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Metropolitan Areas as Functional Communities: A Proposal for a New Definition

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Metropolitan Areas as Functional Communities

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SUMMARY

We propose defining the metropolitan area as a Functional Community Area (FCA) as distinct from a physically-defined entity or a broader economic region. When the original Standard Metropolitan Area (SMA) concept was formulated, there was a high degree of correspondence between the region's labor market area, its housing market area, and local activity space. This area also tended to take on a common physical form where a highly dense core area served both integrative and distributive functions for a less dense, largely residential hinterland.

Changes in transportation, communication, and production technologies, in the organization of production, as well as nationwide industrial and demographic shifts, have led to a decoupling of these functional and physical spaces. Regional economic areas are now much broader than local labor market areas and local activity spaces. Over the years, the expansion of existing areas and creation of new areas in a low density mode have led to a diversity of physical configurations for the daily activity space of community residents -- including areas that have no discernible cores. Since the original concept was defined, the country's rural territory has become more strongly integrated into the national economy. Some portions of this nonmetropolitan space have become closely tied to specific metropolitan areas, while others stand relatively isolated from metropolitan influence.

We propose a new system which views the metropolitan area as a Functional Community Area, consistent with Amos Hawley's concept of an "enlarged area of local life." These FCA areas will be defined on the basis of high commuting density, as an indicator of the community's activity space. They will employ building blocks that consist of incorporated places, minor civil divisions, and census designated places, and may or may not contain a single highly dense place or employment node. Where adjacent FCAs are closely linked, they will be combined to form a broader Metropolitan Economic Region (MER). The criteria used to define these regions will include both commuting and non-commuting considerations. However, MERs will be defined on the basis of a "bottom-up" aggregation of FCAs. The building blocks for MERs will be larger units such as counties and New England towns.

Territory within FCAs and MERs will be classed according to place or minor civil division attributes. Urban centers, primarily residential areas, and primarily employment areas will be among the several categories used to classify territory within Functional Community Areas. These categories can be cross-classified with the traditional rural-urban concept. However, this classification will be developed solely to distinguish analytically meaningful types of territory. It will not form the basis for defining the boundaries of the FCAs or MERs.

Because the Functional Community Areas are defined on the basis of commuting clusters, rather than linkages to a large or highly dense central place, FCAs will cover most of the nation's territory--both urban and rural. As with many metropolitan areas under the present system, several FCAs will comprise mixed urban and rural territory. Other FCAs will be totally urban or totally rural. Some portions of the country with weak commuting links to other areas will lie outside any FCA. Such areas will be grouped by proximity and given a different name to indicate that they are not included in an FCA. We have not adopted any a priori criteria with respect to minimum population densities, or population sizes, for FCAs.

Because our definition of FCAs and MERs are heavily dependent on commuting data, we do not advocate updating the system between census enumerations unless reliable commuting data can be obtained elsewhere. We also recommend the development of a county-counterpart system of FCAs to facilitate analyses with data that are available only at the county level. Finally, we end our proposal with several research questions that we believe need to be answered to further refine the FCA concept, and facilitate its implementation.

I. Background

This proposal offers a new approach toward representing the geography of the US settlement system that is consistent with the changing nature of this system and the kinds of statistical comparisons users will want to make. Our recommendations are based on a review of the original Standard Metropolitan Area (SMA) concept that has formed the basis for settlement statistics since 1950, and our assessment of evolving changes in the settlement pattern which renders some aspects of the old concept obsolete. Yet, consistent with the original concept, our proposed system of Functional Community Areas (FCAs) purports to delineate "enlarged areas of local life" that represent socially and economically-integrated communities that exist within our highly interdependent regional and national economic systems.

This proposal is divided into three separate parts. Section I reviews some of the underpinnings of the current metropolitan concept and reassesses their relevance in light of the changing US settlement patterns of the past four decades. It concludes by discussing some of the limitations of the present metropolitan area concept. In Section II, we present the basic principles of the Functional Community Area system we propose as a successor to the system currently in use. Lastly, in Section III, we enumerate questions for further research that will help to refine the FCA concept and facilitate its implementation.

A. Original SMA Concept

The metropolitan statistical area concept, defined during the 1940s, was an appropriate one to represent the national geographic settlement system as it evolved to that point. Four aspects of this concept that are relevant to our reassessment of its use are as follows:

- The metropolitan area was seen to be an economic unit where a cluster of activities in a core location dominated export, import and service functions that sustained the population of a surrounding hinterland, that was economically and socially integrated with the core area.[1]

- Historically, this functional definition coincided with physical properties that were common to most metropolitan areas at the time.[2]
- Socio-demographic, industrial and land-use characteristics also patterned themselves in common ways as distance from the core increased.[3]
- Because of the correspondence between functional and physical space, the metropolitan area could be operationalized by identifying core areas with population size and density criteria; and hinterland areas by measures of integration with the core.

Operationalization of Original Concept

The original Standard Metropolitan Areas (SMAs) which were defined in 1949 for use in tabulating the 1950 Census were based on the concept of a large population nucleus together with adjacent communities that have a high degree of integration with the nucleus. Integration was defined mainly by commuting trips. For all of the United States except New England, SMAs were defined in terms of counties or county equivalents. There are two advantages to defining metropolitan areas in terms of counties. First, the county is the smallest geographical unit for which many types of data are tabulated. Second, there have been very few changes in county boundaries over time so that it is relatively easy to study metropolitan change over time using constant boundaries. An obvious disadvantage of county units, however, is their variability in size.

In 1958 the term was changed to Standard Metropolitan Statistical Areas (SMSAs) and in 1983 it was changed to Metropolitan Statistical Areas (MSAs). While there have been some changes in the rules for defining these areas over time, the basic concept has remained the same. For all of the censuses between 1950 and 1990, metropolitan areas have been defined as including a densely settled urban core with a population of at least 50,000, the rest of the county in which most of this core was located, and any contiguous counties which met both the criteria of metropolitan character and the criteria of integration with the core.

When metropolitan areas were initially defined in 1949, these areas had to have a central city with at least 50,000 population. In 1958, these criteria were revised so that two contiguous cities with a

combined population of 50,000 could qualify as the nucleus of a metropolitan area, providing that the smaller had at least 15,000. In 1971, the concept was further modified to allow a city of 25,000 to qualify if the total population of the city and surrounding places with density of 1000 or more persons per square mile was at least 50,000. In 1980, the concept of urban core was again enlarged to include Urbanized Areas of at least 50,000. When the core consists of an urbanized area without a central city of at least 50,000, the entire metropolitan area must have 100,000 population (except in New England where this minimum was set at 75,000).

Since 1949, adjacent counties have been added to metropolitan areas if they met the criteria of metropolitan character and social and economic integration. In the 1950 Census, a county met the criteria of metropolitan character if at least one half of its population lived in minor civil divisions with a density of 150 or more persons per square mile and less than one-third of its workers were engaged in agriculture. It met the criteria of integration if at least 15 percent of its resident workers worked in the central city's county or 25 percent of the people working in the county commuted from the central county. In consideration of the declining proportion of the labor force in agriculture, the criteria of metropolitan character were modified in 1958 to require that at least 75 percent of the population of a contiguous county be employed in non-agricultural activity before the county could qualify for addition to a metropolitan area. In 1980 the requirement that contiguous areas have a minimum proportion employed in non-agriculture was dropped. By that time, only about seven percent of the non-metropolitan labor force was engaged in agriculture, so that there were few counties in the United States which did not meet the non-agricultural requirement.

In 1980, the criteria of metropolitan character were combined with the criteria of integration to provide a sliding scale whereby a county could qualify for inclusion either because it has high density or a high level of commuting to the core.[4] For example, an adjacent county in which 50 percent of the workers commute to the core can be added with a density as low as 25 persons per square mile while a county with only 15 percent commuters needed a density of 50 persons per square mile and other evidence of metropolitan character. These criteria were applied to new metropolitan areas defined in

1981 and used in the tabulation of 1980 Census data, but they were not applied to existing metropolitan areas until 1983.

From the beginning, slightly different criteria have been used to define metropolitan areas in New England. Because the cities and towns in New England have more political significance than the counties, have had relatively stable boundaries since 1950 and data are available for these units, they were used as the building blocks for SMAs and later for SMSAs. The result is that most New England SMSAs are smaller in land area than those in the rest of the United States and some New England counties contain two or more metropolitan areas.

Consolidated Metropolitan Areas

In several parts of the country, the urbanized areas surrounding major cities have grown together so that it is hard to determine where one metropolitan area begins and another ends. The area between Boston and Washington has long been described as "an almost continuous stretch of urban and suburban areas" (Gottman, 1961, p. 3). In all parts of the country, improvements in highways have made it easier for people to commute longer distances and metropolitan areas which were once quite separate have become more closely tied to one another.

In the 1960 census, the concept of Standard Consolidated Area (SCA) was introduced to provide an alternative aggregate unit which included two or more adjacent SMSAs which were closely integrated. Originally, this merely recombined parts of the New York and Chicago areas of 1950 which had been split by the application of 1960 criteria. In 1975, definite criteria of size and integration were established and the name was changed to Standard Consolidated Statistical Areas. This permitted the recognition of the growing integration of previously separate metropolitan areas. In 1980, there were 16 SCSAs consisting of 48 SMSAs. All of these SCSAs had at least one million people in 1980.

In the 1983 revision, metropolitan areas with over one million population which contained two or more counties, were divided into two or more Primary Metropolitan Statistical Areas (PMSAs) if local opinion supported such a division.[5] The original metropolitan area was known as a Consolidated Metropolitan Statistical Area (CMSA) and the components were called Primary Metropolitan Statistical

Areas (PMSAs). The 1983 revision resulted in 254 MSAs which were not part of larger units plus 20 CMSAs which contained a total of 71 PMSAs, as of 1991.

The establishment of SCSAs and the more recent CMSAs gives the analyst a choice of units to use. In ranking metropolitan areas by size, the CMSA seems more accurately to represent the total size of metropolitan areas such as New York than does the more restricted New York PMSA. However the PMSAs are better units for studying processes of change such as suburbanization because they are more likely to contain only a single central city and its suburbs. Also, since local governments play an important role in determining the directions of change of an area, two nearby cities, which logically fit within a single consolidated area, may experience different patterns of growth or decline.

Criticisms

From the beginning, both the criteria for defining metropolitan areas and the application of these criteria to specific cases have been sharply criticized. On one side, those who feel that a metropolitan area should be a relatively autonomous economic area have pointed out that most officially defined metropolitan areas are underbounded in terms of including all of the population which depends upon the area for certain services such as public utilities, retail shopping, medicine, education and other personal services.[6] Alternative areas such as Berry's "urban fields" tend to be considerably larger on the average, although there is much variability (Berry, 1973).

On the other side are those who associate metropolitan character with size, density and the performance of certain "metropolitan" functions. These critics feel that the concept has been stretched to allow more and more marginal areas to qualify for federal programs targeted for metropolitan areas. Most notable among these critics is Calvin Beale who has pointed out that the new metropolitan areas which were designated in the 1970s, lack many of the facilities which might be expected of a "metropolitan area" such as a television station, a Sunday newspaper, local bus service, a four year college and specialized hospital services (Beale, 1984).[7] Forty six out of the 58 areas added during this period lacked central cities of 50,000 and 9 did not even have a central city of 25,000.

While Beale's criticism applies to many of the newer SMSAs which he cites, some of the new SMSAs represent a newer form of metropolitan settlement, one based more on suburbs than central cities. An example of this newer form of settlement is Bradenton, Florida which has a central city of only 30,170, but a total population of 148,442 which is 89 percent urban.

The various attempts to adapt the SMA to consolidated metropolitan areas and the kinds of criticism, just discussed, suggest that the nation's settlement areas evolved in ways not anticipated by the original concept. That concept was consistent with the settlement pattern that existed at mid-century and was probably relevant for two decades that followed World War II. Under this settlement system, the following generalizations held:

- Functional settlement areas could be approximated by areas with common physical attributes.
- Areas generally contained one central, highly dense, populated core area with a hinterland that spread out with declining density, along with a predictable patterning of population and land-use attributes.
- Because of limited and relatively undifferentiated hinterlands, there was little need to consider a nesting of metropolitan areas, or subareas, into a wider regional hierarchy. The metropolitan community represented, at once, a regional economic area, a local labor market area, and a community's overall activity space.

Each of these characterizations of the nation's settlement areas at mid-decade are less generally applicable to today's settlement patterns.

B. Changes in Settlement Patterns, 1950-1990

Since the current metropolitan area concept was put into use with the 1950 census, there have been massive shifts in the patterns of settlement in the United States which have called into question the applicability of this concept for future decades. These changes include:

- Extensive suburbanization within metropolitan areas giving rise to multinucleated suburbs, suburbs

with highly diversified economies, suburban commercial and employment nodes, residential suburbs, and mixed urban-rural territory.

- Metropolitan expansion and development in previously undeveloped parts of the country in a low-density mode, following a different model than the single core-hinterland development experiences around older cities.
- The increased spread and expansion of all economic activities has led to different-sized radii for the broader regional economic unit, and smaller labor market or daily activity areas nested within the larger unit.
- The development of nonmetropolitan systems which were based less on farms and extractive activities, but more on new production, service and recreation activities.

These changes have occurred as a result of improved transportation and communication technologies, as well as massive federal subsidies, that led to the continued spread of residential, retail and manufacturing activities away from core central cities (Long, 1981; Zimmer, 1975). In established areas, this decentralization began much earlier in the century (Hawley, 1971) but became accentuated in the immediate postwar decades. This is apparent from the population trends, shown in Figure 1, for large metropolitan areas classed as: North-Declining, North-Old, South-Old, and West-Old.[8] In less urbanized portions of the South and West, newer metropolitan areas also experienced peripheral growth -- though often in concert with their less dense, territorially extensive core areas. (See patterns for South-Young and West-Young metropolitan areas in Figure 1).

(Figure 1 about here)

Spread of Metropolitan Population since 1970

Over the past two decades, in particular, the expansion of metropolitan population was the result of the continued spread of population into new territory around existing metropolitan areas, and the establishment of new metropolitan areas in less densely populated parts of the country (Long and DeAre,1988). During the 1970s, 45% of the nation's metropolitan population increase was attributed to the reclassification of residents into metropolitan territory (through added counties or the creation of new metropolitan areas). The comparable percentage for the 1950s was 16% (Frey and Speare, 1988, p. 45). In that decade the vast majority of metropolitan population growth occurred within the boundaries of existing metropolitan areas. It was also in the last two decades that most larger older central cities lost significant percentages of their resident populations (see Table 1), leading to a continued redistribution of the metropolitan population to low density suburban communities and newer settlement areas that do not conform to earlier morphological stereotypes.

(Table 1 about here)

The new redistribution shifts render the original central city-hinterland model less useful for distinguishing socio-economic and demographic settlement patterns -- except, perhaps, for residence patterns by race. The 1950s distinction between a suburban population oriented toward "familism" and a more heterogeneous central city population has broken down, as suburban populations took on much more of an "urban" character. Migration and distribution patterns, particularly in the last two decades, have led to heterogeneous suburban populations when classed by social status, household type, and age structure -- if one considers the non-central city portion of the metropolitan area to comprise the suburbs (Frey and Speare, 1988).

Of course, within this broad category, one finds the usual clustering of population characteristics across smaller communities (Muller, 1981). Yet even these configurations do not conform to the kinds of distance-based or sectoral models that urban sociologists and geographers showed, in earlier times,

to be consistent with core-hinterland development (Johnston, 1971). Detailed examinations of tract cluster variations on a range of 1980 population and housing characteristics, in selected metropolitan areas, indicate that neither the central city-ring nor the urbanized area- ring dichotomies are ideal categories for distinguishing intra-metropolitan attribute differences (Treadway, 1990; 1991).

Indeed, the social geography in many settlement areas has now evolved to a situation where it is the central city population rather than its suburbs that is unique in its socio-demographic makeup. This characterization is most applicable to large older industrial central cities that have served, historically, as destinations for immigrants from abroad or the black rural-to-urban migrants. These central cities, whose physical configurations most closely approximate the classic model, have been sustaining race- and class-based population declines for decades. (1980-90 white-minority changes for these areas are shown in Table 2.) As a consequence, these cities' social and demographic compositions are decidedly unrepresentative of the broader metropolitan area. This argues for a classification scheme that recognizes analytically meaningful categories within the broad expanse of territory classed simply as "balance of MSA" under the present statistical system. The new classification should be just as applicable to smaller and recently developed settlement areas as to older areas with growth histories that conform more closely with the core-hinterland model.

(Table 2 about here)

Spread of Employment since 1970

The strong deconcentration of the metropolitan population since mid-century is closely linked to the outward spread of employment. Already in the 1940s, manufacturing and retail employment followed residential redistribution outward from the central city (Hawley, 1971; Schnore, 1965)). The suburbanization of manufacturing and consumer services continued in the 1950s and 1960s. Yet, as with the suburbanization of residences, it was in the post-1970 period when employment deconcentration accelerated in both scope and character. It was during the 1970s that the balance of

metropolitan jobs shifted from the central city to the suburbs in many older metropolitan areas (see Figure 2). It was also during this decade that the suburbanization of nonmanufacturing jobs out paced those for manufacturing jobs in these older areas (Frey and Speare, 1988). This included many white collar office and service industry jobs that heralded the beginning of the "suburban office boom" (Cervero, 1986).

(Figure 2 about here)

Hartshorn and Muller (1986) characterized the 1970-80 decade as a period of "catalytic growth" for suburban downtowns (following the pre-1960 "bedroom community" and 1960-70 "independence" stages).[9] During this stage, suburban employment clustered in various types of places classed as: suburban freeway corridors, retail strip corridors, high-technology corridors, regional mall centers, diversified office centers, large-scale mixed use centers, old town centers, and suburban specialty centers. Although there was some development of regional shopping centers, industrial parks and office parks in the 1960s, the widespread growth of these suburban employment sites accelerated during the 1970s.

Stanback (1991) contends that these suburban employment changes are associated with a new era of metropolitan economic development wherein suburban employment centers have begun to compete with historical central cities becoming more economically independent and taking on more of the area's export functions. In a detailed study of counties within 14 large metropolitan areas, he finds that suburban counties have become more diverse, and central counties more specialized in their industrial structures since 1970. Much of this Stanback attributes to the post-1970 rise in advanced business and producer services. These, as well as social and public services, comprise an increasing share of the nation's industrial structure, and are attracted to certain suburban locations. (See also Noyelle and Stanback, 1984, for a discussion of the spatial implications of the new service economy.)

While the employment in many suburban communities still revolves around residential service

activities, other communities have taken on service activities such as wholesaling and business-related services that were previously concentrated in the central city. Still other suburbs, which Stanback labels as "suburban magnet" areas, have achieved certain agglomeration economies and stand in competition with the historic city with respect to key export services. These areas often house high-tech and office complexes, divisional offices, sales centers, and, sometimes, headquarters for large corporations. They are surrounded by a complement of hotels, retail, and entertainment complexes that are located within ready highway access to other parts of the metropolitan area. Stanback identifies counties in 11 selected metropolitan areas that house such suburban magnets (see Table 3). Many of these counties rival the metropolitan area's central county in total employment, and all show high and increasing employment/population ratios. These counties have also shown precipitous declines in the percent of net out-commuting to the central county, over time.

(Table 3 about here)

Stanback's (1991) analysis of these counties' industrial structures confirms that they have taken on many advanced service functions previously held by the central county. Yet, employment in the most specialized FIRE (finance, insurance, real estate, industries) and legal services continues to be centralized in the central counties for these study areas. This suggests that there is both a symbiotic and competitive relationship between the central city and its magnet suburban areas.

Nevertheless, Stanback's analysis shows that there has been a dramatic deconcentration of almost all types of employment into suburban counties. Central cities, more than ever before, are dependent on suburban in-commuters to fill jobs that require higher eduction and skills. At the same time there has been a significant increase in metropolitan resident-workers that both live and work outside the central city (Pisarski, 1987; Frey and Speare, 1988). In many large older metropolitan areas, suburb resident-workers comprise a plurality of the metropolitan work force.

Stanback's work, and related evidence from other studies, suggest the existence of "suburb-only"

activity spaces and labor markets associated with the post-1970 spread of residences and work places. Yet the phenomenon is so new that comprehensive empirical studies (prior to the 1990 census) could not be undertaken to establish their geographic limits. Stanback (1991,p. 65) observes that his county-level analysis is too crude to serve this purpose.

The identification of local activity or labor market spaces is fraught with two kinds of complexities: (1) these spaces do not necessarily conform to single incorporated places or minor civil divisions but can comprise combinations of these depending on the nature of the activity space; and (2) there may be overlapping local labor market or activity spaces. The dramatic rise in womens' labor force participation since 1970 (Bianchi and Spain, 1986) has increased the number of workers and, in particular, the number of part-time workers in the labor force. This has given rise to more multiple-worker and multiple-work place households. Commuting studies have suggested that local labor markets might also differ by population subgroup characteristics such as education, race and gender (Frey and Speare, 1988; Kasarda, 1988; Stanback, 1991; McLafferty and Preston, 1991). This is implied by the distinctly different city-suburb residential distributions for white and black resident-workers, shown in figure 3.

(Figure 3 about here)

Two recent investigations of suburban employment patterns suggest that local labor markets, which exist within the broad expanse of suburbia, should be defined in terms of geographic units below the county level. In a careful empirical study of post-1980 materials Cervero (1989) identified 57 Suburban Employment Centers (SECs) in representative metropolitan areas and regions of the country. Each of these areas had: more than 1 million square feet of office floor space, 2,000 or more workers, and were located more than 5 miles from the area's central city's CBD. Areas with the greatest concentrations of jobs were classed as office growth corridors, subcities, and large mixed-use developments (with average employment concentrations of 234,000; 33,500; and 27,500 jobs, respectively).

The second investigation is a carefully researched journalistic account by Garreau (1991) who labels his suburban centers, "edge cities." He identifies 203 such areas within the boundaries of 36 major metropolitan areas, primarily on criteria of: more than 5 million square feet of leasable office space; more than 600,000 square feet of retail space; a high employment/population ratio; its local perception as a single end destination for mixed use (jobs, shopping, entertainment); the transformation from residential or rural to mixed use over the past 30 years. Neither Cervero's empirical study nor Garreau's journalistic account intend to define local activity spaces or labor market areas within the suburbs. Yet their discussions of land use patterns, industrial and demographic characteristics associated with these emergent suburban employment centers provide useful background for the more in-depth study which should be a prerequisite to any new classification of local labor market or community areas.

Outside Metropolitan Areas

One final aspect of the national settlement system which has changed since mid-century is the nature of those areas that lie outside of metropolitan areas, as currently defined. In the 1940s, the territory outside of metropolitan areas was more predominantly rural and less integrated into the national economy than has been the case for the last two decades. While the population and economic characteristics and territory now classed as "nonmetropolitan" still shows some distinction from that in metropolitan areas, improvements in transportation, communication, and the organization of production have served to integrate economic activities in nonmetropolitan areas to those in the rest of the country (Fuguitt, Brown and Beale, 1989). Also, around 1970, residential and employment activities began to deconcentrate around many small and moderate sized places, following a pattern that has heretofore existed in metropolitan areas. This has continued according to recent analyses of nonmetropolitan commuting patterns (Fuguitt, 1991b) and some of the 1980s population growth analyses (Fuguitt, 1991a).[10]

In light of these patterns and for more analytic reasons, it would make sense to define local labor

market areas for that part of the country now defined as nonmetropolitan. Earlier attempts to define the nation's nonmetropolitan territory into homogeneous or analytically useful regions (Bogue and Beale, 1961; Berry, 1973; Beale and Fuguitt, 1978; Morrison, 1990, chapter 7; or see Dahmann, 1990) should, at a minimum, be revised to reflect the significant demographic and economic shifts of the past two decades. However, a more promising approach might be to update Tolbert and Killian's (1987) Labor Market Areas that group counties on the basis of 1980 commuting clusters. The latter approach serves to diminish the distinction between "metropolitan" and "nonmetropolitan" areas, allowing users to decide how they want to classify each area on the basis of statistics readily available for these county-based units.

To summarize, the U.S. settlement pattern has undergone significant change since 1950, particularly during the last two decades. Metropolitan growth has deconcentrated markedly within the older parts of the country, and has spread to new territory (through reclassification) into less developed, less dense areas and regions. The outward, suburban spread of more diverse population groups and economic activities has created the need for more useful settlement categories pertaining to new activity spaces and local labor market areas. Finally, the increased economic integration of the territory now classed as nonmetropolitan has created the need for a system of settlement areas that classifies this territory with procedures similar to those used to classify territory now labelled as metropolitan.

These shifts in the nation's settlement patterns over the past 40 years call into question the three assumptions we associated with the current statistical system:

- functional settlement areas can no longer be approximated by areas with common physical attributes.
- the highly dense central core-hinterland model of settlement now only characterizes only a portion of the nation's settlement system.
- as population and economic activities have increasingly spread outward from metropolitan centers, there is a need to consider a nesting of local activity spaces or labor market areas that are

connected to the broader metropolitan region.

C. Limitations of the Current Metropolitan Concept

Although the concept of a functionally defined community is an important one to preserve, we believe that the changed settlement patterns, over the past four decades, have rendered some aspects of the current metropolitan area formulation obsolete. We identify, below, five limitations of the present formulation for representing the evolving U.S. settlement system.

First, the definition of the current Metropolitan Statistical Areas (MSAs) is too wedded to the central core-hinterland concept of settlement area.[11] The need for high central densities no longer exists and there is no reason why a modern post-industrial settlement could not be developed around a set of dispersed labor market areas that could be entirely "suburban" in character while providing employment, shopping, and recreation for its inhabitants.

Second, current MSA definitions are limited by their restriction to county building blocks. While the use of counties has well-known practical advantages, they are too large in many parts of the country to adequately define functional or activity space.

Third, while the current concept recognizes that some metropolitan areas can be part of larger consolidated areas (CMSAs), the division of these areas is often done in a nonsystematic fashion with great discretion given to local areas for identification. Moreover, the metropolitan area components (PMSAs) are often crudely identified because: (a) the procedure gives first priority to identifying the larger CMSA, following a top-down approach toward specifying PMSAs; and (b) PMSAs are created to fit an often inappropriate core-hinterland model, on the basis of crude county building blocks.

Fourth, statistics available for intra-metropolitan analysis are generally produced for only two components -- the central city (or combined multiple central cities), and the suburban ring. Hence, the expansive residual territory that includes primarily residential suburbs, primarily employment suburbs, mixed-use urban centers, and still undeveloped territory remains undifferentiated in the statistics available for analytical use. A fifth limitation with the present metropolitan statistical system is that much of the country is left out. The vast territory now classified as "nonmetropolitan"

has become more integrated both with the metropolitan economy and, internally, on the basis of local labor market areas. Moreover, to the extent that government agencies and private sector analysts find metropolitan areas useful in their planning, they may ignore the population living in nonmetropolitan territory simply because a manageable classification scheme is not available.

II. Basic Principles of the New System

In light of the above considerations, we propose here a new formulation of geographic settlement areas designed to accommodate evolving changes in the nation's distribution patterns. At the same time, we wish to retain the general notion of a functional community area that served as an underlying tenet of the metropolitan community concept upon which the earlier statistical system was designed.

In the paragraphs below, we discuss the ways our proposed system addresses the various items that are of interest to the Census Bureau's Metropolitan Concepts and Statistics Project. The items will appear in the following sequence: (A) Conceptual Basis (Item 1); (B) Aggregation Criteria and Integration Measures (Items 3 and 4); (C) Building Blocks (Item 2); and (D) Relationships among Areas (Item 5); (E) Entities of the Settlement System (Item 9); (F) Data to Delineate Areas (Item 6); (G) Local Views (Item 7); (H) Frequency for Updating Statistical Areas (Item 8); and (I) Data for Users (Item 10).

A. Conceptual Basis

We propose Functional Community Areas (FCAs) to form the basic areas of the new settlement system. They are intended to delineate functional areas that represent, to the extent possible, self-contained local activity or local labor market areas. In this regard, it is consistent with the functional community premise underlying Hawley's conception of an "enlarged area of local life." In discussing the metropolitan community, as it was originally formulated, he states:

> The concept of the metropolitan area lends itself to various definitions...It may apply to an enlarged area of local life, i.e., with a radius of twenty-five to thirty miles, or it may refer to a much broader area in which the scattered activities have come under the administrative

supervision of a metropolis. The former is what is usually denoted when the term *metropolitan area* or *metropolitan community* is used; *metropolitan region* is ordinarily reserved for the latter.

> The principle of the metropolitan community, as well as the metropolitan region, is delineated by the frequency with which outlying residents and institutions transact their affairs in the metropolis, whether through direct visitation or through indirect means of communication. These frequencies...decline in gradient fashion with distance from the center. Thus figuratively speaking, one might rotate a gradient on its center and sweep out a zone in which the residents routinely engage in a given frequency of communication with the center. The zone of daily frequencies comprises the metropolitan community; zones of lesser frequencies fall in new regions. Theoretically sound as this mode of definition appears to be, it presents certain difficulties. To the observer, for example, the boundaries located in the manner described are ephemeral. They correspond to no political demarcation or, unless there happens to be a seacoast or mountain range nearby, to no physical impediments. A boundary is visible only through the application of rather refined means of observation. A functional boundary of that kind is also somewhat fluid; it shifts from time to time as the influence of the metropolis is extended or retracted. (Hawley, 1971: pp. 149-150).

As has been discussed earlier, certain aspects of the original metropolitan community formulation are no longer valid for today's settlement patterns. One of these is its earlier strong linkage to the central core- hinterland physical model of settlement. Another would be the assignment of a specific distance to the community's radius. Yet the basic notion of a common area with heightened frequencies of daily interaction lay at the root of this functional conception of the metropolitan community.

Another aspect of the original formulation seems also applicable, in some parts of the country today. That is the distinction between the local community or activity space and a broader metropolitan region. Again, the nature of the functional relationships between these two kinds of spaces differ markedly from those that existed at mid-century, when this concept was originally formulated. However, the recent work of Stanback (1991) and others reviewed earlier suggests that a strong symbiosis exists between communities in some parts of the country and these can be thought of as metropolitan regions.

The functional community areas we propose are not tied to any physical configurations, such as population size and density criteria, or location in urbanized areas. They will be specified, solely, on

the basis of measures of interaction (although some size considerations will be used in designating metropolitan economic regions). Because the same kind of interaction procedures will be used to designate FCAs in rural as well as urban parts of the country, they will not be formally distinguished on the basis of "metropolitan" and "nonmetropolitan" status. As such, they will encompass a much larger portion of the national territory than the current system.

The procedures discussed below reflect our preliminary thinking in the formulation and operationalization of the FCA concept. As the next section reveals, we place heavy reliance on commuting data as an indicator of interaction. Nevertheless, we are open to wide experimentation which might employ various types of commuting measures or noncommuting measures in designating these settlement areas. There maybe even larger questions of face validity associated with designated areas of this type. In the final part of this report (III), we call for broader research efforts along these lines.

B. Aggregation Criteria and Integration Measures

The measures of integration we propose to designate FCAs are those traditionally used to define local labor markets. A labor market is an area within which a worker can commute to work, and our procedure assumes that we can identify spatially distinct labor markets on the basic of commuting data. As indicated above, the FCA concept does not presume to identify homogeneous areas on physical characteristics. Neither does it presume to identify homogeneous areas on population or housing attributes. The main criteria for identifying these areas are high levels of interaction. For the remainder of this section we will discuss specific techniques employed by others to determine commuting flow-based labor market areas. Although the specific objectives and areal building blocks for these investigations differ from our objectives, they provide a methodological basis for the procedures we wish to adopt.

Commuting Cluster Methodology

Killian and Tolbert (1991) have developed a commuting-based procedure which maps the areas of the U.S. into an "exhaustive and mutually exclusive set" of local labor markets. Unlike other sets of areas, such as those of the Bureau of Economic Analysis, these local labor market areas are not necessarily formed around a large urban core, and do not therefore carry an "urban bias." Their procedure starts with a county by county matrix of place of work by place of residence. Unlike the procedure for defining current MSAs, their procedure uses flows in both directions between pairs of counties. There is no attempt to define one county as "central."

They used a two step procedure in which a computer algorithm was first used to group counties into commuting clusters and these clusters were then aggregated into labor market areas. After the first step, they identified 763 commuting zones (excluding Alaska), some of which were single counties which did not have sufficient commuting to cluster with any other counties. Recognizing the need for a minimum size for labor market areas either to provide reliable estimates for some measures based on samples or to protect confidentiality on public use samples of individual data, they aggregated adjacent commuting clusters to provide labor market areas with at least 100,000 population. This aggregation was based primarily on commuting flows between clusters and secondarily upon pure proximity when flows were too weak to link clusters with less than 100,000. This resulted in 382 labor market areas, with all of Alaska treated as one area.

Any clustering procedure, such as that used by Killian and Tolbert, requires setting an arbitrary cut-off level for stopping the clustering procedure. Otherwise, the computer program will run until it has linked all of the counties into a single cluster. In setting a cut-off level, Killian and Tolbert were particularly concerned with getting nonmetropolitan counties with relatively small commuting flows to cluster together. This meant that around major cities counties which were not part of the official Metropolitan Statistical Areas were often added to these areas to form labor market areas which were much larger than the MSAs. Using a higher level of commuting as the cut-off level would have resulted in smaller clusters around metropolitan areas, but would have also left a larger number of isolated counties. (Killian and Tolbert had about 80 isolated counties using their cut-off rule.)

Another aspect of Killian and Tolbert's work which might benefit from further research is the measure of strength which they used to define the closeness of two areas. They calculated the sum of the number of commuters in both directions between two counties divided by the labor force of the smaller county. They claim that this measure reduces the tendency for smaller counties to be drawn into larger ones and is more likely to produce clusters of counties that are independent of large cities. The actual clustering was done with the SAS CLUSTER procedure and required converting the measure of strength of interaction into distance, which they did by subtracting it from 1.0 (Tolbert and Killian, 1987). This conversion may further distort the measure and lead to poor groupings in some cases. However, this can only be determined by experimenting with alternative measures and by doing sensitivity analysis to see what effect sampling error may have on the results.

Forstall, Rives and Gossette (1982) experimented with different clustering rules using 291 counties in 9 contiguous states in the South. He considered all flows of 100 or more workers which constituted at least 2 percent of a county's work force. Alternative stopping rules varying from 20 percent of the county's work force down to 2 percent were used. At the 20 percent level, less than one-quarter of the counties were included in clusters, while at the 2 percent level, only 7 of the counties were not included in any cluster. However, using the lower cutoff percentage resulted in considerably fewer clusters. While this paper does not recommend an optimal "cut-off" level, it does demonstrate the overall feasibility of the approach.

British geographers have developed a more sophisticated computer algorithm for dividing the country into labor market areas (Coombes, Green and Openshaw, 1986). This algorithm considers only those commuting flows between pairs of areas which satisfied minimum criteria for the proportion of workers commuting between these pairs and the proportion of all workers involved in commuting. The measure of strength which they used to decide between alternative pairings of areas was based on a formula which included the number of commuters in each direction between the areas and the number of workers who were working and residing in both areas.

A test of the method for different subgroups of the population revealed that the labor market areas

were not the same for different types of workers (Coombes, Green and Owen, 1988). In general, the more affluent workers such as managers and professionals tended to commute longer distances and therefore had larger labor market areas than less affluent workers. However, the smaller areas of unskilled workers were not always nested within the larger areas of the more affluent workers. This suggests that any similar method of clustering of areas based on commuting data needs to be tested with different subgroups of the population.

C. Building Blocks

While counties are convenient units to use because their boundaries rarely change and because a great deal of other data are available at the county level, they are generally far too large to aggregate into the local labor market areas we wish to identify. A more precise definition could be obtained by using smaller building blocks such as minor civil divisions, and places. Census tracts and Block Numbering Areas in rural area would also be logical units to use. However, to facilitate widespread use, there should also be a county-counterpart system of FCAs.

How small should local labor market areas be? If an area had a square shape and residences and work places were randomly distributed throughout the area, it can be shown that the average commuting distance would be about .6 times the length of one side of the square. Assuming an average commuting distance one way of 6 miles, (based on the 1985 Panel of the Census Bureau's Survey of Income and Program Participation) an area of 10 miles by 10 miles or 100 square miles would be large enough to be a single labor market area. In reality, workers will tend to live closer to work than the random location assumed here which would allow for somewhat larger areas. However, it seems reasonable that the building blocks be smaller than 100 square miles, when possible. Since the average county in the United States (excluding Alaska) has about 965 square miles, counties are too large by this criterion.

There should also be a minimum size for building blocks, based on population size. If commuting is to be used as the basis for grouping building blocks, then the commuting data should pass some

minimum standard of reliability. Given that commuting data are based on a sample of about one in six workers, if a minimum stream of 100 workers is used (as Forstall did in his analysis) in the clustering, then this is actually based on a sample of only about 16 workers and has a sampling error of about 25 percent. If the minimum proportion of workers commuting which is used to define a stream worthy of consideration for clustering is 10 percent, then the area must have at least 1000 workers or about 2500 population to satisfy this minimum.

In many parts of the United States, it will not be possible to find building blocks which both contain at least 2500 people and have 100 square miles or less of area. In these regions, the county may be the smallest feasible building block. However, the fact that there are many low density areas in some parts of the United States should not be used to argue for using the county in higher density areas where the land area of counties far exceeds average commuting fields.

The use of smaller building blocks should help in setting the dividing line between adjacent FCAs. At present there are many MSAs which are adjacent to other MSAs and where there may be commuting in both directions from counties on the boundary. While the metropolitan areas are adjacent, the urbanized areas are often clearly separated and the use of sub county areas should help to divide parts of the county which are oriented towards one area from parts oriented towards the other.

An obvious alternative to the use of counties as building blocks would be to use county subdivisions. There were 35,158 such units in 1980, excluding Alaska. The average size of these areas was about 84 square miles, which fits the first criteria well, while the average population was about 6,400 which satisfies the second criteria. However, the type of county subdivision varied widely among regions and states. In 24 states, towns or townships were the basic subcounty units, although these varied greatly in function ranging from the basic governmental units below the state in Southern New England to mere historical units with little present day functions in parts of the Midwest. Twenty states had only census designated county divisions and six states had other types of divisions.

Of even greater consequence than the variation in type and function of county subdivisions is the

considerable variation in size and population from one state to another. For example, California has 386 divisions with an average area of 405 square miles and an average population of 61,300 per division, while North Dakota has 1811 divisions with an average area of 38 square miles and an average population of 360. In Minnesota there are 2729 units with an average area of only 29 square miles. In Alaska, the 37 divisions have an average area of 15,428 square miles each.

The variation could be reduced considerably by combining adjacent small areas in states such as North Dakota and Minnesota and by dividing overly large areas in states such as Alaska, Montana and California. While this is possible, there would still be the problem of changes in boundaries of subdivisions between censuses which would make comparison difficult.

Another possibility would be to use census tracts. These are defined by the Bureau of the Census and changes in boundaries can be limited to cases of significant population change and those changes can be accomplished mainly through splitting tracts or combining tracts to make longitudinal comparisons possible. Since tracts have an average population around 4000, they meet the criteria discussed above.

Whether tracts or county subdivisions were used, the goal would be to obtain labor market areas which more closely reflected actual commuting areas than is possible using counties as units. It is expected that some of the linkages among counties are due to workers at one end of a county commuting in one direction while those at the other end of the county go in the opposite direction. For example if there are three counties, A, B and C, in a line, workers at one end of county B may go to county A, while those at the other end of county B will go to county C. Using a clustering method, all three counties may be grouped together when, in fact, there are two distinct commuting zones.

A comparison of the areas and distances along one side of an area shows that both the labor market areas of Killian and Tolbert and their smaller commuting zones are quite large compared to the average commuting distance of American workers:

Type of Area	Number	Ave. Pop. (1980)	Ave Area (sq. mi.)	Ave Width (miles)	
Labor Market		381	594,000	7791	88
Commuting Zone		763	296,400	3891	62
County		3075	73,500	965	31
County Div.		35,158	6,400	84	9
Tract/BNA		61,041	3,705	49	7

Notes: Width calculation assumes square area. Number of counties excludes most of the independent cities in Virginia. Alaska has been excluded from all calculations.

In sum, we recommend that FCAs be delineated on the basis of subcounty building blocks with appropriate adjustments in States where these are unusually large or small. Such a system of FCAs will not necessarily exhaust the entirety of U.S. territory because some areas will not display strong commuting ties with adjacent territory. Nevertheless, such areas will comprise a much smaller part of the population than that which lies outside of the current MSA system. (As a crude indication, 502 of the 763 county-based commuting zones identified by Killian and Tolbert, discussed above, lie totally outside of metropolitan territory under present definitions.) Finally, to assist analyses based on data available only at the county level, we advocate designing a county-counterpart system to the more finely grained FCA system. The county-counterparts would be determined in much the same manner that the current New England County Metropolitan Areas (NECMAs) are determined from the present town-bounded MSAs in the New England states.

D. Relationships Among Areas

The primary geographic areas of the settlement system will be the FCAs, defined solely on the basis of interaction (commuting) clusters, without taking into consideration physical form, population homogeneity, proximity to other areas, or hierarchical considerations. As indicated above, some portion of the national territory will lie outside of these areas, but this will comprise of a very small percentage of the population. Yet, the system should also reflect the existence of broader Metropolitan Economic Regions (MERs) to which the economies and wider activity spaces (those involving less

frequent interactions) of residents in the MERs' component FCAs are linked. These MERs would be somewhat analogous to the current CMSAs though they will be determined in a very different manner.

Unlike the identification of current CMSAs, the MERs would be identified using a "bottom-up" approach beginning with already-defined FCAs. Also, the aggregation of FCAs into MERs would be based on a cluster analysis of inter-FCA commuting flows, rather than flows with a specific core area. While core areas would be identified for MERs, they would not become the starting point for defining these areas' commuting regions. Finally, because FCAs are generally smaller in both territorial and population size than PMSAs (the component of CMSAs), MERs will be composed of a greater number of component areas than CMSAs.

Different aggregation techniques and metropolitan area sizes can lead to a variety of outcomes toward identifying a larger metropolitan region. This is crudely illustrated with maps 1 through 4 for the greater New York metropolitan area. Map 1 shows the 12 PMSAs that are carved out of the presently defined New York CMSA using the "top-down" procedure described earlier. The Tolbert-Killian LMAs, based on the commuting cluster algorithm yields the four areas shown in Map 2. (Fairfield, Connecticut, included in the OMB-defined New York CMSA, is included with a large part of Connecticut in the Tolbert-Killian scheme.) Map 3 depicts the three suburban magnet counties identified in Stanback's (1991) analysis of employment/population ratios, and Map 4 depicts the 23 edge cities and suburban downtowns that Garreau (1991) identifies in the greater New York region.

If one considers Stanback's suburb magnet counties as areas most strongly integrated with the greater region's economy, it is noteworthy to see that each is located in a different PMSA in Map 1, while two are located in the same Tolbert-Killian LMA. Clearly the Stanback magnet counties do not constitute a surrogate for the commuting cluster relationships our procedure would identify. Both PMSAs and LMAs are constructed from larger (county) units than the ones we propose be used. While identified in a much less systematic fashion, Garreau's edge cities and suburban downtown may come closer to the kinds of areas that would be linked to the New York area after the more finely-

grained FCAs, for this region, are identified. (Note that only eight of the edge cities/suburban downtowns are located in Stanback's magnet counties.)

(CENTER MAPS 1,2,3,4 ABOUT HERE)

Another consideration in identifying MERs involve the desire to make them inclusive of all segments of the region's population. This should include residentially segregated racial, ethnic or class subgroups whose commuting flows do not contribute greatly to the aggregate flows that determine the MER's component FCAs. Much has been written about the spatial isolation of inner-city minorities from expanding employment opportunities in the suburbs (Kasarda, 1988; McLafferty and Preston, 1991). Moreover, the examination of the social, economic and demographic characteristics of the counties and PMSAs that make up the New York CMSA reveal a great deal of diversity across PMSA units. It is likely that the smaller FCA components, used in our system, would show even greater inter-area diversity. For this reason, procedures should be devised to ensure that the MERs will include the broad diversity of population subgroups residing in the region. This may involve some experimentation with subgroup-specific commuting clusters before arriving at the final formula.

(Maps 5 and 6, and Tables 5 and 6 about here)

Two additional considerations toward defining MER regions involve: (1) identifying the region's core cities, and (2) establishing a minimum population size and density criteria. In this system, core cities should not be used to establish the MER's commuting area but should simply be identified as the primary urban centers in the region. An MER's core cities, then, would include all of those cities or areas that qualify for "Urban Center" status according to the classification presented under section E (below).

Minimum population size and density criteria for the entire MER would also need to be

established, after some experimentation. As an exercise, we classified the Tolbert-Killian county-based LMAs by arbitrary metropolitan size and density categories, and cross-classified them by metropolitan status according to the current OMB classification (see Table 4). The results show that 163 of the 763 LMAs are classified as metropolitan (either "large metro" or "other metro") according to these arbitrary criteria. An additional 159 LMAs are classed as "mixed." These size density criteria tend to class more areas into the metropolitan category than the current OMB classification. However, this exercise should not be taken to necessarily reflect the outcomes of the MER scheme proposed here. As indicated earlier, MERs will comprise groupings of FCAs, which will be defined on the basis of sub-county rather than county building blocks.

In sum, we recommend the designation Metropolitan Economic Regions, in appropriate parts of the country, by aggregating FCA areas with strong commuting ties and where the entire MER unit satisfies minimum population size and density requirements. Additional experimentation should develop the means of including the broad diversity of the region's population subgroups into the MER area. This could involve examining subgroup-specific commuting clusters by race, ethnicity, gender, and other attributes. Finally, we believe that MERs should be defined on the basis of entire counties. In cases where component FCAs cut across county boundaries, the entire county should be included in the MER.

E. Entities of the Settlement System

For reasons outlined above, we believe it is useful to replace the current central city-suburb categorization of intra-area territory with a classification scheme that more accurately reflects current land use and activity categories. We advocate a classification scheme that delineates each FCA's subcounty building blocks according to the following categories: Urban Centers, Primarily Residential Areas, Primarily Employment Areas, Other Urban, Mixed Rural-Urban, Rural.

Urban Centers would identify places or county subdivision areas that satisfy minimum population and density requirements, have high employment/population ratios, and, using criteria yet to be

determined, are local centers of commercial and cultural activities.

Primarily Residential Areas are places or county subdivision areas that are classed as urban, have low employment-population ratios, and, using criteria yet to be determined, are primarily residential in character.

Primarily Employment Areas are places and subcounty areas that are classified as urban, and have high employment/population ratios, but do not qualify as Urban areas on the basis of population size, density, or other criteria.

Other Urban Areas, Mixed Urban-Rural Areas, and Rural Areas, are used to class the remaining places or subcounty areas (not previously classed as Urban Centers, Primarily Residential Areas, or Primarily Employment Areas), and are classed on the basis of traditional rural-urban criteria.

This classification scheme represents a minimum set of categories which could be elaborated upon, even further, pending additional investigation. These categories could be reaggregated into the traditional rural-urban classification as well as into size-of-place categories for purposes of statistical tabulations. As indicated under D (above) Urban Centers that are located within MERs would be included in the list of "core cities" for those MERs. Further investigation into land use patterns, economic activity, and, perhaps, local opinion, should be undertaken to develop additional criteria for identifying Urban Centers and Primarily Residential Areas.

F. Data for Delineating Areas

The data required for specifying the FCAs and MERs are commuting and population data provided by the decennial Census of Population. Additional land use and economic census data may be required for classifying local areas as Urban Centers, or Primarily Residential Areas (under E above). However, the latter data will not be required for identifying the basic FCA or MER units, or for delineating their boundaries.

Local Views

We advocate instituting procedures for identifying FCAs and MERs that rely on commuting measures of spatial interaction rather than placing an emphasis on local views. While local views offer guidance, a strong reliance on them in the definition of areas, leaves open the possibilities for political pressure and arbitrary decisions.

Local views may have some influence on our designation or Urban Centers and Primarily Residential Areas as categories of land use for the statistical presentation of data (under E above). However, these considerations are not relevant for the identification of FCAs or MERs or the delineation of their boundaries.

H. Frequency for Updating Statistical Areas

Because our definition of FCAs and MERs are dependent upon the availability of commuting data, we do not advocate updating the system between census enumerations unless reliable commuting data can be obtained elsewhere.

I. Data for Users

All of the statistical areas and geographic entities for statistical presentation, proposed above, are based on standard geographic units: Census subcounty divisions, places, and counties. Hence, the wide range of data that are available for the latter units can be presented and disseminated for the various elements in the system we propose. Moreover, we also advocate developing a county-counterpart system of FCAs to facilitate comparisons of statistical measures that are only conveniently available at the county level.

III. Questions to Be Investigated

This proposal advocates defining settlement areas on a purely functional basis in light of the decoupling of resident-workers' activity spaces and local labor market areas from older physical configurations. These activity spaces can now occur totally within the "suburbs" or "nonmetropolitan territory" as they are classed under the present system. These functional areas, as conceived here, are not tied to any particular density criteria, linkage to core cities, or population homogeneity criteria. They are based simply on the assumption that community and local labor market activities cluster within spatially delimited areas.

Our formulation and operationalization of these local activity spaces or Functional Community Areas are based on certain assumptions about the overlap of activity spaces with local labor market areas, and the use of commuting data to delimit the boundaries of these spaces. However, we propose these ideas very much in the abstract. There is much need for investigations in the field of the measures and assumptions underlying our proposals.. This involves examining larger questions such as: How closely do the FCAs, as delimited by commuting data, coincide with local perceptions of a common activity space? They also involve smaller issues such as: Do the commuting clusters, as measured from the basis or all employed workers, differ from those that are based on the commuting of only full-time workers?

We believe these kinds of issues can only be resolved from extensive on-site research activities conducted in selected parts of the country that reflect different patterns of settlement and for which county subdivision (and, hence, commuting data) are assembled differently. The kinds of questions that should be addressed in these investigations are:

1. Questions of Face Validity. Do the commuting clusters, as measured with census commuting data, actually reflect daily activity spaces when using other measures of interaction? Are the commuting cluster areas less valid in particular kinds of locations (for example, where large numbers

of persons are out of the work force)? To what degree are local activity spaces or labor markets spatially distinct from each other? To what degree is there a fair amount of overlap? What is an appropriate territorial size for the local activity space in different kinds of contexts (e.g., highly urbanized, suburban, rural)?

2. Questions of Measurement Specification. Are FCAs, as measured by all commuters, different from the ones approximated from full-time worker commuters? How greatly do they differ for population subgroups (e.g., men vs. women, minorities, workers in different occupations)? If there are differences, which best approximates the local labor market area?

3. Alternative Indicators. To what degree can alternative indicators be used to identify FCAs? Experiments with alternative local measures of activity can be undertaken as well as an assessment of indirect measures of some of our concepts. This might facilitate lesser dependence on census data, and a more frequent updating of the system.

These are only representative of the issues that need to be investigated in a thorough manner before adopting and implementing this (or any other) fundamental change to the existing system of representing settlement areas. They involve both broad questions of concept formulation and more technical questions of measurement calibration. Appropriate States for conducting these investigations would include: California, Minnesota, New Jersey, North Carolina, and Massachusetts. These states differ from each other in the types of minor civil division and county subdivision boundaries that are delineated and also represent different types of urban and rural settlement patterns.

FOOTNOTES

1. The basic underpinnings of this concept are put forth in McKenzie (1933) and Hawley (1950). However, as described later in this paper, the actual operationalization of metropolitan areas was in terms of high-density clusters linked by commuting without consideration of export, import and service functions to the surrounding community.
2. See Hawley (1971).
3. See Duncan and Reiss (1956) for U.S. evidence through 1950, and Johnston (1971) for a review of research on this topic.
4. This sliding scale had been used to some extent in 1970 for counties with between 15 and 30 percent commuting.
5. The are also some additional criteria which must be met in establishing PMSAs. See Statistical Reporter, Aug. 1980, p. 363.
6. The metropolitan areas and their predecessor Metropolitan Districts, as officially designated, were never intended to include all the territory dependent on the area for specified services.
7. See Forstall (1991) for a comment on Beale's criticism.
8. Frey and Speare (1988) group the nation's 39 largest 1980 SMSAs into six classes on the basis of their region location, population growth status, and their central city's age.
9. Hartshorn and Muller (1986) as reported in Stanback (1991).
10. On the whole, nonmetropolitan growth has dropped off during the 1980s (Frey and Speare, 1991). However, Fuguitt's (1991a) analysis shows that, within nonmetropolitan counties, the territory that exists outside of incorporated places continues to grow faster than that within places.
11. Although the official definition does not use the term "hinterland", the requirement of a densely settled core and a surrounding area defined by commuting to that core is similar to the core-hinterland model.

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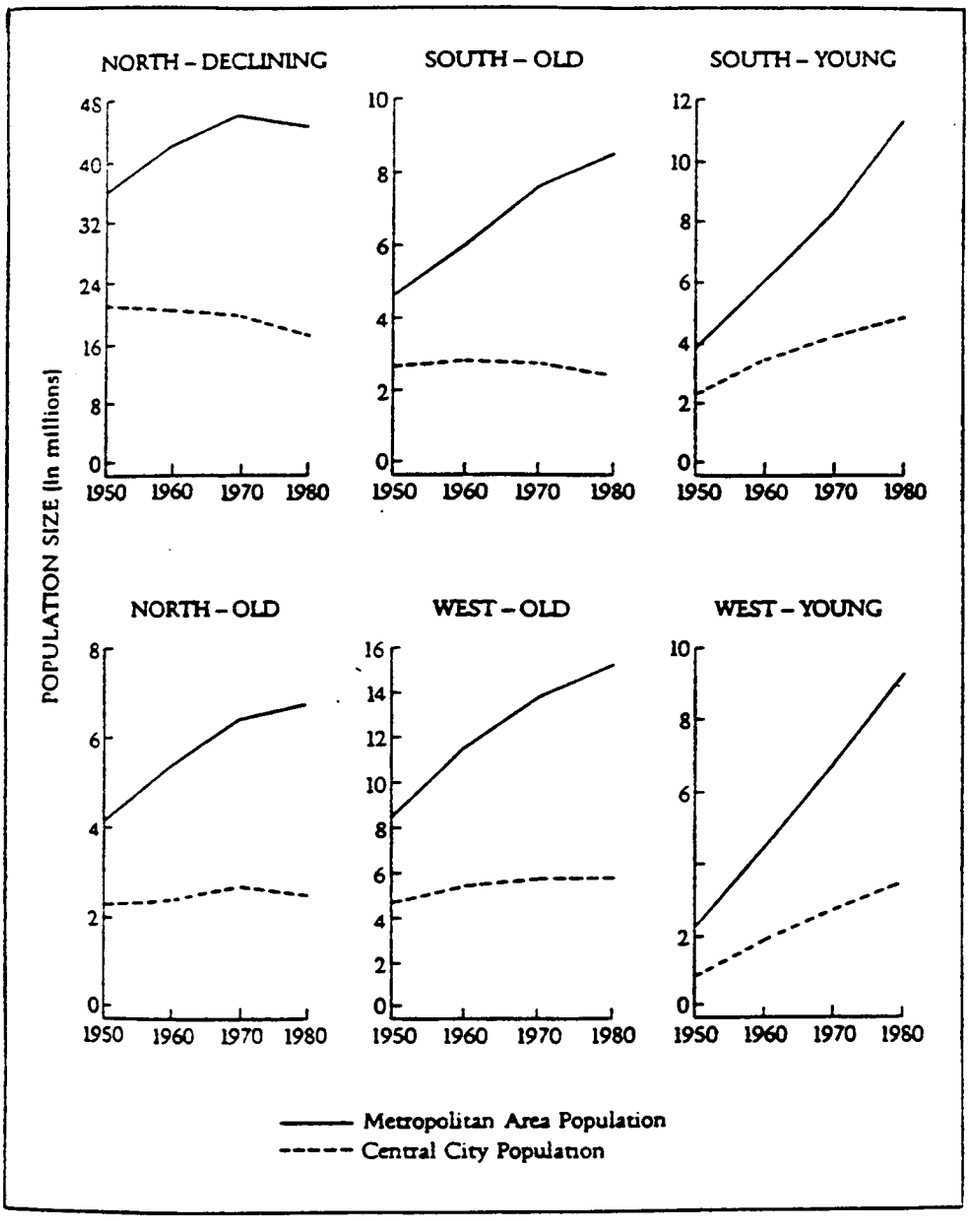
Figure 1: Metropolitan Area and Central City Populations, 1950-1980 for Large Metropolitan Areas,* classed by Frey-Speare Groupings.**

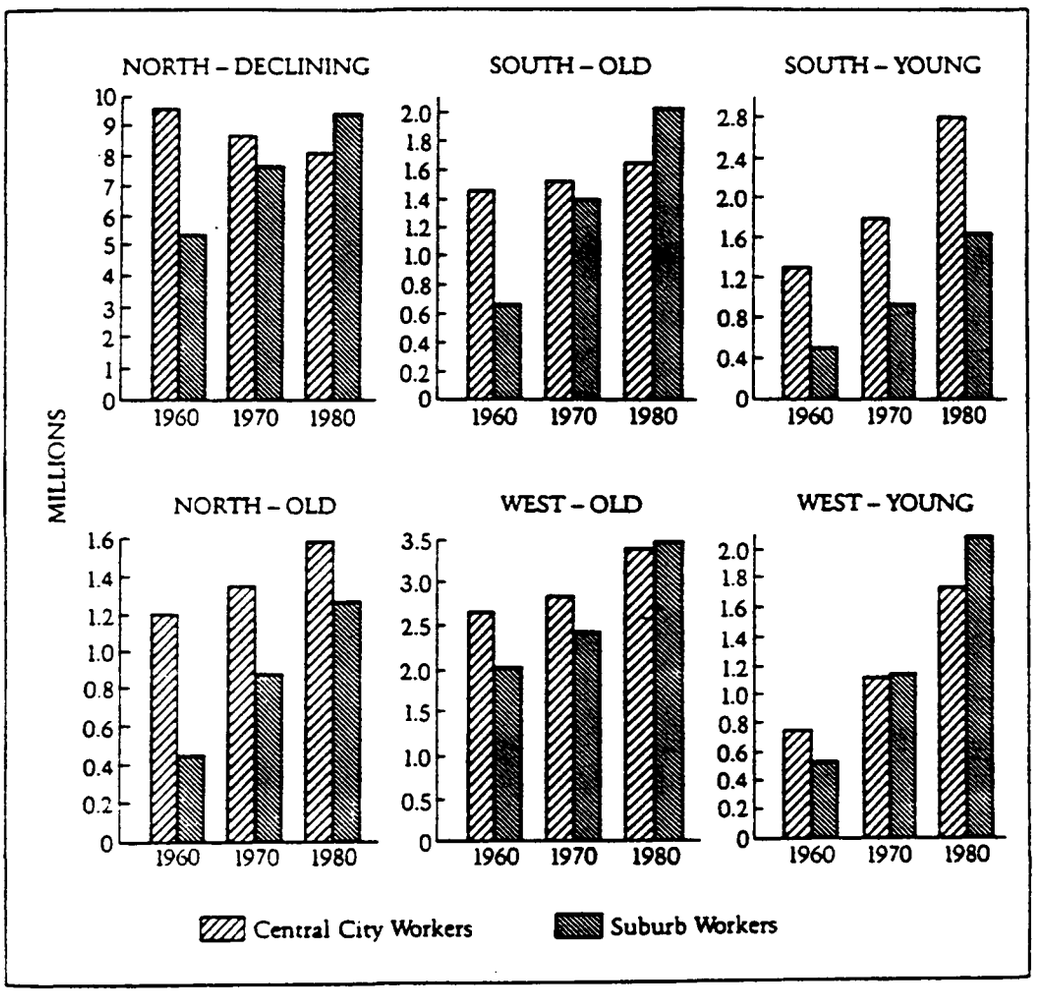


*1980 metropolitan areas with populations greater than 1 million defined as 1980 SMSAs and NECMAs (in New England).

**These metropolitan area groupings are based on three categories of region (North, South, West), two categories of age (Old, Young), and two categories of metropolitan growth (Declining, Nondeclining). Thirteen Declining areas are also Old and located in the North, and are placed in the single North-Declining grouping. The remaining 26 areas are all Nondeclining and are sorted into the groupings: North-Old, South-Old, West-Old, South-Young, and West-Young.

Source: William H. Frey and Alden Speare, Jr. 1988. Regional and Metropolitan Growth and Decline in the U.S. A 1980 Census Monograph, New York: Russell Sage. Chapter 7.

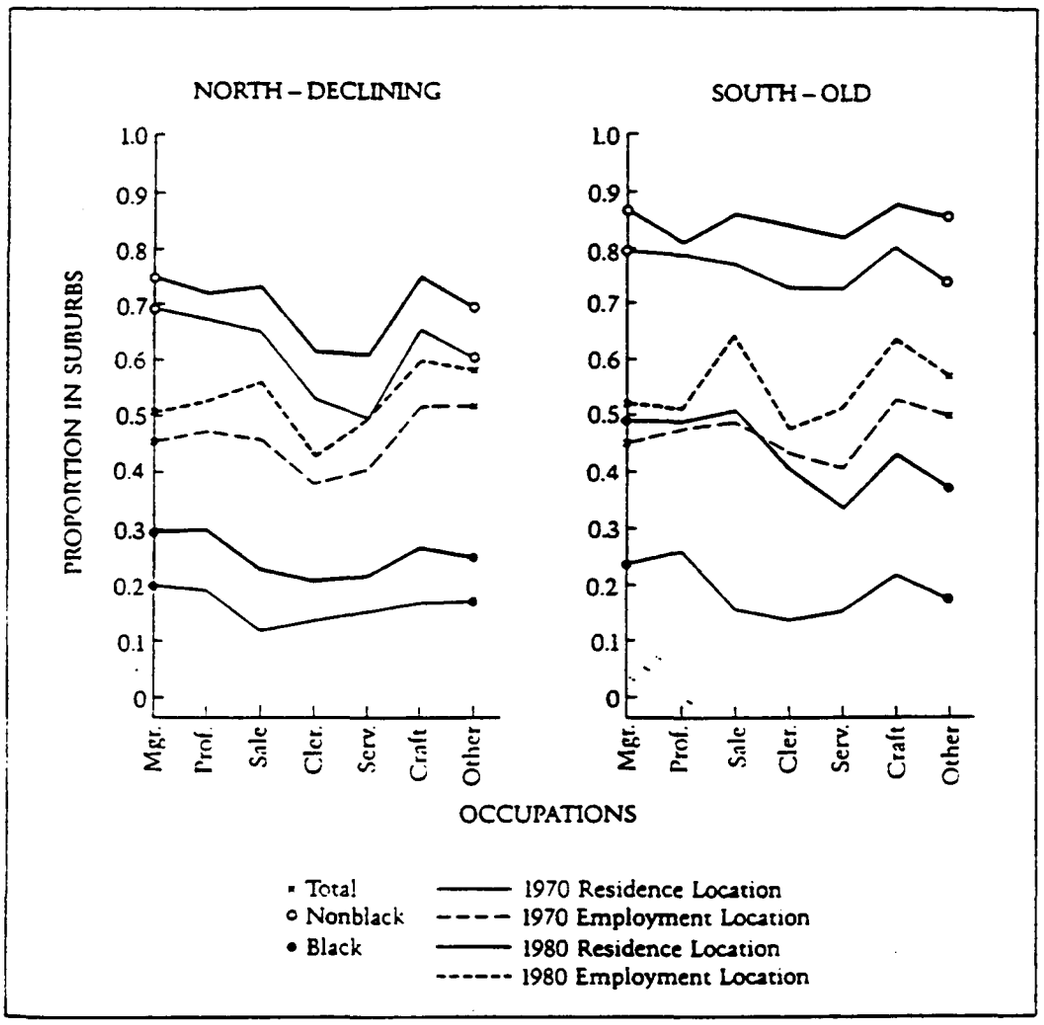
Figure 2: Workers' Employment Location, * Central Cities and Suburbs, 1960-1980, for Large Metropolitan Areas, classed by Frey-Speare Groupings.



*Includes employed workers, at work during census week, for metropolitan area residents who reported workplace (ages 14+ in 1960, ages 16+ in 1970 and 1980).

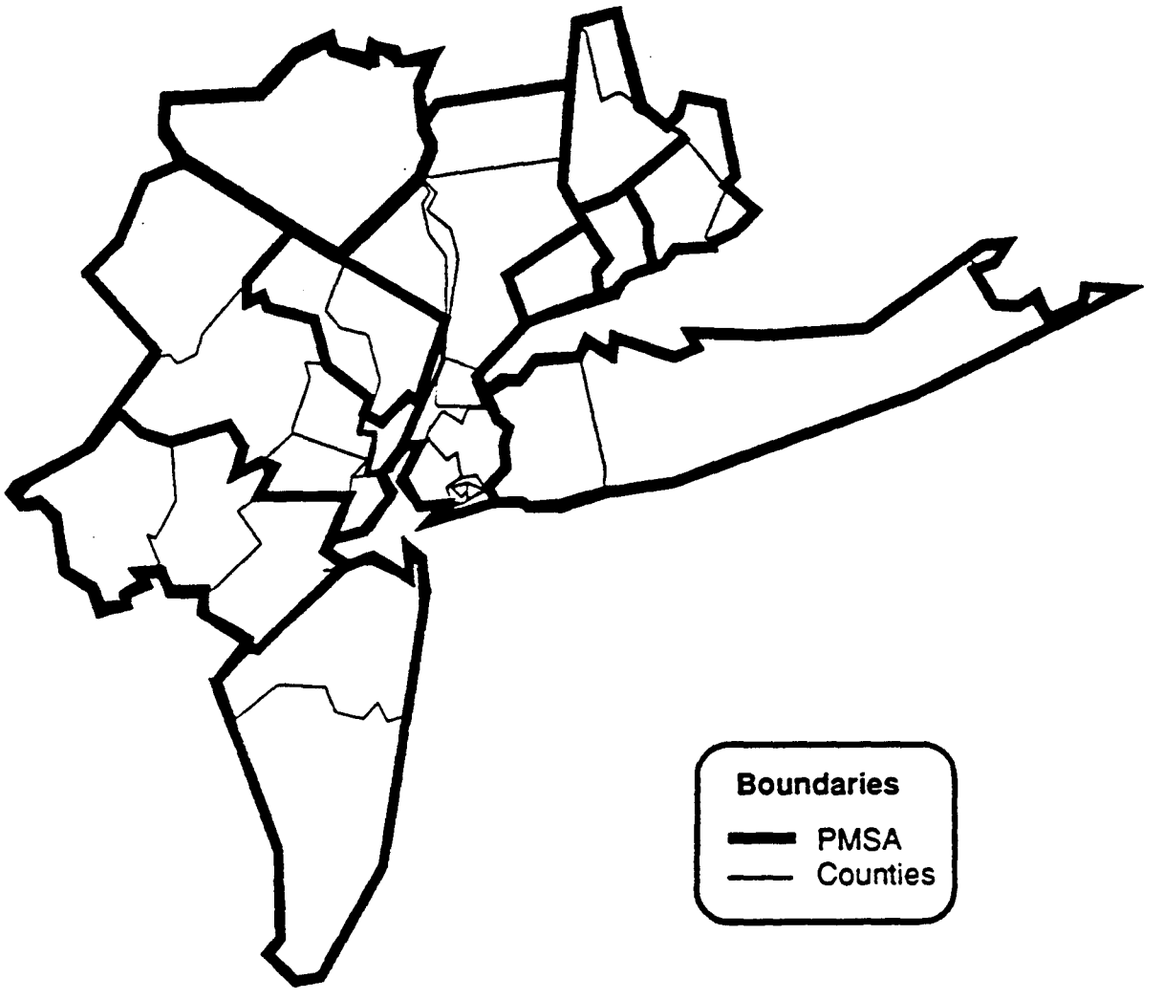
Source: William H. Frey and Alden Speare, Jr. 1988. Regional and Metropolitan Growth and Decline in the U.S. A 1980 Census Monograph, New York: Russell Sage. Chapter 11.

Figure 3: Worker Employment Locations by Occupations and Worker Residence Locations by Race and Occupations, 1970 and 1980: North-Declining and South-Old Groupings.*



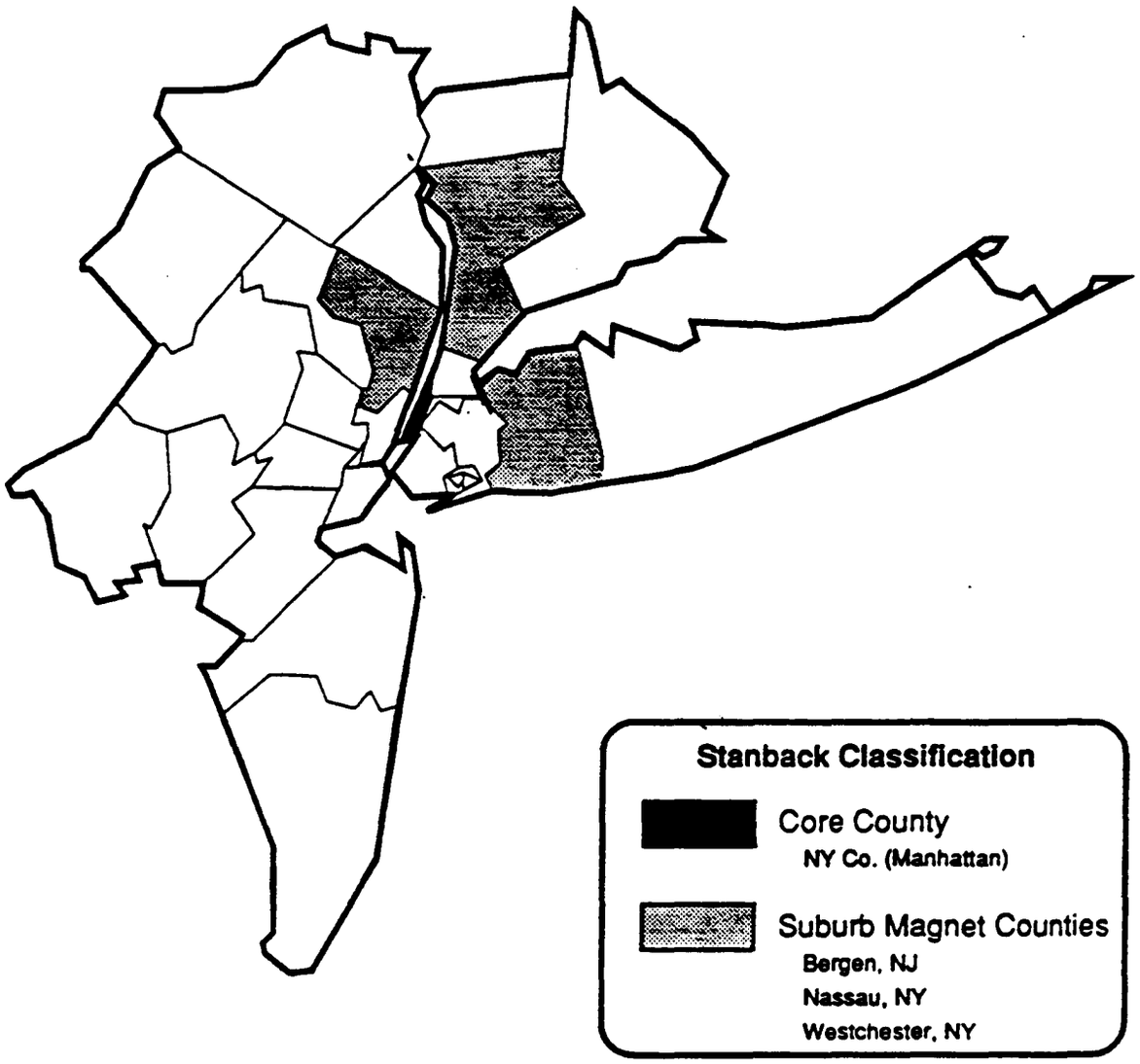
*Based on metropolitan resident-workers, who were employed at work during census week.

Source: William H. Frey and Alden Speare, Jr. 1988. Regional and Metropolitan Growth and Decline in the U.S. A 1980 Census Monograph, New York: Russell Sage. Chapter 11.



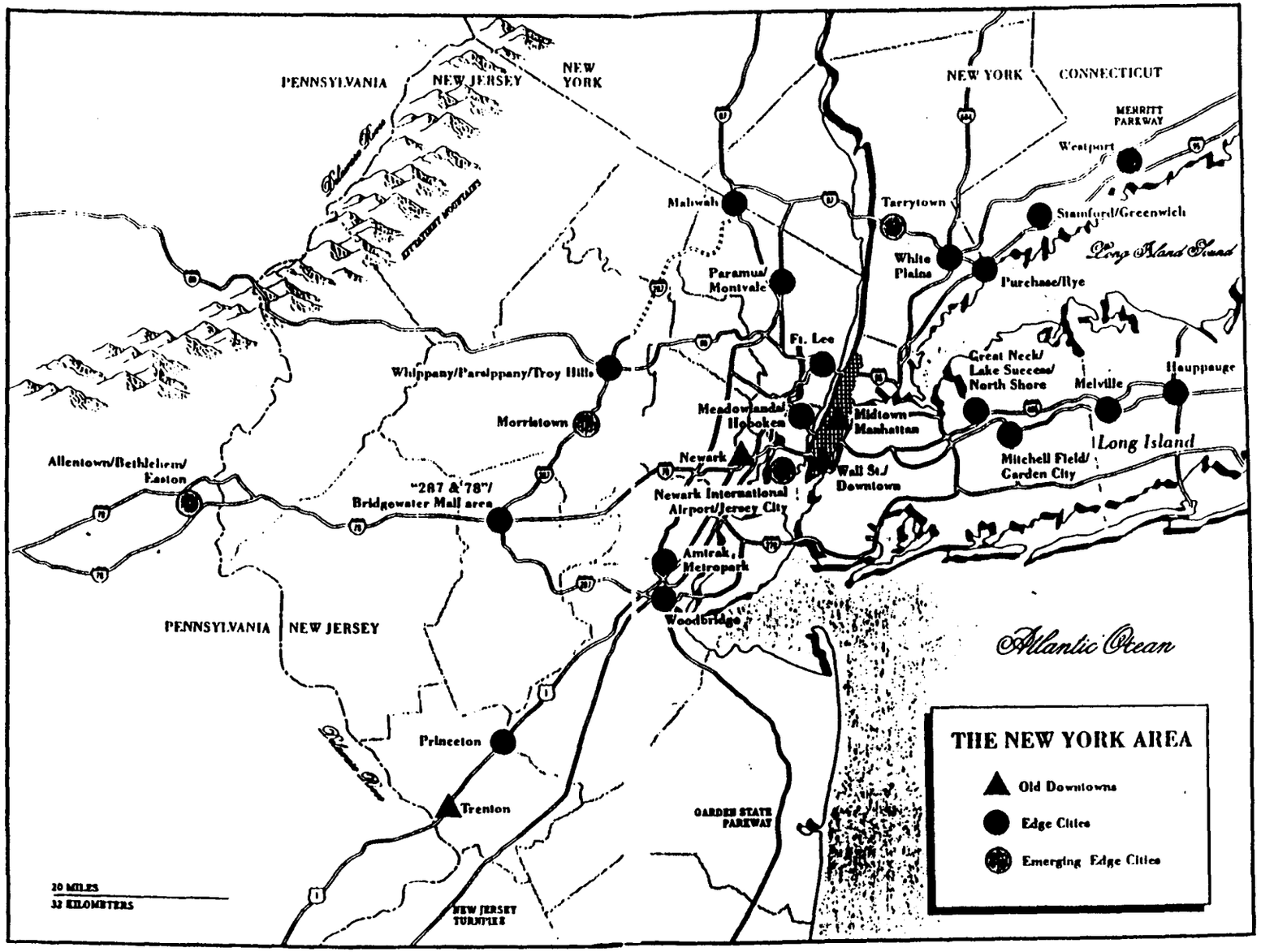
Map 1. Component PMSAs of New York CMSA

Map 2. Tolbert-Killia

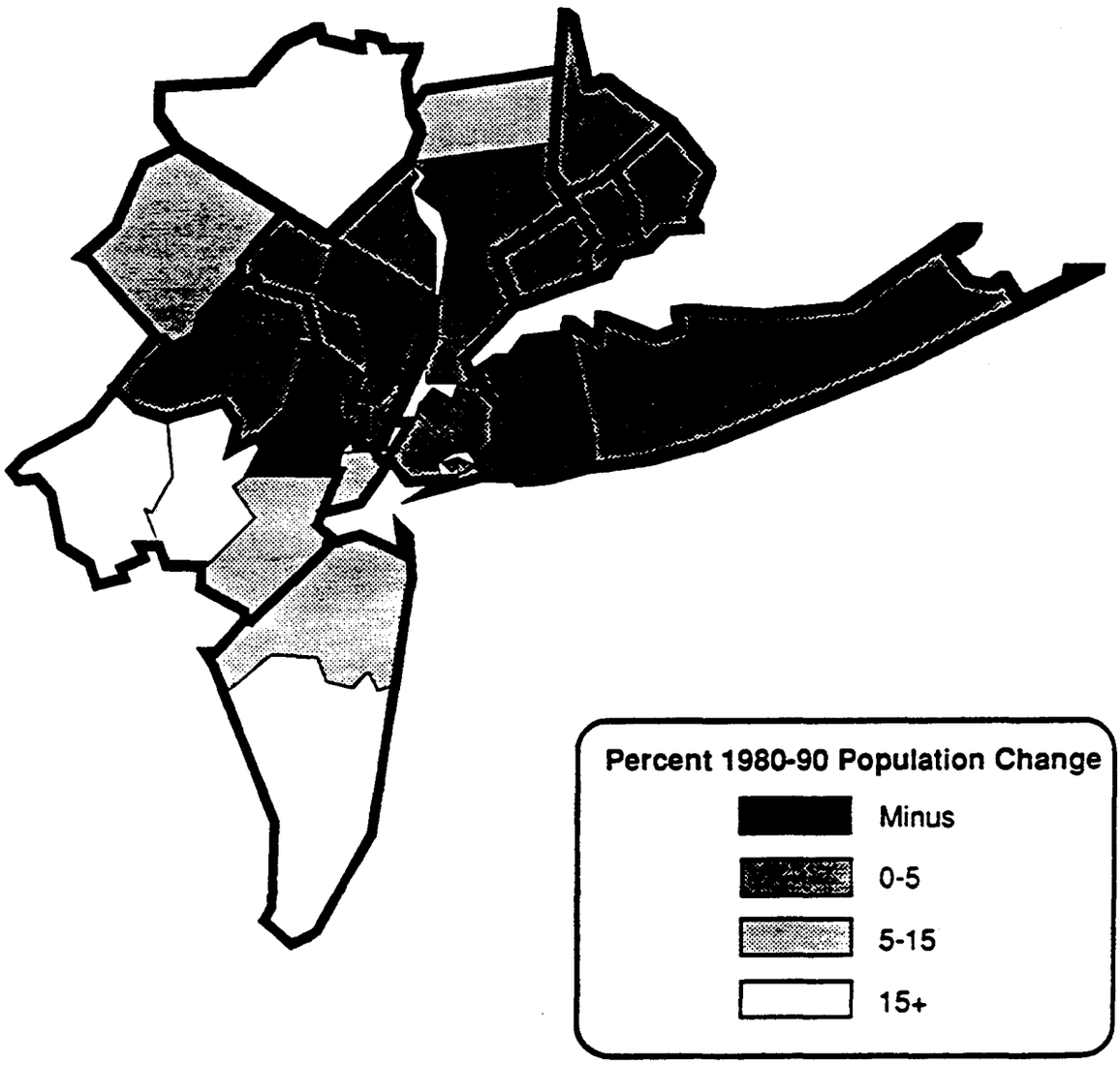


Map 3. Component Counties of New York CMSA

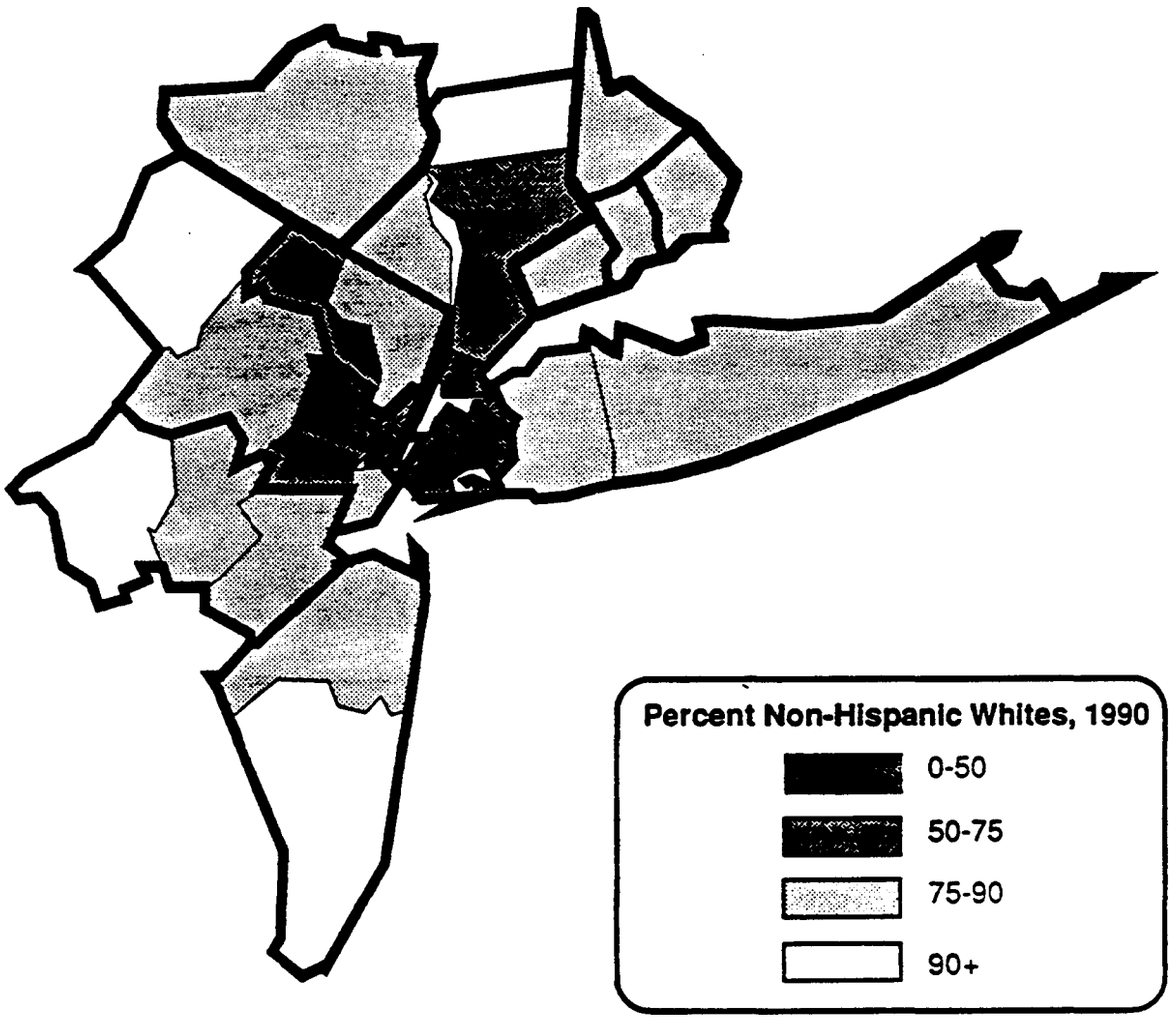
MAP 4: "EDGE CITIES" IDENTIFIED BY GARREAU.



Source: Joel Garreau. 1991. Edge City: Life on the New Frontier. New York: Doubleday.



Map 5 Percent 1980-90 Population Change for Counties Located in New York CMSA and Component PMSAs



Map 6. Percent Non-Hispanic Whites, 1990, for Counties Located in New York CMSA and Component PMSAs

Table 1: Percent Change in Primary Central City(s) and Surrounding Areas of the 25 Largest Metroppolitan Areas in North, South and West Regions, 1960-1990

Region and Metropolitan Area[b]	Age of Area[c]	1990 Size (1000s)		Primary Central City Percent 10-yr Change			Surrounding Area Percent 10-yr Change		
		Metro-politan Area	Primary Central City(s)	1960 -70	1970 -80	1980 -90	1960 -70	1970 -80	1980 -90
NORTH									
New York CMSA	1800	18087	7323	1.5	-10.4	3.5	21.1	1.7	2.8
Chicago CMSA	1860	8066	2784	-5.1	-10.8	-7.4	30.3	11.8	7.1
Philadelphia CMSA	1810	5899	1586	-2.6	-13.4	-6.1	21.5	5.1	8.0
Detroit CMSA	1870	4665	1028	-9.3	-20.5	-14.6	28.2	8.4	2.5
Boston CMSA	1830	4172	574	-8.0	-12.2	2.0	17.8	3.4	5.5
Cleveland CMSA	1870	2760	506	-14.3	-23.6	-11.9	21.1	0.5	-0.3
Minneapolis-St. Paul MSA	1890	2464	641	-6.5	-13.8	-0.1	51.8	20.8	21.9
St. Louis MSA	1850	2444	397	-17.1	-27.2	-12.4	28.1	6.5	6.4
Pittsburgh CMSA	1870	2243	370	-13.9	-18.5	-12.8	3.3	-1.8	-6.3
Cincinnati CMSA	1850	1744	364	-9.7	-15.1	-5.5	20.2	10.0	8.3
Milwaukee CMSA	1870	1607	628	-3.2	-11.3	-1.3	26.2	8.9	4.8
Kansas City MSA	1880	1566	435	6.5	-11.6	-2.9	19.3	13.8	14.8
SOUTH									
Washington MSA	1860	3924	607	-0.9	-15.7	-4.9	57.5	14.4	27.0
Dallas-Fort Worth CMSA	1910	3885	1454	19.5	4.2	12.8	63.9	47.3	48.2
Houston CMSA	1910	3711	1631	31.6	29.3	2.2	47.8	61.1	38.1
Miami CMSA	1930	3193	359	14.7	3.5	3.4	58.9	47.9	23.4
Atlanta MSA	1890	2834	394	1.6	-14.1	-7.3	56.3	44.1	42.4
Baltimore MSA	1820	2382	736	-3.5	-13.2	-6.4	34.3	19.4	16.5
Tampa-St. Petersburg MSA	1920	2086	519	8.3	3.3	1.7	67.8	80.4	40.4
WEST									
Los Angeles CMSA	1890	14532	3485	13.6	5.4	17.4	35.9	19.0	29.5
San Francisco-Oakland CMSA	1860	6253	1096	-2.8	-5.4	7.6	40.6	18.3	18.6
Seattle CMSA	1900	2559	516	-4.7	-7.0	4.5	49.8	22.4	27.7
San Diego MSA	1920	2498	1111	21.6	25.6	26.8	43.7	49.2	40.7
Phoenix MSA	1940	2122	983	33.0	35.2	24.5	72.5	85.8	58.3
Denver CMSA	1890	1848	468	4.2	-4.3	-5.1	64.3	55.6	22.6

[a] Metropolitan Areas are CMSAs and MSAs, defined by OMB as of June 30, 1990, with 1990 populations exceeding 1.5 million. Primary Central City(s) consist of the one or two historically dominant cities of the area, and the Surrounding Area consists of the remainder of the Metropolitan Area.

[b] Abbreviated CMSA or MSA name (according to primary central city(s)).

[c] Census year when metropolitan areas's primary central city first achieved a population of 50,000.

Source: Compiled at University of Michigan Population Studies Center from the 1960, 1970, 1980, and 1990 U.S. Censuses.

Table 2: 1990 Percent Minorities, and 1980-90 Percent Change for Non-Hispanic Whites and Minorities in Primary Central City(s) and Surrounding Suburbs of the 25 Largeest Metropolitan Areas in North, South and West Regions

Region and Metropolitan Area[b]	1990 Percent Minorities			% Change N-H Whites			% Change Minorities			City-Suburb Dissimilarity Index[c]		
	Central City	Suburbs	Diff.	Central City	Suburbs	Diff.	Central City	Suburbs	Diff.	1990	1980	Diff.
NORTH												
New York CMSA	56.8	23.4	-33.4	-13.8	-4.1	+9.7	+22.2	+34.7	+12.5	33	30	+3
Chicago CMSA	62.1	18.2	-43.9	-18.7	+1.2	+19.9	+1.3	+44.8	+43.5	44	43	+1
Philadelphia CMSA	47.9	15.8	-32.1	-14.3	+4.7	+19.0	+4.8	+30.2	+25.4	32	30	+2
Detroit CMSA	79.4	9.2	-70.2	-47.2	+0.5	+47.7	+1.8	+27.2	+25.4	70	59	+11
Boston CMSA*	41.0	8.8	-32.2	-11.4	+0.1	+11.5	+30.2	+114.1	+83.9	32	28	+4
Cleveland CMSA	52.2	11.6	-40.6	-19.4	-2.4	+17.0	-3.6	+19.8	+23.4	41	38	+3
Minn.-St. Paul MSA	21.3	4.3	-17.0	-10.1	+19.8	+29.9	+69.8	+101.9	+32.1	17	10	+7
St. Louis MSA	49.9	13.6	-36.3	-16.9	+4.6	+21.5	-7.5	+19.3	+26.8	36	35	+1
Pittsburgh CMSA	28.4	5.6	-22.8	-15.9	-7.0	+8.9	-3.6	+5.8	+9.4	23	21	+2
Cincinnati CMSA	39.9	6.2	-33.7	-12.3	+7.4	+19.7	+6.8	+23.2	+16.4	34	30	+4
Milwaukee CMSA	39.2	5.5	-33.7	-15.8	+3.5	+19.4	+34.9	+33.1	-1.8	34	24	+10
Kansas City MSA	35.0	10.3	-24.7	-7.4	+13.0	+20.4	+6.6	+33.8	+27.2	25	23	+2
SOUTH												
Washington DC MSA	72.6	30.9	-41.7	+1.2	+13.6	+12.4	-7.0	+72.1	+79.8	42	52	-10
Dallas FT. Worth CMSA	49.6	18.7	-30.9	-3.5	+35.1	+38.6	+36.1	+154.5	+118.4	31	30	+1
Houston CMSA	59.4	28.6	-30.8	-20.6	+25.1	+45.7	+27.2	+87.0	+59.8	31	27	+4
Miami CMSA	87.8	47.7	-40.1	-34.9	-4.1	+30.8	+12.6	+79.9	+67.3	40	48	-8
Atlanta MSA	69.7	23.4	-46.3	-11.9	+29.9	+41.8	-5.1	+107.9	+113.0	46	52	-6
Baltimore MSA	61.4	14.5	-46.9	-16.8	+12.7	+29.5	+1.5	+45.8	+44.3	47	45	+2
Tampa ST. Pete MSA	33.1	11.4	-21.7	-4.1	+35.5	+39.6	+15.6	+95.0	+79.4	22	21	+4
WEST												
Los Angeles CMSA	62.7	46.3	-16.4	-8.4	+6.5	+14.9	+41.3	+72.9	+31.6	16	17	-1
S.F.-Oakland CMSA	59.7	34.3	-25.4	-6.5	+4.0	+10.5	+20.0	+62.1	+42.1	25	28	-3
Seattle CMSA	26.3	12.3	-14.0	-1.7	+22.7	+24.4	+27.2	+81.3	+54.1	14	13	+1
San Diego MSA	41.3	29.3	-12.0	+8.3	+27.0	+18.7	+67.7	+90.0	+22.3	12	10	+2
Phoenix MSA	28.2	18.2	-10.0	+14.5	+53.2	+38.7	+60.3	+86.3	+26.0	10	6	+4
Denver CMSA	38.6	14.0	-24.6	-12.1	+18.3	+30.4	+8.8	+58.3	+49.5	25	23	+2

[a] Metropolitan Areas are CMSAs and MSAs, defined by OMB as of June 30, 1990, with 1990 populations exceeding 1.5 million (*NECMA counterparts are used for Boston CMSA). Primary Central City(s) consist of the one or two historically dominant cities of the area, and the Surrounding Area consists of the remainder of the Metropolitan Area.

[b] Abbreviated CMSA or MSA name (according to primary central city(s)).

[c] Index represents the percentage of minorities that would need to change (city or suburb) residence to achieve the same city-suburb residence distribution as Non-Hispanic Whites (100 = maximum segregation, 0 = absence of segregation).

Source: Compiled at University of Michigan Population Studies Center from the 1980 and 1990 U.S. Censuses.

Table 3: 1987 Employment and Employment/Population (E/P) Ratios, 1969 and 1987, for Suburban Magnet Counties[a] in Selected Metropolitan Areas.

Metro Area/ Magnet Counties	1987 Employment	Percentage of Central City County	E/P Ratio 1969	E/P Ratio 1987
New York	2,679,977	100.0		
Westchester	507,162	18.9	.42	.59
Nassau	784,494	29.3	.38	.60
Bergen	558,580	20.8	.41	.67
Chicago	1,330,029	100.0		
Du Page	430,318	32.4	.31	.58
Philadelphia	869,654	100.0		
Montgomery	492,299	56.6	.51	.73
Camden	245,482	28.2		.50
Atlanta	685,290	100.0		
De Kalb	346,638	50.6	.35	.64
Cobb	224,083	32.7	.40	.55
Clayton	94,144	13.7	.26	.56
Boston	656,311	100.0		
Middlesex	962,718	146.7	.45	.70
Norfolk	373,374	56.9	.37	.61
Cincinnati	595,293	100.0		
Boone	34,558	5.8	.32	.66
Columbus	625,175	100.0		
Union	15,993	2.6	.45	.55
Detroit	1,021,050	100.0		
Oakland	648,638	63.5	.37	.62
Minneapolis	856,530	100.0		
Ramsey	341,464	39.9	.58	.72
St. Louis	330,240	100.0		
St. Louis	662,852	200.7	.39	.66
Washington	740,671	100.0		
Arlington	204,175	27.6	.80	1.28
Montgomery	460,593	62.2	.43	.67
Alexandria	112,915	15.2	.53	1.05
Fairfax	474,983	64.1	.30	.54

[a]Source: Thomas M. Stanback, Jr. 1991. The New Suburbanization: Challenge to the Central City. Boulder, CO: Westview Press. Chapter 4. (Data compiled by Bureau of Economic Analysis)

Table 4: Correspondence between Tolbert-Killian MLAs, classed by Population Size and Density, with OMB MSAs defined as of June 30, 1990.

Tolbert-Killian LMA Size-Density Category (a)	OMB MSA Category		
	Mostly MSA	Part MSA	Non-MSA (b)
Large Metro	47	0	0
Other Metro	65	47	4
Mixed	31	50	78
Nonmetro	7	14	420

(a) The commuting zones of Tolbert and Killian were classified by size and density to create 4 levels of metropolitan/ nonmetropolitan areas. These included: Large Metro (Size>1 million); Other Metro (Size>250,000 and Density >50); Mixed (Size>100,000 and Density>25): and Nonmetro (Size<100,000).

(b) "Mostly MSA" pertains to MLAs with greater than 75 percent of the population located in OMB-defined MSAs.

Table 5. Population Size, Minority Composition and 1980-90 Change in New York CMSA*.

PMSA/ County	1990 Population Size (1000s)	Percent of Population		1980-90 Percent Change		
		Non-Hsp. White	Minority	Total	Non-Hsp. White	Minority
New York, NY PMSA	8,546	47.9	52.1	+3.3	-12.2	+23.4
Bronx Co.	1,203	22.6	77.4	+3.0	-31.3	+20.6
Kings Co.	2,300	40.1	59.9	+3.1	-14.9	+20.2
New York Co.	1,487	48.9	51.1	+4.1	+1.8	+6.5
Queens Co.	1,951	48.0	52.0	+3.2	-20.0	+41.1
Richmond Co.	378	80.0	20.0	+7.6	+0.9	+47.1
Westchester Co.	874	73.2	26.8	+1.0	-8.3	+39.4
Rockland Co.	265	79.9	20.1	+2.3	-5.6	+52.6
Putnam Co.	88	95.3	4.7	+8.7	+6.7	+80.1
Nassau-Suffolk, NY PMSA	2,609	84.1	15.9	+0.1	-5.1	+41.3
Nassau Co.	1,287	82.6	17.4	-2.6	-9.2	+48.7
Suffolk Co.	1,322	85.5	14.5	+2.9	-0.9	+33.5
Bridgeport-Stamford-Norwalk-Danbury-CT NECMA (Fairfield Co.)	827	79.8	20.2	+2.5	-3.9	+39.5
Orange Co., NY PMSA (Orange Co.)	307	84.8	15.2	+18.5	+13.4	+58.2
Bergen-Passaic, NJ PMSA	1,278	75.6	24.4	-1.1	-10.7	+47.9
Bergen Co.	825	82.7	17.3	-2.4	-10.4	+70.7
Passaic Co.	453	62.7	37.3	+1.2	-11.3	+32.8
Jersey City, NJ PMSA (Hudson Co.)	553	47.4	52.6	-0.7	-19.5	+25.8
Newark, NJ PMSA	1,824	64.2	35.8	-2.9	-10.7	+15.1
Essex Co.	778	45.1	54.9	-8.6	-21.0	+32.9
Union Co.	493	65.3	34.7	-2.0	-14.1	+5.0
Morris Co.	421	88.4	11.6	+3.4	-1.7	+70.1
Sussex Co.	130	95.8	4.2	+12.1	+11.1	+72.5
Middlesex-Somerset-Hunterdon, NJ PMSA	1,019	80.8	19.2	+15.1	+5.4	+88.0
Middlesex Co.	671	77.0	23.0	+12.7	+0.9	+85.0
Somerset Co.	240	85.2	14.8	+18.3	+10.5	+100.0
Hunterdon Co.	108	95.0	5.0	+23.4	+20.9	+100.7
Monmouth-Ocean, NJ PMSA	986	88.5	11.5	+16.1	+13.8	+38.0
Monmouth Co.	553	84.8	15.2	+9.9	+6.4	+34.6
Ocean Co.	443	93.1	6.9	+25.2	+23.8	+48.4
Total New York CMSA	17,953	63.0	37.0	+3.1	-7.0	+26.6

*The New England portion consists of the Bridgeport-Stamford-Norwalk-Danbury CT NECMA rather than four separate PMSAs in the official definition.

Source: Compiled at University of Michigan Population Studies Center from 1980 and 1990 U.S. Censuses.

Table 6. Population and Housing Characteristics for PMSAs within New York CMSA and surrounding MSAs.

CMSA/PMSA MSA	1990 Pop. (1000s)	1980-90 Percent Change	Percent of Pop Min- ority[a]	 Age 0-17	 Age 65+	Percent Married Couples[b]	Percent Nonfam HHs	Persons Per HH	Percent Owner Occ HHs	Median Home Value[c]
New York CMSA	18,087	+3.1	37.0	23.0	13.1	50.6	31.2	2.67	51.0	191.1
New York, NY PMSA	8,546	+3.3	52.1	23.0	13.0	41.6	36.9	2.56	33.3	59.4
Nassau-Suffolk, NY PMSA	2,609	+0.1	15.9	23.3	12.4	66.4	20.0	2.99	80.3	187.0
Stamford CT PMSA	202	+1.9	19.9	20.8	14.1	56.3	30.2	2.60	64.8	394.0
Norwalk CT PMSA	127	+0.5	18.1	21.1	12.3	58.4	28.2	2.60	70.6	315.8
Bridgeport-Milford CT PMSA	443	+1.2	22.1	23.2	14.2	55.3	28.0	2.67	67.6	190.1
Danbury CT PMSA	187	+10.3	9.2	24.4	9.9	63.5	25.3	2.75	74.9	221.2
Orange Co NY PMSA	307	+18.5	15.2	27.6	10.4	62.3	24.0	2.89	67.5	141.7
Bergen Passaic NJ PMSA	1,278	-1.1	24.4	21.7	14.5	58.4	26.7	2.71	63.9	214.4
Jersey City NJ PMSA	553	-0.7	52.6	22.1	12.7	43.4	34.8	2.62	32.5	157.0
Newark NJ PMSA	1,824	-2.9	35.8	23.5	12.5	54.2	27.7	2.74	59.1	191.4
Middlesex-Somerset-Hunterdon NJ PMSA	1,019	+15.1	19.2	21.9	11.3	61.6	26.0	2.71	70.7	173.5
Monmouth Ocean NJ PMSA	986	+16.1	11.5	23.6	17.3	60.9	27.1	2.65	77.4	150.6
New Haven-Meriden CT MSA	530	+5.9	20.1	22.6	14.1	52.6	31.7	2.55	62.4	171.9
Waterbury CT MSA	221	+8.1	15.3	23.4	15.6	54.9	29.7	2.58	63.3	148.0
Poughkeepsie NY MSA	259	+5.9	14.1	23.9	11.4	59.9	27.7	2.69	69.1	149.2
Allentown-Bethlehem PA NJ MSA	686	+8.1	7.2	23.9	15.2	59.7	27.9	2.57	71.6	102.4

[a] Persons who are not classed as Non-Hispanic Whites.

[b] Percent of all families that are married couple families.

[c] Value in 1000s of dollars.

Source: Compiled at University of Michigan Population Studies Center from 1980 and 1990 U.S. Censuses.