NONMETROPOLITAN FRINGE AND SUBURBAN COUNTY FACTORS DETERRING NONMETROPOLITAN FRINGE COUNTY METROPOLITAN INCLUSION

by

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CHAPTER ONE

Introduction

Encompassing our nation's standard metropolitan statistical areas (SMSAs)[1], both large and small alike, nonmetropolitan fringe counties (NFCs) are areas of ambiguity. The term nonmetropolitan fringe county is herein used to denote all nonmetropolitan counties whose county seats or largest urban places are up to 61 miles from the central city of an SMSA to which they are contiguous. Although these counties (often referred to as exurban counties)[2] are not technically metropolitan, neither are they actually rural. Indeed, they are transition zones where the city becomes rural and rurality becomes urban. As such, they may be predominantly urban, edging toward the threshold of metropolitanization[3], or else maintaining their rural state. Those which fall in this first category are highly developed, some undergoing metropolitanization at an incredible rate. Some of the latter category are stagnating, if not declining, alongside SMSAs. Many of these neighboring SMSAs are growing and sometimes even prospering. There has even been a case where a metropolitan county has reverted to nonmetropolitan status.[4] Sprawling out beyond the statistical limits of the metropolitan community, these counties are: 1) areas of low densities and often times of high-cost utilities; 2) areas of extensive wildlife habitats undergoing encroachment by the ur-

ban environment; 3) areas of intermingling rural and urban land uses; 4) areas of dispersed settlement and inadequate social organization; 5) starting places of long, arduous commuting to a metropolis (to the central and/or other suburban counties) and to other nonmetro counties, and ending places of the return journey; and 6) termini of "metropolitan leakage[5]".

The proximity to urban areas presents unique problems in the nonmetropolitan fringe county which local officials are seldom able to adequately resolve. Many of these problems are generated by the contiguous metropolitan community and cannot actually be resolved in isolation of the nearby SMSA. Having neither truly rural nor metropolitan qualities, the intrinsic character of the NFC is often a melange of the qualities of both, often times closely imitating those of the latter. This comes as no surprise, for more and more evidence indicates that the exurban county is becoming more dependent on the nearby, dominating metropolis.

Theoretical Formulation

The Gravity Model

Under an idealized situation, i.e., the entire urban network were arranged on an isotropic plain,[6] solely centripetal forces were operating in the urban milieu, and people acted rationally, a nonmetro fringe county would tend to promptly fuse with an adjacent SMSA. Interaction be-

tween the NFC and the central county -- this could be the central city, other communities within the central county, or a combination of the two -- would necessarily take place (Figure 1), as is formulated by the general gravity model:

$$I_{ij} = \frac{f_1(P_i, P_j)}{f_2(D_{ij})}$$

I_{ij} = interaction between place i and place j
f_1 = function of
P_i = population of i
P_j = population of j
f_2 = function of
and
D_{ij} = distance between i and j.

In essence, the model makes the generalization that "interaction between two centers of population varies directly with some function of the population size of the two centers and inversely with some function of the distance between them."[7] Thus, NFCs of large metropolitan areas should have higher levels of interaction and more rapidly meet requirements for SMSA inclusion.

The Urban Size Ratchet

As centripetal forces impel metropolitan growth, the urban size ratchet concept would eventually interplay.[8] Upon attaining a certain critical size (often quoted as 250,000), the probability of persistent metropolitan growth would be greater and the actuality of contraction less likely. At this size or larger, a growth mechanism, analogous to a ratchet, is enacted, locking in previous growth and in-

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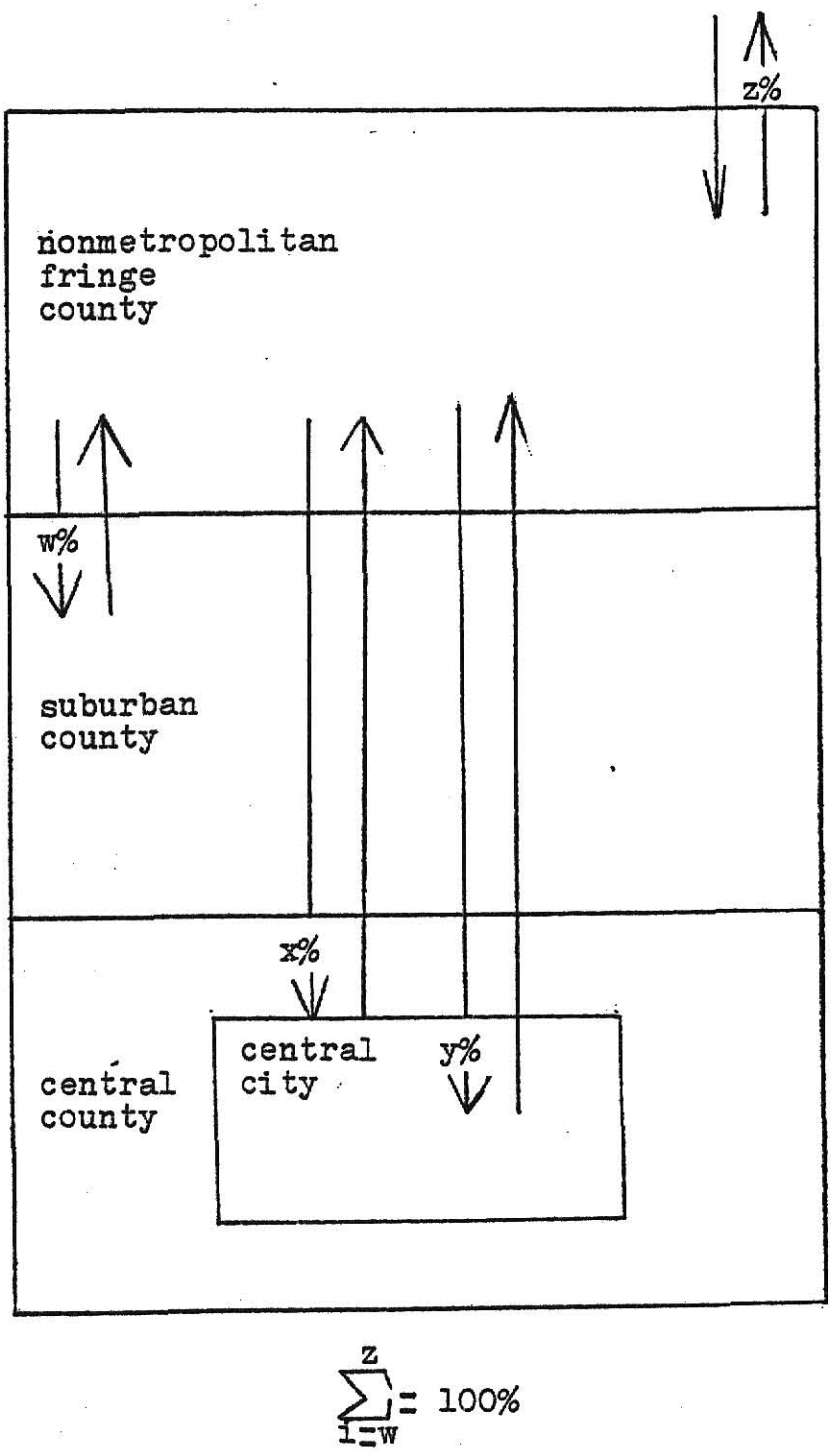


Figure 1. NFC Interaction in Relative Percentages (movement of goods, bus, railway, airline, and automobile passengers, number of telephone calls between NFC and other political units, etc.)

hibiting contraction.

However, the attainment of this critical population is not solely dependent upon internal metropolitan population growth. This critical figure could possibly be achieved through NFC merger with a declining SMSA. An SMSA can undergo a negative net increase in population, but this lost could be partially, and sometimes positively, offset through NFC merger.

The Ecological Theory of Expansion

After the urban size ratchet became operational, the SMSA would expand and settlement would subsequently locate at its fringes. As such settlement progresses, the ecological theory of expansion would interplay. This theory imparts that:

> population growth in peripheral areas of a system will be matched by an increase in organizational functions in its nucleus to ensure integration and coordination of activities and relationships throughout the expanded system.[9]

Hence, not only does NFC merger with its metropolitan neighbor create changes in the NFC itself, it reflects organizational changes in the central county.

This theoretical framework has been sketched to lay a foundation for this study. Contrary to the preceding, many SMSAs and NFCs have failed to progress through the phases of metropolitan growth, change, and development, in spite of the theoretical basis for this progression. Many NFCs are

coëxisting alongside metropolitan communities, showing little, if any, inclination to merge. Still others have evolved into SMSAs in their own right and have subsequently absorbed other NFCs that have not.[10] As previously cited, one merged with its neighboring metropolitan area, but since has reverted to nonmetropolitan status.

Problem Statement

This study is an inquiry to ascertain underlying reasons why many nonmetropolitan fringe counties are not more directly integrated with the central counties of our nation's SMSAs. Given the fact that much of the 1980 census data haven't been disclosed by the Census Bureau -- namely, commuting data, this study is relegated to the 1970 decade. Although the study's time frame is the preceding decade, identification of these factors is important in not only disclosing the factors themselves, but in revealing how they may change in relative importance in succeeding decades. Important ones in one decade have generally been influenced by another set of factors in a previous decade. Subsequently, this current set will influence a future set.[11] Because of the multiplicity of factors involved, disclosure of the exhaustive set of deterring factors is beyond the scope of this study. Hence, the central problem and directing theme of the thesis is nonmetropolitan fringe and suburban county factors deterring NFC metropolitan inclusion.

In many respects, this study parallels others that have

preceded it. However, other authors have treated the nonmetropolitan fringe county in a much broader context (Doxiadis, 1967; Berry, 1968; Friedmann, 1973; Berry and Kasarda, 1977; Gillard, 1977; Long and DeAre, 1980). Previous literature has either superficially or indirectly examined the NFC in reference to metropolitan fusion. No author has ever critically written about this aspect of metropolitan spatial expansion at the county level regarding the Census Bureau's "commuting criterion". This criterion states that a county is regarded as integrated with the county(ies) containing the central city(ies) of the metropolitan area if at least 15 percent of the workers living in the county works in a county containing a central city of the SMSA. Supplementing previous research in metropolitan growth and expansion, the thesis specifically employs the criterion.

Method of Approach

The method of approach will entail the following: 1) reviewing the literature to ascertain which factors have had significant influence in the nonmetropolitan fringe and suburban counties (chapter 2); 2) choosing a random sample of no more than fifty observations, variable selection and its justification, and description of computational procedure (chapter 3); 3) interpretation of computational results and findings and revealing methodological limitations (chapter 4); and finally, 4) presenting summary and conclusions (chapter 5).

Justification

Practical justification. The NFC skirting the modern SMSA proves to be an enigma to township, county, and urban planners, to real-estate analysts and promoters, to city fathers and rural government officials, to tax commissioners, and to social scientist -- the urban geographer included. Land-use planners view it as an area of rapid population growth, unregulated subdivision, antagonistic land uses, and spreading slurbs. To the real-estate promoter it is an area to be exploited. To metro officials it represents a sizable proportion of their daytime population escaping tax and legal jurisdiction. To rural officials the NFC is undergoing an invasion of a new mass population and the impact can be disquieting as conflicts are observed between rural nostalgias and urban appetites, and as an antiquated governmental structure is sometimes strained to the breaking point.[12]

The influx of population into the NFC can debilitate rural governmental entities, which find themselves confronting a myriad of problems they are not equipped to handle -- unrestricted subdivision, antagonistic land uses, and environmental pollution and degradation. Infrequently fully and adequately staffed by full-time professionals, these governments exist, with respect to many functions, more on paper than in reality.[13]

In both the NFC and SMSA, an unequivocal dependency ex-

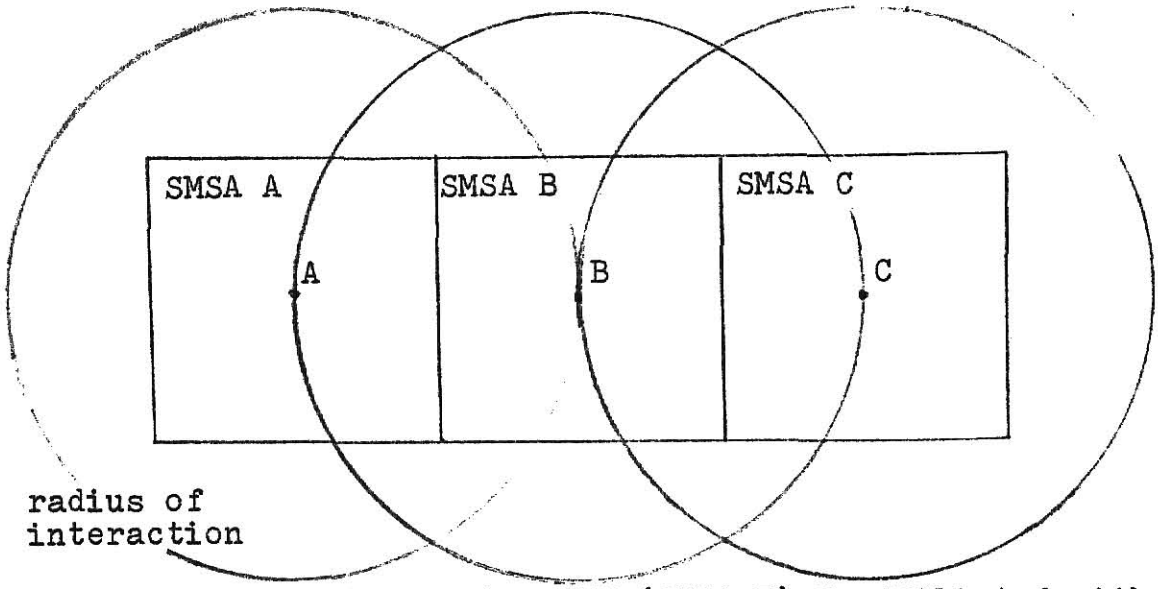
ists between employment and population growth. In many instances, the best way to induce population growth is to induce employment growth. Research has revealed that the primary cause of spatial employment redistribution in the metropolitan milieu has been spatial relocation of job centers and of market demand. Because the NFC is inextricably tied to its bordering SMSA, this redistribution has had repercussions in the former, promoting population growth where none had been anticipated.[14] This susceptibility is one rationale for NFC inclusion in the metropolitan community.

There also exists a rationale for providing or improving incomes of people in chronically economically distressed rural counties surrounding small metropolitan areas. This is one goal entailed in the Public Works and Economic Development Act (PWEDA). Proponents of rural development have noted that there frequently exists an income differential between metro counties and NFCs. This difference is accentuated in the nation's lagging areas. If nonmetropolitan fringe counties were to interact more directly with these SMSAs -- for example, become an integral part of the metropolitan complex, the latter could promote economic development in the depressed NFCs.[15]

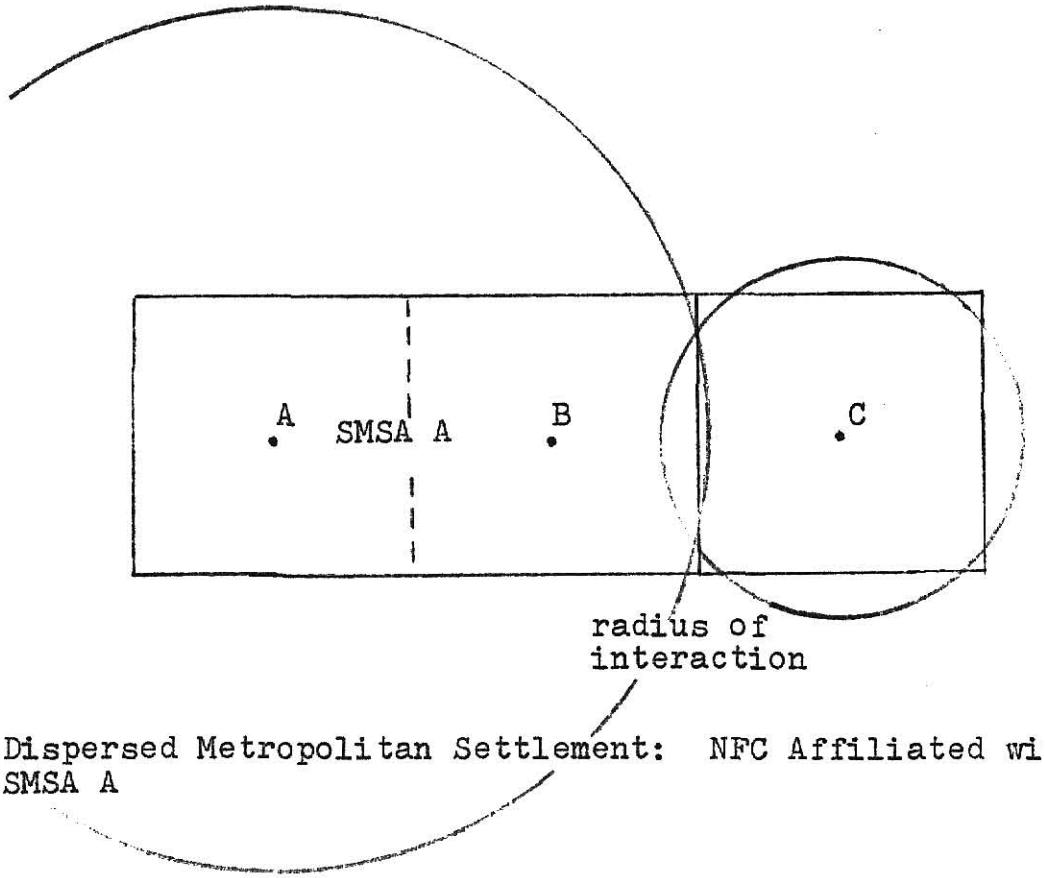
Finally, should an NFC develop and yet remain officially unaffiliated with the SMSA, it could develop to the extent that it meets metropolitan criteria. Potentially, it could evolve into a rather large metropolitan community. As

time progresses, it and other communities could develop into a megalopolitan structure and replicate problems therein entailed. These problems are familiar to anyone residing in the nation's megalopolises or other large conurbations. Not only do they generate serious problems -- pollution, traffic congestion, higher per capita public expenditures, they are unduly vulnerable to catastrophes, be they natural or man-made. Conurbations can, and often do, suffer enormously from floods, hurricanes, power failures, riots, and other natural or social disruptive action.[16]

To preclude or obviate any or all of the aforementioned urban dilemmas would be inordinately difficult without first unveiling the factors that either directly or indirectly spawn them. Rapid population growth in the NFC has been aided and abetted by high metropolitan incomes, sophisticated high-speed transportation networks -- together allowing households a great degree of locational freedom, and spatial relocation of manufacturing in the metropolitan area. Income disparities between metro areas and depressed NFCs can be rectified by rehabilitating rural labor forces and making metro areas more accessible through upgrading road networks and providing rural public transportation. Likewise, through determining and manipulation of the factors deterring metropolitan inclusion of nonmetropolitan fringe counties, we could preclude eventual megalopolitanization by promoting NFC affiliation -- through commuting -- to the nearest SMSA (Figure 2). Hence, in-



Megalopolitan Settlement: NFC (SMSA B) Unaffiliated with either SMSA A or C



Dispersed Metropolitan Settlement: NFC Affiliated with SMSA A

Figure 2. Megalopolitan Preclusion through NFC SMSA Affiliation

vestigating these factors is a justifiable endeavor having scientific merit.

Geographical justification. According to my definition of the field, geography is the science that studies the distribution of phenomena, whether natural or man-made, at or near the earth's surface. Geography as a discipline necessarily entails four traditions: i. the earth studies tradition ii. the man-land tradition iii. areal differentiation and iv. the spatial analysis tradition. The research topic of the thesis decisively falls under the fourth tradition. Illuminating the factors which encourage or hinder metropolitan areal expansion -- a spatial process, the topic necessitates spatial analysis.

Geography -- not unlike other sciences having a comprehensive nature -- is a field with subdivisions. This is obvious in my definition. Given the limitations of the human mind, individual scholars specialize in certain parts of the whole field. A geographer with an interest in plants and their geographic relation with the natural environment would specialize in biogeography; another with an interest in settlement patterns would specialize in urban geography. Because no one person could become proficient in all aspects of geography, each geographer must define a subdivision or subdivisions of the field. Specializing topically is a means of attaining competency in the discipline.[17]

Urban geography. Geographers engage in the study of cities because urban centers constitute distinctive areas. As the foci of population settlement, they are disproportionately economically, socially, and politically important to their hinterlands.

Geographers who study cities are urban geographers. Urban geographers approach the study of cities in different ways. One may be principally concerned with the city as a part of the fabric of settlement. He may scrutinize the forms and patterns of settlement as of the present, trace back the evolution of the phenomena of settlement to their inception, then predict impending changes. Another may approach the city as an economic phenomenon with associated social and political attributes, by endeavoring to identify the function or functions underlying city growth or decline, or the significance of the city in the economic well-being of its hinterland. In actuality, the urban geographer integrates these approaches. Furthermore, he may undertake the study of cities to formulate basic concepts of city growth, city location, or character. Finally, he may study cities in order to contribute to the solution of practical problems of urban planning (James and Jones, p. 143). In view of the foregoing, it is geography and the task of the urban geographer to illuminate the factors deterring metropolitan inclusion of the nonmetropolitan fringe county in the 1970 decade.

Notes

[1] For a precise definition of an SMSA, see any volume of Characteristics of the Population, 1970 published by the Bureau of the Census of the U.S. Department of Commerce. The general concept of an SMSA is one of a large population nucleus, together with adjacent communities which have a high degree of economic and social integration with that nucleus.

[2] Larry H. Long and Diana DeAre, Migration to Nonmetropolitan Areas: Appraising the Trend and Reasons for Moving (Washington, D.C.: GPO, 1980), p. 18. In this study the authors utilized the term "exurban" to connote settlement beyond physically established suburbia. The community is not metropolitan or nonmetropolitan in character, but is nevertheless similar to the suburban fringe of the expanding metropolitan area.

[3] Metropolitanization can occur by two processes, one being more external than internal and the other being more internal than external. In the latter case, the intrinsic nature of the county itself becomes metropolitan, which left undisturbed will result in the county becoming an SMSA in its own right. In the former case, external factors are so developed or developing to tie this particular county to the central county of an existing SMSA, namely through the commuting criterion. This criterion requires that at least 15% of the labor force of that county to commute to employ-

ment in the central county. However, internal factors are not totally discounted, for the merging county must evince a specified degree of metropolitan character.

[4] Deletion of a metropolitan county from an SMSA occurred in 1974 when Clay County, Texas was deleted from the Wichita Falls SMSA by the National Bureau of Standards.

[5] Metropolitan leakage is the term used to denote that not all the income earned within an SMSA remains within that SMSA. Money flows out of the metropolitan system via wages paid to commuters and purchases of external goods and services.

[6] Walter Christaller, Central Places in Southern Germany, trans. C. W. Baskin (Englewood Cliffs, NJ: Prentice-Hall, 1966), pp. 43-45. In formulating his "central place theory", Christaller's first postulation was an isotropic surface, a featureless plain devoid of any natural or artificial features. Therefore, neither mountains nor jurisdictional boundaries, among other things, would be found on this plain.

[7] Gerald A. P. Carrothers, "An Historical Review of the Gravity Model and Potential Concepts of Human Interaction," Journal of American Institute of Planners, 22 (1956), 94.

[8] Wilbur R. Thompson, "Urban Economic Growth and Development in a National System of Cities," The Study of Urbanization, eds. P. M. Hauser and L. F. Schnore (New York:

Wiley, 1965), pp. 431-90. Several factors have been stipulated to account for the urban size ratchet. First, as cities grow their economic structure concomitantly become more diversified. Having this increased level of diversification tends to ensure local growth rates are at least as high as the national average. Second, as cities grow in size, they also attain more political power, enabling them to bargain effectively for government contracts and support. Another factor is that cities of this size category have already received large amounts of investment capital for the construction and maintenance of their urban infrastructures. These developed infrastructures attract firms and industries. Finally, creativity is greater in a larger city. Conducive to greater human interaction, the big-city environment is more likely to spawn innovations, some contributing to its own success.

[9] Roderick D. McKenzie, "Industrial Expansion and the Interrelations of Peoples," Race and Cultural Contacts, ed. E. B. Reuter (New York: McGraw-Hill, 1933), p. 20. McKenzie exposed this theory within the field of human ecology in 1933.

[10] Since 1981, the National Bureau of Standards have awarded several nonmetropolitan fringe counties SMSA status and some NFCs have already fused with them. Some multicounty SMSAs having evolved this way include Salisbury-Concord-Kannapolis, NC and Yuba City-Marysville, CA.

[11] Quentin Gillard, Incomes and Accessibility, Research Paper 175, (Chicago: Univ. of Chicago Press, 1977), p. 30.

[12] Walter T. Martin, The Rural-Urban Fringe: A Study of Adjustment to Residence Location (Eugene, OR: Univ. of Oregon Press, 1953), p. 1.

[13] Dale E. Hathaway, "A Public Employment Program for Rural Areas," Federal Manpower Policy in Transition, (Washington, D.C.: Manpower Administration, U.S. Department of Labor, 1974), pp. 62-64.

[14] John R. Ottensmann, The Changing Spatial Structure of American Cities (Lexington, MA: D. C. Heath, 1975), p. 22.

[15] Niles M. Hansen, Improving Access to Economic Opportunity: Nonmetropolitan Labor Markets in An Urban Society (Cambridge, MA: Ballinger, 1976), p. 41.

[16] The September 8 hurricane which hit the coast of Texas in 1900 caused 6,000 deaths. Had this hurricane hit the heavily urbanized East Coast, the number of deaths would have been multifold.

[17] Preston E. James and Clarence F. Jones, eds., American Geography Inventory and Prospect (Syracuse, NY: Syracuse Univ. Press, 1954), p. 15.

CHAPTER TWO

Background of the Study

Chapter 1 acquainted the reader with the NFC, put it in theoretical perspective, and provided both practical and disciplinary justification for its study. Chapter 2 will now review the literature to expose the more significant variables of both NFC and suburban milieus deterring SMSA inclusion of the former.

As long as there have been metropolitan areas, there have been nonmetropolitan fringes. Upon the day when the 3,047 counties[1] external of New England undergo metropolitanization, the NFC will not be of any concern. Until then, however, it is of primary concern to many, be they NFC residents, real estate promoters, land speculators, wildlife preservationists, or urban planners. Because the NFC is a melange of both urban and rural qualities, its nature reveals a high degree of ambiguity. Therefore, it is crucial that its nature be examined in order to more accurately identify those factors deterring metropolitan inclusion of the nonmetropolitan fringe county in the 1970 decade.

Geographical Distribution

The NFC is practically ubiquitous, appearing in the Northeast, South, North Central, and the West. New England, where the SMSA consists of towns, townships, and cit-

ies instead of counties, is the only section of the country the NFC cannot officially be found.[2] Outside this region, wherever there are SMSAs, there are nonetheless NFCs. They are to be found in differing cultural and physiographic regions alike. For example, they coëxist with SMSAs on the West Coast and in the Deep South. They are found in Appalachia as they are on the Atlantic Coastal Plain. Their presence is neither unknown on the high plains of Colorado nor the Willamette Valley of Oregon.

The ubiquity of the NFC can indeed be explained. Supplementing the continuing centripetal "country-to-city" migration, centrifugal "city-to-suburban" migration commenced about a century ago. It is still accelerating in the United States and in all other developed countries. Apparently occurring at the same rate per capita as disposable personal income is increasing, the net result of these two migration trends is the emergence of a new form of human settlement in the different sections of the nation -- the urban region.[3] Within such regions a distinction can be made between the central "commuter watershed", generally defined as a metropolitan area, and the nonmetropolitan fringe. This fringe contains, on the one hand, enterprises and settlements which are served by higher-order producer and consumer services of the metropolis, and on the other, contains summer cottages and other facilities which serve the population of the metropolis. Even in the nation's well-

developed urban regions the NFC exists. Sometimes circumscribing SMSAs or groups of SMSAs like cellular membranes, they dissever expansive, heavily populated metropolitan areas within these regions. In many instances, they represent discontinuities from the coalescing of great urban centers by not having been merged with any particular SMSA. Hence, the nonmetro fringe county is found in the Lower Great Lakes, the Northwest, and the California[4] urban regions, to mention several.[5]

Although the nonmetropolitan fringe county can be found in our nation's heavily urbanized regions, they are not numerous there. Often times only a single tier of NFCs separate two nearby metropolitan communities; whereas in less developed regions, two or three tiers of rural counties can be found interpersed among neighboring metropolitan settlements. Multiple SMSAs in the urbanized regions are now contiguous, forming chains which stretch uninterrupted for hundred of miles. Some chains traverse boundaries between two distinct regions, and are interconnected with shorter metropolitan chains. Examples of such are apparent in "Bosnywash" and the Lower Great Lakes region. Similar developments are occurring in the Florida and the Gulf Shore urban regions.[6]

Although a nonmetropolitan fringe county can be a place of insufficient tax returns, incongruous land-use patterns, high-cost utilities, deteriorating roads, and in-

adequate social organization, it is also a phase. It is a new phase in the urbanization process, a dynamic expansion in the number of people that set themselves apart residentially from the SMSA to which they are bound by economic interdependence, social interrelationships, and cultural ties and sentiments.[7]

Many metropolitan areas, especially the older and larger ones in the nation's old manufacturing belt, have passed through the processes of inception, growth and development, and final delineation.[8] Many have reached the phase where parts of their areas are experiencing physical and social deterioration. Consequently, the metropolitan area is perceived by many to be a place of insecurity and discomfort. Crime, threats to self and property, noise, congestion, and pollution are thought to be inherent to the metropolitan milieu. Many metropolitan residents are subsequently returning to relatively cleaner and at least perceived "safer" small-town or rural-like environments found in the metropolitan fringe. There they can live in pseudo-microcosms of less crime, better quality of air and water, "wholesome" environments for children, overall lower cost of living, or to live out their retirement years[9] in tranquility.[10]

Metropolitan Proximity

A metropolitan area is surrounded by a much more extensive fringe which is more or less overwhelmingly domi-

nated and transformed by its center. The SMSA's influence can be pervasive throughout the nonmetropolitan fringe, having either a direct or indirect effect. John Friedmann referred to this area of effect as the "urban field[11]"; others prefer the term "metropolitan region" (Figure 3). The influence of the central metropolitan area is felt in two ways. Productive enterprises, primarily manufacturing, settle in the fringe, taking advantage of the proximity of services in the center. Inhabitants of the center take advantage of the proximity of recreational resources on the fringe. This larger region may extend to a maximum of one hundred and fifty miles from the central city.[12]

Table 1, constructed from a random sample[13] of thirty NFCs and suburban counties[14] of the same metropolitan complex, gives an indication of the comparative location of the NFC. Of the sample, seven of the thirty are at the same or less distance from the metropolitan core than the corresponding suburban county. The differences of three (Branch, Barry; Lebanon, Perry; Louisa, Greene) of the remaining twenty-three sets, although positive, are negligible. At the other extreme, a case occurs (Hardin, TN, Colbert, AL) where an NFC, located at a distance of fifty-one miles is forty-five miles farther from its central city than the suburban county. It is at an overall distance of 8.5 times that of the suburban county from the metropolitan core. However, this divergence is explicable through the

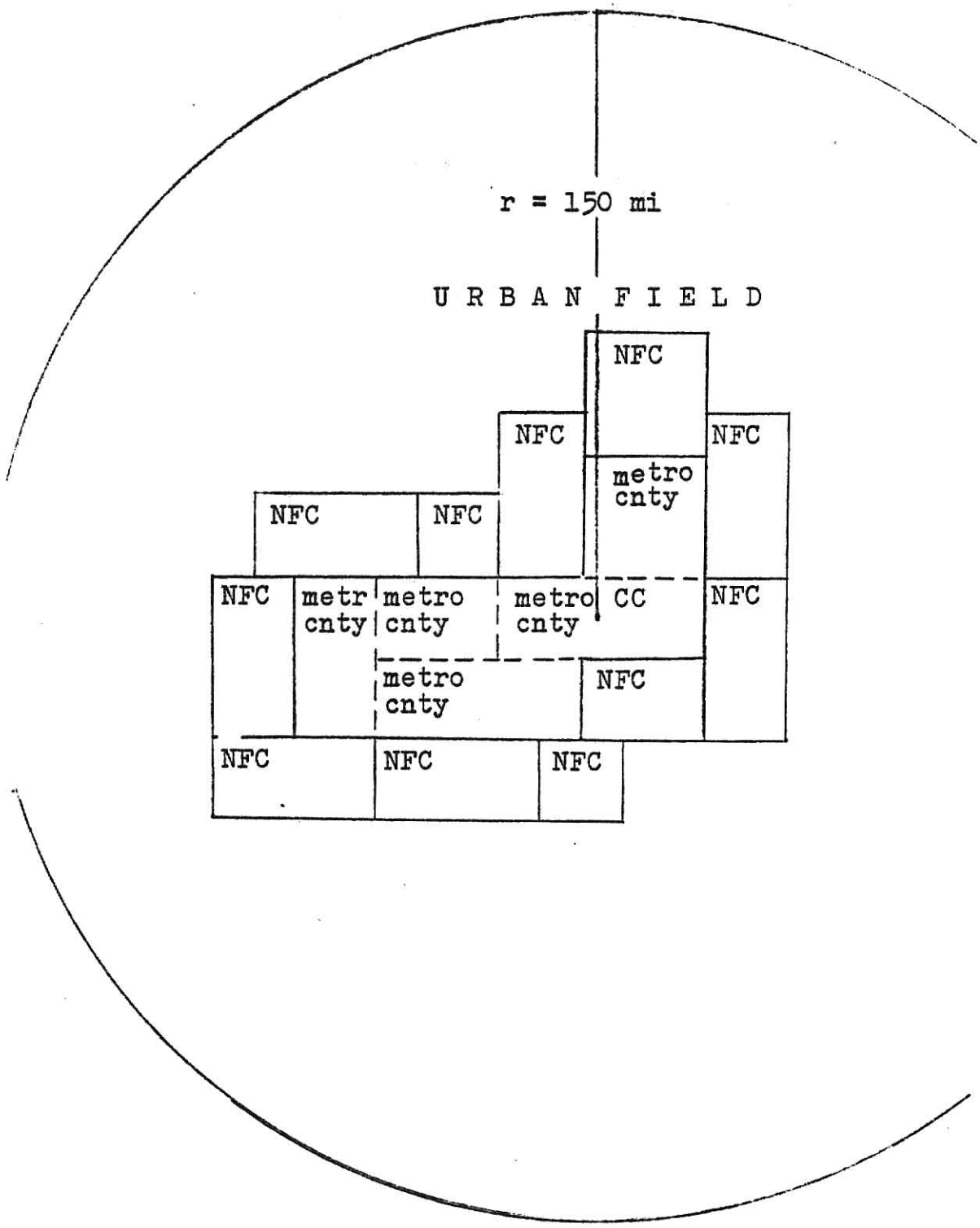


Figure 3. NFC Location in Urban Field Relative to Central Metropolitan Area

Table 1. Comparative NFC and Suburban County Distances from Metropolitan Central City of a Random Sample

	NFC	Dist.	Central city	Suburban cnty	Dist.
1.	Adair	44	Fayetteville, AR	Benton	20
2.	Bandera	46	San Antonio	Guadalupe	36
3.	Barnell, SC	42	Augusta	Aiken, SC	16
4.	Bastrop	30	Austin	Hays	33
5.	Bedford	53	Nashville	Rutherford	32
6.	Branch	26	Battle Creek, MI	Barry	25
7.	Caldwell	19	Hickory, NC	Alexander	24
8.	Cass, IA	51	Omaha	Sarpy	15
9.	Dallas	23	Des Moines	Warren	17
10.	Franklin	37	Fort Smith, AR	Leflore	37
11.	Hall	40	Athens, GA	Jackson	18
12.	Hardin, TN	51	Florence, AL	Colbert	6
13.	Harvey	24	Wichita	Butler	32
14.	Kendall	51	Chicago	McHenry	61
15.	Lebanon	26	Harrisburg	Perry	28
16.	Louisa	26	Charlottesville, VA	Greene	24
17.	Macoupin	44	Springfield, IL	Menard	24
18.	Mitchell	25	Albany, GA	Lee	10
19.	Newaygo	45	Grand Rapids	Ottawa	31
20.	Ottawa, OK	28	Joplin, MO	Newton	21

Table 1 (continued)

	NFC	Dist.	Central city	Suburban cnty	Dist.
21.	Person	32	Durham, NC	Orange	11
22.	Ross	46	Columbus, OH	Pickaway	27
23.	Sullivan	57	Wilkes-Barre, PA	Monroe	45
24.	Thurston, NE	40	Sioux City, IA	Dakota	7
25.	Tuscarawas	24	Canton, OH	Carroll	25
26.	Washington	60	Mobile	Baldwin	30
27.	Washington, IL	55	St. Louis	Franklin	49
28.	Washington, IN	38	Louisville	Oldham	27
29.	Wharton	55	Houston	Brazoria	45
30.	Yamhill	38	Portland, OR	Washington	17
		$\bar{x}_n = 39$			$\bar{x}_s = 26$

Distances are actual highway mileage measured from county seat or largest place in county to central city.

The suburban county at the greatest distance from the central city was chosen for the sample.

geographical location of Sheffield in suburban Colbert County. Sheffield, located on the south bank of the Tennessee River from Florence, forms twin communities with the central city, similar to St. Louis-East St. Louis, Omaha-Council Bluffs, or Eugene-Springfield, OR. Although Sheffield is not the county seat, it is the largest urban place. As such, distance was measured between it and Florence. Had Tuscumbia, county seat of Colbert County, been used, the locational difference between the NFC and the suburban county would not have been so great. This case was deliberated on because it is representative of others.

The averages or means of the distances are noteworthy in themselves. Having a mean of thirty-nine miles, NFCs in the sample are in relatively close proximity to metropolitan areas. However, they are located, on the average, thirteen miles farther from the central county or at a distance of 1.5 times that of suburban counties. The suburban county mean is twenty-six miles.

On the premise that this sample is representative of the populations of NFCs and suburban counties on the whole, one-third of all NFCs are at the same relative distance from the metropolitan central city as suburban counties. This geographical proximity to the metropolitan core should promote interaction with the SMSA, but not necessarily with the central county.

Many SMSAs have evolved to the point that they are now

comprised of component counties. Between the NFC and central county are frequently intervening suburban counties. This intervention has resulted in nonmetro fringe counties occurring, although still in relatively close proximity to the metro core, further out from the core.

Because of its proximity to the metropolitan core, the NFC could be expected to be more directly and immediately affected by its larger, more influential neighbor than other counties farther out in the urban field. Unlike rural counties and other communities further from the metropolis, the NFC has generally less independence. In many cases, sizeable commuties dispersed further out into the urban field exert influence -- albeit limited -- on neighboring smaller communities. However, rural counties at the outermost fringes of the urban field frequently come under the dominance of two neighboring SMSAs. Whereas these counties are partially dominated by two metropolitan areas, NFCs are dominated by a sole metropolitan area.

The degree of domination is exemplified by the process of diffusion. Diffusion entails the transmittal of new technology, managerial expertise, and other economic, social, and cultural innovations from the centers of activity to impact areas. Hence, it is one of very few spatial processes.[15] When these innovations are discovered, they filter down through the urban hierarchy. In the case of localized discoveries, they diffuse from the metropolitan settlement

to smaller settlements in the urban field. Although there may well be larger settlements in this field, other things equal, the NFC is generally the first -- after the SMSA -- to benefit. Communities farthest out should receive innovations last.

Nevertheless, negative aspects accrue from metropolitan adjacency. The NFC, because of its proximity, encounters more intense environmental pressures than counties more isolated from the metropolis. Proximate communities and counties are most apt to experience in-migration of both industry and population. Even when people don't establish permanent residences in open-country areas of NFCs, they still tend to recreate there. Proximate locations are also most likely to become sites for electric power plants, or perhaps solid, toxic, and nuclear waste disposal sites.[16]

Residential preferences. Previous research (Zuiches and Fuguitt, 1972; Fuguitt and Zuiches, 1975) has demonstrated that proximity to larger cities is a significant consideration in residential preferences. Whether the actual locality of preferred residence is in rural areas or small towns, closeness to a large metropolitan area is an important issue. Table 2, originally compiled by Fuguitt and Zuiches from the results of the National Opinion Research Center General Social Survey, was based on the preferences of 1,447 respondents in 1972 and 1,476 in 1974. In Table 2, both the size of place and locational preferences

Table 2. Actual and Preferred Residential Location in the United States, 1972 and 1974

Type of location	Actual Residence		Preferred Residence	
	1972	1974	1972	1974
	%	%	%	%
City more than 500,000	20	19	9	9
City 50,000 to 500,000	24	22	16	13
Within 30 miles of a city with over 50,000 population:				
Small city	23	25	31	25
Rural	11	13	24	27
More than 30 miles from a city over 50,000 population:				
Small city	12	15	10	13
Rural	9	6	9	14
Total	100	100	100	100
Number[a]	1,447	1,476	1,447	1,476

[a]Excludes 34 respondents in 1972 and 8 in 1974 with missing data on preferences.

Source: Fuguitt and Zuiches, 1975; quoted in Demography 12 1975: 495.

were included. Upon perusing Table 2, the consistency between the preferred distribution at the two dates is evident. At both time periods, more than a majority of respondents preferred residing within commuting range of a large central city. However, only thirty-four percent in 1972 and thirty-eight percent in 1974 actually lived at this distance.[17] Noting that the proportion preferring smaller cities at this location declined by six percentage points and the proportion preferring rural areas increased by three percentage points, the NFC would implicitly seem more resi-

dentially desirable than a suburban county at this distance.

Many metropolitan residents do leave the metropolitan area to secure their locational preferences. Some of these migrants do not go far. Relocating in exurban territory -- territory slightly beyond established suburban development and not clearly metropolitan or nonmetropolitan in character but steadily becoming part of the suburban fringe of expanding metropolitan areas, they remain close enough to commute into the metropolitan area.[18]

Persons relocating to territory statistically defined as nonmetropolitan but lying adjacent to an SMSA seem to be moving for the same reasons as city-to-suburb movers. Consequently, they might be thought of as suburbanites who are merely moving slightly farther than others from the urban core. Given the preceding, it follows that a large proportion of their reasons should be noneconomic (Long and DeAre, p. 19).

Table 3, originally constructed by Long and DeAre (1980), shows the distribution of reasons for moving among city-to-suburb movers and three groups of households leaving metropolitan areas as defined in 1970. Reasons for moving are broken down into seven general categories. Percentages not classified and not reported are also shown.

Upon examining Table 3, one can conclude that most households leaving metropolitan areas relocate in counties either adjacent to metropolitan areas or no more than one

Table 3. Reasons Household Heads Moved from Cities to Suburbs and for Moving Out of Metropolitan Areas in the 12 Months Preceding the 1975 Annual Housing Survey According to an Indicator of Distance from Metropolitan Areas

Main reason for moving	Movers[a] from central cities to balance of SMSA as defined in 1970	Movers from SMSAs as defined in 1970: To counties added to SMSAs between 1970 and 1975	To counties adjacent to SMSA as defined in 1975	To counties not adjacent to SMSAs as defined in 1975
Household heads (thous.)	1,003	156	372	240
	%	%	%	%
Employment related	8.3	34.6	35.2	53.1
Family related	24.6	15.4	21.0	13.7
Housing and neighborhood related	52.5	22.4	17.2	7.8
Enter or leave armed forces	0.3	1.3	1.1	5.4
Attend school	0.5	4.5	7.3	2.9

Table 3 (continued)

Main reason for moving	Movers[a] from central cities to balance of SMSA as defined in 1970	Movers from SMSAs as defined in 1970: To counties added to SMSAs between 1970 and 1975	To counties adjacent to SMSA as defined in 1975	To counties not adjacent to SMSAs as defined in 1975
	%	%	%	%
Retirement	0.6	5.1	5.6	5.0
Change of climate	0.8	1.3	2.2	2.5
Not classified	10.0	12.2	5.6	7.1
Not reported	2.5	3.2	4.8	2.5
TOTAL	100.0	100.0	100.0	100.0

[a]Excludes intermetropolitan migrants.

SOURCE: Larry H. Long and Diana DeAre, Migration to Nonmetropolitan Areas: Appraising the Trend and Reasons for Moving (Washington, D.C.: GPO, 1980), p. 21.

county away. From Table 3, it is discernible that approximately 20.3 percent migrated to nonmetropolitan fringe counties incorporated into metropolitan areas between 1970 and 1975; an additional 48.3 percent went to counties still nonmetropolitan in 1975 but contiguous to metropolitan communities whose boundaries had been updated by 1975. In sum, 68.6 percent of the nonmetropolitan-bound households went to counties very recently redefined as belonging to SMSAs or else adjacent to redefined SMSAs. Past analyses, having shown that about sixty percent of the net in-migration to nonmetropolitan territory went to NFCs, have been more or less consistent with these findings (Long and DeAre, p. 19). These analyses are evidence that well over a majority of people desiring a nonmetropolitan residential location preferred one proximate to a metropolitan area.

To summarize, the geographical distribution of the NFC is so widespread that the NFC is of national significance. New England, because of definitional variation, is the only region of the country devoid of the nonmetropolitan fringe county, though a nonmetro fringe surely obtains. Nevertheless, in the balance of the nation, the NFC plays a vital role in preserving wilderness areas, serving as weekend recreational sites, acting as buffer zones between encroaching conurbations, among other things. However, its relative metropolitan proximity is in itself a drawback to its longevity (Table 3, col. 2). Recent change in preferred resi-

dential location and individuals becoming better able and more willing to act on the basis of longstanding preferences have made the NFC more susceptible to in-migration. This in-migration has caused concomitant conflicts and pressures, which, ironically, are somewhat reminiscent of those in the metropolitan milieu.

Population Growth

Investigations aimed at measuring growth rates in varying concentric zones around the metropolitan center revealed that population centralized up to the benchmark year of 1920 and decentralized thereafter. As growth spread in an outward manner, peripheral population increased at the most rapid rates in the 0 to 5 mile zone adjacent to cities from 1910-1920, and in the five-to-ten mile zone after 1920. Most metropolitan growth is now found in the rapidly dispersing suburban and exurban fringe territory. In short, there has been a persistent shift in the locus of new growth -- residential, industrial, commercial -- to the expanding periphery. More and more suburban areas now provide most of the essential services formerly concentrated in the central city; new outlying locations provide for shopping needs, jobs, and entertainment among a myriad of other services. Not only do suburbs provide themselves with these services, but also provide them to NFCs and other rural counties farther out in the central city's urban field.[19] Because of this, growth in suburbia and exurbia is not solely the re-

sult of the exodus from the central city and the older established suburbs. The availability of affordable housing and suburban employment has enabled in-migrants to select nonmetropolitan fringe locations. Actual and anticipated location decisions of in-migrants, and relocation decisions of prior central-city residents, could encourage suburban housing and employment growth. In turn, this growth could encourage nonmetropolitan fringe county population growth.[20] Fuguitt suggests that

> centers near metropolitan centers may grow in population as part of a decentralization process, becoming commuter towns or new homes of industry. Within such an extended metropolitan community, residential and commercial location decisions may be influenced less by factors directly associated with size of place as by such things as the availability of space for housing, tax structure, quality of schools, etc. -- considerations which might actually be more favorable in smaller centers.[21]

Political scientist Edward C. Banfield states that what has transpired in the metropolitan environment is readily explainable within the context of a growth and melting-pot theory of the core-oriented industrial metropolis. He explains:

> Much of what has happened -- as well as of what is happening -- in the typical city can be understood in terms of three imperatives. The first is demographic: if the population of a city increases, the city must expand in one direction or another -- up, down, or from the centre outward. The second is technological: if it is feasible to transport large numbers of people outward (by train, bus, and automobile) but not upward or downward (by elevator), the city must expand outward. The third is economic: if the distribution of wealth and income is such that some can afford new housing and the time and money to commute considerable distances to work. . . the expanding periphery of the city must be occupied. . . The word "imperatives" is

> used to emphasize the inexorable, constraining character of the three factors that together comprise the logic of city growth (Berry and Kasarda, pp. 108-9).

Little noticed in the years following 1950, a shift in population distribution became prominent after 1970. In conjunction with total growth rates in metro counties subsiding, the ability of metro counties to attract population from nonmetro areas diminished significantly. This new trend in population dynamics, announced on November 23, 1973 by the Census Bureau, is deemed "the nonmetropolitan turnaround". This turnaround was revealed through data from the March 1973 Current Population Survey. Another independent data source, the Census Bureau's annual estimates of population by county, substantiated the finding. Among other things, it concluded that population growth in the nonmetropolitan sphere was attributal to spillover into nonmetropolitan fringe county territory (Long and DeAre, 1980).

Table 4, compiled from a random sample of twenty-nine NFCs and one independent city contained within an NFC, contains population growth rates over the past four decades. The result of the nonmetropolitan turnaround is salient. Hernando County, Florida exemplifies the effect of this social phenomenon on positive growth. Growing at incredible rates preceding the emergence of the nonmetropolitan turnaround, the rate was astronomical in the decade of the turnaround -- over three times the rate of the 1960 to 1970 interim. Calvert County, Maryland presents a similar, although

Table 4. Population Growth Rates of a Random Sample of Nonmetropolitan Fringe Counties Before and After the Emergence of the Nonmetropolitan Turnaround

Nonmetropolitan Fringe county	Percent increase			
	1940-50	1950-60	1960-70	1970-80
1. Baldwin, GA	22.8	14.7	0.5	1.3
2. Bradford, FL	31.4	8.6	17.5	36.9
3. Brown, IN	0.3	13.1	28.9	36.7
4. Calvert, MD	15.4	30.8	30.7	67.5
5. Cass, IL	-8.1	-3.7	-2.2	6.1
6. Clifton Forge, VA[a]	-11.5	-9.1	4.4	-8.2
7. Clinton, IN	4.7	3.5	-0.7	3.3
8. Cowley, KS	-3.2	2.6	-7.5	5.2
9. Decatur, IN	2.8	9.9	13.6	4.9
10. Elbert, CO	-18.0	-17.2	5.3	75.5
11. Evans, GA	-10.1	4.5	4.9	15.6
12. Fauquier, VA	1.0	13.3	9.6	36.1
13. Frederick, MD	8.7	15.5	18.1	34.5
14. Fulton, IN	6.3	2.4	0.2	13.8
15. Goodhue, MN	1.8	2.9	5.4	11.3
16. Haskell, OK	-23.2	-31.5	5.0	15.0
17. Hernando, FL	18.6	67.4	51.8	161.5
18. Hot Spring, AR	17.3	-1.3	0.3	22.1
19. Jay, IN	2.5	-2.5	4.4	-1.3
20. Jersey, IL	11.9	11.5	8.6	11.1
21. La Porte, IN	20.7	23.8	10.8	3.1
22. Lauderdale, TN	2.4	-12.8	-7.2	21.1
23. Lincoln, MO	-6.4	9.7	22.0	23.0
24. McLeod, MN	3.8	9.9	13.4	7.2
25. Marion, GA	-6.2	-16.0	-6.9	3.9
26. St. Charles, LA	8.5	58.8	39.3	26.1
27. Scott, MS	-6.3	-2.3	0.9	14.9
28. Taney, MO	-4.5	3.8	27.2	57.2
29. Tangipahoa, LA	16.9	11.7	10.8	22.5
30. Washington, IL	-8.5	-6.2	1.6	12.3

[a]This is an independent city contained within the legal boundaries of a nonmetropolitan fringe county.

not so impressive, story. In the case of negative growth, Marion County, Georgia, experiencing continual decline in the previous three decades, actually experienced growth during this last decade. Needless to say, not all counties have been affected similarly by this demographic turnaround. In fact, some have not been affected at all, e.g., Clifton Forge, VA; Decatur, IN; St. Charles Parish, LA; etc.

Brown and Beale have devised a typology of post-1970 population change. In doing so, population change of non-metro counties were organized into five categories. They are defined as follows: (1) continuous population growth: growth during both the 1960s and 1970s; (2) reverse turnaround: growth during the 1960s and decline during the 1970s; (3) continuous population decline: decline during both the 1960s and 1970s; (4) extreme turnaround: 21.8 percent growth or more during the 1970s (triple the national average) and/or 16.5 percentage points or more positive difference during this interim compared with the 1960s rate; and (5) low to moderate turnaround: less than 21.8 percent growth and/or less than 16.5 percentage points of positive difference in the rate of growth in the 1970s compared with the 1960s rate (Brown and Beale, Nonmetropolitan America in Transition, p. 28).

Table 5 shows how NFCs fell into this typology. Showing the distribution among these categories provides an essential perspective for scrutinizing the nature and magnitude of the

Table 5. A Typology of Post-1970 Nonmetropolitan Fringe County Population Change

	Growth in 1960s		Decline in 1960s		
	Growth in 1970s	Decline in 1970s	Decline in 1970s	Growth in 1970s	
Total NFCs in 1970	Continuous Growth	Reverse Turnaround	Continuous Decline	Extreme Turnaround	Low to Moderate Turnaround
909	548	29	102	115	115

SOURCE: Adapted from Table 1.3 of David L. Brown and Calvin L. Beale, "Diversity in Post-1970 Population Trends" in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara Mills Mazie (Chapel Hill, NC, 1981), p. 47.

post-1970 nonmetro population turnaround on the NFC. Because different NFCs have been affected differently by this turnaround, this typology is needed to ascertain how pervasive this demographic phenomenon has been in the nonmetropolitan sphere.

Generally, nonmetropolitan areas located immediately adjacent to metropolitan centers have experienced the most consistent and the highest nonmetropolitan growth rates during the 1970s. NFCs underwent an average 4.7 percent increase through 1973 compared with 3.7 percent for nonadjacent nonmetropolitan counties. Containing 51.5 percent of all nonmetropolitan residents, NFCs have a high level of integration of their residents into metropolitan labor markets. Consequently, they have experienced larger rates of growth. Through 1974, population has increased 9.1 percent in NFCs where twenty percent or more of the residents commute to a metropolitan locality for employment.[22]

In dealing with growth rates, a word of caution is warranted. Comparing annual growth rates can be misleading, especially in the case where the base populations are unequal. For example, if NFC "x" with a base population of 500,000 underwent a net increase of 50,000 people over a ten year period, its decennial growth rate would be 10.0%. However, if NFC "y" with a base population of 50,000 increased by 10,000, its growth rate would be 20.0%. Although NFC "x" increased by five-times the amount that NFC "y" did, its o-

verall growth rate was smaller. Because of this, it is occasionally beneficial to examine numerical change in conjunction with growth rates when one has reason to believe that actual numerical increases or decreases are significant in themselves.

Nevertheless, NFC high-growth rates have, in many cases, resulted in large populations. This is obvious upon glancing at Table 6. Contained within this table is the 1980 census population of the sixty most populous NFCs. This entire set is comprised of nonmetropolitan fringe counties whose populations could have qualified them for metropolitan status. Phrased differently, each and every one of these NFCs in its own right had over the minimum 50,000 in population needed to be classified as an SMSA.[23] Although these counties had well over this figure, neither a single community nor twin communities within them had this minimum population requirement. Consequently, these counties failed to meet the metropolitan criterion.

The NFC having the largest population is Ocean County, NJ. Having a population of 346,038, it, as an SMSA, would rank 111th in the nation and 6th in New Jersey. Long Branch, the major central city of the Long Branch-Ashbury Park SMSA, lies thirty-five miles northeast of Toms River, the county seat of Ocean County. Integrated, these two counties would comprise a metropolitan area with a population of 849,211. It would rank 46th in the nation and 2nd in New Jersey --

Table 6. 1980 Census Population of Sixty Largest Nonmetropolitan Fringe Counties

	NFC	Population		NFC	Population
1.	Ocean, NJ	346,038	31.	Sumter, SC	88,243
2.	Schykill, PA	160,630	32.	Hunterdon, NJ	87,361
3.	Fayette, PA	160,395	33.	Thompkins, NY	87,085
4.	Ulster, NY	158,158	34.	Raleigh, WV	86,821
5.	Butler, PA	147,912	35.	El Dorado, CA	85,812
6.	Chautauqua, NY	146,925	36.	Collier, FL	85,791
7.	Merced, CA	134,560	37.	Cattaraugus, NY	85,697
8.	Sussex, NJ	116,119	38.	Tuscarawas, OH	84,614
9.	Frederick, MD	114,263	39.	Scioto, OH	84,545
10.	Franklin, PA	113,629	40.	St. Landry, LA	84,128
11.	Columbiana, OH	113,572	41.	Canyon, ID	83,756
12.	Lebanon, PA	109,829	42.	Clearfield, PA	83,578
13.	Porter, IN	108,632	43.	Cleveland, NC	83,435
14.	Lawrence, PA	107,150	44.	Rockingham, NC	83,426
15.	Lake, FL	104,870	45.	Muskingum, OH	83,340
16.	Ashtabula, OH	104,215	46.	Manitowoc, WI	82,918
17.	Robeson, NC	101,577	47.	Iredell, NC	82,538
18.	Northumberland, PA	100,381	48.	La Fourche, LA	82,483
19.	Steuben, NY	99,135	49.	Orangeburg, SC	82,276
20.	Kent, DE	98,219	50.	Cape May, NJ	82,266

Table 6 (continued)

	NFC	Population		NFC	Population
21.	Wayne, OH	97,408	51.	Allegan, MI	81,555
22.	Wayne, NC	97,054	52.	Grant, IN	80,934
23.	Vermillion, IN	95,222	53.	Tangipahoa, LA	80,698
24.	Indiana, PA	92,281	54.	Cayuga, NY	79,894
25.	Morgan, AL	90,231	55.	Erie, OH	79,655
26.	Lenawee, MI	89,948	56.	Cowlitz, WA	79,548
27.	Linn, OR	89,495	57.	Armstrong, PA	77,768
28.	Fond du Lac, WI	88,952	58.	Lee, AL	76,283
29.	Hardin, KY	88,917	59.	Wayne, IN	76,058
30.	Crawford, PA	88,869	60.	Hall, GA	75,649

SOURCE: U.S. Bureau of the Census 1980 Census of Population (Washington, D.C.: GPO, 1981).

the Newark SMSA has 1.9 million. There is ample evidence of social and economic integration. Extending southward along the Atlantic coast from the urban conglomeration of Long Branch-Ashbury Park is a heavily urbanized corridor, its southern tip in Ocean County. This part of the urbanized area accounts for 28.0% (96,909) of the county's population. Although a well-developed urbanized area links metropolitan Monmouth County with nonmetropolitan Ocean County, the latter has not experienced metropolitan inclusion or evolution.

In summary, the growth and decentralization of metropolitan population has had concomitant effects on the ecological structures of not only the metropolitan area but also on the NFC. Closely following the centrifugal drift of metropolitan population was the dispersion of retail establishments and standard consumer services to serve this population. Consequently, this dispersion of employment sources made it possible for even greater growth in NFCs (Berry and Kasarda, p. 228).

To explain the present growth occurring in the nonmetropolitan fringe county is a difficult task. Clearly, there is no simple explanation. The fact is that the resumption of nonmetropolitan fringe growth -- as with nonmetropolitan growth in general -- has been intensifying since the turn of the century. This turnaround has been aided and abetted by a progressive extension of communication and transportation networks, the introduction of rural free delivery of mail and

of parcel post, the all-weather surfacing of roads, the development of the interstate freeway system, and the rapid spread of motor vehicle ownership. The consequent diffusion of metropolitan influence over the countryside has extended the urban culture beyond former bounds.[24]

An issue that deserves more investigation is the effect of population growth on the NFC. Maintenance of rural attributes in a pristine state becomes more difficult as more and more in-migrants relocate there. Use patterns change, costs accelerate, and environmental regulations are both advantageous and disadvantageous to the community. As nonmetropolitan fringe population increases, financial support for planning and implementation of plans preserving the precarious nonmetropolitan fringe environment is mandatory. Any lack thereof may lead to the deterioration of the features principally attracting new residents. Not to be neglected is sufficient water supplies, energy services, and waste and garbage disposal. Numerous services required for household and commercial developments are more expensive and less conveniently and less efficiently provided in rural communities. Planning is therefore needed to ensure that population growth will not result in the destruction and contamination of the NFC environment (Zuiches, Nonmetropolitan America in Transition, p. 106).

Some of the problems have already become appreciable in the nonmetropolitan sphere. Social integration is dissolved

by high rates of growth and decline. Community solidarity is perceived to be threatened. Issues such as school and sewer bonds may cause community conflict. Community disagreement may spawn from property taxes or policies for community development. Fiscal dilemmas are generally inevitable as infrastructural requirements mean higher local expenditures for the provision of medical services, police and fire protection, utility services, and larger physical facilities and personnel.[25]

Another point to be emphasized is a continuing process of adjustment is simultaneously occurring at the individual level. Planning in the NFC environment is necessary to maintain a minimum level of services necessary for community health and vitality. These services, in turn, increase the potential for further growth as individuals selectively pick and choose new residential locations according to their personal desires. Not only should the planning process seek to satisfy the preferences of younger families to evade metropolitan environments, it should seek to retain current residents and recent in-migrants or to attract others (Zuiches, Nonmetropolitan America in Transition, p. 109).

NFC Employment Opportunities

Manufacturing opportunities. Significant economic changes have unequivocally occurred in the nonmetropolitan fringe county over recent history. In order to take advan-

tage of lower taxes, less expensive land, and especially cheaper labor costs, industry has dispersed in America. It has decentralized within metropolitan areas to sites more accessible to nonmetropolitan areas -- namely, the nonmetropolitan fringe county.[26] It has also dispersed to nonmetro counties.

In the past, metropolitan growth has successfully tended to siphon off productive population, investment capital, and economic activity from many hinterland areas. In some places, this is yet transpiring. However, there are definite indications that the urbanization process is reversing this trend. Presently, centrifugal forces are beginning to propel economic activity away from existing metropolitan centers into their hinterlands and beyond. The hinterland has space, scenery, and localities that are increasingly attractive to businesses. Technological innovations have and will relax some of the need for metropolitan proximity in distribution, marketing, information services, and decision-making. For instance, computerized business inventory systems, videophones, and the use of coded cards to send information, order items, and transfer funds by telephone will make possible greater decentralization of some types of businesses and industrial activity. Improvement in transportation technology will continue to shorten functional distances and promote accessibility. When the National Interstate Highway system is completed, an estimated 3.5-7.5 million acres will be opened

up for development. The overall impact of these forces are and will continue to open up the "rural" hinterland for purposes that are "urban" in character.[27] While the older metropolitan core may persist in being the center for major educational and government institutions, prestigeous museums, and outstanding cultural and sports events, industrial activities will and are decentralizing to suburban counties, to some nonmetropolitan fringe counties, and throughout the urban field.[28] The center-oriented pattern of the industrial city has given way to a new, more dispersed urban structure. The mobility provided by the modern automobile and sophisticated transportation networks have created these new possibilities. At least one author argues that industrial concerns seeking new locations can presently choose their locales as much on the basis of the social and physical environment as on the economics of access (Ottensmann, p. 23).

Where industrial growth has occurred in the NFC, it has largely been resultant of plant expansions and the creation of new industries rather than relocation of older metropolitan industries (Hawley and Mills, p. 11). However, similar to the present phenomenon transpiring in the central city environment, overall industrial decline has also occurred in some NFCs. Compiled of a random sample of thirty NFCs, Table 7 contains the number of manufacturing establishments located in these counties in 1970 and 1980. It also shows numerical and percentage change. In 1970, 1,329 manufac-

Table 7. Number of Manufacturing Establishments in 1970 and 1980 of a Random Sample of Thirty Nonmetropolitan Fringe Counties

	NFC	Number of Manufacturing Establishments 1970	1980	Change	% Change
1.	Escambia, AL	82	65	-17	-20.7
2.	Gadsden, FL	34	40	+6	+17.6
3.	Haralson, GA	23	34	+11	+47.8
4.	Pulaski, GA	14	9	-5	-35.7
5.	Elmore, ID	5	4	-1	-20.0
6.	Grundy, IL	32	35	+3	+9.4
7.	Vermilion, IL	119	126	+7	+5.9
8.	Cass, IN	57	63	+6	+10.5
9.	Lagrange, IN	42	51	+9	+21.4
10.	Ripley, IN	22	31	+9	+40.9
11.	Washington, IN	23	33	+10	+43.5
12.	Washington, IA	25	27	+2	+8.0
13.	Miami, KS	16	18	+2	+12.5
14.	Nelson, KY	28	25	-3	-10.7
15.	Simpson, KY	15	29	+14	+93.3
16.	Avoyelles, LA	25	37	+12	+48.0
17.	Morehouse, LA	27	25	-2	-7.4
18.	St. Helena, LA	9	8	-1	-11.1
19.	Rice, MN	35	48	+13	+37.1
20.	Howard, MO	10	10	0	0.0
21.	Taney, MO	269	22	-247	-91.8
22.	Yates, NY	26	20	-6	-23.1
23.	Sandusky, OH	108	105	-3	-2.8
24.	Lebanon, PA	182	185	-3	-1.6
25.	Hampton, SC	35	41	+6	+17.1
26.	Lincoln, SD	8	14	+6	+75.0
27.	Jefferson, TN	22	37	+15	+68.2
28.	Palo Pinto, TX	30	49	+19	+63.3
29.	Somervell, TX	2	1	-1	-50.0
30.	Wilson, TX	4	10	+6	+150.0
	TOTAL	1,329	1,202	-127	-9.6

SOURCE: County Business Patterns, 1970 and 1980, U.S. Bureau of the Census.

turing establishments were located in these NFCs. By 1980, this number was 1,202, a decline of 127 establishments or 9.6%. On the premise that this random sample is at least statistically representative of some of the population of NFCs, NFC industrial workers would have a rationale to replace lost work by commuting to industrial employment found in either a suburban zone or in a central county.

People residing in nonmetropolitan fringe counties are engaged in a wide-range of economic activities. These activities are becoming increasingly like those of metro Americans. However, in 1977, the largest employer was manfacturing (Brown and Beale, Nonmetropolitan America in Transition, p. 41). This trend was especially notable in the South and East. In some states outside of these regions -- namely, Michigan, Oregon, and Washington, manufacturing was also an important source of NFC employment.

While there has been a general decline in the number of NFC manufacturing establishments as shown by Table 7, Table 8 shows that actual NFC employees of the sample employed in manufacturing has actually grown, causing overall proportions of the labor force engaged in this sector in 1970 and and 1980 to remain virtually constant. This is also further evidence the NFC residents are evidently taking advantage of industrial employment opportunities in the metropolitan area. Relocating and expanding manufacturing concerns in suburban metropolitan zones are becoming alternate employment sources

Table 8. Manufacturing Employment in 1970 and 1980 of a Random Sample of Thirty Nonmetropolitan Fringe Counties

	NFC	Employed in Manufacturing 1970	Employed in Manufacturing 1980		Percent of Total Labor Force 1970	Percent of Total Labor Force 1980
1.	Escambia, AL	2,772	3,505		42.0	40.4
2.	Gadsden, FL	1,539	1,240		34.0	25.4
3.	Haralson, GA	6,025	5,677		84.0	77.2
4.	Pulaski, GA	589	750		39.0	41.4
5.	Elmore, ID	69	156		5.6	8.2
6.	Grundy, IL	2,128	2,839		32.7	34.1
7.	Vermillion, IL	14,249	13,896		50.8	44.0
8.	Cass, IN	5,215	5,318		50.6	46.1
9.	Lagrange, IN	2,256	2,849		53.9	52.3
10.	Ripley, IN	2,304	3,743		52.9	55.7
11.	Washington, IN	1,328	1,921		47.8	55.6
12.	Washington, IA	516	1,491		18.8	28.4
13.	Miami, KS	745	982		28.2	25.7
14.	Nelson, KY	1,253	1,908		38.4	31.7
15.	Simpson, KY	2,578	2,759		61.9	56.2
16.	Avoyelles, LA	375	902		11.3	16.6
17.	Morehouse, LA	2,437	1,750		54.4	32.4
18.	St. Helena, LA	190	249		36.2	47.5
19.	Rice, MN	2,118	2,869		26.4	22.0
20.	Howard, MO	251	583		18.6	34.1
21.	Taney, MO	2,130	541		10.1	12.8
22.	Yates, NY	1,024	710		33.8	19.1
23.	Sandusky, OH	7,620	8,997		50.6	48.8
24.	Lebanon, PA	15,630	14,456		51.6	45.6
25.	Hampton, SC	1,584	2,117		50.7	49.8
26.	Lincoln, SD	319	711		27.0	28.0
27.	Jefferson, TN	2,820	3,135		55.5	45.4
28.	Palo Pinto, TX	1,614	3,016		21.4	45.0
29.	Somervell, TX	10	10		5.9	2.0
30.	Wilson, TX	30	259		3.0	17.2
	TOTAL	81,718	89,339	MEAN	36.5	36.3

SOURCE: County Business Patterns, 1970 and 1980, U.S. Bureau of the Census.

as we shall see later in the thesis.

Firm age is the major factor accounting for stable employment in nonmetropolitan fringe areas during a period of general retrenchment in the manufacturing sector. Suburban and nonmetro industrialization is a comparatively recent phenomenon. Most stationary firms are relatively new and early in their life cycles in comparison with other stationary firms in the old central city that are older and most likely less efficient. The newer, more efficient firms in suburban areas have expanded employment more rapidly than older firms in metropolitan cores (Miller, p. 24).

Table 9 gives a breakdown of manufacturing employment by county groups in 1969 and 1975. Originally compiled by James P. Miller in Nonmetro Job Growth and Locational Change in Manufacturing, it was based on the data files of Dun and Bradstreet Corporation and Duns Market Identifiers (DMI).

From 1969 to 1975, Table 9 shows that manufacturing employment in nonmetropolitan fringe counties decreased by the smallest rate of decline of all manufacturing employment. The metropolitan rate of decline was roughly 10%, almost four times the rate in the NFC. Those manufacturing concerns not leaving the SMSA entirely are increasingly attracted to suburban locations. These suburban locations have brought manufacturing employment opportunities within closer commuter range of the NFC.

Density gradients in employment sectors -- computed as

Table 9. Manufacturing Employment by County Groups, 1969-75

Area	Employed 1969	Employed 1975	Difference	Percent Change
United States	19,187,000	18,573,000	-614,000	-3.2
Metro	14,937,000	14,315,000	-622,000	-9.6
NFC	2,552,000	2,488,000	-64,000	-2.5
Nonmetro Nonadjacent	1,698,000	1,757,000	59,000	3.5

SOURCE: Adapted from James P. Miller, Nonmetro Job Growth and Locational Change in Manufacturing Firms (Washington, D.C.: GPO, 1980), p. 25.

far back as data allow -- show a steady decline in the manufacturing sector in metropolitan areas. Similar to density gradients in other sectors, i.e., retailing, wholesaling, and services, manufacturing employment opportunities have been dispersing throughout metropolitan areas. Total manufacturing diminished in the central cities while they increased dramatically on the suburban fringe of many metro areas. This decentralization has apparently been occurring since 1920 (Ottensmann, p. 22).

The manufacturing redistribution trends of recent years, especially of the post-1970 period, has enabled nonmetropolitan fringe counties to take advantage of employment opportunities which had so long been characteristic of only a central city setting. In 1975, the NFC labor force was engaged in 14.4% of total manufacturing employment (Table 10).

Table 10. Distribution of All Manufacturing Employment by Urban Orientation of Counties, 1975

County group	All manufacturing employment (%)
All metro	74.5
All nonmetro	25.5
NFC	14.4
Other nonmetro	11.1
All U.S. counties	100.0

SOURCE: Adapted from Edward J. Smith, Energy and Labor Use by Rural Manufacturing Industries, Rural Development Research Report, No. 26 (Washington, D.C.: U. S. Department of Agriculture, 1981), p. 6.

The cumulative effect of this process has been a reduction of the difference not only in incomes, but in the cultures of the central city and the nonmetropolitan fringe county (Hawley and Mazie, p. 9).

Service sector. Growing faster than any other sector in the economy, the service sector's role in creating jobs and enhancing the quality of life makes it a prime component of rural employment.[29] The service sector is, however, anything but homogeneous. Comprising lawyers, maids, professors, busboys, auto mechanics, to name a few, this employment sector is important in the NFC as it is in the SMSA. A multiplicity of service firms and establishments is found in

both nonmetropolitan and metropolitan environments (Menchik, Nonmetropolitan America in Transition, p. 237).

From 1970 to 1977, the national employment in the service sector increased by twenty-four percent. As a comparison, this is more than four times the growth in the goods sector. Each industry within the service sector grew faster than the average for all industries, except for transportation, communication, and utilities industry (Menchik, Nonmetropolitan America in Transition, p. 232).

Table 11 exhibits the number of service establishments in the sample of NFCs of Tables 7 and 8 in 1970 and 1980. Like Table 7, it also contains numerical and percentage increases. In 1970, service units outnumbered manufacturing units in these NFCs by a ratio of 2.4:1. With an overall positive growth rate in NFC services during this last decade, the ratio increased to 3.1:1 by 1980. The overall decennial growth rate of service units in these thirty counties was 16.7% versus -9.6% for manufacturing establishments. This resulted from an increase of a total of 537 service units and a decrease of 127 manufacturing units. These findings attest to the fact that the service sector accounts for an increasingly larger proportion of the NFC economy, as the manufacturing sector is simultaneously contributing a smaller share.

Paralleling the trend in the manufacturing sector, employment in the service sector has also increased in the

Table 11. Number of Service Establishments in 1970 and 1980 of a Random Sample of Thirty Nonmetropolitan Fringe Counties

	NFC	Number of Service Establishments 1970	1980	Change	% Change
1.	Escambia, AL	142	144	+2	+1.4
2.	Gadsden, FL	89	107	+18	+20.2
3.	Haralson, GA	58	56	-2	-3.4
4.	Pulaski, GA	39	49	+10	+25.6
5.	Elmore, ID	51	75	+24	+47.1
6.	Grundy, IL	103	134	+31	+30.1
7.	Vermillion, IL	438	458	+17	+3.9
8.	Cass, IN	183	193	+10	+5.5
9.	Lagrange, IN	44	67	+23	+52.3
10.	Ripley, IN	74	83	+9	+12.2
11.	Washington, IN	50	56	+6	+12.0
12.	Washington, IA	94	112	+18	+19.1
13.	Miami, KS	91	106	+15	+16.5
14.	Nelson, KY	77	109	+32	+41.6
15.	Simpson, KY	58	67	+9	+15.5
16.	Avoyelles, LA	102	131	+29	+28.4
17.	Morehouse, LA	86	106	+20	+23.3
18.	St. Helena, LA	6	11	+5	+83.3
19.	Rice, MN	177	198	+21	+11.9
20.	Howard, MO	51	47	-4	-7.8
21.	Taney, MO	72	167	+95	+132.0
22.	Yates, NY	78	86	+8	+10.3
23.	Sandusky, OH	267	295	+28	+10.5
24.	Lebanon, PA	450	503	+53	+11.8
25.	Hampton, SC	46	62	+16	+34.8
26.	Lincoln, SD	39	56	+17	+43.6
27.	Jefferson, TN	66	84	+18	+27.3
28.	Palo Pinto, TX	131	133	+2	+1.5
29.	Somervell, TX	12	15	+3	+25.0
30.	Wilson, TX	41	42	+1	+2.4
	TOTAL	3,215	3,752	+537	+16.7

SOURCE: County Business Patterns, 1970 and 1980, U.S. Bureau of the Census.

sample, as shown by Table 12. This increase was larger in percent and numerical increase than the corresponding increase in the manufacturing sector. In spite of this faster growth rate, the service sector comprised virtually the same proportion of total NFC employment in 1980 and 1970. This is explained through the fact as NFCs grow and develop, there is a corresponding expansion in the service sector -- the economic sector which provides services to the population and firms. Proximity is a must, so expansion will necessarily take place in the NFC itself, rather than a bordering suburban location.

In this section, the thesis examined the two most important employment sectors in the nonmetropolitan fringe county. It has revealed that although manufacturing establishments in the HFC have declined, the proportion of the NFC labor force engaged in this sector of the economy has remained constant. Some NFC industrial employees have been able to replace lost jobs by commuting to suburban manufacturing opportunities. In the service realm, service jobs have increased, inducing a concomitant increase in service sector employment. However, the relative percentage that this sector comprises of total employment in the NFC realm has, like manufacturing employment, remained virtually constant. This growth in the service sector is having multiplier effects[30] in the NFC economy as old firms are induced to stay and new firms are attracted (Menchik, Nonmetropolitan America in Tran-

Table 12. Service Sector Employment in 1970 and 1980 of a Random Sample of Thirty Nonmetropolitan Fringe Counties

	NFC	Employed in Service Sector 1970	Employed in Service Sector 1980	Percent of Total Labor Force 1970	Percent of Total Labor Force 1980
1.	Escambia, AL	573	899	8.7	10.4
2.	Gadsden, FL	326	601	7.2	12.3
3.	Haralson, GA	203	486	2.8	6.6
4.	Pulaski, GA	323	75	21.4	4.1
5.	Elmore, ID	196	284	16.0	14.9
6.	Grundy, IL	588	1,073	9.0	12.9
7.	Vermillion, IL	3,609	4,847	12.9	15.3
8.	Cass, IN	1,106	1,358	10.7	11.8
9.	Lagrange, IN	488	528	11.7	9.7
10.	Ripley, IN	446	759	10.2	11.3
11.	Washington, IN	193	364	6.9	10.5
12.	Washington, IA	410	930	14.9	17.7
13.	Miami, KS	490	849	18.5	22.3
14.	Nelson, KY	500	1,780	15.3	29.6
15.	Simpson, KY	265	370	6.4	7.5
16.	Avoyelles, LA	881	1,472	26.5	27.1
17.	Morehouse, LA	432	500	9.6	9.2
18.	St. Helena, LA	34	33	6.5	6.3
19.	Rice, MN	2,523	4,311	31.5	33.1
20.	Howard, MO	290	377	21.5	22.1
21.	Taney, MO	759	1,660	35.6	39.2
22.	Yates, NY	685	1,133	22.6	30.5
23.	Sandusky, OH	1,982	2,926	13.2	15.9
24.	Lebanon, PA	3,410	4,945	11.3	15.6
25.	Hampton, SC	184	400	5.9	9.4
26.	Lincoln, SD	249	716	21.0	28.2
27.	Jefferson, TN	620	955	12.2	13.8
28.	Palo Pinto, TX	3,849	898	51.0	13.4
29.	Somervell, TX	25	140	14.7	27.5
30.	Wilson, TX	260	226	26.0	15.0
	TOTAL	25,899	35,895	16.1	16.8

SOURCE: County Business Patterns, 1970 and 1980, U.S. Bureau of the Census.

sition, p. 245).

Metropolitan Commuting
from the NFC

The emergence of a new urban form, of which commuting shifts are dramatic indicators, is ensuing. Throughout this century all evidence has been conclusive; all trends have pointed in the same direction. Public opinion surveys have repeatedly disclosed that popular preferences are for smaller places, lower densities, and concomitantly richer environmental amenities, but yet in proximity to a metropolitan entity. This current development has been one leading unremittingly towards the reversal of the processes of population concentration spurred by technologies of the industrial revolution, a reversal finally realized after 1970. The non-metropolitan turnaround is indeed a socio-demographic phenomenon of consequence (Berry and Gillard, pp. 108-9).[31]

Improved transportation has made possible very long distance commuting. Commuting these distances for employment purposes had been virtually unfeasible until after World War II when the automobile began to be used more and more for the journey to work. Widespread automobile ownership enabled households to reside at greater distances from places of employment in the central city and even in the county containing the central city.[32] This locational freedom led to vigorous development of suburbs and eventually exurban territory contiguous to metropolitan areas.[33] Hence, improved

transportation, together with the possibility of very long distance commuting, and the universality of electricity and television have very simply extended the urban way of life considerably beyond the boundaries of the modern SMSA (Berry and Gillard, p. 6).

Better modes of transportation necessitated the construction of more highways and eventually freeways. This could not have been done if it had not been for federal assistance. Just as suburban housing was, in effect, greatly accelerated by federal policies, so were freeways the result of federal policies. The tremendous construction of limited-access freeways initiated in the 1950s has continued. Indeed, the impetus was the 1956 Interstate Highway Act.[34] Today, especially in the nation's large cities, this has resulted in a complex system of highways and freeways. These complex road systems facilitate mobility to, from, and within the SMSA.

NFCs greatly benefited from this increased accessibility to the metropolitan community. Promoting metropolitan affiliation through commuting ties, many NFCs were appended to SMSAs during the decade when the Interstate Highway Act was enacted. Table 13 gives the total number of metropolitan counties existing in each of the four censusregions and the total area of these metropolitan counties for 1950[35], 1960, and 1970. It does not account for new SMSAs having emerged since 1950 and their expansion. Although rates of NFC mer-

Table 13. Total Number and Area of Metropolitan Counties of SMSAs in 1950 Having Undergone Areal Expansion by 1970

Region	1950	1960	1970	Increase (%) 1950-60	Increase (%) 1960-70	Increase (%) 1950-70
NORTHEAST						
Number of metro counties	56	66	66	17.9	0.0	17.9
Total square miles	28,798	35,270	35,270	22.5	0.0	22.5
MIDWEST						
Number of metro counties	82	121	122	47.6	0.8	48.8
Total square miles	49,271	69,434	69,864	40.9	0.6	41.8
SOUTH						
Number of metro counties	100	131	142	31.8	8.4	42.0
Total square miles	55,774	81,605	87,934	46.3	7.8	57.7
WEST						
Number of metro counties	32	37	37	15.6	0.0	15.6
Total square miles	69,285	81,771	81,771	18.0	0.0	18.0

SOURCE: Census of Population, 1950, 1960, 1970, U.S. Bureau of the Census.

ger with SMSAs were pronounced between 1950 and 1960, these rates considerably diminished in the succeeding decade. One plausible explanation for these drastic declines is that most NFCs within commuting range, given the level and sophistication of transportation networks at that time, had probably merged with the neighboring structure by the advent of the 1960 decade. Therefore, in 1950 there were 82 counties in the Midwest having metropolitan status. By 1970, forty nonmetropolitan fringe counties had been officially added to this set of metropolitan counties, resulting from a decrease in the dependency of agriculture as a source of employment in these NFCs and greater commuting ties to central counties of the metropolitan areas. For the Midwest, this was an increase of 48.8% in the number of metropolitan counties and a concomitant increase of 41.8% in the total area of all metropolitan counties.

Table 14 originally compiled by Berry and Kasarda (1977) shows the number of SMSAs appending NFCs from 1900 to 1970 and also the total population of the added counties for any particular decade. This information will not become available for the 1970-80 decade until the Bureau of Standards has scrutinized metropolitan criteria and made modifications.

Revealing how increased automobile ownership and improved roads and highways enabled a higher degree of central county commuting, over four million nonmetropolitan fringe county residents were officially added to preëxisting metro-

Table 14. Number of Metropolitan Areas Enlarged by Nonmetropolitan Fringe County Merger

Decade	SMSAs enlarged	Pop. in added counties (000)	Pop. in existing SMSAs (000)	% of SMSA Population
1900-10	2	145	7,331	2.0
1910-20	3	264	8,436	3.1
1920-30	12	836	12,245	6.8
1930-40	3	178	5,075	3.5
1940-50	17	902	14,354	6.3
1950-60	57	4,260	21,330	20.0
1960-70	76	4,443	18,976	23.4

SOURCE: Adapted from Brian J.L. Berry and John D. Kasarda, Contemporary Urban Ecology (New York: Macmillan, 1977), p. 166.

politan populations. This increase was no less than 20.0% of the total metropolitan population present at the advent of the 1950 decade. Similarly, in the 1960 decade, freedom of mobility provided by increasing automobile ownership and the commencement of construction of the interstate and local freeway systems facilitated additional central county commuting. In that decade, 4.4 million NFC residents were added to the standard metropolitan statistical area population or 23.4 percent of this metropolitan population.

As long distance commuting has become the norm, many metropolitan areas have spatially expanded. Even some SMSAs that actually decreased in population in the 1970s witnessed growth in their outer counties and in this way expanded outward into the NFC (Long and DeAre, p. 19). After the commuting data from the 1970 census became available in 1973, more than 100 nonmetropolitan fringe counties were added to

standard metropolitan statistical areas. In essence, this was a reflection of the extension of suburbanization and the fact that a number of NFCs had become functionally parts of metropolitan areas as defined by the commuting criterion (Long and DeAre, p. 4).

Although suburban and exurban development has occurred to the extent it has, there is now evidence of a diminishing of the trend of SMSAs to spatially expand. In some instances, nonmetropolitan fringe counties themselves have evolved into metropolitan entities.

Similar to their suburban neighbors, many nonmetropolitan fringe county residents undertake a diurnal journey to work, out in the morning and back at night. For some this journey is a pleasant interlude, separating the two worlds in which they live. It is to many an opportunity to escape the confines of the country and partake of metropolitan amenities.

Table 15 is a confirmation of the trend of NFC commuting. Frequently, the level of commuting is substantial. In 1970, almost half of the labor force of Kendall County, IL commuted to employment. McClain County, OK experienced virtually the same level of commuting. In cases where commuting was not so extreme, levels were still substantially higher than the minimum 15% which directed to the central county of the adjacent metropolitan area would qualify the NFC as suburban. The overall average rate of commuting for this sample is in

Table 15. Percent of Labor Force of a Random Sample of Thirty NFCs Commuting to Employment, 1970

	NFC	Percent Commuting	Adjacent Metropolitan Area
1.	Cullman, AL	18.9	Birmingham, AL
2.	Pinal, AZ	10.7	Phoenix, AZ
3.	Faulkner, AR	17.8	Little Rock, AR
4.	Eldorado, CA	27.9	Sacramento, CA
5.	Nevada, CA	21.7	Yuba City-Marysville, CA
6.	Canyon, ID	8.6	Boise, ID
7.	Kendall, IL	45.3	Chicago, IL
8.	Muscatine, IA	11.8	Davenport-Rock Island, IA-IL
9.	Pointe Coupee, LA	28.7	Baton Rouge, LA
10.	Frederick, MD	22.3	Washington, D.C.-MD-VI
11.	Gratiot, MI	35.1	Lansing, MI
12.	Montcalm, MI	22.2	Grand Rapids, MI
13.	George, MS	34.8	Pascagoula-Moss Point, MS
14.	Madison, MS	27.4	Jackson, MS
15.	Callaway, MO	24.7	Columbia, MO
16.	Lafayette, MO	26.6	Kansas City, MO-KS
17.	Warren, MO	29.6	St. Louis, MO-IL
18.	Storey, NV	15.8	Reno, NV
19.	Hunterdon, NJ	39.4	Trenton, NJ
20.	Ocean, NJ	32.3	Long Branch-Ashbury Park, NJ
21.	Cotton, OK	19.0	Lawton, OK
22.	McClain, OK	44.0	Oklahoma City, OK
23.	Fayette, TN	31.8	Memphis, TN
24.	Sevier, TN	26.5	Knoxville, TN
25.	Deaf Smith, TX	4.6	Amarillo, TX
26.	Fannin, TX	20.7	Sherman-Denison, TX
27.	Hunt, TX	13.1	Dallas, TX
28.	Oldham, TX	8.2	Amarillo, TX
29.	Skagit, WA	10.8	Bellingham, WA
30.	Jefferson, WI	20.3	Milwaukee, WI
		$\bar{x}$ = 23.4	

SOURCE: Characteristics of the Population, 1950, 1960, 1970, U.S. Bureau of the Census.

itself larger than this critical figure by 8.4 percentage points.

The overall pattern of journeys to work in and around a metropolitan area is predictable. This predictability is

the fundamental concept that Doxiadias' D.U.S. (daily urban system) is based on. People consider travel time and distance, as one dimension in a set of factors, when deciding where to live and work. Generalizations can be made about their decisions and verified statistically. The most fundamental of these generalizations is that a person is less likely to work in any given place the smaller it is and the further he resides from that place. As the journey to work lengthens and the destination point decreases in size, potential commuters are deterred by the time and monetary costs involved, and search for employment closer to their residences. This prediction has been verified by drawing concentric rings around the metropolitan center (central city) and tabulating the proportion of residents in each ring working there. The proportions, as would be expected, decline with distance (Manning, p. 47).

The deline with distance of the probability that people will work in the metropolitan center means that short as possible journeys to employment locations are most common (Manning, p. 47). The thesis has already shown that shorter NFC work distances have indeed been made possible by growth in the NFC service sector and manufacturing decentralization to suburban locations.

Studies of commuting patterns in developed nations reveal that median and average distances covered by travelers to suburban concentrations of employment are not apprecia-

bly less than to the central city, at least for men. This discovery may lead one to doubt the effectiveness of large-scale decentralization in reducing the burden of the journey to work. This is particularly the case for the inner suburban concentrations. Here, traffic flows are largely additional to those to and from the metropolitan center. The end result of decentralization of work to a central city satellite and simultaneous suburban development beyond the present boundaries of metro areas has been increasing commuting ties to adjacent SMSAs, but not a noteworthy reduction in commuting distances (Berry and Gillard, p. 103). Nonmetropolitan fringe county commuters travel more or less the same distance to suburban employment as suburbanites commute to central city employment (Manning, p. 128).

Revealing the effect of metropolitan dispersion, distance-decay gradients that were roughly parallel in 1960, although higher for the larger workplace centers, became flatter in 1970. The maximum commuting radius to central cities increased from an average of 58 to 64 miles, to central counties from 64 to 72 miles, and to SMSAs from 66 to 76 miles in the decade. Since these are national averages, there are substantial variations by city size and location (Berry and Gillard, p. 51).

Commuting of nonmetro household heads to metro jobs yields higher average incomes than those generally obtainable in the nonmetro milieu. Commuting to metropolitan employment

not only raises households' incomes, it helps to raise income levels of nonmetropolitan communities. Metro commuters had higher median incomes than those NFC employees who commuted to other nonmetro counties. In a study by Bowles and Beale (1980), incomes of NFC commuters working in ring locations appeared higher than those of a group who commuted to the central city; however, because of the small sample size, the difference was not statistically significant (Bowles and Beale, Agricultural Economics Research, 32, No. 3, p. 15).

Summary. In this section, the thesis revealed how long distance commuting to the metropolitan area has been promoted by nearly universal automobile ownership and the construction of super highways initiated by the 1956 Interstate Highway Act. Resulting complex transportation networks have caused many NFCs to meet the operational (census) standard to be joined as part of the neighboring metropolitan system (Table 13). The added population in both the 1950 and 1960 decades were significant proportions of the base metropolitan population of both decades (Table 14). Ironically, just as this greater accessibility to the metropolis has promoted NFC merger, it has also inhibited it. The new freeway systems also promoted intra-urban mobility, now that automobile ownership was widespread. Decentralizing industrial plants began to favor suburban sites. A few plants even relocated to the NFC itself. This in effect greatly diminished the

distance an industrial employee from the nonmetropolitan fringe county had to travel diurnally to and from his employment. Through the curtailment of direct commuting to the central county, the NFC remains "officially" independent of the larger metropolitan entity, although ever as much and sometimes even more dependent on it.

Notes

[1] In arriving at this number, independent cities, i.e., Baltimore, MD; St. Louis, MO; Carson City, NV; Clifton Forge, VI; and the District of Columbia were considered to be equal in status to the county.

[2] The criteria defining New England SMSAs can also be found in any volume of Characteristics of the Population, 1970.

[3] The nation's eight major urban regions were defined by Yeates (1980). He based the definition and final delineation of these regions on broad urban fields, overlapping daily urban systems, and population densities at the county level of aggregation.

[4] The California urban region extends with interruptions from San Diego in the south, through Los Angeles, Santa Barbara, the San Joaquin Valley, to the San Francisco Bay Area and Sacramento. Eastwards, it extends into Nevada to include Las Vegas and Reno, which both have very specialized functions within this urban region. By the turn of the century, this region will have achieved megalopolitan status according to Maurice Yeates and Barry J. Gardner, The North American City, 3rd ed. (New York: Harper & Row, 1980), p. 507.

[5] The other five urban regions are the following: the Gulf Shore, the Ohio Valley, the Urban South, Florida, and Bosnywash. Even in Bosnywash, the nation's most developed

megalopolis, some NFCs still survive. However, many are literally surrounded by metropolitan pressures. Hunterdon County, NJ is a case in point.

[6] A linear chain of metropolises presently extends from New Orleans, LA eastward to Fort Walton Beach, FL. Spanning a distance of 244 miles and encompassing six metro areas, this area has a total population of over 2.3 million. In Florida, a chain of SMSAs extend northward from Miami to West Palm Beach, a distance of 78 miles encompassing 3.2 million people. Also, another metropolitan axis spans the width of the peninsula. From Sarasota through Tampa and Orlando to Daytona Beach, it is 184 miles. This area itself encompasses another 3.2 million inhabitants.

[7] Walter T. Martin, The Rural-Urban Fringe: A Study of Adjustment to Residence Location (Eugene, OR: Univ. of Oregon Press, 1953), p. 2.

[8] Many of the SMSAs in the nation's old manufacturing belt are physically enclosed. Whereas many of their counterparts in other sections of the nation have expanded spatially, they cannot. For example, the Chicago metro area is effectively hemmed in by the Kenosha, Rockford, Kankakee, Gary-Hammond-East Chicago SMSAs. The Cleveland SMSA is surrounded by the Lorain, Akron, and Youngstown metro areas. Several SMSAs encircle Philadelphia. They are: Allentown, Reading, Lancaster, Wilmington, Atlantic City, Long Branch-Ashbury Park, and Trenton. It is virtually impossible for Chicago,

Cleveland, Philadelphia, and other similar SMSAs to undergo spatial expansion, unless the contguous SMSAs merge with their larger rivals. This has been known to happen. For example, the Fort Worth SMSA merged with Dallas during the early '70s.

[9] A certain number of NFCs are acquiring high proportions of elderly through in-migration of retirees. These retirement areas often have been low in economic development and population size and provide a limited range of public and private goods. These counties are found, for example, in the Texas Hill Country, the Ozarks, and the Florida peninsula according to David L. Brown and Calvin L. Beale, "Diversity in Post-1970 Population Trends," in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara M. Mazie (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 35.

[10] Richard L. Morrill and Ernest H. Woldenberg, The Geography of Poverty in the United States (New York: McGraw-Hill, 1971), p. 147.

[11] The urban field was defined by John Friedmann, "The Urban Field as Human Habitat," in The Place of Planning, ed. S. P. Snow (Auburn, AL: Auburn Univ. Press, 1973). It is a new form of urban habitat of relatively low density involving a good transportation system and a large array of economic, social, and recreational opportunities.

Each urban field is centered on and dominated to a large

extent by a metropolitan area of at least 200,000 - 300,000 people. The extent of its limits can be defined by two criteria: (1) the maximum time or distance that most people are prepared to commute, and (2) the time or distance that most people are prepared to travel to or from weekly or weekend recreational opportunities. The diurnal commuting perspective defines the "hardcore" of the urban field, and results in regions of about a 40 - 50 mile radius from the central metropolitan area. The weekend recreational perspective results in a much wider field of about 100 - 150 miles, with far less determinate boundaries.

[12] An urban field extending to the maximum of 150 miles from its metropolitan core would cover much territority. Covering a total area of over 70,600 mi^2, it could extend into several states, or over a significant portion of a large state or region. Because these fields are sometimes very expansive, they are important socioeconomic urban mechanisms to literally millions of Americans.

[13] This and all other random samples to follow will be selected utilizing a random numbers table. Each and every nonmetropolitan fringe county has been assigned a number. The random number corresponding to the assigned number selects the element of the sample.

[14] The corresponding suburban county chosen was the one at the greatest distance from the central city. This was done to elucidate the fact that NFCs may indeed be at a closer

proximity to the metropolitan center than suburban counties of the same metropolitan complex.

[15] Another prime example of a spatial process is migration -- the process whereby population is redistributed geographically.

[16] Frederick H. Buttel, "Environmental Quality and Protection," in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara M. Mazie (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 685.

[17] Glenn V. Fuguitt and James J. Zuiches, "Residential Preferences and Population Distribution," Demography, 12 (1975), 491-504.

[18] Larry H. Long and Diana DeAre, Migration to Nonmetropolitan Areas: Appraising the Trend and Reasons for Moving (Washington, D.C.: GPO, 1980), pp. 18-19.

James J. Zuiches, "Residential Preferences in the United States," in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara M. Mazie (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 82.

[19] Brian J.L. Berry and John D. Kasarda, Contemporary Urban Ecology (New York: Macmillan, 1977), pp. 107-8.

[20] Michael J. Greenwood, Migration and Economic Growth in the United States (New York: Academic Press, 1981), p. 106.

Stanley D. Brunn and James O. Wheeler, The American Metropolitan System: Present and Future (New York: Wiley,

1980), p. 10.

[21] Glenn V. Fuguitt, Growth and Change in Rural America (Washington, D.C.: Urban Land Institute, 1979), p. 165.

[22] Brian J.L. Berry, "The Counterurbanization Process: How General?" in Human Settlement Systems: International Perspectives on Structure, Change and Public Policy, ed. Niles M. Hansen (Cambridge, MA: Ballinger, 1978), p. 39.

[23] Many SMSAs have smaller populations than NFCs. Here listed are several SMSAs and their 1980 census populations: Meriden, CT: 57,118; Enid, OK: 62,820; Lawrence, KS: 67,640; Victoria, TX: 68,807; Bismarck, ND: 79,988; Great Falls, MT: 80,696; Midland, TX: 82,636; San Angelo, TX: 84,784; and Owensboro, KY: 85,949. All these SMSAs and more have smaller populations than NFCs listed in Table 6.

[24] Amos H. Hawley and Sara Mills Mazie, eds., Nonmetropolitan America in Transition (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 7.

[25] Louis Ploch, "The Reversal in Migration Patterns -- Some Rural Development Consequences," Rural Sociology, 43 (1978), 293-303.

[26] See, for example, U.S. Department of Housing and Urban Development, 1978.

[27] James P. Miller, Nonmetro Job Growth and Locational Change in Manufacturing Firms (Washington, D.C.: GPO, 1980), p. 16.

[28] Thomas E. Till, "Manufacturing Industry: Trends and

Impacts," in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara Mills Mazie (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 206. Here, Till touches upon Thompson's filtering hypothesis propounded in 1969 in Contemporary Economic Issues, Neil W. Chamberlin, editor.

[29] Mark D. Menchik, "The Service Sector," in Nonmetropolitan America in Transition, eds. Amos H. Hawley and Sara M. Mazie (Chapel Hill, NC: Univ. of North Carolina Press, 1981), p. 231.

In the 1970 decade, the proportion engaged in manufacturing employment in the random sample of NFCs grew by 9.3%. This translates into 7,621 additional people employed in manufacturing in 1980 than were employed in this sector in 1970. However, by 1980 employment in the service sector for these counties had grown by a substantial amount -- 38.6%. This translates that 9,996 more service sector employees existed in 1980 than in 1970 in this particular sample.

[30] This term is used to denote economic growth spawned in other sectors of the urban milieu by initial growth in a particular economic sector.

[31] Richard Lamb, Metropolitan Impacts on Rural America (Chicago: Univ. of Chicago Press, 1975), p. 8.

[32] By the close of the 1970 decade, suburban counties were situated up to sixty-one miles from the central city. This maximum distance was observed in the nation's largest SMSAs. This distance is the road distance measured from the

central city to the suburban county seat or largest urban place.

[33] Ian Manning, The Journey to Work (Boston, MA: George Allen & Unwin, 1978), p. 13.

[34] Robert H. Connery and Richard H. Leach, The Federal Government and Metropolitan Areas (Cambridge, MA: Harvard Univ. Press, 1960), p. 48.

[35] The comparative analysis of Table 13 was limited to only two decades because before 1950, metropolitan communities were not based on entire counties. In 1940, the Census Bureau set up the metropolitan district in connection with each city of 50,000 or more, two or more such cities sometimes being in one district. The general plan was to include in the district, in addition to the central city or cities, all adjacent and contiguous minor civil divisions or incorporated places having a population of 150 or more per square mile.

[36] Gladys K. Bowles and Calvin L. Beale, "Commuting and Migration Status in Nonmetro Areas," Agricultural Economics Research, 32, No. 3 (1980), 15.

CHAPTER THREE

Method of Analysis

Having reviewed the literature in chapter two, the thesis in this chapter will describe the method of analysis used in the study.

Having met most of metropolitan criteria, only one stands between metropolitanization and the NFC. This is commuting level. An NFC having satisfied the density criterion and the specified number of nonagricultural worker criterion[1] may not have a central city or central cities with a combined population of at least 50,000. However, this does not necessarily prevent the NFC from becoming metropolitan in character. If at least 15.0% of its work force commutes to the central county of an SMSA, the NFC officially becomes part of that SMSA.[2] Needless to say, an NFC could satisfy this last criterion, but not the first two metropolitan criteria. Failing to do so prevents the county from becoming officially metropolitan.

Obviously, not as much as fifteen percent of NFC labor forces are commuting to central counties of SMSAs. If so, these NFCs would be metropolitan (suburban) counties. The most practical way to determine why these people are not undertaking this level of central county commuting is to ask them -- namely, conduct a random survey. However, when time

and expenditures do not permit and a researcher has tenable evidence that central county commuting is affected by other variables, a representative sample of NFCs can be selected for analysis of secondary data. The detailed description of this process as employed in this study ensues.

Sampling Design

There are 921 political units[3] that qualify as nonmetropolitan fringe counties. This is nearly one-third (30.3%) of all counties, exempting New England. However, to keep the study manageable, a subset of NFCs is examined in the analysis which follows. This subset is the set of all NFCs of multicounty SMSAs. Phrased differently, only NFCs bordering metro areas of two or more counties will be examined. Having limited the analysis to these counties, two hundred and three qualify. This is 22.0% of all NFCs.

A sample of fifty was drawn from the 203. Each of the 203 was numbered in order of the alphabetization of the state of location and the size of the SMSA they bordered. This in fact contributed to a random ordering of all NFCs. By utilizing a random numbers table, random numbers corresponding to the initial serial ordering were used to select the study sample. Consequently, cases occurred where to NFCs were drawn from the same metropolitan complex, i.e., Lexington, KY SMSA. It's not entirely possible that three or perhaps more NFCs of the same metropolitan system could have been drawn.

Each NFC drawn was matched with a metropolitan county. This was a contiguous, intervening suburban county on the main travel route from the nonmetropolitan fringe county to the central county. Therefore, the selection of NFCs actually rendered two sets of counties, nonmetropolitan fringe and suburban. Table 16 lists the NFCs comprising the study sample.

The sample size was set at fifty for two reasons. First, a sample containing less than thirty observations could inappropriately represent the population in question. Statistics calculated on a small sample might not approximate population parameters, rendering the sample at least questionable.[4] Second, a sample too large wastes time and effort (Ott, Mendenhall, and Larson, p. 205). The sample size of fifty was settled upon because it was a manageable number and a size sufficient to be representative of the population.

Variable Selection and Justification

Having reviewed previous works on the subjects of metropolitan, rural, and fringe area growth, change, and development, several important factors are recurrent throughout the literature. In the selection of the study variables, the choice was based on those variables encountered in the nonmetropolitan fringe and suburban milieus which the researcher felt positively or negatively affected NFC commuting. Also considered was how readily these variables could lend

Table 16. Study Sample of NFCs, the Adjacent SMSAs, and Intervening Suburban Counties

	NFC	SMSA	Suburban county
1.	Chilton, AL	Birmingham	Shelby
2.	Dallas, AL	Montgomery	Autauga
3.	Escambia, AL	Pensacola, FL	Santa Rosa, FL
4.	Carroll, AR	Fayetteville	Benton
5.	Hot Spring, AR	Little Rock	Saline
6.	Elbert, CO	Denver	Douglas
7.	Bradford, FL	Jacksonville	Clay
8.	Hernando, FL	Tampa	Pasco
9.	Bulloch, GA	Savannah	Bryan
10.	Polk, GA	Atlanta	Paulding
11.	Cass, IL	Springfield	Menard
12.	Grundy, IL	Chicago	Will
13.	Marshall, IL	Peoria	Woodford
14.	White, IL	Evansville, IN	Posey, IN
15.	Brown, IN	Indianapolis	Johnson
16.	Jay, IN	Fort Wayne	Adams
17.	Scott, IN	Louisville, KY	Clark, IN
18.	Marion, IA	Des Moines	Warren
19.	Coffey, KS	Topeka	Osage
20.	Cowley, KS	Wichita	Butler
21.	Leavenworth, KS	Kansas City, MO	Wyandotte, KS
22.	Garrard, KY	Lexington	Jessamine
23.	Grant, KY	" "	Scott
24.	Bienville, LA	Shreveport	Webster
25.	St. Charles, LA	New Orleans	Jefferson
26.	Tangipahoa	" "	St. Tammany
27.	Frederick, MD	Washington, D.C.	Montgomery, MD
28.	Kent, MD	Wilmington, DE	Cecil, MD
29.	Allegan, MI	Grand Rapids	Ottawa
30.	Gratiot, MI	Lansing	Clinton
31.	Scott, MS	Jackson	Rankin
32.	Lincoln, MO	St. Louis	St. Charles
33.	Taney, MO	Springfield	Christian
34.	Seneca, NY	Rochester	Ontario
35.	Ashtabula, OH	Cleveland	Lake
36.	Fayette, OH	Columbus	Pickaway
37.	Haskell, OK	Fort Smith, AR	Le Flore, OK
38.	Benton, OR	Salem	Polk
39.	Yamhill, OR	Portland	Washington
40.	Bradford, PA	Binghampton, NY	Susquehanna, PA
41.	Indiana, PA	Pittsburgh	Westmoreland
42.	Edgefield, SC	Augusta, GA	Aiken, SC
43.	Hancock, TN	Kingsport	Hawkins
44.	Lauderdale, TN	Memphis	Tipton

Table 16 (continued)

	NFC	SMSA	Suburban county
45.	Deaf Smith, TX	Amarillo	Randall
46.	Eastland, TX	Abilene	Callahan
47.	Van Zandt, TX	Dallas	Kaufman
48.	Wharton, TX	Houston	Fort Bend
49.	Morgan, UT	Ogden	Davis
50.	Jefferson, WI	Milwaukee	Waukesha

themselves to planning goals and objectives. Variables through which planning agencies or councils could achieve desired goals and effects were selected. What resulted was a set of fifteen independent variables. This was thought to be few enough to minimize the chance of overlap in explained variance, resulting in less ambiguity in the causal interpretations of their supposed effects, yet enough to justify confidence in findings. Additionally, it is desirable to avoid multicollinearity -- the sensitivity to sampling and measurement errors of both partial correlations and slope estimates when the independent variables are highly intercorrelated.[5] Thirdly, a predictive equation with too many variables may establish a relationship between variables that does not exist, thus rendering an unreliable R^2.

In reality, the study set of variables is in effect characteristics of the following: 1) the NFC in question, 2) all other nonmetropolitan counties (within commuting range), 3) suburban counties (within commuting range), and

4) the central county. Simultaneously affecting NFC commuting, the characteristics of the four types of political entities would act as either "push" or "pull" factors.

When an NFC is not officially included in an SMSA, one or both of the following are true: 1) commuters from the NFC are deflected to suburban or to other nonmetropolitan counties because the pull factors are stronger than those of the central county and/or 2) job generation has stagnated, even declined, in the central county. Thus, there exists no pull, or little pull, or even deflection factors in the central county when it proves not to be a magnet. However, to prevent the study from becoming unwieldy, the study set of variables were limited to nonmetropolitan fringe and suburban factors. In the analysis, the dependent and independent variables are the following:

1.	PCTOUT	Percent of NFC labor force commuting to employment. This is the dependent variable.
2.	DSTSUB	Highway mileage from the county seat or largest urban place in NFC to the county seat or largest urban place in the nearest intervening suburban county. The greater the measured distance, the smaller the rate of commuting to the suburban county would be. Where multiple road systems existed leading to the suburban county, it was reasoned that some commuters would take advantage of these additional travel routes. Hence, the average distance was calculated.
3.	QUALRS	The quality of the road system(s) interconnecting the NFC and the suburban county. Superior road systems would promote intercounty commuting. There-

fore, the researcher felt it was necessary to devise some scale to differentiate the quality of the road networks. Free, multilane controlled access from county seat to county seat was rated 10.0; a state turnpike, 9.0; other multilane divided highways, 8.0; U.S. and principal through-routes, 6.5; other principal roads, 5.5; and other roads, 4.5. An NFC having a multiplicity of roads of varying quality was assigned a composite score. Having at least one interstate freeway among other road networks, a particular NFC could have a high quality index.

4. POPSUB — The 1970 census population of the suburban county. The greater the population of the county, the more likely interaction will take place between it and the NFC.

5. POPNFC — The 1970 census population of the nonmetropolitan fringe county. Interaction is indeed a multidirectional phenomenon, i.e., NFC with suburban county and suburban county with NFC. However, the study is concerned with one segment of this process -- NFC commuting to the suburban county. In this context, the smaller the population of the nonmetropolitan fringe county, the more likely its residents will interact with a suburban county of a given size.

6. PCTLBF — The percentage of total nonmetropolitan fringe county population that the work force comprised in 1970. An NFC with a high PCTLBF would be more likely to experience out-commuting than one with a low PCTLBF for two important reasons. The larger the work force is, the greater the variety of jobs it demands. A greater variety of employment opportunities can generally be attained by commuting. Secondly, a county with a low score on this variable could be a retirement county. If so, its small labor force could find ample employment within the home county. Consequently, workers would have little inclination to commute.

7. GEESUB — Growth in the number of total employment establishments in the suburban county between 1960 and 1970, based on data in County Business Patterns. Employment expansion in the suburban county would be an incentive to commute for unemployed or underemployed members of the NFC labor force.

8. GEENFC — Growth in the number of total employment establishments in the NFC between 1960 and 1970. Little or no growth in the number of employment establishments in the NFC would be an impetus for commuting to job sites in an adjacent SMSA, in both a nearby suburban county and the central county.

9. TWPSUB — Total taxable wage paid in the suburban county in the first quarter (Jan-Mar) of 1970 in thousands of dollars. These data was also obtained in County Business Patterns, 1970. A high score on this variable would act as a pull factor for suburban commuting from the NFC.

10. TWPNFC — Total taxable wage paid in NFC in the first quarter of 1970. A low TWPNFC would be in effect a push factor for commuting.

11. PCTMFC — Percent of NFC labor force engaged in the manufacturing sector in 1970. These data was obtained in Characteristics of the Population, 1970. The willingness of rural industrial workers to commute considerable distances to manufacturing jobs combined with the overall decline of establishments in this sector in the NFC would suggest that a high score on this variable is a result of commuting.

12. PCTESS — Percent of NFC labor force engaged in the service sector. A low percentage would indicate a greater share of the labor force employed in occupations not necessarily restricted to the county of residence. An overwhelming percentage of those employed in the service sector tends to be employed in the county of residence.

13. GMFSUB — Percentage growth in manufacturing establishments in suburban county from 1960 to 1970. Conceptually similar to GEESUB, high industrial growth in the suburban county combined with the willingness of NFC laborers to commute to this type of employment would be a definite pull factor promoting commuting.

14. GMFNFC — Percentage growth in manufacturing establishments in the nonmetropolitan fringe county. Decline in the manufacturing sector in the NFC would succor to persuade NFC residents to replace lost industrial employment through suburban commuting. Negative growth would in effect be a "push" factor.

15. GSSNFC — Percentage growth in service establishments in nonmetropolitan fringe county in the 1960 decade. Having a high employee retainment rate, a high rate of growth in the NFC service sector would translate into less employees needing to commute to employment. A negative growth rate for this variable can be interpreted as a push factor.

16. GSSSUB — Growth in service sector establishments in suburban county from 1960 to 1970. Unprecedented growth in this sector could entice NFC commuters to actively seek jobs in the suburban zone because service sector employment is capturing a larger share of overall employment. Growth in this sector tends to retain the indigenous labor force, but it does not preclude extraneous job seekers from commuting to the surplus of jobs in this sector. Large positive change for this variable is, therefore, a pull factor.

Computational Procedure

A very useful computer program in the social sciences is one constructing a predictive model, a (multiple) regression equation. Such an application, however, is not limited to prediction. By utilizing the multiple regression model,

the researcher can obtain measures of the degree of relationship between a dependent variable Y and any of the independent variables, controlling for one or more other variables.[6] Hence, the computer program BMDP2R was employed. Through entering or removing variables one at a time from the list of potential indicators, P2R computes estimates of the parameters of a multiple linear regression in a stepwise manner. It also designates the relative importance of each variable in a descriptive/predictive model (Blalock, p. 455).

To acquaint the reader with the procedures employed in the BMDP2R program, the computations entailed will be here cursorily outlined. The results of these computations most relevant to the research problem will be discussed in chapter 4.

Only complete cases are used in the computations; i.e., cases that have all values or no extreme values. In this analysis, there were fifty cases.

To reveal internal variability and the normality of the distribution of the variables, univariate statistics for each variable was computed. These included the mean, standard deviation, and kurtosis. For example, variables with large standard deviations denoted a large range in values. POPSUB (p. 84) and TWPSUB (p. 85), for example, were two variables with large standard deviations. One or two extreme scores can cause a large variance, resulting in a pronounced effect on R^2 (Blalock, p. 403). Few extreme values were en-

countered in the research data set. On the other hand, little internal variability in an independent variable -- often times dependent on the scale of measurement -- could still result in a high correlation, positive or negative, with the dependent variable. Its overall effect might contribute substantially to the squared multiple correlation (R^2), if not too intercorrelated with other independent variables.

Secondly, kurtosis values greater than zero indicated a distribution with heavier tails than a normal distribution. GSSNFC (p. 86) and POPSUB (p. 84) were two variables with large kurtosis values. The fact that the frequency distribution of a variable is not normal is not detrimental to the predictive equation as long as the distribution of the means of samples drawn from the population is normal. In actuality, this tends to be the case (Blalock, p. 452). Also, normality, or the absence thereof, does not affect the interpretation of the squared multiple correlation.

Covariance and correlation matrices were then computed.[7] The correlation matrix illuminated linear relationships between pairs of variables. By doing so, the researcher can verify expected relationships and detect inconsistent relationships or associations.

The dependent variable, percent commuting from NFCs, was designated and the remainder of the options of the program took their preassigned values.[8] The stepping algorithm was the F-statistic; that is, the entry or removal of the

variables from the equation was based on F-to-enter or F-to-remove limits.

The distribution of the largest F-to-enter is affected by the number of variables available for selection, their correlation structure, and the sample size. In utilizing the F-value, the computer procedure selects the best predictor variables. The variable with the highest F-to-enter value explains the most variance in the dependent variable, the one with the next highest F-to-enter value the second most, and so on.

In this particular problem, all the independent values had smaller F-values than the preassigned F-to-enter value of 4.0. Consequently, they had to be forced into the multiple regression equation. This was accomplished by assigning each variable the level of 1 and adding the instruction that Force was 1.[9]

Sixteen steps, one for the standard error of the estimate and one for each independent variable, were executed. Beginning with step one, the variable with the highest F-to-enter value (meaning it had the highest simple correlation with the dependent variable) was entered into the equation, even when forced as in this case. The stepping terminated when no variable had an F-to-enter value exceeding 4.0 or all forced variables had been entered into the multiple regression equation.

Results were then printed at each step; the multiple R

was printed as well as the multiple R^2 and the adjusted R^2.[10] The multiple R denotes the correlation of the dependent variable with the predicted value. The multiple R^2 gives the percentage of variation explained by the multiple regression equation.

The analysis of variance table for the regression was printed. It contained the regression sum of squares, the residual sum of squares, and the F ratio.

Subsequently, statistics for each independent variable were computed. Statistics were computed for those variables already in the equation and for those not yet entered. The statistics on these variables were: (i) regression coefficient, (ii) standard error, (iii) standardized regression coefficient, (iv) tolerance, (v) F-to-remove, (vi) level, and (vii) partial correlation.

Notes

[1] The density requirement states that the county has to have 50 percent or more of its population living in contiguous minor civil divisions with a density of at least 150 persons per square mile. The nonagricultural worker criterion specifies that at least 75 percent of the county's labor force must be in the nonagricultural category.

[2] See Peter G. Goheen, "Metropolitan Area Definition: A Re-evaluation of Concept and Statistical Practice," in Internal Structure of the City: Readings on Space and Environment, ed. Larry S. Bourne (New York: Oxford Univ. Press, 1971), pp. 50-51.

[3] This number is the combined total of counties, parishes, and independent cities combined that meet NFC criteria as defined in this thesis.

[4] See Lyman Ott, William Mendenhall, and Richard F. Larson, Statistics: A Tool for the Social Sciences (North Scituate, MA: Duxbury Press, 1978), p. 236.

[5] See Hubert M. Blalock, Jr., Social Statistics, 2nd rev. ed. (New York: McGraw-Hill, 1979), p. 485.

[6] Jeremy D. Finn, A General Model for Multivariate Analysis (New York: Holt, Rinehart, and Winston, 1974), pp. 92-93.

Paul E. Green and J. Douglas Carroll, Mathematical Tools for Applied Multivariate Analysis (San Francisco: Academic Press, 1976), pp. 18-20.

[7] See Blalock p. 392 for the conceptual interpretation of the covariance.

[8] These are specifications used in the BMDP2R program that are appropriate for most problems, e.g., the size of a plot has a fixed size unless changed by the researcher. For a more detailed description of these options and their uses see UCLA Department of Biomathematics, BMDP Statistical Software (Los Angeles: Univ. of California Press, 1981), p. 28.

[9] For a detailed explanation of this procedure see BMDP Statistical Software pp. 255-58.

[10] Because R^2 will never decrease as new independent variables are added to the multiple regression equation and will generally always increase slightly because of sampling error, it is advisable to compute a corrected (adjusted) multiple coefficient R^2. This is an unbiased estimate of the population counterpart (Blalock, p. 487).

CHAPTER FOUR

Findings and Interpretations

Chapter 3 went over the method of approach, including sampling design, variable selection, and the computational procedures involved. This chapter will interpret the computational results and the overall findings of the research. It will also point out methodological limitations of the study.

Table 17 is the simple correlation matrix mentioned in chapter three. Surprisingly, no independent variable was highly correlated with the dependent variable. The variable having the highest correlation coefficient with PCTOUT (p. 83) was POPNFC (p. 84) at -0.2657. Four other variables had a correlation greater than -0.2. These were: 1) GMFNFC (p. 86) at -0.2479, 2) PCTESS (p. 85) at -0.2320, 3) DSTSUB (p. 83) at -0.2188, and 4) TWPNFC (p. 85) at -0.2018. Revealing a small negative relationship between PCTOUT and POPNFC, the data signified that as the population of nonmetropolitan fringe counties decreased, commuting rates showed signs of increasing. However, according to the gravity model, one would expect to find a much stronger negative relationship. As growth in manufacturing establishments occurred in the NFC, commuting again evinced a slight tendency to decrease. Likewise, as the percent of the labor force employed in the service sector and the distance to the suburban coun-

Table 17. Correlation Matrix

		$PCTOUT_1$	$DSTSUB_2$	$QUALRS_3$	$POPSUB_4$	$POPNFC_5$	$PCTLBF_6$	$GEESUB_7$	$GEENFC_8$
PCTOUT	1	1.0000							
DSTSUB	2	-0.2188	1.0000						
QUALRS	3	0.1698	-0.1335	1.0000					
POPSUB	4	0.0950	0.0197	0.2737	1.0000				
POPNFC	5	-0.2657	0.0154	0.2620	0.6236	1.0000			
PCTLBF	6	-0.1378	-0.0261	0.0010	0.0502	-0.0869	1.0000		
GEESUB	7	0.0564	0.0571	0.1677	0.1967	0.0342	0.2405	1.0000	
GEENFC	8	0.0033	0.0426	0.2428	0.0347	-0.1428	0.0000	0.3242	1.0000
TWPSUB	9	0.0943	0.0022	0.3064	0.9773	0.6115	0.0369	0.1122	-0.0279
TWPNFC	10	-0.2018	-0.0032	0.2490	0.7075	0.9116	-0.0133	0.0466	-0.1585
PCTMFC	11	-0.1362	-0.0231	0.1342	0.1104	0.2874	-0.0544	-0.0021	-0.2071
PCTESS	12	-0.2320	0.0908	-0.0255	-0.0627	0.0396	-0.1338	-0.1325	0.1671
GMFSUB	13	0.0318	-0.1204	0.1332	0.2231	0.0419	0.1762	0.5370	0.1992
GMFNFC	14	-0.2479	-0.1230	-0.0665	-0.0235	-0.1781	0.2447	0.2120	0.3919
GSSNFC	15	-0.1897	0.0257	0.0350	-0.0196	-0.0463	-0.0421	0.0568	0.7448
GSSSUB	16	0.0565	0.1199	0.0282	0.2469	0.0902	0.2864	0.8361	0.1552

Table 17 (continued)

		$TWPSUB_9$	$TWPNFC_{10}$	$PCTMFC_{11}$	$PCTESS_{12}$	$GMFSUB_{13}$	$GMFNFC_{14}$	$GSSNFC_{15}$	$GSSSUB_{16}$
PCTOUT	1								
DSTSUB	2								
QUALRS	3								
POPSUB	4								
POPNFC	5								
PCTLBF	6								
GEESUB	7								
GEENFC	8								
TWPSUB	9	1.0000							
TWPNFC	10	0.6856	1.0000						
PCTMFC	11	0.1631	0.3547	1.0000					
PCTESS	12	-0.0881	-0.0609	-0.4950	1.0000				
GMFSUB	13	0.1616	0.1104	-0.1820	-0.0089	1.0000			
GMFNFC	14	-0.0716	-0.0899	0.0766	0.0811	0.1860	1.0000		
GSSNFC	15	-0.0457	-0.0715	-0.2635	0.2671	0.2292	0.2285	1.0000	
GSSSUB	16	0.1665	0.0851	0.0765	-0.2304	0.3929	0.1962	-0.0353	1.0000

ty increased, the rate of NFC commuting gave indications of decreasing.

Relationships are discernible between the independent variables themselves. According to this matrix, the data revealed an almost perfect correlation between TWPSUB (p. 85) and POPSUB (p. 84), $r \simeq 0.9773$. Another nearly perfect relationship was that between TWPNFC and POPNFC, $r = 0.9116$. Both cases exemplify the fact that increases in wage levels brings about increases in population levels. Strong positive relationships were revealed between the following variables: GSSSUB (p. 86), GEESUB (p. 85) -- $r = 0.8361$; GSSNFC (p. 86), GEENFC (p. 85) -- $r = 0.7448$; TWPNFC, POPSUB -- $r = 0.7075$; and POPNFC, POPSUB -- $r = 0.6236$. Since service establishments are inclusive in total employment establishments, the relationship between the first two pairs of variables is expected. Even under the a priori assumption that many NFC employees are commuting to the suburban zone, the relationship between POPSUB and TWPNFC, although strongly positive, is not actually causal. The wage level in a nonmetropolitan fringe county does have an effect on its own population, but it would have noe effect on a neighboring suburban county's population. Where an effect does occur, a substantial degree of commuting takes place from the suburban county to the NFC. The product-moment correlation between POPSUB and POPNFC at 0.6236 adds credence to the contention that suburbanization is occurring

just beyond suburban boundaries.

Because partial correlations designate the degree of relationship between a dependent variable Y and any or all of the independent variables, controlling for one or more other independent variables, they in themselves are very important statistics. Table 18 is the partial correlation summary table of the data analysis.

In step 0 and only step 0, the partial correlation of each independent variable is synonymous to the simple (product-moment) correlation between it and the dependent variable. For example, the partial correlation between GEENFC and PCTOUT is 0.0033; this is also the zero-order correlation.

The asterisks indicate the step at which the variable entered the equation. For example in step 1, an asterisk appeared alongside the partial correlation of POPNFC. This was the first variable to enter the equation. In step two, an asterisk appeared alongside the partial correlation of POPSUB, the second variable to enter into the equation.

At each step, the inclusion of a new variable into the equation necessitated expanding the partial correlation formula (see Blalock, pp. 459-62). The result was that the partial correlations of the variables changed upon entering into a new step.

With all variables in the equation, it was seen how strongly each independent variable was associated, positively or negatively, with the dependent variable, having con-

Table 18. Partial Correlation Summary Table

Variables	2 DSTSUB	3 QUALRS	4 POPSUB	5 POPNFC	6 PCTLBF	7 GEESUB	8 GEENFC	9 TWPSUB
Step								
0	-0.2188	0.1698	0.0950	-0.2657	-0.1378	0.0564	0.0033	0.0943
1	-0.2227	0.2573	0.3459	-0.2657*	-0.1675	0.0680	-0.0362	0.3365
2	-0.2421	0.2227	0.3459*	-0.4175*	-0.2300	-0.0105	-0.0988	0.0131
3	-0.3143	0.2251	0.4038*	-0.4950*	-0.1622	0.0724	0.0446	-0.0823
4	-0.3143*	0.1889	0.4282*	-0.5191*	-0.1706	0.1040	0.0794	-0.1252
5	-0.2909*	0.1889*	0.4079*	-0.5366*	-0.1765	0.0756	0.0179	-0.1633
6	-0.2946*	0.1943*	0.4258*	-0.5516*	-0.1765*	0.1122	-0.0072	-0.1673
7	-0.3213*	0.1989*	0.3950*	-0.5572*	-0.2188*	-0.0796	-0.0271	-0.1120
8	-0.3134*	0.2132*	0.4004*	-0.5648*	-0.2357*	-0.0577	0.1774	-0.1357
9	-0.3351*	0.1204*	0.3882*	-0.5223*	-0.2113*	-0.1169	0.1774*	-0.0844
10	-0.3220*	0.1190*	0.3838*	-0.5143*	-0.2197*	-0.1063	0.1796*	-0.1085
11	-0.3066*	0.1442*	0.3573*	-0.4475*	-0.2463*	-0.1142	0.1644*	-0.0680
12	-0.3157*	0.1601*	0.3547*	-0.4506*	-0.2451*	-0.1142*	0.1903*	-0.0808
13	-0.3171*	0.1766*	0.1617*	-0.4548*	-0.2407*	-0.1221*	0.1629*	-0.0808*
14	-0.3191*	0.1720*	0.1248*	-0.3173*	-0.2456*	-0.1285*	0.1711*	-0.0592*
15	-0.3167*	0.1696*	0.1234*	-0.3149*	-0.2455*	-0.1169*	0.1626*	-0.0586*

Table 18 (continued)

Variables	10 TWPNFC	11 PCTMFC	12 PCTESS	13 GMFSUB	14 GMFNFC	15 GSSNFC	16 GSSSUB
Step							
0	-0.2018	-0.1362	-0.2320	0.0318	-0.2479	-0.1897	0.0565
1	0.1020	-0.0649	-0.2299	0.0446	-0.3112	-0.2097	0.0838
2	-0.0562	-0.0354	-0.2050	-0.0469	-0.3760	-0.2279	-0.0010
3	-0.0019	0.0219	-0.1802	0.0206	-0.3760*	-0.1590	0.0800
4	-0.0137	0.0200	-0.1554	-0.0146	-0.4219*	-0.1492	0.1347
5	-0.0057	0.0041	-0.1580	-0.0317	-0.4195*	-0.1652	0.1377
6	0.0098	-0.0057	-0.1888	-0.0109	-0.3859*	-0.1877	0.1895
7	0.0433	-0.0191	-0.1510	-0.0804	-0.4116*	-0.1782	0.1895*
8	0.0218	-0.0812	-0.1144	-0.0354	-0.3688*	-0.1782*	0.1801*
9	0.0531	-0.0661	-0.1178	-0.0063	-0.4033*	-0.2481*	0.1365*
10	0.0247	-0.1611	-0.1178*	0.0012	-0.3929*	-0.2317*	0.1083*
11	0.0559	-0.1611*	-0.1877*	-0.0352	-0.3265*	-0.2447*	0.0986*
12	0.0767	-0.1663*	-0.1818*	0.0190	-0.3330*	-0.2602*	0.1497*
13	0.0534	-0.1397*	-0.1820*	0.0071	-0.3400*	-0.2393*	0.1412*
14	0.0534*	-0.1489*	-0.1742*	0.0024	-0.3437*	-0.2448*	0.1504*
15	0.0530*	-0.1456*	-0.1732*	0.0024*	-0.3403*	-0.2291*	0.1494*

*Indicates variables in the multiple regression equation.

trolled for the influence of all other variables in the equation. As was the case with the zero-order correlations, no variable had a particularly high partial correlation with the dependent variable. GMFNFC had the highest partial at -0.3403. Two other variables followed closely behind, DSTSUB at -0.3167 and POPNFC at -0.3149. This signified that as growth in NFC manufacturing establishments declined, distances to suburban counties became shorter, and NFC population decreased, NFC commuting showed signs of increasing, having controlled for the influence of all other variables in the equation. The first and third variables are in fact push factors, the second variable being a pull factor. There were only two other variables having a partial correlation greater than -0.2. These were PCTLBF (p. 84) and GSSNFC, at -0.2455 and -0.2291, respectively. Again the interpretation of these partial correlations is similar to that of the other three. As the PCTLBF and GSSNFC decreased in the nonmetropolitan fringe county, NFC commuting showed signs of decreasing, however not quite as pronounced as GMFNFC, DSTSUB, and POPNFC.

The multiple correlation (R) increased to a maximum of 0.7055 in step 14 (Table 19). The multiple correlation coefficient is the maximum correlation attainable between the dependent variable and the predicted value from the multiple regression of that variable on the other variables. The correlation arrived at through this analysis was rather high,

Table 19. Summary Table

Step No.	Variable Entered	Multiple R	Multiple RSQ	Increase in RSQ	Adjusted RSQ	Increase in Adjusted RSQ
1	5 POPNFC	0.2657	0.0706	0.0706	0.0512	0.0512
2	4 POPSUB	0.4263	0.1818	0.1112	0.1469	0.0957
3	14 GMFNFC	0.5454	0.2975	0.1157	0.2516	0.1047
4	2 DSTSUB	0.6057	0.3669	0.0694	0.3106	0.0590
5	3 QUALRS	0.6241	0.3895	0.0226	0.3201	0.0095
6	6 PCTLBF	0.6391	0.4085	0.0190	0.3260	0.0059
7	16 GSSSUB	0.6555	0.4297	0.0212	0.3347	0.0087
8	15 GSSNFC	0.6692	0.4478	0.0181	0.3401	0.0054
9	8 GEENFC	0.6821	0.4652	0.0174	0.3449	0.0048
10	12 PCTESS	0.6875	0.4726	0.0074	0.3374	-0.0075
11	11 PCTMFC	0.6974	0.4863	0.0137	0.3376	0.0002
12	7 GEESUB	0.7022	0.4930	0.0067	0.3286	-0.0090
13	9 TWPSUB	0.7045	0.4963	0.0033	0.3145	-0.0141
14	10 TWPNFC	0.7055	0.4978	0.0014	0.2969	-0.0176
15	13 GMFSUB	0.7055	0.4978	0.0000	0.2762	-0.0207

denoting a highly positive association between PCTOUT and its predicted values.

The multiple R^2 increased to a maximum of 0.4978 in step 14; the adjusted R^2 continued to increase only up to step 9. Although R^2 can never decrease as independent variables are added, it is possible for the adjusted R^2 to diminish where variables contribute only a small increment to the total explained variance. Therefore, whenever the adjusted R^2 decreases, the added independent variables -- in this case six -- should be deleted from the explanatory system (Blalock, p. 487). Adhering to this rule, nine independent variables explained a maximum of 34.5% of the total variance in the dependent variable, level of commuting.

Of the nine more significant variables, four individually explained a significant proportion of the 34.5% of the explained variance in the dependent variable. These were: 1) growth in manufacturing establishments in the NFC, 2) population of an adjacent intervening suburban county, 3) distance to the adjacent intervening suburban county, and 4) population of the NFC are the nonmetropolitan fringe and suburban county factors deterring NFC metropolitan inclusion. Upon entering the multiple regression model, POPNFC (p. 84) increased the explained portion of the variance in commuting by 0.051. Distance to suburban county increased the adjusted R^2 by 0.059, or it accounted for 5.9% of the variance in the dependent variable above and beyond the amount ac-

counted for by variables already in the equation. Population of suburban county increased the adjusted R^2 by 0.0957. Growth in NFC manufacturing establishments, explaining the most of any single variable, increased the adjusted R^2 by 0.1047.

The remaining eleven study variables all proved to be absolutely insignificant in accounting for NFC commuting. Not one accounted for as much as 1% of the variance in the dependent variable (see Table 18). Five contributed so little as to actually detract from the equation's explicative power. These were: PCTESS (p. 85), GEESUB (p. 85), TWPSUB (p. 85), TWPNFC (p. 85), and GMFSUB (p. 86).

Methodological Limitations

NFC commuting. Following postulations propounded through Doxiadias' D.U.S. (1973), Friedmann's urban field (1973), and research by Berry (1977, 1978), and Hansen (1976), this study proceeded on the a priori assumption that almost all NFC commuting was actually directed toward the metropolital area and upon traversing metropolitan boundaries terminated in the suburban zone. Needless to say, a few commuters are going to other rural counties and probably a greater number is commuting to the central county itself. Although the percentage of commuters from its respective suburban counties to the central county can be obtained, percentages of rural county commuters to the central county is not known.

The only way to ascertain this amount is to estimate the number based on a random survey, the method the U.S. Bureau of the Census employs to ascertain the level of suburban county commuting. Because of the large expenditure in time and money, this method was not feasible for the purposes of the thesis. Thus, the nonmetropolitan fringe and suburban county factors could have possibly been made to seem more important than they really are as determents to NFC metropolitan inclusion.

Central county commuting. In some instances, twenty-five percent or more of the labor force in the central county works in a particular county. This could be a nonmetropolitan fringe county. Regardless, if 15.0% or more of the NFC's labor force actually worked in the central county, it would officially become suburban. This study did not treat this case, although there inevitably exists nonmetro fringe county factors and suburban county factors deterring the central county labor force from commuting for employment purposes to the NFC. In reality, cases of substantial reverse commuting are infrequent. Therefore, it was a better utilization of resources to investigate this problem from the NFC perspective.

Factor selection. The factors chosen for the study were those inferred to be significant by authors and investigators of the underlying reasons for rural and metropolitan growth, change, and development. However, these re-

searchers failed to actively seek direct responses from NFC residents themselves explaining their reasons for curtailed central county commuting. In addition, all but one factor -- DSTSUB (p. 83) -- were adaptable to planning purposes and consequently economic. It's not entirely impossible that potential commuters have been dissuaded from seeking central county employment for environmental and social reasons. Perhaps poverty and pollution are too blatant in the central city and older, inner suburbs. If so, the higher esthetic index of the suburban county and the nonmetropolitan county itself would detract from NFC commuting to the central county.

F-to-enter values. In the computational procedure, the F-to-enter values of all fifteen independent variables were smaller than the preassigned valued of 4.0. Because the BMDP2R program selects the best variables, the appropriate critical value is a function of the number of cases, the number of variables, and, unfortunately, the correlation structure of the predictor variables. Phrased differently, the level of significance corresponding to an F-to-enter depends upon the particular set of data used.

According to this logic, the set used in this particular analysis did not explain a high degree of NFC commuting. An even higher degree might have been explained if additional nonmetropolitan and central county variables had been included in the analysis. However, the scope of the study was

confined to nonmetropolitan fringe county and suburban county factors. Of the portion of NFC commuting actually explainable by NFC and suburban county variables, one can conclude that the explanation of 34.5% of the total variance is significant.

Another important point to be emphasized is that human behavior is seldom 100% conformant. Therefore in the social sciences, it is only possible to obtain an approximation of a causal relationship affecting human behavior. Frequently, however, this approximation is a good one. In this study, NFC and suburban county factors accounted for 34.5% of NFC commuting. Perhaps they should have been able to account for more. However, even if all the possible variables associated with NFC commuting had been included in the analysis, it is doubtful that R^2 would have equaled 1.00.

Time setting. Since the study was relegated to the 1970 decade, the thesis findings are only applicable to that time period. The analysis revealed that of the proportion of NFC commuting explained by nonmetropolitan fringe and suburban factors in 1970, growth (actually decline) in NFC industrial concerns, population of the suburban county, distance to the suburban county, and population of the NFC itself were the most influential factors. In this present decade, the relative importance of these variables may have shifted. Or perhaps, these variables have been supplanted by others. Nevertheless, having illuminated important var-

iables in the 1970 decade, we can follow, explain, and predict the relative importance of present and future variables. This is a most desirable goal of scientific inquiry.

However, according to this study, while acknowledging limitations, one can conclude that the following variables accounted for the following percentages in total NFC commuting: GMFNFC, 10.5%; POPSUB, 9.6%; DSTSUB, 5.9%; and POPNFC, 5.1%.

CHAPTER FIVE

Summary and Conclusions

Summary

Although some nonmetropolitan fringe counties are merging with metropolitan communities, many continue to coëxist alongside metropolitan areas, both large and small alike, without succumbing to metropolitan pressures of inclusion. As the literature review revealed, this has been the result of the metamorphosis of not only the metropolitan area, but the NFC likewise. It was hypothesized that nonmetropolitan fringe county factors and also suburban county factors were indeed significant in deterring NFC commuting to the central county -- some more than others. Through the multiple regression-correlation model, the thesis tested and proved this hypothesis, and found four of fifteen factors to considerably deter NFC commuting to the central county.

In the search for potential nonmetropolitan fringe county and suburban county factors, fifteen variables representing the NFC and suburban milieus were isolated as the most likely to influence commuting levels in the NFC. These variables were those recurrent in the literature and research on nonmetropolitan and metropolitan growth, change, and development. All but four of these variables had economic implications.

Having chosen fifteen variables assumed to affect the level of NFC commuting, they could be inserted in a predictive

equation to determine the relative importance of each variable in explaining the variance in NFC commuting.

Although nine of the variables explained some portion of the variance in commuting, only four explained a significant degree. These were in the order of their relative importance: (i) growth in manufacturing establishments in the NFC (ii) population of the suburban county (iii) distance to suburban county, and (iv) population of the NFC. GMFNFC explained 10.5% of the total variance in NFC commuting. POPSUB explained 9.57% above and beyond that portion explained by GMFNFC. Accounting for almost equal proportions of the explained variance, DSTSUB and POPNFC explained 5.9% and 5.1%, respectively.

Conclusions

Indeed, a multiplicity of nonmetro fringe and suburban county factors could have contributed to the determent of NFC metropolitan inclusion in the 1970 decade. In this analysis, fourteen were found having this effect. However, the study suggests that four were significant. Compoundedly with other undisclosed factors existing in both the nonmetropolitan and metropolitan realms, these factors had a profound impact on the preclusion of nonmetropolitan fringe county merger with SMSAs. No other subset of factors included in this analysis accounted for nearly as much variance in NFC commuting as this subset. These four nonmetropolitan fringe and suburban county factors, in conjunction

with other undisclosed factors, have inhibited NFC merger with the standard metropolitan statistical area. They have, in effect, promoted the longevity of the NFC, an indispensable political entity having various recreational and important social functions.

Future Prospects

The factors revealed in this study are proof of changes already tentatively in evidence -- namely, changes on the periphery of metropolitan communities. If America's large cities continue to be seen as decaying cores or degenerating sectors, large cities in the future will have a rather different spatial organization. They will exceed the total population and economic and social energy that our present metropolitan entities have. Functioning more like large dispersed clusters of urban settlements -- some rather large in themselves, this urban network may spread more than one hundred miles in all directions from the metropolitan center -- the urban field. However, unlike those in the standard metropolitan statistical area, commuting flows will be multidirectional. The only restraint will be that commuting is largely restricted to points within this dispersed settlement. This urban dispersal is inevitable as long as most Americans want to own a house and a yard of their own in a nice urban setting. As long as fuel and energy remains both attainable and affordable, people will seek places offering these domestic amenities regardless how far their place of

employment might be.

Because of nonmetropolitan fringe and suburban factors, the urban fringes of many of the nation's metropolitan areas have now extended deep into their hinterlands, farther and farther from the traditional metropolitan centers. More importantly, the core-orientation implicit in the terms "central city" and "central county" will continue to wane because of these factors. Thus, the SMSA presently defined will not truly delineate the physical extent of metropolitan affiliation. The nation's metropolitan systems appear to be evolving into multinodal, multiconnected social systems, in which the centralization of population and industrial activity have been and will continue to be countered by a reverse thrust of decentralization.

The prospectus is clear. Many of the factors that had limited locators to choices of places within metropolitan areas have been relaxed. The consequence can only be still further dispersion as potential nonmetropolitan fringe and suburban county factors deter NFC metropolitan inclusion.

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NONMETROPOLITAN FRINGE AND SUBURBAN COUNTY FACTORS DETERRING NONMETROPOLITAN FRINGE COUNTY METROPOLITAN INCLUSION

by

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ABSTRACT

NONMETROPOLITAN FRINGE AND SUBURBAN COUNTY FACTORS DETERRING NONMETROPOLITAN FRINGE COUNTY METROPOLITAN INCLUSION

Andra L. Juniel

Many counties bordering metropolitan areas, referred to as nonmetropolitan fringe counties (NFCs), are showing little tendency to officially become part of metropolitan areas. In fact, some have delayed merger until they themselves evolved into metropolitan entities. Unlike other NFCs which eventually merged with a coëxisting metropolitan complex, factors were so developed to inhibit metropolitan merger.

First, since the emergence of centrifugal forces in 1920, suburban areas have assumed central functions that had been previously limited to the metropolitan center. Industrial activity, employment opportunities, and needed services can presently be found dispersed throughout the suburban zone, greatly reducing dependency on the central city and the county containing it.

Second, improvements in communication technology and transportation networks, combined with an increasing rate of automobile ownership, have considerably influenced locational decisions of both industry and households since WWII. Industry can take advantage of less expensive and more plentiful land resources in the suburban zone. Upon relocating

to suburbia, it finds itself in the midst of a plentiful, productive work force. Individual households can relocate beyond metropolitan boundaries and commute on high-speed transportation networks to the suburban ring or deep into the metropolitan network. Potential metropolitan in-migrants themselves can take advantage of the development on the fringes of the metropolitan area. These are areas of affordable housing and environmental amenities.

Third, along with initial growth in one or a few economic sectors, growth is bound to occur in other sectors not originally affected. This is termed the multiplier effect. This additional growth attracts more population which in itself spurs growth in other economic activity. The cycle continues until some equilibrium is achieved where growth in both economic activity and population is ceased or seriously curtailed.

Development such as those of the foregoing have contributed to the factors deterring nonmetropolitan fringe county metropolitan inclusion. This study endeavors to ascertain the more important factors in both the nonmetropolitan fringe and suburban milieus which have inhibited NFC merger with metropolitan areas in the 1970 decade. Focusing on previous research variables and those recurrent in the literature, a set was selected to conduct a computer analysis on. This analysis was employed to reveal the relative importance of each variable in inhibiting metropolitan in-

clusion of the NFC.

Although nine of the research variables contributed something to the explanation of the variance in NFC commuting, only four made a significant contribution. Two of the factors were inherent to the nonmetropolitan fringe county; two were inherent to the suburban county. Combined, these four variables alone almost explained one-third of the total variance in nonmetropolitan fringe county commuting.

Disclosure of these variables is important in that the relative importance of the variables might shift from decade to decade, or the variables might wane in importance in inhibiting NFC merger with the SMSA as time progresses. Planning bodies and governmental agencies need to know which factors in the 1970 decade have precluded metropolitan expansion to plan for the well-being of those concerned. Social scientists should be cognizant of these factors to follow and explain present metropolitan trends and predict future trends. This is a most desirable goal in scientific inquiry.