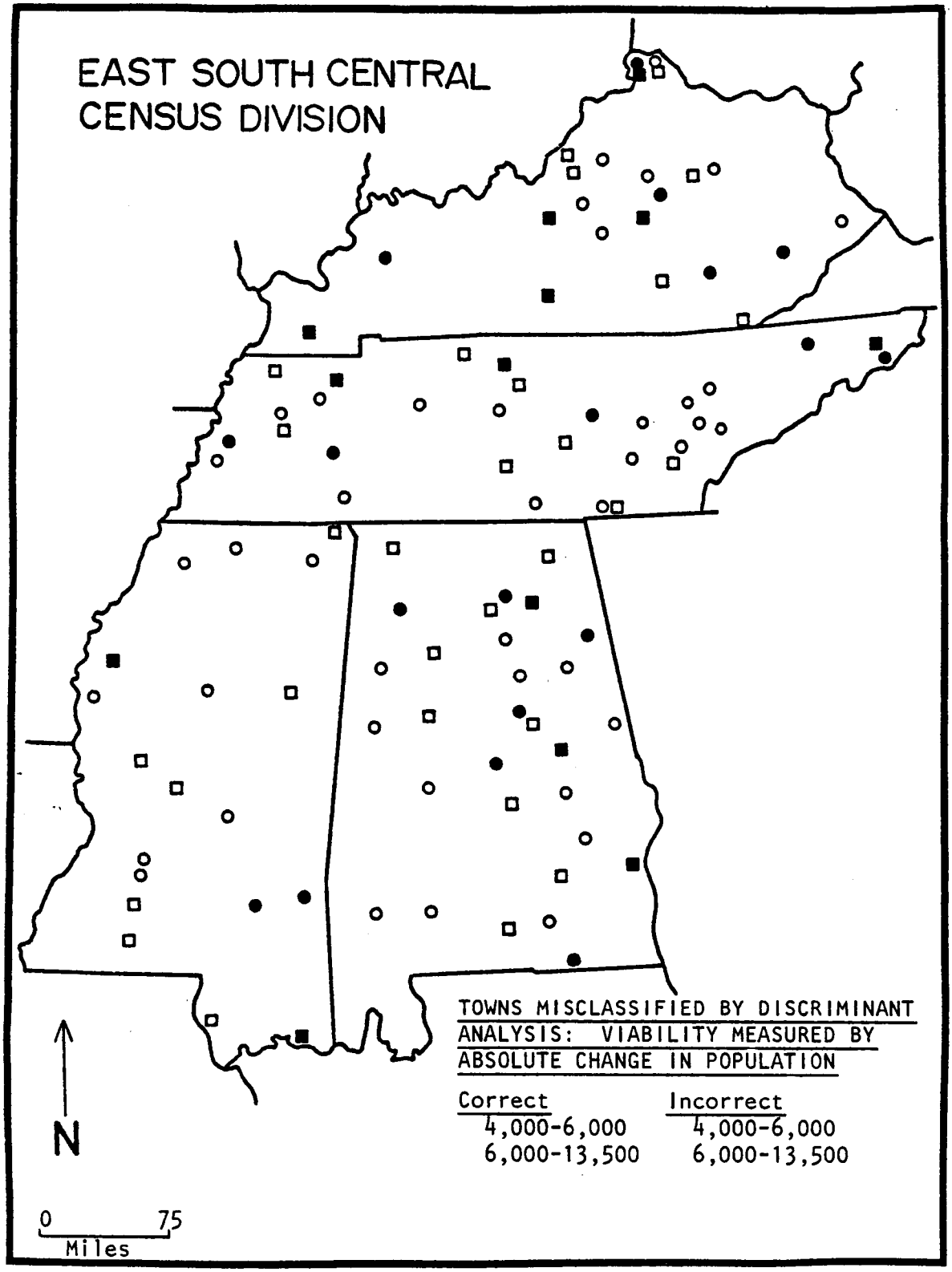

Figure 16. Towns Misclassified by Discriminant Analysis: Viability Measured by Absolute Change in Population

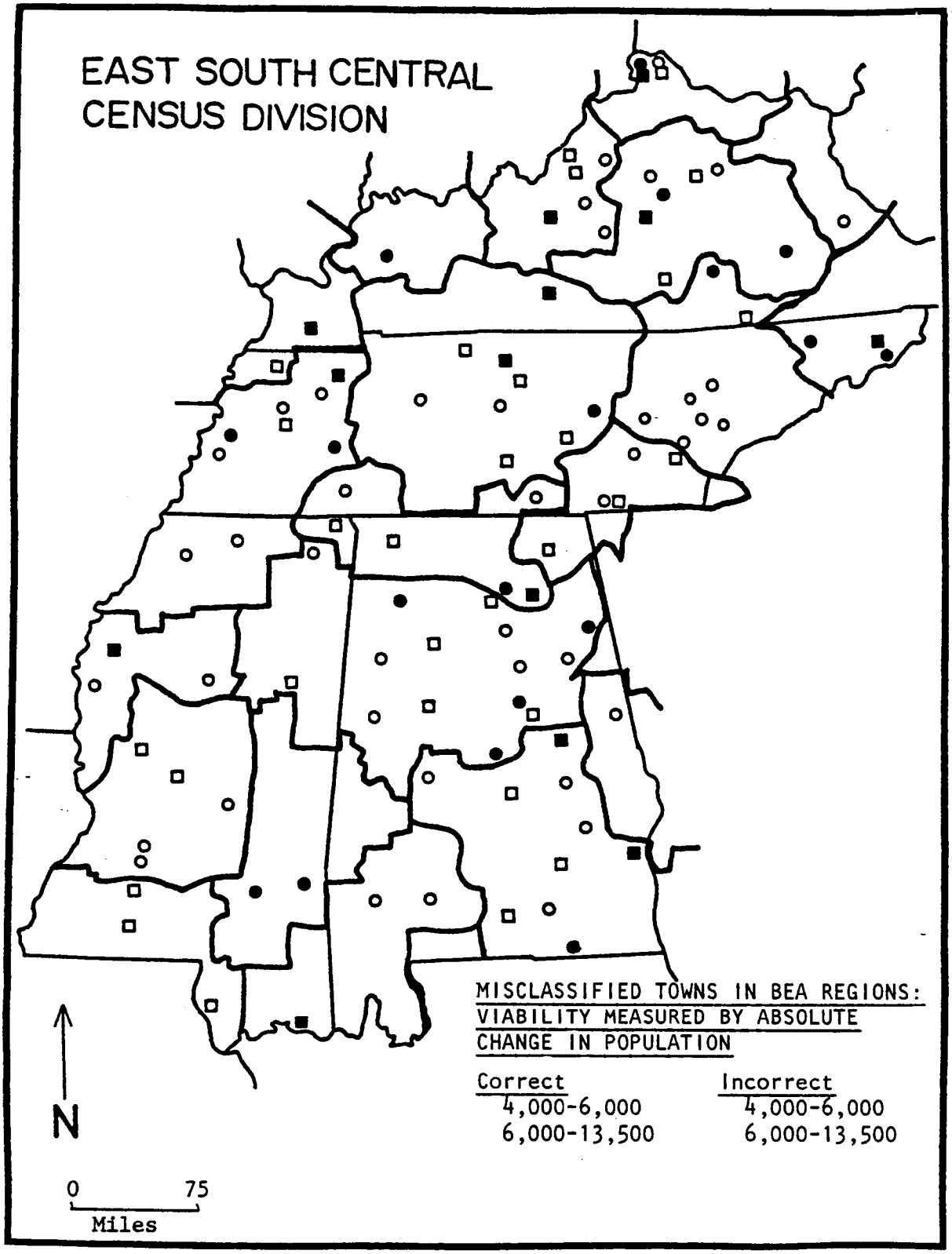

Figure 17. Misclassified Towns in BEA Regions: Viability Measured by Absolute Change in Population

benefiting from the trend of population growth in villages and rural areas.[52] This may be the case of the nonmetropolitan places in the study region. In the declining towns, growth that requires building materials may be occuring in the region surrounding the nonmetropolitan places causing the unexpected deviation in building material sales. Because the ESCCD lags behind the national average of urban residents, a major portion of the residential and commercial growth may be occurring in suburban areas and would not, therefore, show up in the census as town data. Another possibility is that due to the large numbers of small towns in the ESCCD, only certain towns are able to provide a large scale building materials store. This store would then serve several towns and the other towns would only offer minimum building material merchandise. The retail establishment variables in the discriminant function presents a mixture of high and low order goods, but the means for the variables varied as expected for growing and declining towns. The higher means for the two employment variables in the LDF indicate that growing towns are composed of younger families which are in the child bearing years. Also, because the families are likely young, many of the wives have to work to supplement the family income. These conclusions are consistent with the assumption that growing towns have a more normal population distribution than declining towns which have experienced selective outmigration.

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[52]Johansen, p. 105.

Discriminating Between Growing and Declining Towns When Viability is Measured by Absolute Changes in the Volume of Retail Sales

The variables selected to make up the discriminant function and their coefficients when the towns are grouped into those which are undergoing absolute decline or absolute gain in retail sales are given in Table 17. The four variables which make up the discriminant function in the order of importance are: percentage change in eating establishment sales; percent change in service station sales; percent change in building material sales; and, size of the labor force in manufacturing in 1970. The two most important variables in the LDF are percentage change in eating establishment sales and percentage change in service station sales--two low order functions.

The eigenvalue and canonical correlation for the absolute retail sales change analysis were 0.163 and 0.374, respectively. These values indicate a moderate ability to discriminate between the growing and declining towns, however, the ability is not quite as great as in the first analysis. The moderately poor ability to separate the two groups of ESCCD places is displayed in the frequency distribution (Figure 18). As can be seen in Figure 18, there is a fairly high percentage mixture of declining towns interspersed with the growing towns. It is interesting to note that although the separation of the two groups of towns is not impressive, the ability of the discriminant function to discriminant between the two groups is very good. Overall, 88.24 percent of the towns were correctly classified by viability group in this analysis. Only twelve towns were incorrectly classified (Table 18).

TABLE 17

Standardized Discriminant Function Coefficients: Town Viability Measured by Absolute Retail Sales Volume Change

Variable	Discriminant Coefficient
1. Labor Force in Manufacturing	0.256
2. Percent Change Bldg. Material Sales	-0.281
3. Percent change Service Station Sales	-0.572
4. Percent Change Eating Estab. Sales	1.080

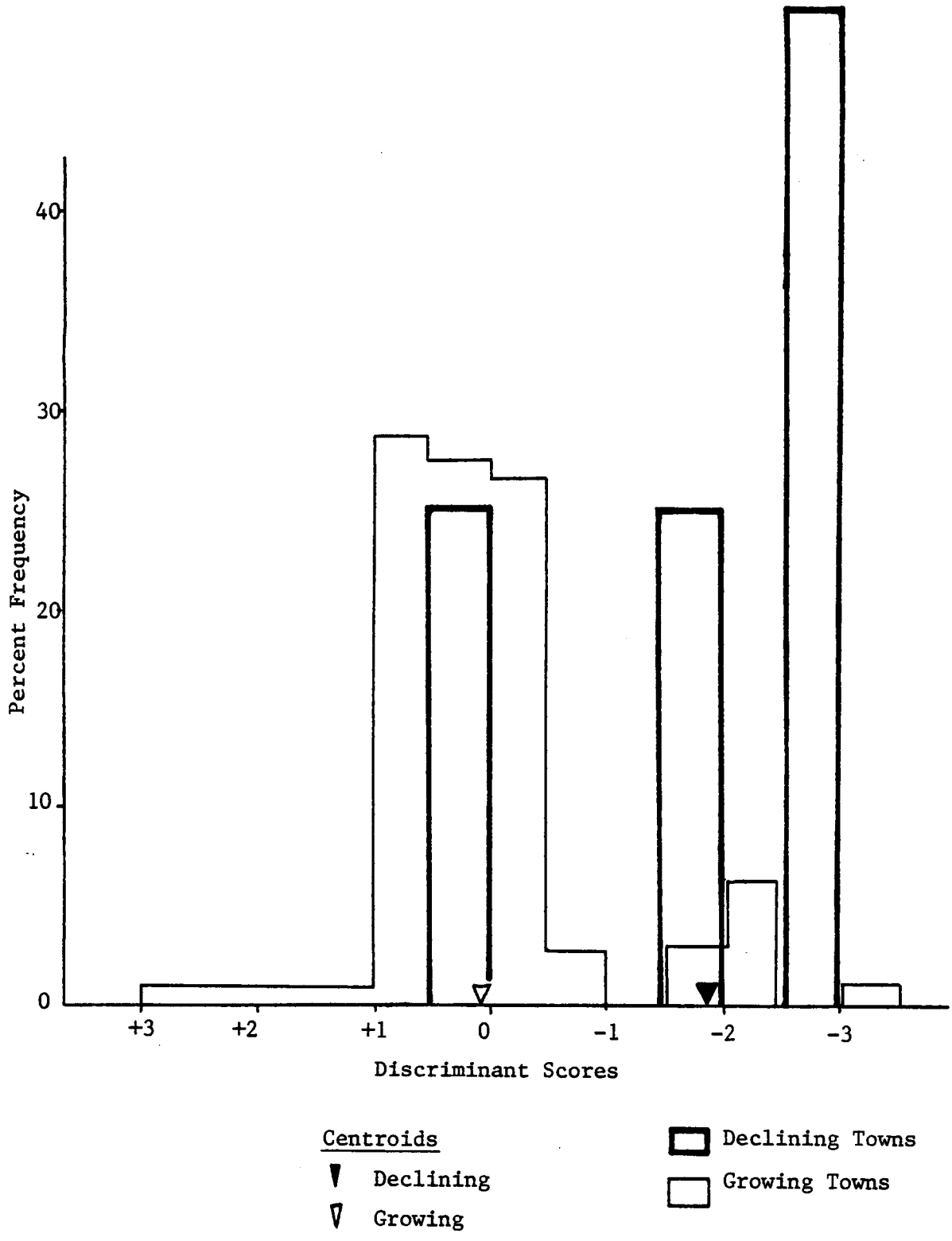

Figure 18. Frequency of Discriminant Scores: Viability Measured by Absolute Retail Sales Volume

TABLE 18

Confusion Matrix:
Absolute Retail Sales

Actual Group	No. of Cases	Predicted Group Membership Declining	Growing
Declining	4	3 (75.0%)	1 (25.0%)
Growing	98	11 (11.2%)	87 (88.8%)

88.24 percent of the towns correctly classified.

The eigenvalue and canonical correlation for the absolute retail sales change analysis were 0.163 and 0.374, respectively. These values indicate a moderate ability to discriminate between the growing and declining towns, however, the ability is not quite as great as in the first analysis. The moderately poor ability to separate the two groups of ESCCD places is displayed in the frequency distribution (Figure 19). As can be seen in Figure 19, there is a fairly high percentage mixture of declining towns interspersed with the growing towns. It is interesting to note that although the separation of the two groups of towns is not impressive, the ability of the discriminant function to discriminant between the two groups is very good. Overall, 88.24 percent of the towns were correctly classified by viability group in this analysis. Only twelve towns were incorrectly classified (Table 18).

Means for the variables which constitute the discriminant function in this analysis are shown in Table 19. The three retail variables all had higher means for growing towns than for declining towns. Eating establishment sales and service station sales (low order functions) had similar variations between growing and declining towns as in the previous analysis. Building material sales, however, exhibits a higher mean change in growing towns than in declining towns; opposite of the previous analysis. In this analysis, building material sales in the growing and declining towns deviated as expected; growing towns having higher increases. An explanation of this is that building material sales change is not confined to the corporate limits of the towns examined as is population change. The

TABLE 19

Means for Discriminant Fuction Variables: Analysis for Absolute Change in Retail Sales Volume

Variable	Mean Declining Towns	Mean Growing Towns
% Labor Force in Manufacturing (1970)	23.53	28.61
% Change Building Material Sales*	49.73	76.07
% Change Service Station Sales*	4.05	255.44
% Change Eating Establishment Sales*	45.76	203.40

*1963-1972

conflicting results of this analysis and the previous analysis may, therefore, be a result of retail sales being more descriptive of viability than population change. The mean for percent of labor force in manufacturing was greater in growing towns than in declining towns.

Summary of Findings

Measuring nonmetropolitan viability by absolute change in retail sales volume is not the traditional method of defining viability. The success of discriminating between growing and declining towns using absolute retail sales volume change in this analysis was very high--88.24 percent accurate. This is a much higher predictive rate than the analysis using absolute population change which was 69.9 percent accurate. The distribution of misclassified ESCCD towns for this analysis is shown in Figure 19. As Figure 19 illustrates, the spatial distribution of towns misclassified is difficult to interpret. Nine of the twelve misclassified towns in this analysis are located in BEA's which had slower population growth rates than the ESCCD (Figure 20). Eight of the twelve misclassified towns are also located in BEAs which have lower percentages of urban residents than the national average. This finding is consistent with the finding in Chapter 2 where more declining towns were located in the more rural BEA's.

Discriminating Between Growing and Declining Towns When Viability is Measured by Relative Population Change

The variables selected to make up the discriminant function and their coefficients when viability is measured by the change in population relative to overall population change in the East South

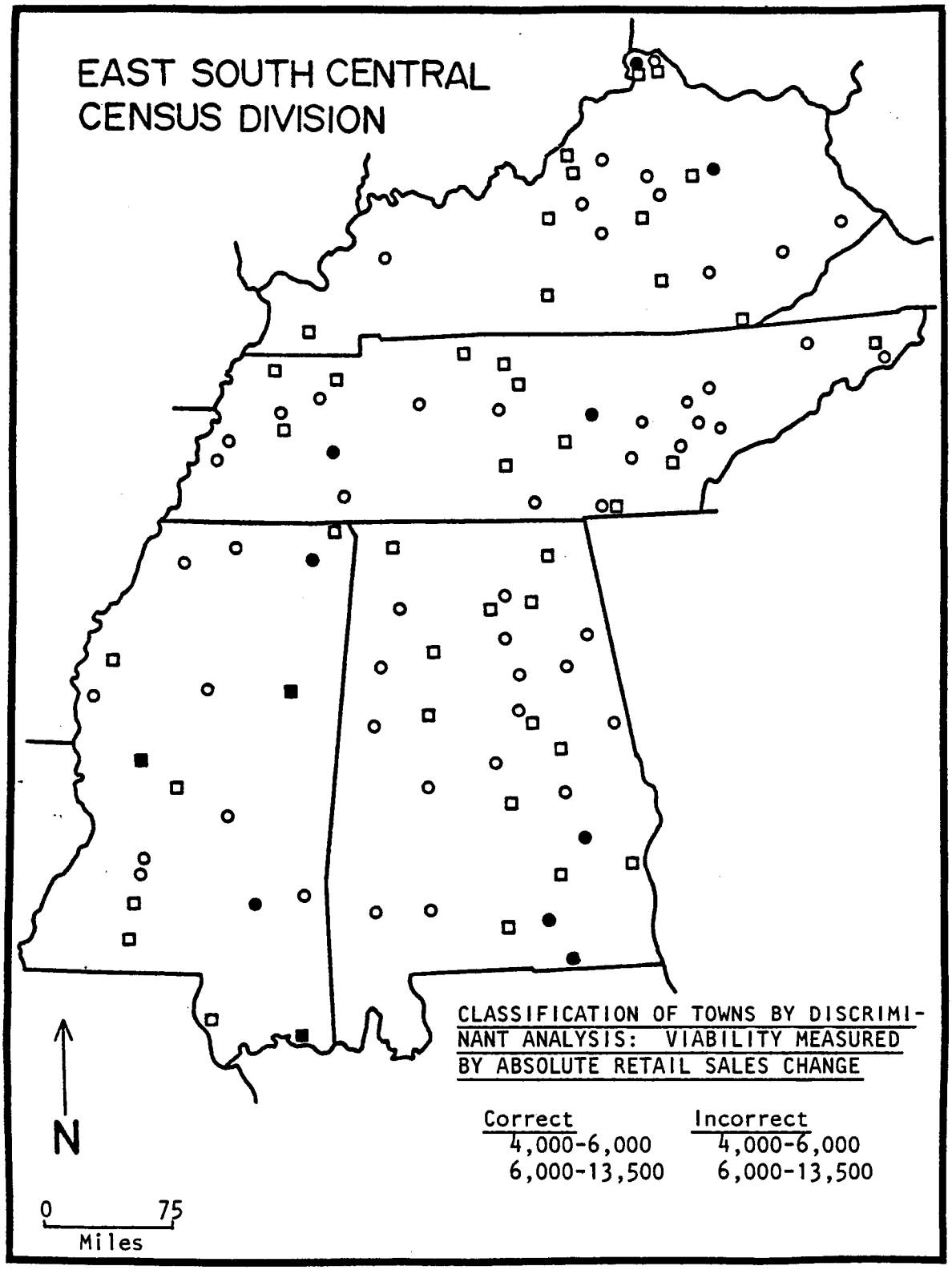

Figure 19. Classification of Towns by Discriminant Analysis: Viability Measured by Absolute Retail Sales Change

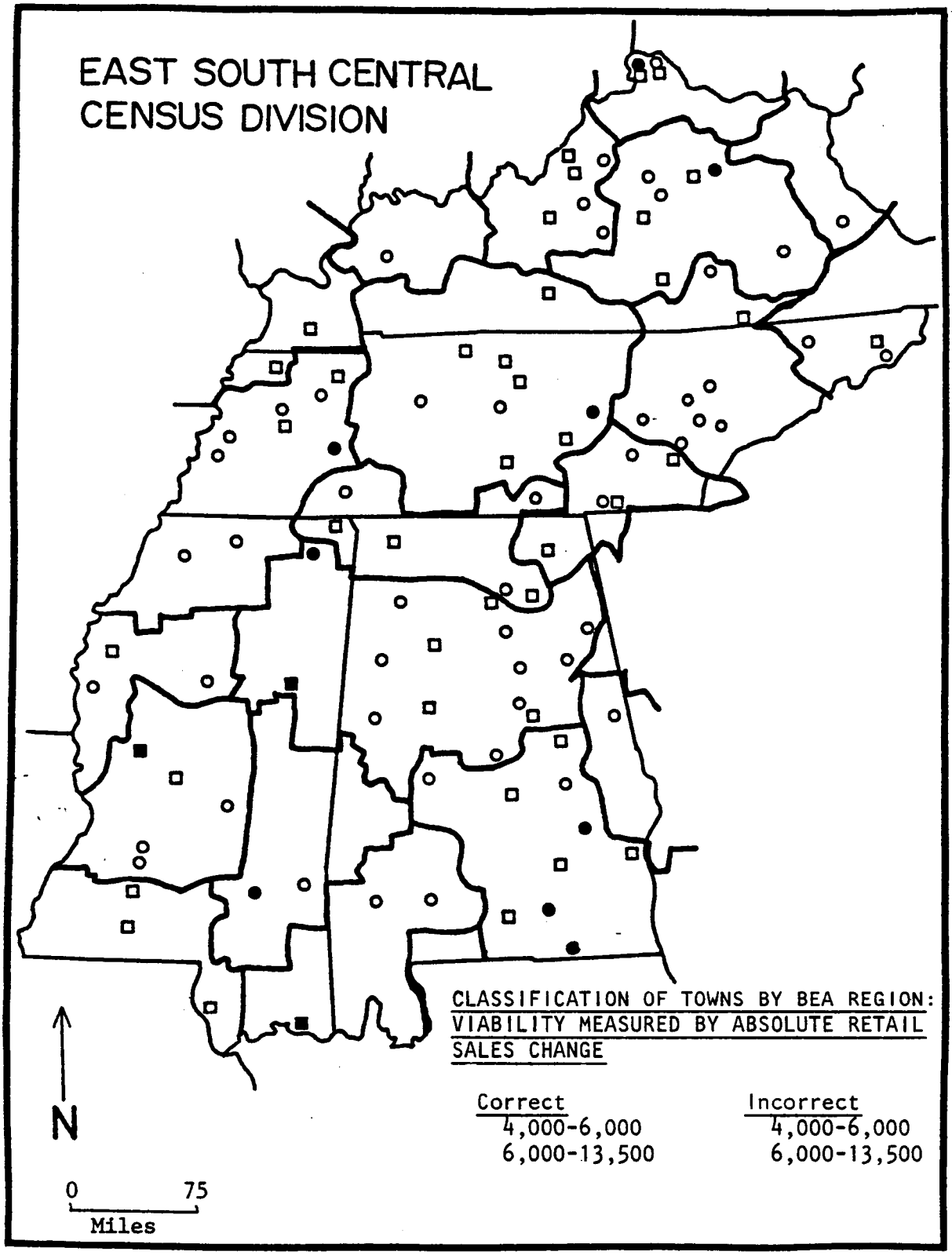

Figure 20. Classification of Towns by BEA Region: Viability Measured by Absolute Retail Sales Change

Central Census Division are shown in Table 20. In all, six variables make up the discriminant function in this analysis. The four most important variables in the discriminant function, in their order of importance are: number of females in the work force; percentage of the population with four years of high school in 1970; percentage change in service station sales; and percentage change in general merchandise sales. The two most important variables in the discriminant function indicate the importance of education and labor force characteristics to nonmetropolitan viability.

The eigenvalue and canonical correlations for the analysis are 0.263 and 0.456, respectively. These two values indicate a fair separation of the two groups based on their discriminant function. Figure 22 illustrates the separation of the growing and declining towns; a good separation of group centroids, with considerable overlap in the center. The accuracy of the discriminant function to separate and predict group membership was moderate, correctly predicting 74.6 percent of the group memberships (Table 21). The better ability of this analysis to discriminate between growing and declining towns, opposed to previous analyses, is attributed to the shifting of the numerical value used for defining viability from 0.00 percent in the absolute analyses to 6.30 percent for the relative change analysis.

Means for the variables which constitute the discriminant function are given in Table 22. The means for general merchandise sales and service station sales were higher in declining towns than in growing towns. The higher mean change for these two variables in declining towns is contrary to expectations.

TABLE 20

Standardized Discriminant Function Coefficients: Town Viability Measured by Relative Population Change

Variable	Standardized Discriminant Coefficient
1. 4 Years or More High School 1970	.423
2. Females in Work Force 1970	.513
3. Percent Change General Merchandize Sales	.375
4. Percent change Automobile Sales	-.312
5. Percent Change Service Station Sales	-.412
6. Percent Change Furniture Sales	-.345

TABLE 21

Confusion Matrix :
Relative Population Change

Membership Actual Group	# of Cases	Predicted Group: Declining	Predicted Group: Growing
Declining	33	24 72.7%	9 27.3%
Growing	70	17 24.3%	53 75.7%

74.6 percent of the towns correctly classified.

TABLE 22

Means for Discriminant Function Variables:
Relative Change Population

Variable	Mean Declining Towns	Mean Growing Towns
4 Years or More High School (1970)	41.03	46.74
% Females in Work Force (1970)	39.96	43.40
% Change General Merchandise Sales*	2084.44	113.17
% Change Automobile Sales*	86.45	180.28
% Change Service Station Sales*	457.97	125.12
% Change Furniture Sales	65.17	115.31

*1963-1972

Summary of Findings

Measuring nonmetropolitan viability by relative change in population met with moderate success in this analysis. The predictive success of the LDF is 74.6 percent of the towns correctly placed into growing and declining categories. The distribution of misclassified towns in this analysis, as in the two previous analyses, appears to be spatially superfluous (Figure 21). A high number of the misclassified towns (16 of 26), however, are located in BEA's with relative population decline (Figure 22).

In the growing towns, over five percent more of the adult population had four years of high school education than the declining towns (Table 22). This was expected as growing towns would retain and/or attract more educated workers than declining towns. In the growing towns, the mean percentage of females in the work force was higher than in the declining towns.

Discriminating Between Growing and Declining Towns When Viability is Measured by Relative Change in Retail Sales Volume

Only one variable was selected to make up the discriminant function when viability was measured by relative change in retail sales volume; percentage change in drug sales. Drug sales was the only variable in the LDF because the other variables added no appreciable discriminatory power to the LDF. The discriminant coefficient for drug sales is 1.00. The discriminatory power of the LDF in this analysis proved to be the weakest predictor of group membership thus far. The overall success rate for predicting group membership was 62.75 percent of the cases being correctly classified

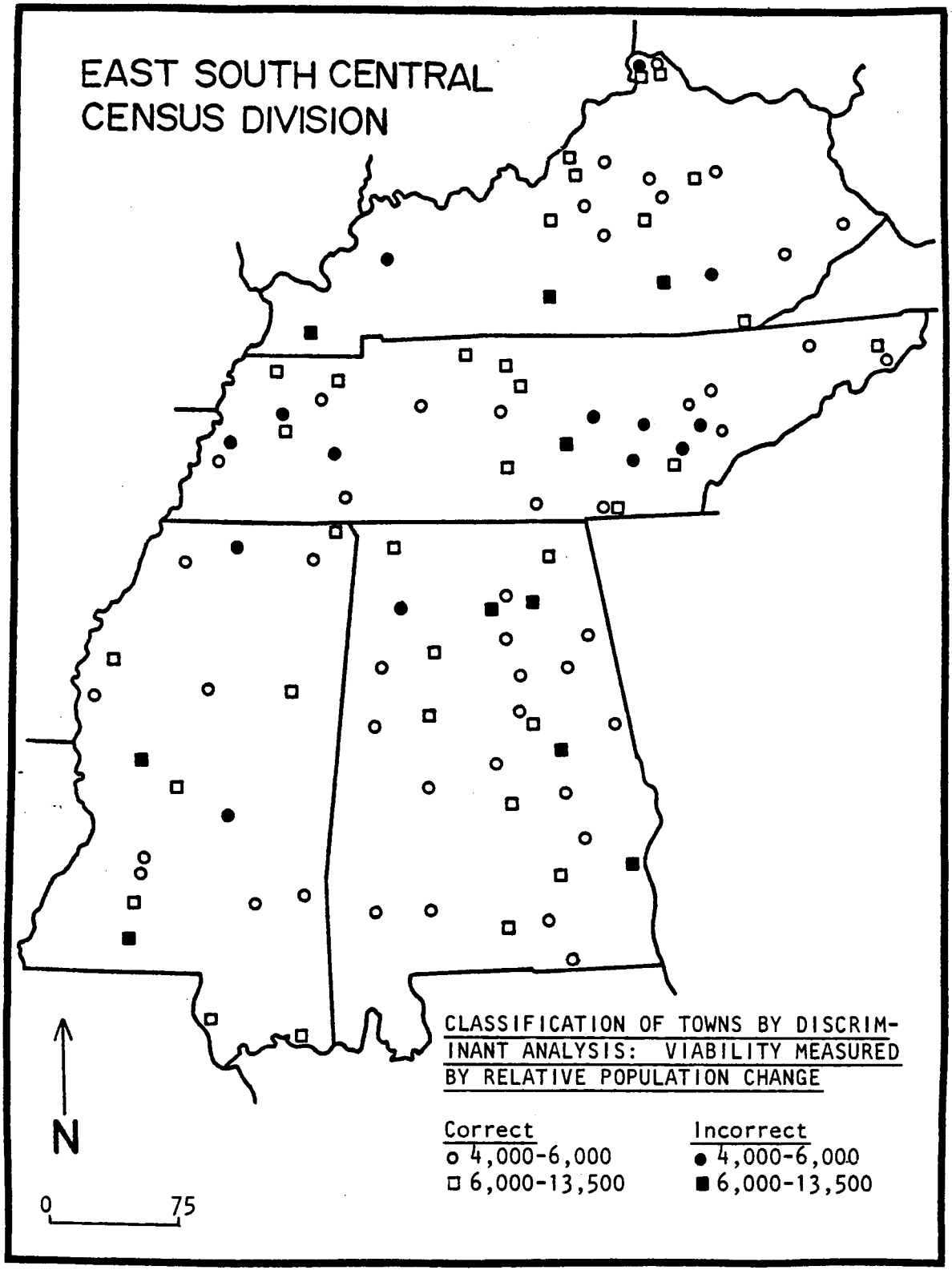

Figure 21. Classification of Towns by Discriminant Analysis: Viability Measured by Relative Population Change

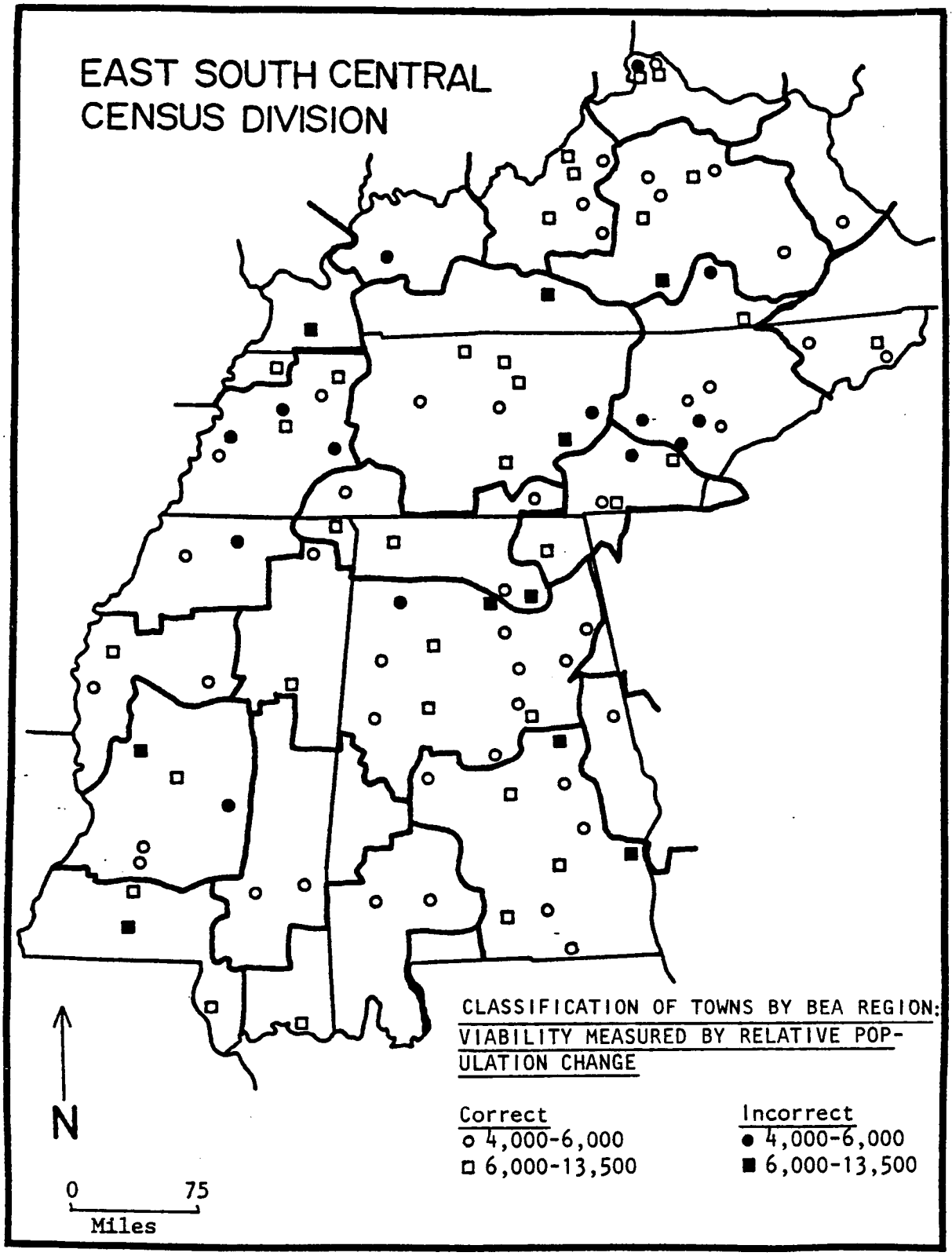

Figure 22. Classification of Towns by BEA Regions: Viability Measured by Relative Population Change

(Table 23). The prediction rate for growing towns was fairly successful having a 74.6 rate of correct classification. Fewer than fifty percent of the declining towns were correctly assigned to their correct a priori group by the discriminant function. It was the inability of the discriminant function to correctly predict declining town group membership that made the overall prediction rate in this analysis so low.

TABLE 23

Classification Table

Actual Group	# of Cases	Predicted Group Membership	
		Declining	Growing
Declining	43	20 46.4%	23 53.5%
Growing	59	15 25.4%	44 74.6%

62.75 percent of cases correctly classified.

Because of the selection of only one variable to make up the discriminant function, the eigenvalue was very high and the canonical correlation was 1.00. Because of the questionable interpretative value of the eigenvalue and canonical correlation in the analysis, the frequency distribution is a more descriptive interpretative tool (Figure 23). As Figure 23 illustrates, there is very little distance between the two group centroids. The histogram displays the problems in distinguishing between growing and declining towns (Figure 23). The discriminant scores in the analysis took only two values for growing and declining towns and were shared.

Summary of Findings

Measuring viability by relative change in retail sales in this analysis proved to be an inadequate, and perhaps inappropriate, method of distinguishing between growing and declining towns. Because of the questionable results of the analysis, it is difficult to suggest any relationship between the variables in the analysis and viability. Drug sales, the only variable in the LDF, had means for growing and declining towns that deviated in the expected way; more sales growth in growing towns than in declining towns. Figure 24 illustrates the distribution of correctly and incorrectly classified towns in the analysis. The distribution of misclassified towns in northeastern Alabama and eastcentral Kentucky exhibit some clustering. The cluster of four misclassified towns in Alabama is not near a SMSA, but the cluster of misclassified towns in Kentucky is close to the Lexington SMSA. Distance of the nonmetropolitan places to larger places is not a factor in the misclassification of the towns in this analysis.

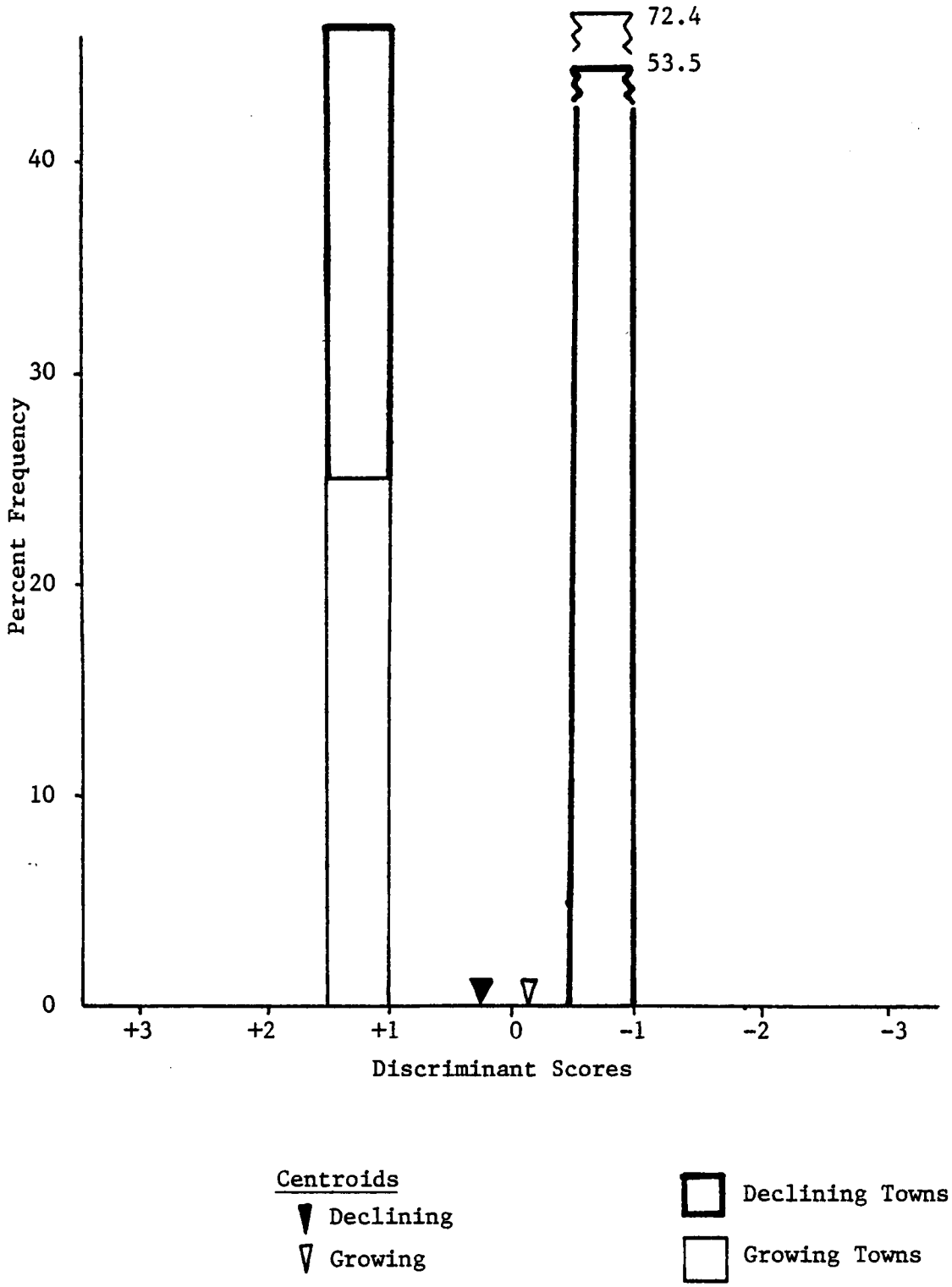

Figure 23. Frequency of Discriminant Scores: Viability Measured by Relative Change in Retail Sales

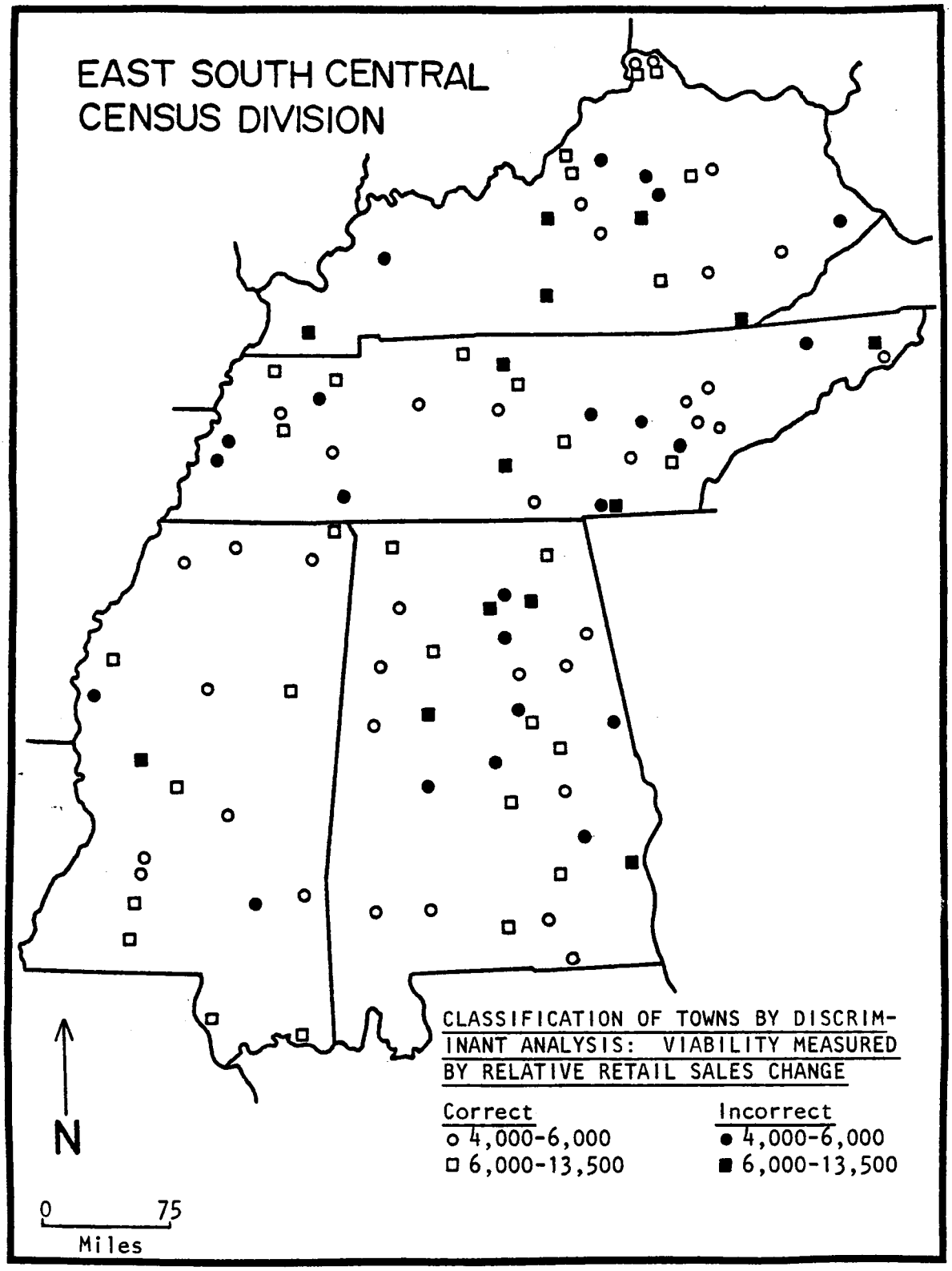

Figure 24. Classification of Towns by Discriminant Analysis: Viability Measured by Relative Retail Sales Change

Distinguishing Between Growing and Declining Towns When the Towns are Placed in Size Groups

The salient viability variables of nonmetropolitan places in the study region were previously discussed in the framework of changing the definition of what constituted nonmetropolitan growth and decline. This section of research uses the measures of viability previously used, but divides the nonmetropolitan places into two size categories: places with 4,000 to 6,000 population; and, places with 9,000 to 13,500 population. A preliminary phase of nonmetropolitan research is to determine the size of the places to be investigated. Central place theory clearly establishes a rationale for analyzing nonmetropolitan places by size categories. Of primary importance to placing towns into appropriate size categories is that towns are functionally different in retail and service makeup. The functional diversity of places is largely a function of their size because different goods and services enter the system as threshold levels increase. If towns are not placed into functional categories according to their size, research to determine the factors and processes responsible for the growth or decline of the towns may become hidden in a mass of self-cancelling statistical results.

By breaking down the nonmetropolitan places in the study region into two size categories, the number of discriminant analyses is doubled. As in the previous section, viability is measured by changes in population and retail sales volume. The variables which make up the discriminant functions of the analyses are shown in Table 24. The most important variables in Table 24 are numbered to show the order of their contributory significance to the discriminant functions. The

Table 24

Variables in Discriminant Functions by Towns Size Category

Discriminant Variable	Absolute Change Population		Relative Pop. Change		Absolute Ret. Sales Change		Relative Ret. Sales Change	
	Small	Large	Small	Large	Small	Large	Small	Large
Median School Years		X_2						
4 Years or More High School				X_2				X_4
Worker/Nonworker Ratio								
Percent Females in Labor Force		X_1		X_1				
Percent Labor Force Unemployed								
Percent Labor Force in Manufacturing		X_5			X_3			X_3
Median Income					X_5			
Percent Families Below Poverty Level			X_5	X_3			X_1	
Percent of Families With Incomes of $15,000 or More							X_4	
Percent Change Building Material Sales		X_3		X_4	X_4		X_3	
Percent Change Gen. Merchandise Sales	X_1		X_3	X_5				
Percent Change Food Sales								
Percent Change Automobile Sales	X_4		X_4					
Percent Change Service Station Sales	X_3		X_2		X_2			
Percent Change Apparel Sales		X_4						
Percent Change Furniture Sales	X_2		X_1				X_5	
Percent Change Eating Estab. Sales					X_1			X_1
Percent Change Drug Store Sales							X_2	X_2
Prediction Success	71.67	79.4	71.67	81.40	83.33		68.33	69.05

variables which are not numbered contribute approximately the same degree of explanation to the LDF.

Table 24 illustrates the effect that changing nonmetropolitan viability definitions has on the results of the discriminant analyses. The results of the discriminant analysis performed on large towns, where viability is measured by absolute retail sales change, is not presented in the Table. In this analysis, there are no declining towns, therefore, the discriminant procedure could not be applied. It is obvious from Table 24 that the discriminant functions for the small and large town analyses vary greatly. Not only do different variables make up the discriminant functions, but, if a variable is found in more than one discriminant function, it is of a different significance within the functions. This is a result of collinearity among the independent variables in the analyses. In all cases, the success of the group prediction ability of the discriminant function is greater for the large towns. This suggests that town size does play a significant role in the determination of factors associated with growth and decline, as central place theory suggests.

The analysis in which the a priori groups provided the greatest degree of discrimination between growing and declining towns is in the small town category where viability is defined by absolute changes in retail sales volume. In this analysis percent change in the volume of sales in eating establishment and service stations, two low order functions, are the most important variables in the discriminant function. The third most important variable in the function is percent of employment in manufacturing. This variable reflects the importance of basic activities to the economic viability of the towns.

Manufacturing was the one that is stressed in the literature as being of primary importance to the growth of nonmetropolitan places.

The analysis based on absolute changes in population was fairly successful. It is interesting to note that in the small town analysis, only retail variables make up the discriminant function. It was expected that when population was the surrogate for viability, that the socioeconomic variables would be most important in discriminating between growing and declining towns. In the large town analysis, the socioeconomic variables are important contributors to the discriminant function (Table 24).

The two analyses not discussed so far, relative changes in population and retail sales volumes, exhibit a mixture of results. The analysis based on relative change in retail sales is the weakest of the analyses in this section. The discriminatory power of the discriminant functions for these analyses were approximately the same for small and large towns. There is, however, a great difference in the variables that make up the discriminant functions for the small and large towns. The analysis performed on the size groups where viability was determined by relative population change was slightly more successful than the analysis based on absolute population change. The discriminant function variables for the two population analyses were quite different for the small town analyses and fairly similar for the large town analyses (Table 24).

Summary

Two sets of discriminant analyses are presented in this chapter: analyses based on all study towns in the ESCCD grouped together regardless of population size; and, analyses based on the two size

groups of towns in the study area. The results of these analyses serve to illustrate what variables are most important in describing the factors associated with the viability of the nonmetropolitan places in the study area. It was shown that in both sets of analyses that the manner in which viability was defined, by population or retail sales volume, determined what variables were most important in contributary power to the discriminant functions of the analyses. Results also varied according to whether viability was measured in absolute or relative terms. The latter set of analyses demonstrated the importance of defining size group categories, as the success of predicting growing and declining towns varied according to which size group was selected.

Discriminant functions, coefficients, frequency histograms, confusion matrices, and variable means for the four discriminant analyses where the towns were grouped together in growing and declining categories were presented. A summary of the contributing variables in the discriminant functions for these analyses are shown in Table 25.

The most successful discriminant analyses, based on the percentage of towns correctly classified as growing or declining, is the analysis where viability is determined by absolute changes in the towns' retail sales volumes. In this analysis 88.24 percent of the selected ESCCD towns were correctly classified by viability group (Table 25). The four discriminant variables in the analysis using absolute change in retail sales (in their order of importance) are: percentage change in eating establishment sales; percentage change in service station sales; percentage change in building material sales; and, percentage of the labor force in manufacturing.

TABLE 25

DISCRIMINANT ANALYSIS: TOWNS DIVIDED INTO GROWING AND DECLINING GROUPS

Discriminant Variable	Absolute Population Change	Relative Population Change	Relative Retail Sales Change	Absolute Retail Sales Change
4 Years or More High School		X_2		
Worker-Nonworker Ratio	X_3			
Percent Females in Labor Force	X_1	X_1		
Percent Labor Force in Manufacturing				X_4
Percent Change Building Material Sales	X_4			X_3
Percent Change General Merchandise Sales	X	X		
Percent Change Automobile Sales	X	X		
Percent Change Service Station Sales	X_2	X_3		X_2
Percent Change Apparel Sales	X			
Percent Change Furniture Sales	X	X		
Percent Change Eating Establishment Sales				X_1
Percent Change Drug Store Sales			X_1	

Looking at the retail sales variables in a central place hierarchy framework, two of the retail variables which are good discriminators (service station sales and eating establishment sales) are low order functions and one variable, building material sales, is a medium order function. The growing towns had higher sales increases in the three retail functions which were represented in the discriminant function. Eating establishments and service stations, both low order functions, had mean sales volume increases in excess of 200.00 percent in the growing towns. In growing towns in the ESCCD, these low order functions are primary beneficiaries of growth in population and retail sales because of excess discretionary income. This is because as families, or individuals, initially accrue discretionary income two of the first, and easiest, activities to increase is the number of times meals are eaten in restaurants and the amount of traveling one undertakes. Both activities are relatively inexpensive and require little savings. Because only a little more than one-half of the ESCCD's population resided in urban places in 1970, and many of the urban residents lived in small nonmetropolitan places not in close proximity to large urban centers, it is logical that when discritionary incomes increased the people traveled greater distances for shopping and recreation. This assumption is supported by median family income being a variable in the discriminant function of this discriminant analysis. The income variables in the correlation analyses which used absolute retail sales volume change as the surrogate for viability, also had significant correlations with the viability of nonmetropolitan places in the study region. The medium order function, percent change in building material sales, in

the discriminant function exhibited an increase of 76.07 percent in sales for growing towns and a 49.73 percent increase for declining towns. The rate of growth in building material sales is considerably lower for growing towns than for the two low order functions (Table 25). This is a result of sufficient discretionary income in the growing ESCCD towns which enables residents to purchase more low order goods, but not high order goods. Because the ESCCD has traditionally lagged economically and is now beginning to catch up with the nation in personal income, this ordering of retail purchases is logical.

In the absolute retail sales volume change analysis, the fourth variable in the discriminant function, percent of labor force in manufacturing, had a higher mean in the growing towns. This indicates the importance of manufacturing activities to economic growth and the differential spatial patterns of industrial location in the ESCCD. The importance of industrial location as a factor of viability is examined in the field work section which utilizes informed-person surveys.

The second most successful classification of growing and declining towns occured when viability was measured by relative changes in population. Six variables make up the discriminant function in this discriminant analysis. Overall, 74.8 percent of the towns were correctly classified. Only the percent change in service station sales is found in common with this discriminant function and the previous discriminant function. In this analysis, percentage of females in the work force and percentage of the adult population with four years of high school are the two most significant variables in the discriminant function (Table 24). The means for these two

variables are between 3 and 5 percent higher in the growing towns than in the declining towns. The salience of these variables in distinguishing between growing and declining towns is further corroborated by the correlation analyses in Chapter 3; growing towns did have a high r value when correlated to education. The percentage of females in the labor force, however, had an insignificant r value (Table 10, page 86).

The final two discriminant analyses had group prediction rates of less than 70.00 percent (Table 24). Because of the relatively low prediction success of these two analyses, compared to the previous analyses, it is concluded that if viability is to be measured from census material (where towns are grouped into large size categories) absolute changes in retail sales volumes and relative changes in population are the most accurate predictors of nonmetropolitan viability in the study region.

Very few spatial clusters of misclassified towns in the ESCCD emerged from the discriminant analyses. Based on the literature review, expectations were that proximity of nonmetropolitan places to large metropolitan centers would be a factor in the growth of selected nonmetropolitan places. Since the BEA's are functional economic units based on commuting patterns and commodity distribution centered on a large city, distance was expected to be an important viability factor. Declining towns were expected, therefore, to be at greater distances from large centers than growing towns. Although this relationship was not confirmed, misclassified towns were predominately located in BEA subregions which were declining in population relative to the increase for the ESCCD.

CHAPTER 5

CASE STUDIES OF NONMETROPOLITAN PLACES

Introduction

To further assess the characteristics and factors associated with and responsible for viability in the nonmetropolitan places in the ESCCD sample, this chapter examines six towns in Tennessee. It is felt that additional analyses of the spatial, social, and economic characteristics of the six case study towns will effect a more clear understanding and interpretation of the analyses from the preceeding chapters.

Selection of Nonmetropolitan Case Studies

In the first part of Chapter 4, four discriminant analyses were performed on the 103 nonmetropolitan places in the study region. In each of the analyses, a discriminant function was derived and towns were grouped as growing or declining according to their viability characteristics. The predictive success of the discriminant function to properly classify the towns varied from one analysis to the next. Although growing and declining nonmetropolitan places are the two categories examined in the discriminant analyses, a second level of town classification groups can be extracted from the discriminant analysis results: 1) towns correctly classified as growing; 2) towns correctly classified as declining; and 3) towns misclassified (Table 26). Because all of the towns were subjected to eight discriminant analyses, each town has four individual discriminant scores and are classified accordingly. The predictive ability of the discriminant

TABLE 26

POSSIBLE CLASSIFICATION CELLS FROM
THE DISCRIMINANT ANALYSES RESULTS

	Absolute Change		Relative Change	
	Pop.	Sales	Pop.	Sales
Correctly Classified as Growing				
Correctly Classified as Declining				
Incorrectly Classified				

function determines the number of towns misclassified in each analysis. Misclassified towns are either classified as growing or declining when the discriminant function predicted them to belong to the opposite group.

The selection of the nonmetropolitan case studies, using the discriminant analysis classification, insures that the towns selected for further study represent an array of population and retail sales volume viability characteristics. Because of the large areal extent of the study region, the number of towns to be studied in more detail is held to a minimum by selecting at least one town that is correctly predicted to fall into one of the growing or declining town groups in each analysis. Towns in Tennessee are chosen for further examination to accomodate time limitations for research and to hold to a minimum the number of exogenous spatial variables which may affect viability in the ESCCD.

A total of 31 nonmetropolitan places are located in the Tennessee study study area. Since all towns are used in each of the four discriminant analyses, each town appeared four times in the matrix. Towns are selected from the matrix that have high a posteriori probabilities in at least one cell of the matrix (excluding the misclassified cells). By selecting towns in this fashion, each of selected towns may have a high a posteriori probability of belonging to a specific cell in one analysis and a low a posteriori probability of belonging to the same town type group in the next analysis. Declining towns are least often correctly classified and growing towns are most often correctly classified. The towns which are in the

incorrectly classified cells represent the second most frequent classified type of town. Correctly classified declining towns are not more numerous because there are fewer declining towns.

Six towns are selected for further research. The six selected towns are Dayton, Shelbyville, Jefferson City, Clinton, Rogersville, and Sparta, Tennessee. The cells to which the six selected towns belong, according to their classification by the four discriminant analyses, are shown in Table 27. Only Sparta, Tennessee belongs to the same classification group for all of the analyses; towns incorrectly classified. The other five towns exhibit a mixture of town type categories within the table. Because of the differing criteria for defining viability in the analyses and the large number of independent variables which can constitute the discriminant function in each analysis, consistency of cell membership from one analysis to the next is not expected.

The six towns selected represent a cross-section of the study towns in the Tennessee region. The largest concentration of the total towns in the Tennessee portion of the study region is in the eastern sector of the state. Four of the six towns (Clinton, Dayton, Rogersville, and Jefferson City) selected for further analysis are in east Tennessee. Two of the towns (Shelbyville and Sparta) are in middle Tennessee. Although the selection of case study towns is limited to Tennessee, all of the classification possibilities of the analyses are represented.

TABLE 27

TOWNS SELECTED FOR FIELD WORK

	Absolute Change		Relative Change	
	Pop.	Sales	Pop.	Sales
Correctly Classified as Growing	Dayton Shelbyville	Clinton Dayton	Shelbyville Jeff. City	Clinton
Correctly Classified as Declining	Clinton	Rogersville	Clinton	Jeff. City
Incorrectly Classified	Sparta Rogersville	Sparta	Dayton Sparta	Dayton Sparta Shelbyville Rogersville

Characteristics of the Case Study Towns

All of the case study towns, with the exception of Clinton, are thirty miles or more from a major metropolitan center. Because of the varying distances of the case study towns from major metropolitan centers, it is possible to further assess the influence of the larger centers on the economic viability of the case study towns. Clinton and Rogersville, Tennessee, the only two towns within a SMSA county, provide a check for assessing the influence of proximity to metropolitan places on the viability of nonmetropolitan places.

Five of the six towns grew in population between 1960 and 1970 (Table 28). The one exception was Clinton, Tennessee which recorded a 3.0 percent loss in population. Five of the towns grew in their volume of retail sales between 1963 and 1972. The one exception was Rogersville which recorded an 86.43 percent loss in retail sales volume. The loss of retail sales in Rogersville is interesting because its population grew 29.60 percent between 1960 and 1970. Clinton stands out for the opposite reason, its population declined 3.0 percent and its volume of retail sales increased 93.01 percent during the study period. The discrepancies between population change and retail sales volume change in Clinton and Rogersville raises the question of the importance of proximity to metropolitan places in the growth process because both towns are located in SMSA counties. Clinton, located in Anderson County, belongs to the Knoxville SMSA, and Rogersville, located in Hawkins county, belongs to the Sullivan-Hawkins county (Bristol) SMSA. The expectation was that towns which were very close to, or part of, large metropolitan areas

TABLE 28

POPULATION AND RETAIL SALES CHARACTERISTICS
OF THE CASES STUDY TOWN

	Clinton	Dayton	Jefferson City	Rogers-ville	Shelby-ville	Sparta
Pop. 1960	4,943	3,500	4,550	3,121	10,466	4,510
Pop. 1970	4,794	4,361	5,124	4,045	12,262	4,930
% Change 1960-1970	-3.00	24.60	12.60	29.60	17.2	9.30
Retail Sales 1972*	23,399	13,298	9,528	1,860	34,424	21,569
Retail Sales 1963*	12,123	8,971	7,700	13,707	25,863	13,546
% Change Retail Sales 1963-1972	93.01	48.23	23.74	-86.43	33.10	59.23

*Retail Sales figures are adjusted to 1967 constant dollars. Retail Sales data are in $1,000.

would be experiencing similar growth processes and therefore, have similar viability characteristics. If the viability characteristics of the two BEA's Clinton and Rogersville belong to are examined, the causes of their different viability characteristics become somewhat clear. Both BEA's (Knoxville, Tennessee and Bristol, Virginia) exhibit similar viability characteristics on certain education and employment variables (Table 3, p. 37). The inhabitants of the Knoxville BEA, however, have better educations, slightly lower unemployment rates, higher numbers of families below the low income level and above the $25,000 income level, larger farm size and a higher amount of agricultural income than the inhabitants of the Bristol, Virginia BEA. A larger percentage of the total acreage of the Bristol BEA is in farmland than in the Knoxville BEA and more of the Knoxville region inhabitants are classified as urban. The total population of the Knoxville BEA also increased 3.3 percent while the BEA which encompasses Bristol declined 3.1 percent. The socioeconomic characteristics of these two BEA's and the growth characteristics of Clinton and Rogersville are consistent with the findings in Chapter 2. In Chapter 2, it is shown that nonmetropolitan places in less urban BEA's which are oriented to primary activities have a higher incidence of decline than places in more urban-industrialized BEA's.

In view of the differences between the viability characteristics of Clinton and Rogersville, and their perspective BEA's, several general comments can be made. First, the retail sector in Rogersville is not as dynamic as in Clinton. The inhabitants of the Knoxville BEA, including Clinton, have more families earning high incomes and

can, therefore, afford more retail goods. The size and number of farms in the Bristol BEA as well as the lower farm incomes and higher numbers of rural residents, indicate a less viable economic climate than that found in the Knoxville BEA. The loss in population in Clinton is a result of suburbanization of the area than outmigration. The large population gain in Rogersville is a result of commuter relocation and ongoing industrial and public works projects (e.g., TVA) in the area.

In order to better understand the differing degrees of viability for the case study towns, a comparison of the site and situational characteristics of the towns is undertaken. This section of research analyzes selected accessibiltiy, centrality, and industrial development characteristics of the six towns.

Fuguitt and Beale have documented the importance of adequate transportation linkages for rural development in the United States.[53] Access to interstate highways, in Fuguitt and Beale's study, was found to have a positive effect on the growth on nonmetropolitan places. All six case study towns are served by at least one railroad. Clinton is served by three railroads and Rogersville by two. Access to rail transportation is approximately equal for the six towns and does not appear to be an important factor in the towns' growth and decline variations. While this does not mean that all six towns are served equally by rail facilities, the potential for equal service exists.

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[53]Glenn V. Fuguitt and Calvin L. Beale, "Population Change in Nonmetropolitan Cities and Towns," Economic Research Service, Report No. 323, U.S. Department of Agriculture (1976), p.12.

The six towns are intersected by at least one U.S. Highway and one State Highway. All of the towns are within forty miles of an Interstate Highway (Table 29). The average distance to an interstate highway for the six towns is 16.4 miles. Dayton, being 34 miles from I-40, is farthest from an interstate and Clinton, which is 5 miles from I-75, is the closest. From Table 30, it is difficult to establish or confirm a positive relationship between growth of nonmetropolitan places and proximity to interstate highways. The distance of the 103 nonmetropolitan places in the ESCCD to larger places as a growth stimulus also proved inconclusive in Chapter 2. Further work to determine the relationship between the distance a place is from major highways and larger places is, therefore, suggested in future studies. In previous chapters, the assertion that the more industrial development a town has, the more it grows in population and retail sales was examined. In Chapter 3, 18 socioeconomic and retail sales variables were correlated to the viability of the 103 nonmetropolitan places and the results of these analysis confirmed this hypothesis. The discriminant analyses in Chapter 4 also illustrated the importance of manufacturing employment to absolute retail sales viability. The largest town, Shelbyville, has fifteen industries and 4,559 industrial workers (Table 30). The smallest town, Rogersville, has 10 industries and 3,302 industrial workers. Shelbyville, which had a higher population growth rate than the ESCCD and is also the largest case study town examined, has a smaller percentage of its population employed in industry then four of

TABLE 29

ACCESS TO TRANSPORTATION FACILITIES OF
THE CASE STUDY TOWNS

Town	Local Highways	Distance to Interstate
Clinton	U.S. 25 W State 61	I-75--5 miles I-40--14 miles
Dayton	U.S. 27 State 30, 60	I-75--38 miles I-40--34 miles
Jefferson City	U.S. 11E State 92	I-40--10 miles
Rogersville	U.S. 11W State 66,70	I-81--12 miles
Shelbyville	U.S. 41A, 231 State 16, 64, 84, 130	I-24--24 miles
Sparta	U.S. 70 State 84, 42	I-40--16 miles

TABLE 30

INDUSTRIES AND INDUSTRIAL WORKERS FOR CASE STUDY TOWNS

	Clinton	Dayton	Jefferson City	Rogers-ville	Shelby-ville	Sparta
Pop. 1970	4,794	4,361	5,124	4,054	12,060	5,665
County Pop. 1970	60,300	17,202	24,940	33,726	25,383	17,088
No. Industries 1978	13	16	13	10	15	15
No. Industrial Workers 1978	1,813	2,651	2,259	3,302	4,559	3,514

Source: Tennessee Department of Economic and Community Development.

the other towns. Rogersville has a much higher percentage of its population employed in manufacturing than Shelbyville.

From examination of the relationship of industrial development to the rate of growth in the six case study towns, the assertion made earlier that towns with the highest percentages of industrial workers (or industries) are the towns with the highest growth rates can not be substantiated. The same is true if retail sales change is substituted for population change in the assertion (see Tables 29 and 30). The relationships between industrial employment and viability in the 103 nonmetropolitan places studied was positive in most cases, but relatively weak (Chapter 3). A primary problem associated with the relationship between the number of industries or industrial workers in a town and the viability of that town is that of the properly bounding the town's labor shed. Industrial workers may live outside the corporate limits of the town, or in other towns and counties and commute to the town for employment. To test this assertion, a correlation analysis was run on percent population change in the BEA's which comprise the ESCCD (1960-1970) and the percentage of employment in manufacturing in the BEA's. The correlation coefficient was 0.23; relatively weak. Although this correlation coefficient is higher than the same correlation coefficient for the 103 nonmetropolitan places in the study region, it is still too low to formulate a definite conclusion regarding the relationship between manufacturing employment and nonmetropolitan viability.

To assess the role of centrality as a characteristic of viability in the case study towns, selected data were compiled which reflects

centrality. The number of banks and their combined assets for each town is a measure of the town's economic pulling power relative to the other towns. The number of hospitals is an indicator of the town's size and of its subregional influence. The number of churches is a measure similar to the number of hospitals. The number of hotels-motels and rooms for each town reflects the relative importance of the towns as a focus for travel (Table 31).

As is illustrated by Table 31, Clinton has the highest total amount of bank deposits of any of the case study towns and the largest number of banks. Clinton also has the second largest number of motel-hotel rooms of the six towns. These statistics are interesting because Clinton was the only town of the six to lose population between 1960 and 1970. Clinton did, however, have the highest retail sales gain of the towns during the study period (93.0 percent). This can possibly be explained by the proximity of Knoxville to Clinton and the direct and indirect residential and retail sales benefits which Clinton may recieve from this location. Clinton is also within commuting distance to Oak Ridge, Tennessee which is a large employer of government workers. Workers could, therefore, live in Clinton (or in surrounding areas) and commute to either Knoxville or Oak Ridge. This may explain the high amount of bank deposits in Clinton. The number of motel rooms may be a result of access to Knoxville and also to recreational activities in the area. Shelbyville has the second highest amount of bank deposits and the highest number of motel-hotel rooms and churches. Shelbyville was also the most viable study town, in appearance, examined. The number of motel-hotel rooms in

TABLE 31

SELECTED MEASURES OF CENTRALITY

	Clinton	Dayton	Jefferson City	Rogers-ville	Shelby-ville	Sparta
Banks	4	3	2	2	3	3
Banks Combined Assets (million)	150+	60+	25+	75+	113+	72+
Hospitals	2	1	1	1	1	1
Churches	8	8	9	16	30	10
Hotels and Motels	4	3	2	6	9	2
Rooms	170	50	60	97	235	65

Shelbyville can be explained by the prominance of that area for breeding and showing Tennessee Walking Horses. The bisection of Shelbyville by state and federal highways may also help explain the strip development and motel accommodations in the town.

Field Work Method

Information for the six case study towns is divided into two parts: 1) general information collected from local, state, and federal agencies; and 2) information compiled from informed person interviews and direct observation. The general information consists primarily of planning reports from state and local agencies. In the previous section, Community Data Sheets, prepared by the Tennessee Department of Economic and Community Develoment, provided recent statistics concerning industrial development and employment, accessibility, and community facilities for each of the selected case studies. The data available from the Tennessee Department of Economic and Community Development included supplemental information which is not readily available from the United States Census Reports. This information was very suitable for comparison among the selected towns and provided additional measurements of viability not discussed in previous sections. This section expands on the information previously presented by examining selected socioeconomic viability for the six case study towns.

The field work section of this chapter seeks to elicit responses from informed persons in each community regarding their perceptions of the viability of the respective towns, reasons for growth or decline in the town, efforts of local politicians and civic leaders to

encourage economic growth, the success of such development efforts, and the shopping patterns of the local inhabitants. A sample informed person interview guide is provided in Appendix A.

A minimum of three informed persons were interviewed in each town. If possible, the mayor of each town was interviewed. It is felt that the mayor is the person in each town most likely to have information regarding current development programs, past development programs, the vitality of the retail sector, and the success of past and present development programs in stimulating economic growth. Local merchants, planners, and police officers constituted the majority of the remaining interviews. In all cases, an attempt was made to interview persons who had been residents of the communities for a minimum of five years. The five year minimum residency of the interview respondents help insure the answers which they provided were based on a sufficient degree of familiarity with the town.

To supplement the data collected from state and local agencies and the informed person interviews, time was alloted during the field work to walk around in each of the case study CBD's and drive around the communities. The information gained from the casual exploration of the six towns is subjective in nature, but provides added insight into the degree of economic vitality found in each town.

General Information for the Case Study Towns

In order to better understand the nature of the viability characteristics of the Tennessee towns selected for detailed study, it is necessary to first examine the resources each town has available to aid in development efforts. A primary development resource in any

geographic area is the people. Not only are the demographic characteristics of the local population important, but the quality of the local labor force and the local leadership are also important to development and growth. The quality of the local leadership can at least paritally be justified as a factor in the growth of nonmetropolitan places. Declining towns are the towns where the better educated and more highly trained portion of the population leave the area in search of better opportunities elsewhere. For these people, the decision to migrate is one of weighing the positive attributes of migration (e.g., increased job opportunity, better climate) against the negative aspects of migration (e.g., insecurity, distance from family, pollution). Outmigration from an area is therefore considered an investment decision.[54] The people left behind are the less educated and least able portion of the population to leave. These people cannot find or compete for better jobs elsewhere. The result is a spiral effect on growth; towns which had experienced slight decline lose more of their leadership and therefore decline even more. Examination of the six case study towns leads to the questioning of the premise that strong local leadership has a positive relationship to the growth of a town.

All six of the towns selected for further study have planning commissions and a more or less standard set of planning documents which includes land use plans, zoning ordinances, subdivision

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[54]Richard J. Cebula and Richard K. Vedder, "A Note on Migration Economic Opportunity, and the Quality of Life," Journal of Regional Science, Vol. 13, no. 2 (1973), pp. 205-206.

regulations, and housing plans. The completion of these plans is more a result of state and federal requirements than initiation of the city fathers. The list of plans just mentioned includes the basic group required by state and federal agencies to secure various development funds. Small nonmetropolitan places do not normally employ full time mayors or city planners. All six of the case study towns receive planning assistance from the Tennessee State Planning Office. The planner assigned to the individual town has the responsibility to take care of the planning needs of that community. The planner, for example, takes major responsibility for the writing of the land use plan or zoning ordinance. While this is often done in cooperation with the local community, most of the initial decisions are left to the planner and later reviewed by the city council or planning commission. The planner often has the responsibility of informing the local communities of programs under which monies may be obtained and aiding in the application process for those monies.

In addition to the assistance provided by the Tennessee State Planning Office, individual towns also receive assistance from their Regional Development Districts and State Housing Authority in efforts to develop plans for public facilities and community development. As far as the availability of planning for public improvements is concerned, all six towns are more or less equal in opportunity and resources. The fact that the six towns are fairly equal in their ability to secure development assistance and funds weakens the argument that a strong and qualified local leadership is a factor in the viability of nonmetropolitan places. This should not be

interpreted to mean that the entire hypothesis regarding the quality of the local leadership to the viability of nonmetropolitan places is negated. Towns with well qualified and educated leadership probably also have a fairly educated work force which can also be an attraction to industries seeking to relocate.

The relationship between the quality of the work force and town viability is further illustrated by Table 32. In the case study towns, there is to be a positive relationship between population growth rates and the education levels, income levels, and unemployment. All of the towns, with the exception of Clinton, gained population during the study period. Although a relationship between population growth rates and the socioeconomic variables exits, the relationship is weak. Sparta, Tennessee most nearly conforms to expectations regarding low population growth, low education levels, low median family income levels, and high numbers of families below the poverty level (Table 32). Clinton, Tennessee which lost population during the study period had the highest median family income, the second lowest percentage of families below the poverty level, and the highest percentage of families with incomes in excess of $15,000. In the towns where the education/income characteristics do not coincide with expectations for population growth rates, some clarifications evolves if retail sales volume change is substituted for population change. Clinton, the only case study town which declined in population, experienced the highest growth in retail sales volume during the study period. Rogersville, which had low education levels, low median family incomes, and a high percentage of low income

Table 32

SELECTED SOCIOECONOMIC CHARACTERISTICS OF
NONMETROPOLITAN CASE STUDY TOWNS

	Clinton	Dayton	Jefferson City	Rogersville	Shelbyville	Sparta
Population 1970	4749	4361	5124	4045	12262	4930
% Change Pop. 1960-70	-3.0	24.6	12.6	29.6	17.2	9.3
% Change Retail Sales Volume 1963-1972	93.0	48.2	23.7	-86.4	33.1	59.2
% 4 yrs. High School 1970	53.9	43.6	52.2	41.8	43.6	29.9
Median School yrs. 1970	12.1	10.6	12.1	10.2	11.0	8.9
Median Income 1970	9098	6871	6953	6962	7172	6128
% Families Below Poverty Level 1970	15.9	21.1	14.9	16.6	17.8	23.8
% Families with incomes of $15,000 or greater in 1970	12.9	6.7	8.5	6.5	7.9	5.7
% Labor Force Unemployed-1970	5.2	6.1	8.6	4.5	2.8	3.6

Source: U.S. Census of Population, 1970; U.S. Census of Retail Trade, 1972

families, declined by 86.4 percent in retail sales during the study period. Although neither surrogate for viability appears to be strongly related to the education (labor force quality) and income variables, when both surrogates are used for interpretation of the variables the relationships become more clear. Quality of the labor force does appear to be an important growth characteristic when viability is assessed using both the population and retail sales surrogates.

Field Work Findings

A total of eighteen informed persons were interviewed in the six case study towns; three in each town. All of the respondents had lived in their towns for at least five years. The format of the questions asked precludes quantifying the answers in tabular form, however, the following discussion includes a general description of the nature of responses.

The responses to the surveys were very similar in each town. All of the respondents in the six nonmetropolitan places surveyed indicated that the most important single factor for the future viability of their respective town was the attraction of new industry. At least one community, Rogersville, offered a five year tax moratorium for new industries. The mayor of Rogersville felt the tax moratorium was a very progressive measure in the towns' efforts to attract industry.[55] Although not directly asked what type of new industry would be beneficial to the growth of their communities,

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[55]Comment by the mayor of Rogersville during personal interview, August, 1979.

one-half of the respondents indicated that industries which predominately employed men would be most beneficial to their towns viability. The mayor of Sparta commented that low paying industries, such as the textile manufacturing are beneficial to the community, but because of low salaries offered little incentative for attracting new residents.[56] Two of the mayors felt that upgrading and extending the water and sewer systems around the towns would be an important first step in attracting new industries.[57] All of the communities are applying for state and federal grants for public improvements, community facilities, or redevelopment. Such grants provide not only additional revenue for the towns, but stimulate the local economy by increased spending. An added benefit of state and federal grants is that, if the money is spent on needed improvements, the towns become more attractive sites for the location of industry. The police chief of Shelbyville felt that for the city to continue its level of economic growth, new land needed to be purchased by the city for industrial parks.[58]

The responses to the questions regarding the impression the informed persons had concerning local shopping behavior, revealed an almost perfect example of a rational central place hierarchy of shopping behavior. Low order goods such as gasoline and groceries were thought to be purchased locally. Higher order goods were thought

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[56]Mayor of Sparta, Tennessee (August, 1979).

[57]Responses from the mayors of Sparta and Rogersville (August, 1979).

[58]Police Chief of Shelbyville, Tennessee (August, 1979).

to be purchased at the closest larger town. For example, the police chief in Shelbyville mentioned that if a good, such as a special type of sofa, could not be purchased locally the people would travel to Murfreesboro and if it were not available there, they would travel to Nashville.[59] The mayor of Sparta also indicated that the shopping behavior in his town took the similar pattern; goods not available in Sparta are purchased in Cookeville or McMinnville and if they were not available there, the people would travel to Nashville.[60]

Figure 25 demonstrates the impressions of the shopping patterns obtained from the three informed person interviews for Sparta, Tennessee. Sparta residents that cannot find a product or service locally, travel either to McMinnville or Cookeville. The distance to and population size of McMinnville and Cookeville are approximately the same and the decision of which town to go to for the Sparta residents is a matter of preference. If a good or service is not available the people travel to Nashville, a considerably longer distance. The shopping behavior of the residents of Sparta is, therefore, rational according to distance minimization models and central place theory.[61] Similar shopping patterns probably exist in all of the 103 nonmetropolitan places examined in the ESCCD. If shoppers must leave their local community to purchase medium and high order goods, they also may purchase low order goods on the same trip.

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[59]Police Chief of Shelbyville, Tennessee (August, 1979).

[60]Mayor, Sparta, Tennessee (August, 1979).

[61]Brian J.L. Berry, Geography of Market Centers and Retail Distribution, Printice-Hall, Inc. Englewood Cliffs, N.J. (1967), p. 3.

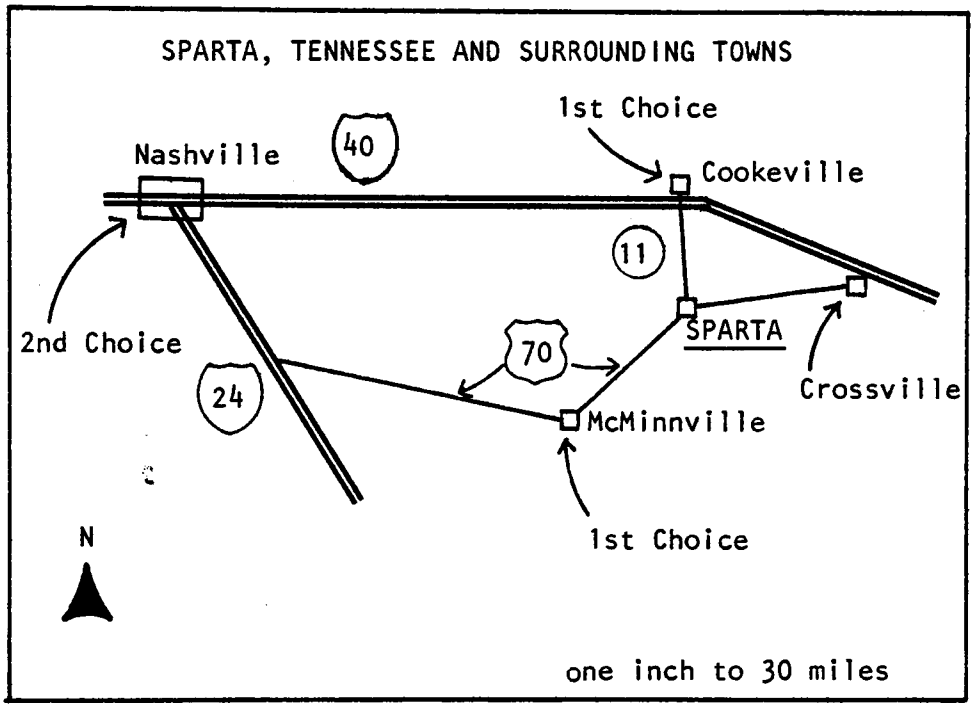

Figure 25. Impression of Shopping Preferences of Sparta Residents as Viewed by Informed Persons

This behavior would have a negative effect on those services in the local community.

The basic information obtained from the surveys strongly indicated that the business and political leaders shared common opinions as to the processes responsible for nonmetropolitan growth; more industry, more retail shopping center development, and better public facilities were necessary ingredients.

As valuable an indicator of nonmetropolitan viability as informed person interviews, is the general impression one perceives about a town by experiencing the town first hand. As one drives up and down the roads leading into and out of a town, or walks through the CBD and browses in stores, an impression as the the viability of that town emerges. Although the impressions that are derived by this method of field observation are by nature subjective, they nonetheless offer a wealth of valuable information that interviewing informed persons and analyzing census data may not offer.

All six towns had certain characteristics in common. As is the case in many American cities, all six of the case study CBD's are in the process of functional decline or change. For example, 16 of 97 stores in the Shelbyville CBD are vacant. Local merchants and politicians in Sparta are attempting to make shopping downtown more attractive by offering free parking.[62] Attempts are also being made to make the downtown area more physically attractive to shoppers in

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[62]Mayor, Sparta, Tennessee (August, 1979).

Rogersville by modernizing facades.[63] The majority of the new retail growth in the six towns is occuring in outlying areas along major roads (Figure 26).

Sparta showed the least amount of outward retail growth. Strip growth is still evident in Sparta, but not to a very significant degree. The Sparta CBD, although the most viable looking CBD of the six, still gives the appearance of decline. Shelbyville and Jefferson City have the most deteriorated CBD's. Jefferson City has a large amount of strip growth along the major roads passing through the town. Figure 26 shows the location of retail establishments in Jefferson City. Area 1 is the old CBD of Jefferson City, a relatively small and compact cluster of retail establishments. Areas 2 and 3 shown the retail growth of Jefferson City outside the CBD. It is obvious from this map that the majority of Jefferson City's retail establishments are now located in strip developments along highway 11E (area 3).

Sparta gave the impression of being the least viable town surveyed and Shelbyville gave the impression of being the most viable. The streets in Sparta carry very little vehicular or pedestrian traffic and many of the stores are empty. Although the CBD of Shelbyville appears to be declining, it is difficult to find a parking place and the streets are moderately busy. Shelbyville is the largest of the six towns, but the amount of retail growth outside the CBD appears to be out of proportion for its size. Sparta with a 1970 population of 5,665 is the second largest town surveyed, but has the

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[63]Mayor, Rogersville, Tennessee (August, 1979)

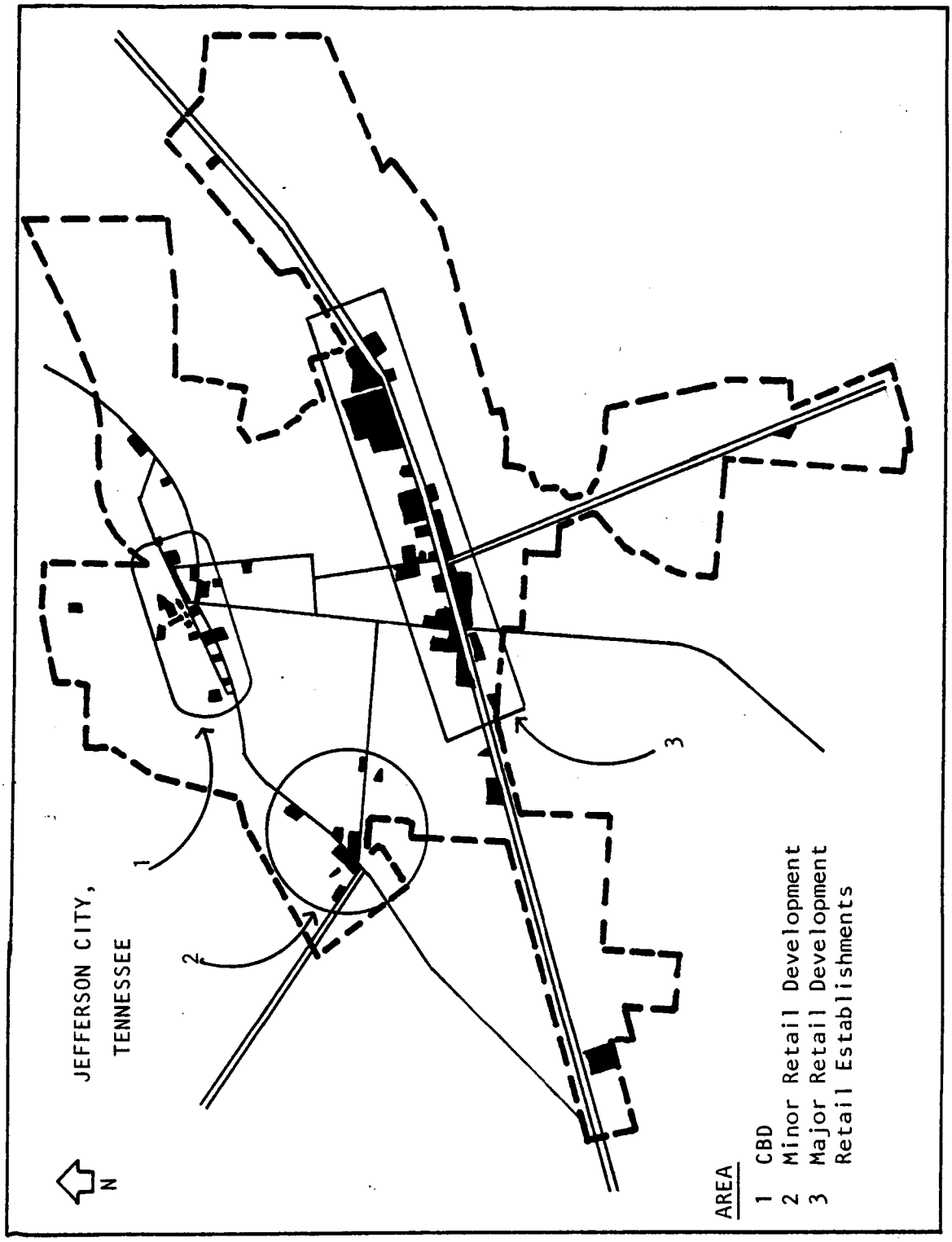

Figure 26. Retail Establishment Clusters in Jefferson City, Tennessee

least amount of retail growth outside the CBD. The other four towns, Dayton, Rogersville, Clinton, and Jefferson City, all have a moderate amount of retail growth outside the CBD. One impression that evolved during the town surveys was that the degree of retail growth was dependent on the accessibility of the towns. Towns adjacent to heavily traveled state and federal highways seem to be expanding their retail sector more than those towns which are not adjacent to heavily traveled highways.

Summary

Using a classification technique derived from the discriminant analyses in the previous chapter, six nonmetropolitan case study towns were selected from the sample of 31 nonmetropolitan places in Tennessee. Variables representing various aspects of selected social, economic, and retail trade phenomena were compared and analyzed in an attempt to describe the viability of the six case study towns. In addition to these variables, accessibility and centrality measures were employed in assessing the different viability characteristics of the selected towns. To supplement the above secondary data, informed person interviews were employed in hopes of better explaining and understanding the characteristics and processes involved in the viability of the selected nonmetropolitan case study towns.

Towns which have easier access to metropolitan places are generally the most viable. The centrality of the case study towns, measured by bank deposits, churches and motel rooms, turned out to be a reasonably good indicator of the viability of the case study towns. Bank deposits appear to be one of the better centrality measures. The

relationship between centrality and nonmetropolitan viability merits additional research. If, as the correlation and discriminant analyses indicated, the relationships between population change, retail sales change, and degrees of variation between socioeconomic variables prove inconclusive or tenuous as measures of nonmetropolitan viability, centrality measures may be the key to a better understanding. This may prove especially helpful in economic development planning. As a rule, the viability of the case study towns is related to the viability of the BEA's to which they belonged.

The importance of industrial employment in the case study towns proved to be a major contributor to the explanation of the towns viability. This was confirmed by data comparison and by informed person interviews. The single most salient variable contributing to industrial employment proved to be the educational attainment of the local inhabitants. In towns with high educational levels, industrial employment tends to be relatively high.

The viability of the retail sectors of the case study towns exhibit several interesting characteristics. In all of the towns sampled, new retail growth is taking place along major highways adjacent to the corporate limits. As a result, the CBD's of the towns are suffering functional and physical decline. The greatest amount of functional decline in the CBD's occurs in the most viable town. Towns with relatively stable or declining population and retail sales growth rates are experiencing less CBD decline than the more viable towns. The decentralization of the retail functions of the towns is a result of shifting residential patterns. Both the shifting retail and

residential patterns in and around the nonmetropolitan places studied make viability research difficult. When relationships between independent variables (e.g., furniture sales and median family income) and nonmetropolitan viability are analyzed, the movement of people and businesses out of the corporate limits of the towns complicates interprelation. This probably contributes to the conflicting findings concerning the viability of nonmetropolitan places in the literature. It is also a complicating factor in interpretating the characteristics of nonmetropolitan viability in the preceding chapters.

CHAPTER 6

SUMMARY FINDINGS AND CONCLUSIONS

Summary of Procedures

The present research isolated salient factors, characteristics, and spatial patterns of nonmetropolitan viability in a sample of places in the East South Central Census Division of the United States. The research also described the major factors associated with nonmetropolitan viability in the study region. First, general socioeconomic characteristics of the South and the ESCCD were described to provide an understanding of the regional unit in which viability assessments of selected nonmetropolitan places could be placed. The ESCCD was further described as a region in which old patterns of economic stagnation and decline were being replaced by economic expansion and population growth. The ESCCD region, therfore, presented an opportunity to examine nonmetropolitan viability in a setting characterized by both growing and declining towns.

In order to place the 103 selected nonmetropolitan places into a spatial unit smaller than the ESCCD, BEA and physiographic subregions were utilized. These subregionalizations were used because it was felt that spatial variations in nonmetropolitan viability in the ESCCD would be more interpretable at a subregional level. Both the absolute and relative viability of the nonmetropolitan places were assessed at these levels. In addition, the analyses used in this research defined viability by population change and by retail sales volume change for the selected places.

In an attempt to isolate salient characteristics of viability in the selected towns, a series of correlation analyses were performed. Each correlation analysis included eighteen independent socioeconomic and retail sales variables. The eighteen variables were correlated to the viability of the nonmetropolitan places based on absolute and relative changes in the towns' population and total retail sales volume change. The correlation analyses provided information regarding the relationship between individual variables and viability, but did not take into account the interrelationships between the variables.

In an attempt to combine and isolate those independent variables which contributed most to explaining the viability of the nonmetropolitan places selected for study, discriminant analysis was used. The discriminant analysis procedure derived a linear discriminant function (LDF) consisting of the most salient independent variables which described the viability of the selected nonmetropolitan places. The LDF, in turn, provided an a posteriori viability prediction for each of the 103 metropolitan places. Discriminant analyses were preformed on the towns according to size categories, relative viability, and absolute viability for both the population and retail sales volume change criteria.

Findings

During the analyses of the selected nonmetropolitan places in the ESCCD, several general observations emerged. The salience of socioeconomic and retail trade variables in describing and explaining nonmetropolitan viability in the ESCCD is dependent on the surrogate

chosen to define viability and the variables used to measure viability. The size of towns also proved to be a key factor in determining what variables were or were not important to viability. Also, when a specific town is studied alone, as illustrated in Chapter 5, viability is less difficult to measure and the factors which contribute to that towns' viability are more clearcut than when a number of towns are grouped together and viability variables are averaged to determine overall viability characteristics.

In the study region, several relationships between independent variables and the viability characteristics of nonmetropolitan places were established from the correlation analyses, discriminant analyses, and field work. Automobile sales proved to be one of the most descriptive variables in determining the viability of nonmetropolitan places in the study region. The importance of automobile sales as an indicator of nonmetropolitan viability is not surprising because the economy of the United States is closely linked to the economic viability of the automobile industry. Automobile sales in nonmetropolitan places represent a smaller manifestation of the larger relationship between automobile sales and economic growth at the national scale. The selection of the size categories of towns to be studied appeared to be an important factor in isolating factors which described viability.

Size of place is one of the easiest, but often neglected, factors to control in nonmetropolitan research. Theoretical justification for the selection of size categories of nonmetropolitan places is replete in central place literature. If towns are functionally different,

according to their size, then one can assume that socioeconomic and retail variables would have varying degrees of importance to viability depending on the size of the places. The results of the correlation analyses and discriminant analyses presented in this research strongly support this assertion. For example, automobile sales in the selected nonmetropolitan places in the ESCCD has a correlation coefficient of 0.20 in the 4,000 to 6,000 population size category when viability is defined by percent change in retail sales volume. The correlation coefficient for places of 9,000 to 13,500 population in the same analysis is 0.50.

The nine retail sales variables used in the correlation and discriminant analyses in this research exhibited an interesting array of results. It was found that in the larger towns which were growing, low order functions were important indicators of their viability. It is believed that sales in low order functions (eating establishments and service stations) are good indicators of the direction the economy is going. In growing towns, there is usually higher median family income and employment in manufacturing (this is a general trend--the actual relationships between these variables and viability varied from one analysis to the next). The affects of discretionary income that economic growth generates in a community appears first in the lower order functions; and would be expected from central place theory postulates. This may also be the result of the stage of economic growth the individual towns are experiencing, more than the actual relationship that could be expected if all of the towns were at approximately the same temporal stage of economic development. The

question of the relationship between selected growth variables and the stages of economic development (from a youthful economy to a mature stable economy) merits further examination.

Conclusions and Suggestions for Future Research

In the analyses presented in this research, relative population change and absolute retail sales volume change in the ESCCD were most successful in describing and predicting nonmetropolitan viability from the independent variables used. Relative population change is a more accurate indicator of the economic viability of nonmetropolitan places than absolute population change because the loss (or gain) of a segment of a town's population may not adversely effect (or help) the town's economy if the town is not extremely small and the percent change is not great. At the individual town level, a loss in population of 5 percent may actually be a political loss with those persons moving outside the corporate limits of the town, but remaining within the town's trade area. Slight population gains in a town may, likewise, be political gains due to annexation. When relative population change is used as the surrogate for viability, the norm for defining growth and decline is shifted upward and the political changes in population become less meaningful.

The success of absolute retail sales volume change in predicting growing and declining towns in the discriminant analyses can be attributed to reasons which are similar to those that were responsible for the success of relative population change in predicting group membership. The retail sector of a local economy depends on the patronage of people from within and from without the corporate limits

of the town. Political changes in the town's population because of annexation or suburbanization do not affect the retail market of the local business establishments. Because of the relative stability of the retail market of a town, slight changes in the level of retail trade are fairly accurate indicators of the economic viability of the towns.

Results of the field work conducted in the six Tennessee case study towns tended to verify the phenomena just described. All of the case study towns exhibited suburban residential, industrial, and retail trade growth. Informed person interviews in the towns indicated that suburban growth was considered growth for the individual towns, even if that growth was outside the corporate limits of the towns. The trend in the case study towns, as the literature indicated, was for most new economic growth to occur at the fringes of the corporate limits.

The relationships concerning population change in the ESCCD can be linked to central place theory. Central Place Theory assumes the primary reason for a town to exist is to provide goods and services to a local and surrounding region. Since people purchase the goods and services available in nonmetropolitan places, population change has become the standard measurement of viability of these places. If all of the people who purchased goods and services in a particualr town lived within the corporate limits of that town and had equal buying power, population change would be an excellent measure of economic viability. This is very seldom, if ever, the case; changes in corporate population are rarely true indicators of the growth of a

town. Nonmetropolitan places, just like their metropolitan counterparts, have experienced growth in adjoining surburban areas and in more remote rural areas. Growth in and around nonmetropolitan places often results from an outward expansion of metropolitan areas. In light of these factors, it is hardly reasonable to assume that nonmetropolitan population change is always an accurate surrogate for economic viability. Population change may be an indicator of viability in the ESCCD, but its use as a surrogate for nonmetropolitan viability must be approached with caution.

The results of the correlation and discriminant analyses support several of the hypotheses presented in this research. The hypothesis that the average educational attainment achieved by a towns' population is directly related to the growth of the town is supported by both the correlation and discriminant analyses. The hypotheses that growth of nonmetropolitan places is directly related to high income levels, labor force characteristics, and employment in manufacturing in the ESCCD were at least partially substantiated by the analyses. The relationships between these variables and viability were most clear when viability was measured by relative population change and absolute retail sales volume change. In the discriminant analyses section, the prediction of group membership (growing or declining towns) was also most accurate for these two measures of viability. When the correlation coefficients for the variables which constituted the linear discriminant functions for the analyses based on relative population change and absolute retail sales volume change were compared, they almost always had high r values. This is

important because the number of variables used to describe the characteristics of growth and decline in the nonmetropolitan places in the study region can be reduced significantly, without greatly affecting the outcome of the analyses. Some of the variables which are discarded during the discriminant analyses may have significant correlations with nonmetropolitan viability in the study region, but the understanding they add to distinguishing between growing and declining towns is negligible. Interrelationships between variables chosen to measure or describe growth and decline in nonmetropolitan places create a problem in all nonmetropolitan research, but especially in research that only considers one or two variables in attempting to explain viability. This is probably the largest contributing factor to the confusing results found in past nonmetropolitan research. It is extremely difficult to assert that one factor, such as distance to larger places or employment in manufacturing, can be held responsible for the growth or decline of a specific place when in reality numerous factors affect the viability of places.

By using the techniques presented in this research, it should be possible to analyze a large number of independent variables in a spatially limited region, such as the ESCCD or a BEA, as an initial step before assessing the viability of a large number of places in the surrounding region. This approach would greatly simplify the delineation of growth or decline criteria used by state or federal agencies in qualifying specific towns for social and economic development programs.

The present research demonstrated that patterns of nonmetropolitan viability varied spatially depending on how viability was defined. In addition, nonmetropolitan growth and decline characteristics were discussed in both absolute and relative terms. While neither population or retail sales volume change are always the appropriate measure of viability in specific places, the relationship between them should be explored further and other viability surrogates examined. More of a systems approach to nonmetropolitan viability studies then has been used previously would likely aid in the understanding of viability processes. Attempts should also be made to place the viability of towns into their regional and subregional settings. This is especially beneficial in understanding general trends in viability patterns. For towns that do not fit expectations based on subregional viability trends, insight into the processes of viability may develop from their examination.

Additional research regarding the interrelationships between independent socioeconomic (and other) variables should be continued to clarify conflicting conclusions in the nonmetropolitan literature. The confusion in the literature as to the factors most associated with nonmetropolitan viability, and the nature of growth and decline factors is a result of the complexity of nonmetropolitan viability. In order to illustrate the relationship of this research to previous research, simple viability models are developed. The models are not intended to represent all the possible groups of phenomena which may contribute to nonmetropolitan growth or decline in the ESCCD, but to give an indication of the complex nature of nonmetropolitan viability

research. Several aspects of nonmetropolitan viability processes are illustrated in Figures 27 and 28. Both the growth and the decline model are divided into "political artifact" and "real" nonmetropolitan growth and decline. Political growth refers to growth that occurs as a result of the town annexing either population, or retail establishments (or both). Growth attributed to annexation may show up in the Census reports, but it does not represent the true population or economic growth of the town. The results of such growth can bias the statistical results of analyses attempting to establish the relationships between selected growth variables and town viability. Political decline of nonmetropolitan places is the opposite of political growth. In political decline, local residents and business establishments move (or locate) to the outskirts of the incorporated area. The census may in turn report population or retail sales loss for the town when this occurs. In reality, decline of the town's tributary area may not have occurred. In political decline, there is simply a spatial redistribution of people and businesses which the town has not annexed. Both political growth and political decline were observed in the six Tennessee towns selected for detailed study.

"Real" growth and "real" decline represent actual increases or decreases in population or retail sales (Figure 27). The causes of real growth are somewhat more complex than the causes of real decline, as a comparison of Figure 27 and 28 reveal. Because of the complexity of the interrelationships between the factors that contribute to the growth of nonmetropolitan places, growth is more difficult to isolate than decline. This is reflected by the disproportionate amount of

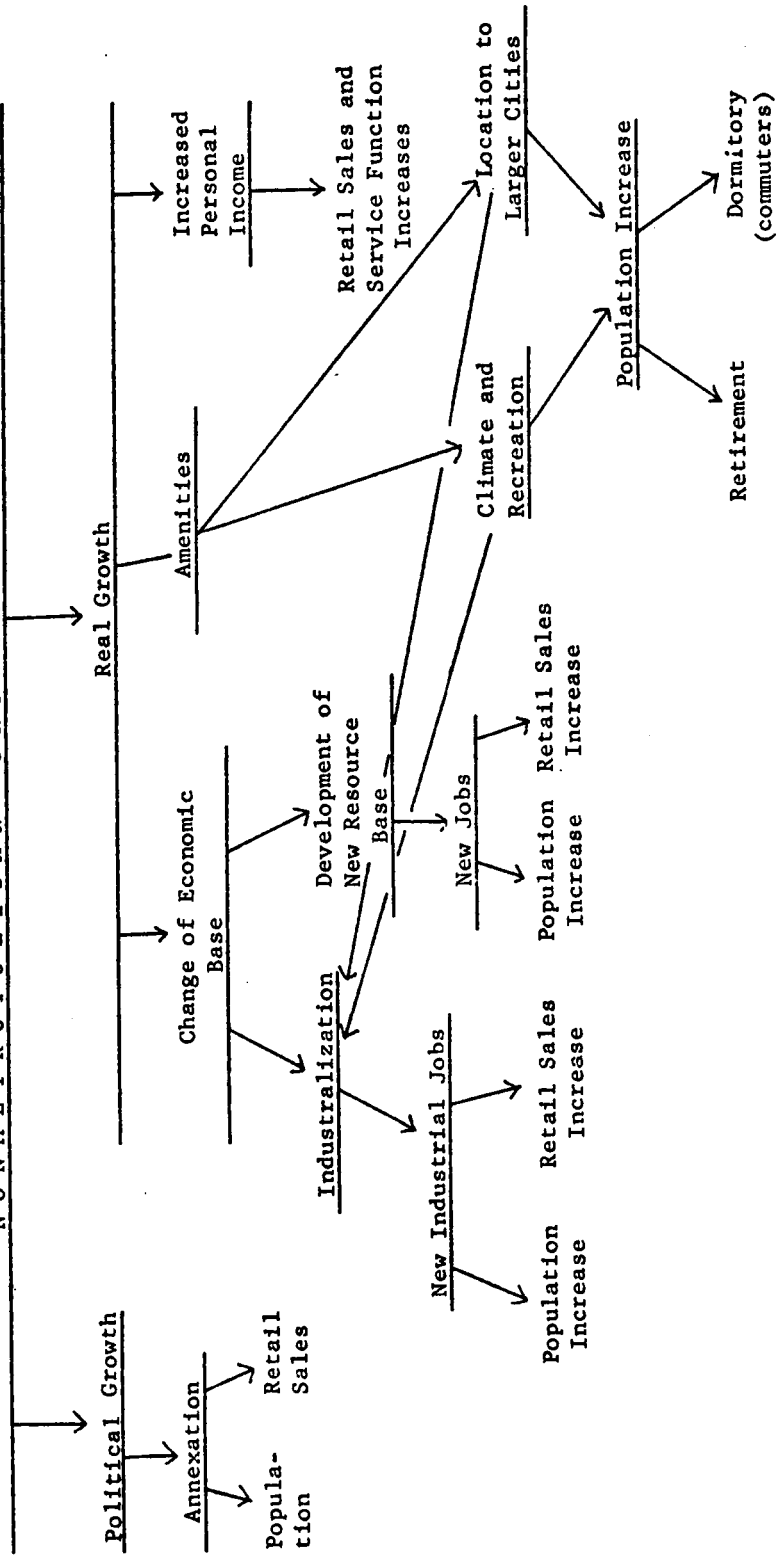

Figure 27. Model of Nonmetropolitan Growth

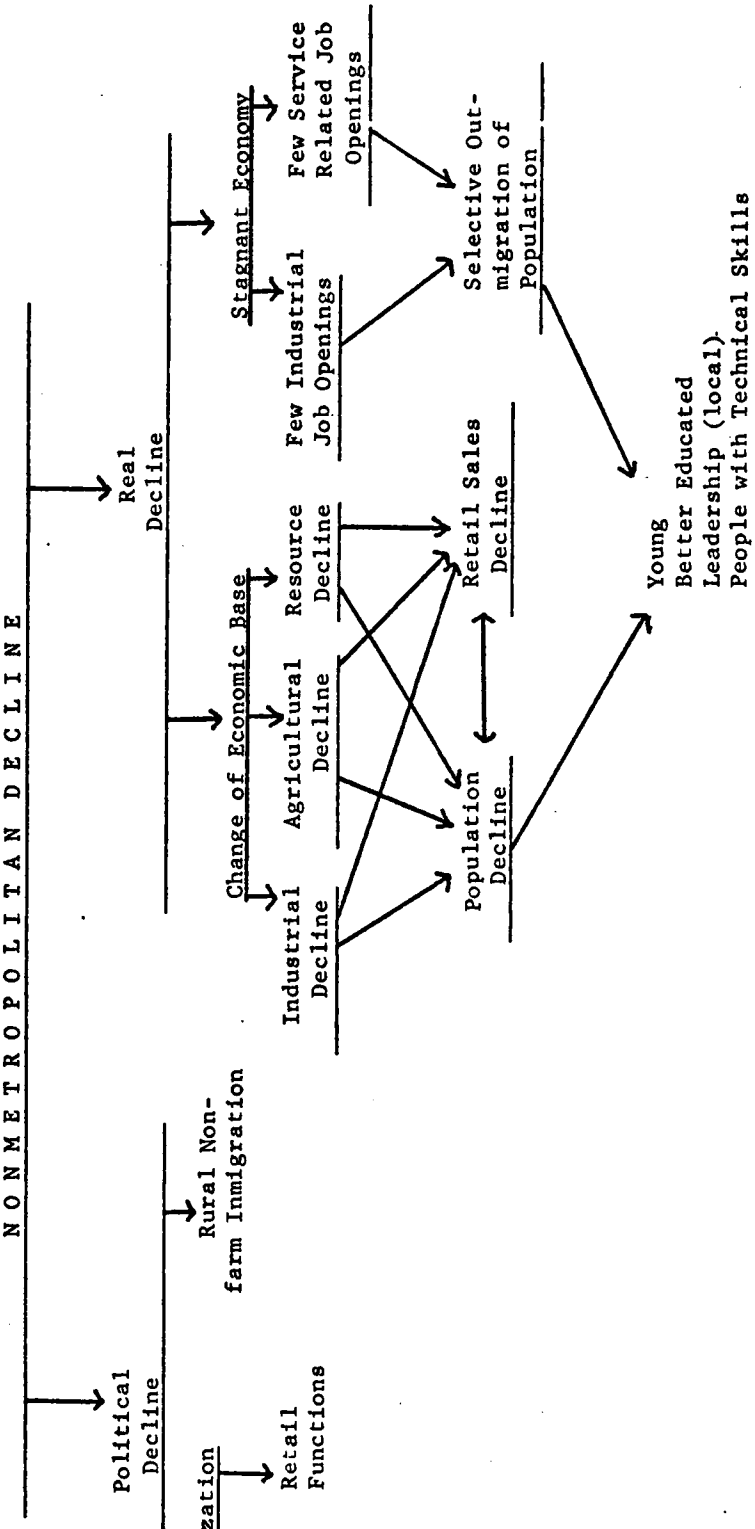

Figure 28. Model of Nonmetropolitan Decline

nonmetropolitan literature that has concentrated on the decline of places rather than the growth of places. As was partially illustrated by the literature review in Chapter 1, each of the subcategories in the two figures has its own body of literature that describes the importance of that particular factor to the viability of metropolitan and nonmetropolitan places. There are, for example, numerous economic base articles, or articles which describe the importance of amenitites such as climate to the growth of nonmetropolitan places. Other articles examine the role of developing a new resource base, or the loss of an old resource base to the viability of nonmetropolitan places. Few articles attempt to establish the relationships between nonmetropolitan viability and the interrelationships between amenities, new resource base, and industralization on the regional growth and decline patterns of a large number of towns. Such an undertaking would be an arduous task, but a more clear understanding of nonmetropolitan viability would evolve if it is undertaken. The difficulty in small scale investigations of nonmetropolitan viability is further compounded when you consider that the economic character of a particular place at a particular time might be mixture of growth and decline processes. For example, consider the difficulty in determining which factors might contribute most to retail sales change in a town which is experiencing an increase in industrial employment, but a decrease in employment in the resource base activities, an area such as the Alabama Piedmont. Figure 27 illustrated that industralization results in more industrial employment and increased retail sales. This relationship is described in economic base

literature by the basic-nonbasic ratio. On closer examination, however, it can be seen that climate and recreation and location to larger cities may have a positive affect on both industralization and retail sales. In the ESCCD, climate and recreation are underlying attractions for nonmetropolitan growth, but distance to larger cities, as pointed out earlier, is not a strong influencing growth factor. In much of the ESCCD, cheap labor may also be an underlying factor which adds to the attractiveness of the region for certain types of industry. On the viability continuum, a loss in the category of resource base employment may result in a decline in retail sales. In the study region, nonmetropolitan places with the higher number of industrial workers had higher growth rates than declining towns. If this loss can be accounted for, how is one to determine if the resource loss resulted in a loss of population which in turn created a retail sales decline. When both of these processes, industrialization gain and resource base loss, are considered together, it becomes very difficult to separate the effects of one from the other.

In declining places, more attention can be given to direct causes of population, economic base, and retail service function decline. Difficulty still arises in pinpointing the component parts of the decline processes in declining places because of the interrelationships between the decline variables.

In summary, the research undertaken in this dissertation illustrates a number of factors associated with the viability of selected nonmetropolitan places in the East South Central Census Division of the United States. The relationships between the

viability of nonmetropolitan places and the variables selected to assess viability varied according to the definitions and measurements used. Relative population change and absolute retail sales change in the study region proved to be the easiest viability classifications for interpreting the relationships between nonmetropolitan viability and the eighteen socioeconomic variables. This may well be a result of the unique character of the ESCCD as a region characterized by new subregional economic and industrial growth interspersed with subregional stagnation and decline. The ESCCD is still catching up with the nation in percentages of urban residents. Corporate boundary adjustments are being made to accomodate the new growth, but a lag time exists between the actual growth and the adjustments local governments make. This tends to complicate data analysis at the corporate level. By the time the new Census is released, these adjustments may be taken into account and the relationships discussed in this dissertation will be more easily interpreted. In the study region, however, nonmetropolitan places which are above the regional average in educational attainment, median family inccomes, automobile sales, and labor force in manufacturing are the places which are most likely to be growing. The majority of the viable nonmetropolitan places in the ESCCD are located in the regions most viable BEA units. The most viable BEA subregions in the ESCCD are those which are the most highly urbanized industrialized, and population with the highest educational attainments.

If a thorough understanding of nonmetropolitan viability is to develop, the most significant variables which contribute to the

viability of places must be isolated for all aspects of growth and decline. The interrelationships of these variables and viability can then be established and an understanding of viability processes will emerge. The research undertaken in this dissertation represents a significant step toward understanding selected characteristics of nonmetropolitan viability in the East South Central Census Division of the United States. By analyzing a selected variety socioeconomic variables, factors associated with the growth and decline of nonmetropolitan places were illustrated. Future research should build upon the finding discussed throughout the data analysis and interpretation sections of the dissertation.

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VITA

Allen R. Arbogast is a native of Appalachia. He was born May 31, 1947, in Charleston, West Virginia. He grew up in West Virginia, graduating from St. Albans High School in 1964. After serving four years in the United States Navy, including a tour in Vietnam and Spain, he returned to complete a Bachelor of Science degree in Geography at Concord College in Athens, West Virginia and a Master's degree in Geography at Marshall University in Huntington, West Virginia.

Mr. Arbogast was Instructor in Geography at Glenville State College, Glenville, West Virginia, before moving to Knoxville, Tennessee, to accept a position as community plannner for The Tennessee State Planning Office. The author began work at The University of Tennessee toward a Doctor of Philosophy degree with a major in Geography in the Fall of 1975. That degree was awarded June, 1980, with special fields in urban and rural geography.

Mr. Arbogast is a member of the Association of American Geographers and the Southeastern Association of American Geographers. He is a Geographer with Henningson, Durham, and Richardson in Knoxville.