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University of Michigan, Ph.D., 1961
Sociology, general

University Microfilms, Inc., Ann Arbor, Michigan

THE NATURE AND DETERMINANTS OF
METROPOLITAN INFLUENCE: AN
ANALYSIS OF 168 METROPOLITAN CENTRAL
CITIES

by
Robert Lloyd Carroll

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in the
University of Michigan
1960

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ACKNOWLEDGMENTS

I would like to take this opportunity to express my gratitude to the many persons who have helped me with this study.

For many extremely useful criticisms and suggestions regarding the design of the study and the interpretation of the findings I am greatly indebted to the members of my doctoral committee: Dr. Ronald Freedman, Dr. David Goldberg, and Dr. Arthur Bromage.

Dr. Amos H. Hawley, the chairman of the committee, provided the most assistance to the completion of this research. I am indebted to him for the initial suggestion of the research, and for permission to use data and information gathered by him in a preliminary investigation of an aspect of the problem analyzed in this study. The references, citing him, in the text of the study do not begin to indicate the influence of his work on this research. Effects of his unpublished materials and of his counseling are found throughout this dissertation.

The responsibility for the shortcomings of this study is, of course, my own.

As an undergraduate student, contemplating marriage, my academic superiors often cautioned me that not all women are willing to undergo the hardships of the years of graduate training. I wish to express appreciation to my wife, who was not only willing, but performed many important tasks during every step of my graduate career.

I wish, also, to acknowledge the fine work of Barbara Feldt, who assisted in the collection of data, and Mary Long, who typed the final draft of the dissertation.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	ii
LIST OF TABLES	iv
 Chapter	
I INTRODUCTION	1
II THE INDICATORS OF METROPOLITAN ACTIVITY	16
III THE METROPOLITAN CENTRAL CITIES	47
IV THE LOCATION OF METROPOLITAN ACTIVITY	74
V SPECIAL ANALYSES OF DIVERSITY AND DISTANCE	113
VI SPECIAL ANALYSES OF DEVIANT CASES	131
VII SUMMARY AND IMPLICATIONS.	142
 APPENDICES	
A. LOCAL ACTIVITIES.	152
B. REGIONAL ACTIVITIES	158
REFERENCES.	165

LIST OF TABLES

Table	Page
1. Coefficients of Dissimilarity for Twenty Indicators of Local and Regional Dominance	36
2. Zero Order Correlation Coefficients Relating Each Metropolitan Indicator to Population Size of Central City and to Population Size of Standard Metropolitan Area	40
3:A. Correlation Coefficients Indicating Relationships Between Ten Indicators of Local Dominance	44
3:B. Correlation Coefficients Indicating Relationships Between Ten Indicators of Regional Dominance	45
3:C. Correlation Coefficients Indicating Relationships Relating the Regional to the Local Indicators of Metropolitan Activities.	46
4. Average Ratios of Indicators of Regional and Local Dominance for Central Cities of Standard Metropolitan Areas.	54
5. Central Cities of Standard Metropolitan Areas Classified by Degree of Metropolitan Activity	65
6. Cities Containing District Office Banks of the Federal Reserve System, and Their Positions in a Classification of Metropolitan Activity	68
7. Cities Containing Ten or More Foreign Counsuls	70
8. Central Cities Classified in Terms of Regionally Dominant Activities, by Population Size of Cities	78
9. Regional Dominance by Distance to Nearest Central City	79
10. Regional Dominance by Distance to Nearest, Larger Central City	80
11. Regional Dominance by Distance to Nearest, Larger City Controlling for Population Size.	81
12. Regional Dominance by Number of Decades Since City Attained a Population Size of 50,000	81
13. Regional Dominance of Cities by Number of Decades Since City Attained a Population Size of 50,000 Controlling for Population Size.	82

Table	Page
14. Regional Dominance of Cities Over 100,000 by Distance to Nearest, Larger City and Number of Decades Since City Attained a Population Size of 50,000	83
15. Regional Dominance by Population Potential, Decades Since Ring has Grown Faster than Central City, and Geographic Feature of Central City.	85
16. Regional Dominance by Population Potential, Number of Decades Since Ring Has Grown Faster than Central City, and Geographic Feature of Central City, Controlling for Population Size.	86
17. Regional Dominance by Population Potential Controlling for Distance to Nearest, Larger Central City	88
18. Regional Dominance by a Combined Measure of Population Size, Distance to Nearest, Larger City, And Number of Decades Since City has Attained 50,000 Population. . .	90
19. Local Dominance by Population Size of City	91
20. Local Dominance by Distance to Nearest, Larger City Controlling for Population Size.	93
21. Local Dominance by Number of Decades Since City Reached 50,000 Population, Controlling for Population Size . .	95
22. Local Dominance of Cities over 100,000 by Distance to Nearest, Larger City and Number of Decades Since City Attained a Population Size of 50,000	96
23. Local Dominance by Number of Decades Since Ring Has Grown Faster than Central City	97
24. Local Dominance by Population Potential.	98
25. Distance to Nearest, Larger City by Population Potential	98
26. Local Dominance by Population Potential Controlling for Distance to Nearest, Larger City	99
27. Local Dominance by Density of Non-Standard Metropolitan Area Counties Surrounding Central Cities, Controlling for Distance to Nearest, Larger City	100
28. Twelve Types of Cities by Population Size, Age, Distance, Population Potential, Decades Since Ring Grew Faster than Central City, and Density of Counties Surrounding City	103
29. Metropolitan and Nonintegrative Cities by Population Size, Age, and Distance.	104

Table	Page
30. Metropolises, Partial Metropolises, and Nonintegrative Cities, by Population Size, Age, Distance, Population Potential, and Density of Surrounding Counties	106
31. Metropolises, Local Service Centers, and Nonintegrative Cities, by Population Size, Age, Distance, and Population Potential	108
32. Partial Metropolises and Local Service Centers by Age, Distance, and Population Potential	110
33. Number of Cities by Number of Ratios over 1.10	114
34. Regional Diversity by Population Size, Age, Distance, Population Potential, Number of Decades Since Ring Grew Faster than Central City, and Density of Surrounding Non-SMA Counties	116
35. Local Diversity by Population Size, Age, Distance to Larger City, Population Potential, Number of Decades Ring Grew Faster than Central City, and Density of Surrounding Non-SMA Counties	118
36. Metropolitan Types by Diversity.	120
37. Diversity by Population Size, Age, and Distance Controlling for Metropolitan Types of Cities	122
38. Diverse Types of Metropolises and all Nonintegrative Cities by Population Size, Age, and Distance	124
39. Metropolitan Types Ranked by Average Distance.	126
40. Characteristics of the Nine Largest Cities not Classified as Metropolises.	133

Chapter I

INTRODUCTION

The metropolis and metropolitan community are concepts commanding an increasing amount of attention by scholars in many fields. The volume of the literature dealing with this aspect of urban life now includes a considerable amount of material. Suggested by much of this literature is the idea that cities vary in the degree to which they perform the service functions which characterize them as urban centers--i.e., different classes of urban places can be distinguished. Cities, it is suggested, may range from satellite types, whose service activities are dominated by other more urban type cities, up to supra-urban type cities which integrate the activities of many units both near and far. When attempting to analyze urban activities, does a taxonomic problem become evident? Does the urban society contain supra-urban cities metropolises, which dominate vast regions including other cities which perform service functions to a less degree? If so, how is the taxonomy arranged and what are the conditions giving rise to the various classes of cities?

Enough information and data are now available to us so that answers to the above questions can be attempted empirically. This study reviews some pertinent literature bearing on the question, "What is a metropolis?," and consequently, "What are the various city types?," and uses the findings from this review as a guide to

the manipulation of data. The data and interpretations presented in the study attempt to demonstrate that in order to be sociologically meaningful, the term metropolis must be used more precisely than it has to date; the system of taxonomy must be spelled out so that various city types can be identified. Besides clarifying the typology of cities, the study also designates pertinent conditions related to metropolitanism in order to increase understanding of how the metropolis arose and how it functions.

Aspects of the literature of human ecology, urban geography, urban sociology, and economics aid us in answering the questions we have raised.

As ecological theory has developed through the years a rather general agreement that the community is the unit of analysis has evolved. The definition of the community--a geographically based unit, or system of interdependence, which supplies its members with the major proportion of their sustenance needs--has also been generally accepted.

General notions of the development of communities and their centers are necessary for a full examination of the concept of metropolis.¹ Because communities are defined as systems of interdependence, we can axiomatically say that communities contain integrative mechanisms or forces which hold the parts of communities together. As communities grow larger the integrative mechanisms tend to centralize. This phenomenon of centralization is hypothesized because ecologists generally assume that as population size increases the division of labor becomes more complex; and as the division of labor becomes more

¹ For an enlightening, simplified description of the development of the community center, see Ames Hawley (1950, pp. 238-245).

complex central control develops as an integrating mechanism of the organization.

In the Middle Ages, during the revival of trade, periodic fairs were held which tended to centralize the market activities of the nearby inhabitants. As these fairs became more numerous and more frequent the integrative activities which they performed for the population increased in importance. Later, permanent villages appeared as market centers of community organization. As self-sufficiency broke down and communities began to specialize in certain activities, networks of interdependence began to develop between communities. And as trading between communities increased, the intercommunity relationships had to be coordinated. This led the integrative mechanisms of communities to increase in number and complexity. The community center, already established, attracted the location of the coordinating activities. Therefore, as the size of communities and the intercommunity relationships increased, the center became larger.

Industrialization, tremendous increases in population, and constant transportation improvements have enabled vast and complex networks of intercommunity relationships to develop. One has only to look around him to see that community centers have also grown along with these other factors.

These community centers are called modern cities. Urban sociologists have documented the growth of cities and the complexities and problems which accompany this growth, and many have suggested that the relationships between cities are so important that they must be studied as a systematic network in order to understand the economy of a society.

The foregoing remarks suggest that modern cities have attained large population size, and that they serve as integrative centers for populations larger than that included within their own boundaries. However, has modern society industrialized to such a degree and developed such transportation facilities that centers have arisen which integrate activities for large populations near and far to such an extent that they far overreach the conventional notion of a city and its trade area?

Integration of activities has been the principal concern thus far in our discussion of communities, cities and metropolises. This factor will continue to be the principal concern throughout this study. Over and over again, however, one can find references in the literature to organizations being metropolises solely on the basis of population size. Florence asks "Is there really such a thing as a metropolis?" And then goes on to answer, "If the metropolis is defined as the chief city of a country, the answer is clearly yes. Thirteen out of nineteen of the world's largest countries have one city that is at least twice as populous as the next largest city... In this discussion, the term metropolis will refer to the biggest city of a country. But metropolitan, city, or area will refer to the next few largest concentrations of population" (1955, p. 85).

Duncan states that "the classification of population agglomerations as 'metropolitan' or 'nonmetropolitan' is a somewhat artificial dichotomy" (1957, p. 363). The artificialness referred to is one of designating the types solely in terms of population size. Many researchers have studied the metropolitan phenomenon by making use of Census' definition of a Standard Metropolitan Area. This definition,

which will be specifically discussed later, uses population size as its main criteria for designating the center of a metropolitan area. Hawley (1956) delineated a somewhat different set of metropolitan areas in order to evaluate the Census definition--The Extended Metropolitan Area--but retained the identical size criteria in defining the central cities of these areas. Bogue (1949) has described still a different set of metropolitan areas, but also uses population size to locate the central cities of his areas.

Size is undoubtedly the major independent variable that ecologists have thus far employed in their examinations of social organization. It is foolhardy, however, to overlook the heritage of sociological theory when defining a type of human group. The fact of integration, especially in the form of interdependent relationships, have been well established as concepts used to delimit human groups. We have no evidence which leads us to believe that metropolises are somehow a special kind of group which need not conform to the generalization that human groups are systems of interdependent parts. It can be argued that the definition of a city conforms to this generalization and that metropolises are merely large cities thus also conforming to the generalization. If this be the case, then there is no need for the added verbiage which the term metropolis provides. The concept of the city would suffice, and whenever a research design warranted it, cities could vary along a size dimension. Is there a new type of city to which we can attach the concept of metropolis--a type of city which engages in integrative activities to a very great degree and involves distant places in interdependent relationships? The literature dealing with urban life causes us to answer this question with an emphatic

"yes." However, are all cities which have generally been called metropolises sufficiently different from average cities to warrant this designation? What is the nature and what are the determinants of the metropolitan influence exhibited by these cities?

The very fact that population size proves to be a useful independent variable makes it theoretically unsound to use it as a criterion for defining a particular kind of social organization. What factors would be used to explain variations in a group defined solely in terms of size? If the use of the term metropolis is warranted to designate a particular type of human group, a case must be made for it in terms other than population attributes alone.

The literature does provide us with a framework for defining metropolises in terms of the sociological concepts of interdependence and integration instead of merely population size.

As early as 1922 Gras remarked that "the externals (the growth of population, expansion of the area of the metropolis itself and of the district from which it drew its supplies, and even the volume of trade) are significant only insofar as they point to the new function performed by the metropolis, the function of organizing business for a wide metropolitan area." Gras believed that the organizing function of metropolises grew to such proportions that he labeled the modern economy a "metropolitan economy." Gras' description states that "a metropolitan economy is the organization of producers and consumers mutually dependent for goods and services, wherein their wants are supplied by a system of exchange concentrated in the large city, which is the focus of local trade and the center through which normal economic relations are established and maintained" (1922, p. 168).

In 1927 and later in 1933, McKenzie presented further theoretical material which conceptualized the metropolis as a center engaged in integrative activities for a large area. McKenzie's terminology followed the tradition of Park (1925) by employing the analogous use of ecological (plant and animal) concepts. He described cities in terms of dominance and dependence. The appearance of metropolises, or cities where integrative or central activities centralize, closely followed the time when ideas could travel much faster than goods. McKenzie suggests that:

The first effect of this divergence in the rate of speed in the transmission of ideas and objects was to make for centralization of control and decentralization of operation. The function of management and direction is tending to become spatially removed from that of operation or application...

The centralization of intelligence and control resulting from the annihilation of space by modern means of communication has given to individual cities or chains of cities specialized roles as collectors and distributors of different kinds of information. The great produce and financial exchanges centralize in strategic cities or groups of cities and thereby create primary and secondary centers of dominance with respect to the differentiated functions (1927, p. 30).

In the book, The Metropolitan Community, McKenzie presents us with further theoretical insights on the definition of a metropolis. He states, "The metropolitan region thus considered is primarily a functional entity. Geographically it extends as far as the city exerts a dominant influence... The business subcenters are rarely complete in their institutional or service structure. They depend upon the main center for the more specialized and integrating functions" (1933, p. 93).

In his study of metropolitan dominance, Bogue attempted to demonstrate that certain large cities (100,000 or more) in the United States

influence activities in other cities, and that certain of these other cities in turn exert some influence over cities which are smaller in population size. The main technique which Bogue utilized in this study was one of demonstrating that gradient patterns of distribution of certain economic functions emanate from large cities in the United States. Bogue describes his study as follows:

This study is an attempt to explore some aspects of the hypothesis that great cities, or metropolises, dominate the social and economic organization of technologically advanced societies... Out of the attempts to understand cities and their place in the modern world has grown a generalization which may be called the 'dominant city' hypothesis or the 'hypothesis of metropolitan dominance.' This hypothesis seeks to escape part of the aforesaid difficulties of understanding 'urbanism' as a single characteristic, and attempts to solve the problem of intercity interdependence. It classifies cities on the basis of the functions which they perform and their relative ability to 'dominate' other cities and the surrounding countryside. The classification made in formulating this hypothesis is a dichotomous one; cities are divided into 'metropolitan centers' and 'hinterland cities.' The metropolis is usually the largest and most complex (the farthest removed from the 'average city') of all of the cities in the territory. Because it is able to assemble cheaply a varied array of raw materials and products from all parts of the world; because a large number of specialized components and skills are required in the production of the goods required to sustain human beings at their present level of living; because up to a certain point machine production increases in efficiency with an increased scale of operations; and because certain mutual benefits appear to accrue to business enterprises from their location in proximity to each other, the large city is able to produce and distribute more varied goods and services than is the smaller city. From these facts it has been concluded that the metropolis, or modern large and complex city, exercises an organizing and interactive influence on the social and economic life of a broad expanse of territory far beyond the civil boundaries, and thereby dominates all other communities within this area. The hypothesis of metropolitan dominance assumes that there is a system of interdependency among cities, and that there are considerable differences between the activities of individual cities. It maintains that the organizing agent, and one of the forces making for intercity differentiation, is the metropolis (1949, pp. 3 and 6).

Vance and Smith state that Bogue (1949) has provided "empirical proof for Gras' dictum that the keynote of the metropolitan economy is the functional interdependence of city and hinterland and for McKenzie's analogy of the metropolitan region to a symbiotic 'community,' an organismic whole of differentiated parts" (1954, p. 118).

In recent times the literature on the urban community more and more contains references to the characteristics of dominance and gradient patterns emanating from large cities. Many of the urban sociologists and ecologists² who define metropolises solely in terms of size clearly see the importance of studying the metropolitan area within a framework of interdependent relationships.

In a chapter entitled "The Metropolitan Region," Quinn states that:

...under conditions of modern American economy, country and city are tied together as interdependent parts of an integrated totality. The existence and significance of metropolitan regions depend on this fact.

Three types of metropolitan areas, each larger than the politically-bounded central city, may be distinguished. One of these types, generally called the metropolitan district, includes the central city and its built-up fringe of suburban satellites. A second type, known as the industrial area, includes the territory within which concentration of manufacturing activities occurs in and around a city. The third type, the true metropolitan region, includes in addition to the urban metropolitan district or the industrial area, a zone of outlying rural territory... The criteria used in delimiting such a region reflect chiefly the dominant influence of the metropolis (1950, p. 163).

Svend Riemer (1952) proclaims in an urban sociology textbook that in its full bloom, the metropolitan center becomes an end in itself, gaining increasing advantage as an agglomeration of a large resident

²To mention a few: Hawley (1956), Duncan (1957), Schnore (1957), Kish (1957).

population. It fulfills regional as well as national and world-wide services in the pursuit of governmental, educational, commercial and industrial activities.

Throughout this study we will draw heavily from the work of Vance and Smith reported in The Urban South. They present a review of the pertinent literature on metropolitanism, along with an empirical investigation of metropolises in the South. Vance and Smith state that "The meager research that has been focused on this problem (differentiating true metropolises from other large cities) is perhaps as helpful in pointing out what not to do as in providing positive suggestions... In certain specialized functions the whole United States may well be the hinterland of one city...it should not be assumed that the largest cities are necessarily the metropolises; here we should use Gras' insight that the size of certain functions and not the size of the population is crucial" (1954, p. 126).

We have drawn on the literature to present an argument for using certain integrative functions performed by cities as a definition of metropolis instead of merely using population size. The argument between the use of population size and the use of other criteria as the basis of the definition of metropolises is presented to demonstrate that a definitional problem does exist. In this study we will see how far a definition of metropolises based on integrative activities will take us. One reward received from this attempt is the possibility of observing the relationship between population size of cities and the integrative activities of cities.

Even though the literature has provided us with a theoretical basis for defining metropolises in terms of integrative functions, we

still cannot say that our question "What is a metropolis?" has been answered. We must now designate, specifically, each of the integrative functions and demonstrate how they distinguish metropolises from other cities.

If we look back over the literature just reviewed, it becomes apparent that two notions of the integrative criteria of metropolitan status exist. Gras (1922), McKenzie (1933), and Riemer (1952) typify the view that metropolises are administrative seats for activities and interests spread over a broad area; they are hubs of a national economy; they are centers of dominance for vast regions. Quinn (1950) and Bogue (1949) and, as we soon will indicate, the Census Bureau (1950), seem to describe cities which have attained metropolitan status as being the centers of integration for a relatively small area surrounding the city; they are local centers of dominance.

Both views, the regional and the local, hold that the metropolis must engage in integrative activities to a much greater degree and service a much larger area than does the average city.

How can these two views be used to empirically investigate the question, "What is a metropolis?" This study applies the local and regional views to the operational definition of metropolis which is almost universally used in sociological research today--the Standard Metropolitan Area (and its central city). If the literature is correct in indicating that metropolises are centers which engage in vast integrative functions, and if the sociological researchers are actually studying metropolises when they view the central cities of Standard Metropolitan Areas, then these central cities should all be performing integrative functions to a greater degree than the average city.

The central city of the Standard Metropolitan Area is defined solely in terms of size. The Standard Metropolitan Area as a whole is defined as follows:

A standard metropolitan area contained at least one city of 50,000 or more in 1950, and each city of this size is included in one standard metropolitan area... When two cities of 50,000 or more are within 20 miles of one another they have ordinarily been included in the same standard metropolitan area... In general, each standard metropolitan area comprises the county containing the city and any other contiguous counties which are deemed to be closely economically integrated with that city.

Contiguous counties are included in a standard metropolitan area when they qualify on two types of criteria. One type is concerned with the character of the county as a place of work for nonagricultural workers and with the density of population, the other type is concerned with the extent to which contiguous counties are socially and economically integrated with the central city. Specifically, these criteria are:

1. The county must have
 - a. 10,000 nonagricultural workers, or
 - b. 10 per cent of the nonagricultural workers in the standard metropolitan area, or
 - c. At least half of its population residing in contiguous minor civil divisions with a population density of 150 or more per square mile.
2. Nonagricultural workers must constitute at least two-thirds of the total employed labor force of the county.
3. There must be evidence of social and economic integration of the county with the central city as indicated by such criteria as the following:
 - a. 15 per cent or more of the workers residing in the contiguous county work in the county containing the largest city in the standard metropolitan area, or
 - b. 25 per cent or more of the persons working in the contiguous county reside in the county containing the largest city in the standard metropolitan area, or
 - c. An average of four or more telephone calls per subscriber per month from the contiguous county to the county containing the largest city in the

standard metropolitan area (United States Census of Population, 1950).³

This study investigates the question of whether all the central cities of Standard Metropolitan Areas are metropolises in the same sense. An alternative study could be designed to answer the question whether some cities which are not central cities of Standard Metropolitan Areas are also in effect metropolises. We chose the former question because of the availability of data on these cities and because of the importance which urban research has placed on the cities in recent times. Perhaps an answer to this question will provide a means for making the metropolitan concept more precise.

A further and very important value can also come from an answer to the above question. Once we delimit those central cities which are metropolitan in nature and those which are not (if there are any), we can then attempt to discover conditions which are related to the development of metropolitan and nonmetropolitan characteristics.

The value of an attempt to make the use of the concept metropolis more precise seems apparent. The contribution of such a study to general ecological theory, however, may not be as obvious. Since Robert Park (1925) wrote his illuminating article on the relationship between spatial patterns and the moral order, human ecologists have concerned themselves with attempts to describe social structure as a system of interdependent parts, and to relate this description to the distribution of activities over space. The unit of community organization has emerged as the most fruitful unit to analyze in this light because it contains most, if not all, of the types of interdependence in which humans engage in order to sustain life, and also because the community

³ Further information regarding the Standard Metropolitan Area can be obtained from Shyrock (1957).

can readily be seen as a spatial patterning of activities. The observable phenomenon of intercommunity relationships has helped to make the task of relating social structure to spatial structure a difficult one. This study sheds light on the problems of how communities relate to each other, and helps us get a clearer picture of the vast network of interdependence which exists between specialized areas.

Let us think of social structure as being made up of the relationships between units. If this is the case, then the findings of this research will shed some light on the theory of social structure because this study focuses on a certain set of units--central cities of Standard Metropolitan Areas--which are thought to exert relatively more influence on other cities than is exerted on them. This research will show that not all central cities belong to the same class in terms of relative influence exerted, and will then determine some of the conditions related to these different kinds of units. If sociology can set forth the different conditions giving rise to different social organizations, then it can build a body of scientific theory. It is hoped that this study will be a small step in this direction. Furthermore, if the pattern of influence exhibited by metropolitan organization can be related to patterns of activity over space, then this study will have made a contribution to an already developing theoretical framework.

Indicators of the two types of integration--local and regional--are examined in Chapter II. Reasons are stated concerning why one variable indicates local dominance and another indicates regional dominance. Two different empirical checks are made on these particular designations in order to see if we can add the weight of empirical evidence to them.

Chapter III discusses and applies the method by which these indicators determine whether or not all central cities of Standard Metropolitan Areas are metropolises. The findings of this analysis are presented and discussed.

Chapter IV investigates several hypotheses concerning the determinants of metropolitan influence.

Chapter V presents an analysis of the location of metropolitan activity in the United States, and investigates aspects of the diversity of metropolitan influence.

Chapter VI specifically discusses several of the more apparent "deviant case" cities emerging from the preceding analyses.

Chapter VII contains a summary of the major results of the study and attempts to indicate the directions which this study leads us in our analysis of the metropolis.

Now let us proceed to the delineation and discussion of the indicators of metropolitan activity.

Chapter II

THE INDICATORS OF METROPOLITAN ACTIVITY

As noted in the first chapter, the literature provides us with a theoretical framework for discussing and analyzing metropolitan influence. In this chapter hypotheses are presented designating characteristics which indicate either regional or local dominance. After identifying these metropolitan functions we can then see which central cities stand out, in comparison to other urban places, on the basis of such functions.

A measure of the distribution of these activities over the United States is presented, and matrices involving the correlations between the indicators are shown and discussed in an effort to learn more about the nature of our indicators and to add empirical weight to our hypotheses.

The characteristics employed as indicators of dominant activity are:

Local Dominance

1. Per capita apparel sales
2. Per capita business service receipts
3. Per capita merchant wholesale receipts
4. Number of hospital beds per capita
5. Per cent of central city population employed in trucking and warehousing
6. Per cent of central city population employed in utilities and sanitation
7. Per cent of central city population employed in entertainment

8. Per cent employed in finance, insurance, and real estate
9. Per capita bank debits to deposit accounts
10. Per capita post office gross receipts

Regional Dominance

1. Number of national offices of corporations as ratios to central city population
2. Number of employees of corporations represented by home offices in central city as ratio to central city population
3. Per cent of central city population employed in printing, publishing, and allied industries
4. Per cent of central city population employed by railroads
5. Per cent of central city population employed in hotels and lodgings
6. Number of central offices of national associations as ratio to central city population
7. Per capita wholesale sales through brokers' and manufacturers' representatives
8. Number of mail order houses as ratio to central city population
9. Number of passengers boarding planes in central city airports as ratio to central city population
10. Per cent of central city population employed in telecommunications

The characteristics were placed in either the regional or local category by virtue of our knowledge of the urban community. There can be little doubt as to these characteristics being integrative in nature, but questions necessarily arise concerning the designation of the characteristics as being either local or regional integrators. The discussions and hypotheses which follow are intended to serve as a rationale for placing the indicators in either the local or regional categories.

The community, as previously indicated, has developed as the unit of analysis of human ecology. Networks of relationships between communities have developed in complex, industrial societies. These two facts help us to derive our hypotheses. In speaking of the interpenetration of dependent communities, Hawley writes:

... Here again the territorial pattern of modern collective life is in contrast to the discrete and self-contained communities of the pre-industrial era. The introduction and

rapid improvement of mechanically powered transport facilities together with their stimulation to specialization have enabled each local population to participate in the affairs of remote as well as neighboring communal groups. The organizations of spatially separate populations, in other words, have merged at many points giving rise to very extensive and inclusive communities. The term community, interpreted to connote a compact, easily distinguishable entity, has lost much of its meaning.

A closer examination of the spatial aspects of interdependence discloses that a community may have not one boundary, be it a line or a zone, but two or more. It is possible to observe a series of concentric zones about a center which differ in the degree of attachment of their occupants to the center, in the frequency of movement to and from the center, and in the extent to which contacts with the center are direct, involving the movement of individuals, or indirect, involving a circulation of ideas and products rather than people. The intensity of local community life appears to diminish with distance from the center, though it may not be entirely vitiated even at maximum distances (1950, p. 255).

Hawley had earlier made these definitional statements:

... In advanced agricultural and industrial regions, where settlement is scattered over the space intervening between centers and where the division of labor is highly ramified, the community area lacks definiteness. In principle, however, the boundary of every community is determined in the same manner. It is fixed by the maximum radius of routine daily movement to and from a center. Thus the community includes the area the population of which, however widely distributed, regularly turns to a common center for the satisfaction of all or a major part of its needs (1950, p. 246).

The above quotation suggests that population centers can engage in two types of integrative activity--activities which reach a far flung, regional area, or activities servicing a more local area.

Activities which tend to be difficult to export, are not highly specialized (i.e., many units in a society perform them), tend to be transmitted directly to the user, and tend to recur often within a given time period, are more likely to be local rather than regional activities.

Regional activities will exhibit directly opposite tendencies; they will tend to be easily exported, highly specialized, indirectly transmitted, and will recur much less frequently within a given time period.

Richard B. Andrews (1953-1956) has written a series of twelve articles summarizing the material on the concept which has been labeled the urban "economic base." The "economic base" concept implies two types of urban functions: (a) those which export goods and services from the city, and (b) those which serve only the local population. The merits of this scheme have been questioned,⁴ but we have utilized it in order to gain initial insights concerning the twenty indicators of metropolitan dominance. All twenty indicators, viewed in terms of the "economic base" literature, are basic activities for they are all activities engaged in exporting goods and services. Andrews states that some basic activities export goods and services out of the city to distant consumers by mechanisms of their own. Other basic activities draw consumers into the city to purchase goods who in turn export the goods out of the city. Some basic activities, therefore, are regional in character; others are local. Basic activities also may have either a high or low degree of specialization and may be recurring at either a fast or slow rate. All of these characteristics seem to logically differentiate local activities from regional activities.

If local activities are difficult to export, relatively unspecialized, transmitted directly, and recur often, whereas regional activities

⁴ Criticisms of the urban base literature can be found in Tiebout (1956) and Pfouts (1957).

tend to be of the opposite nature, then it would follow that local activities would exhibit a gradient pattern different than regional activities. Although no data permitting us to analyze gradient patterns will be presented in this study, better clarification of the designation of an activity as being either regional or local will be gained if we can hypothesize the type of gradient pattern we would expect an activity to exhibit.

Isard and Whitney (1954) studied the gradient pattern of several types of retail trade which emanate from central cities of metropolitan areas. Their study is suggestive of the types of gradients which would be exhibited by the characteristics we have designated as indicators of metropolitan dominance. These authors tabulated the per capita sales of various types of retail trade in cities grouped in zones emanating from metropolitan central cities. Apparel sales declined rapidly out to a distance of twenty miles from the central city, then rose and leveled off. Food sales exhibited a relatively flat gradient. This suggests that local integrative activities are performed by many cities and that the population acquires these services from the nearest city. The more local an activity tends to be then, the more the gradient distribution tends to decline sharply a relatively short distance from local centers. The food sales gradient reported by Isard and Whitney is flat because the spatial zones used are gross units. The regional activities are not performed in all cities and therefore the gradient tends to be flat, declining slowly, as distance increases from a regional center.

Let us consider, in detail, each of the indicators in light of the above criteria.

LOCAL DOMINANCE

1. Per capita sales in apparel stores (U. S. Census of Business, 1954)

Apparel sales was singled out as the most sensitive retail indicator of local dominance. Apparel goods are directly transmitted to the consumer. As an activity, it exhibits a relatively low degree of specialization. Purchases of wearing apparel are frequently recurring activities. Both Dickinson (1934) and Bogue (1949) use retail sales per capita as an indicator of metropolitan dominance, and both speak of metropolises as being dominants for a relatively local area. Bogue (1949) demonstrates a definite, relatively sharp, gradient pattern from metropolises in terms of retail sales per capita. Nelson (1955) shows that retail trade is fairly evenly distributed among cities in the United States, indicating that retail trade is a local activity. As we indicated previously, Isard and Whitney (1954) describe the type of gradient pattern we would expect from a local activity.

2. Per capita receipts by business service establishments (U. S. Census of Business, 1954)

Business services which make up this Census classification include advertising, credit and adjustment agencies, employment agencies, and stenographic services. All are services which require local supporting populations with the partial exception of advertising; all are services which potential buyers want close at hand. Bogue (1949) uses this indicator also in his study of metropolitan dominance. Vance and Smith (1954) include it as one of six indices related to dominance. Because of the difficulty involved none of these services are exported long distances but rather are transmitted directly to their consumers. Business services, however, are found in great

quantities only in those cities possessing large numbers of the types of businesses which use these rather unique services. The gradient exhibited by this activity therefore would most likely be a flat one.

3. Merchant wholesales: sales per capita (U. S. Census of Business, 1954)

The figures listed in this category represent sales made by wholesale establishments with stock and not by wholesale representatives and brokers. Again, Bogue (1949) demonstrates a gradient pattern with this activity. McKenzie (1933) presents data which indicate a gradient pattern from Chicago for wholesaling activity. He states that the small city, especially if located within convenient trucking distance of a larger place, is losing to the latter most of its wholesaling business. In many instances, retailers buy directly from a merchant wholesaler because the goods are not easily exported or stored for long periods. This activity seems to be relatively evenly distributed over the cities of the United States, and has a relatively rapid pattern of recurrence. For these reasons merchant wholesales is best designated as an indicator of local dominance.

4. Number of hospital beds in city (County and City Data Book, 1954)

This activity seems to be local in nature. People do not tend to travel long distances to hospitals except for very special reasons. The literature gives no evidence that this variable has ever been used as an indicator of metropolitan activity, but the author believes it to be one way in which a city dominates the activity of units surrounding it. Certainly this activity cannot be exported, except through the consumer who carries this service away with him, and it is a service which is directly transmitted to the consumer.

5. Per cent of central city population employed in trucking and warehousing (U. S. Census of Population, 1950)

Because of the lack of any other data, employment figures had to be used as a measure of extensiveness of activity for this and the following three variables. Andrews (1953-1956) states that the job or employment as a unit of measure (for base activities) has been the device most widely used thus far. It has many rather obvious advantages. Moreover, the job unit is a universally experienced thing; and employment, in a general sense, is one of the main concerns of any economic system whether it be national, regional, or local.

Warehousing is a service performed for a local population. No data are available to indicate that this activity is distributed in a gradient pattern, but it seems that it would be. Consumers travel to the warehouse in order to avail themselves of these goods and services. Dickinson (1947) includes merchandising warehouse space as one of his indicators of metropolitan activity. Gras (1922) describes warehousing as an important part of the metropolitan city. It was his belief that storage is a vital part of commerce in the metropolitan economy.

The Census category includes trucking activity along with warehousing activity. We have no idea which activity provides the greatest employment for the city, but we believe it would be trucking. Trucking is not as clearly a local activity as warehousing seems to be. Trucks can move goods on the long haul or the short haul. From our experience with urban communities we believe local trucking to be of sufficient volume to include this as a local activity. McKenzie (1933) remarks that if the truck becomes commonly employed as a two-way-haul agency of transportation, it may tend to make the buying area of the city more closely coincide with the selling area, in which

event the city will become even more intimately bound up with its local hinterland. This variable is not clear cut, but it is included as a local indicator because it is much too limited an activity to integrate far flung regions.

6. Utilities and sanitation services (per cent employed) (U. S. Census of Population, 1950)

We found no mention of these services as integrative activities in the metropolitan literature. Every city must provide these services in some form. It would be too costly and cumbersome to carry out these activities on any scale other than a local one. Of all the local indicators used in this research, this is the only one which could be questioned as being too local. It may be that these activities service only units within the city, and are not integrating the activities of units in a larger area. In many instances, however, they are extended into urbanized areas and remainders of counties. It is extremely difficult to transport the services of utilities and sanitation. These activities recur at a steady and rapid rate. They service a local area, and probably would have a relatively steep gradient from central cities.

7. Entertainment (per cent employed) (U. S. Census of Population, 1950)

Except for vacations, people tend to seek their entertainment in the local community area. It seems that the closer people live to a city providing entertainment facilities the more likely they are to travel to that city for their commercial entertainment. Entertainment activities do not tend to be exported great distances, and tend to be transmitted directly to the consumer.

8. Finance, insurance, and real estate (per cent employed) (U. S. Census of Population, 1950)

People employed in banks, selling insurance, and real estate represent activities which sometimes extend to distant areas. We believe,

though, that most of the services performed by these employees are for local purposes. If the data in this category represent the activity of insurance salesmen selling policies to a local population, and real estate agents serving the housing requirements of a local population, then except for cities containing home offices of insurance companies, this is necessarily a local indicator. Since we found no indication that this variable has been studied in terms of its gradient distribution, we can only hypothesize that it would exhibit a relatively steep pattern. Although consumers do not travel to the location of these services exclusively, in many instances they do. Nelson (1955) found that almost all cities were clustered very near the average for this activity, which indicates that finance, insurance, and real estate is distributed relatively evenly and uniformly over the United States. It is believed that this variable indicates local activity more than regional activity.

9. Per capita bank debits to deposit accounts (County and City Data Book, 1954)

The County and City Data Book (1954) states that bank debits to deposit accounts are calendar-year data and include debits or charges to deposit accounts of individuals, partnerships, corporations, the United States government, and state and local governments. They also include debits to time or savings accounts, payments from trust funds on deposit in the banking department, and payments of certificates of deposit. Excluded are payments in settlement of clearing house balances, charges to expense and miscellaneous accounts, corrections and similar charges, and debits to the accounts of other banks (that is, to interbank accounts).

If a substantial part of these banking data represent individuals and businesses doing their banking on a local level, then we would expect to find a relatively steep gradient pattern exhibited by this

activity, and would expect to observe many people traveling to the bank to complete their banking transactions. This activity recurs often and tends to be directly transmitted to the consumer.

10. Per capita post office gross receipts (County and City Data Book, 1954)

Gross receipts, as defined by the County and City Data Book (1954) include all post office receipts for the calendar-year from money order business, postal savings, and certain other extraordinary items. These data represent banking functions which are provided by the United States Government. Because of the limited nature of this measure we are identifying it as a local activity. These figures, then, give no indication of the volume of communication via the mail coming into and leaving a city.

REGIONAL DOMINANCE

1. Number of national offices of industrial corporations (Moody's, 1954)

Various cities in the United States contain the home offices of industrial corporations. Information in this category refers only to those corporations having plants in two or more cities. Industrial manufacturing has long been considered a metropolitan function. Most of the writers previously cited discuss this function as being an important aspect of metropolitan activity. Central office information derived from Moody's Industrial Manual (1954) seems to indicate the metropolitan aspect of manufacturing better than any other kind of manufacturing data which are available. We know that cities containing central offices integrate the activities of the company plants located in other cities.

This indicator would not seem to be distributed in a steep gradient pattern from central cities; the services performed by the central office are definitely "shipped" to the other cities concerned. This variable, then, is an ideal indicator of dominant activity on a regional basis.

2. Number of employees of corporations represented by their national office in a city (Moody's, 1954)

This variable, which is very similar to the preceding one, is included because of the added information it provides. For example, one city may contain more central offices than another, but the latter may contain a single office which integrates the activities of a much larger number of employees than the former city.

The Industrial Structure of American Cities by Alexandersson (1956) indicates that manufacturing is a concentrated activity in the United States.

Alexandersson (1956) studied practically all of the Census' industrial categories, attempting to designate the major "basic" activities of each American city with a population of 10,000 or more. No summary measures for the United States as a whole were utilized in this study, however. He found that manufacturing was much less ubiquitous than the service industries. A concentrated manufacturing belt, east of the Mississippi River, and north of the Ohio River, exists in the United States. These findings suggest that manufacturing be included as an indicator of metropolitan activity. It is difficult, however, to conceptualize any one type of manufacturing activity as being a meaningful metropolitan indicator. The difficulty is further compounded when one tries to make a case for manufacturing as representing an integrative activity.

The integrative activities of the two indicators cited above are readily inferred, and the use of these two indicators, along with wholesaling through manufacturers' agents--described later, will probably cause manufacturing to play an important role in determining the metropolitan status of a city.

3. Per cent of central city population employed in printing, publishing, and allied industries (U. S. Census of Population, 1950)

Cities and establishments which integrate the activities of people spread over a large area must utilize mechanisms which enable them to communicate with all the places with which they are involved. Newspapers, periodicals, and banks are some of these means of communication. Unfortunately, the criteria of regional dominance cannot be clearly applied to this set of data. Newspaper circulation has long been used to define the boundaries of local communities. We expect, however, that this industrial category mainly represents the activity of publishing houses, magazine distributors, and other printing establishments located in particular cities distributing printed material throughout a vast region. If the activity of publishing houses and magazine distributors is great, then the activity of this category will exhibit a flat gradient pattern from central cities, and the majority of the printed goods would be relatively easy to export to the customer.

4. Per cent of central city employed in telecommunications (U. S. Census of Population, 1950)

Telephones, telegraph wires, radio stations, and television stations are also mechanisms of communication which enable one place to integrate the activities of distant places.

McKenzie (1933) indicates that this category may not be completely a non-local activity. He states:

Two important aspects of the recent developments in communications are pertinent: (a) their utilization is more pronounced within the local area than between more distant points; and (b) the radius of daily activities has been extended several fold over that of a few decades ago. In this regard, the recent developments in communications have had a somewhat different application from those which arose in the nineteenth century. Whereas the railway and the telegraph were primarily long-distance agencies of contact, the motor vehicle and the telephone, despite their extended application, are chiefly used within the orbit of daily local relations. The airplane and the radio, of still more recent origin, have initiated a second revolution in the field of distant contacts (1933, p. 81).

Gras (1922) when speaking of the telegraph, states that the respective tributary areas of metropolises were being spread with a network of wires. Gras (1922) also analyzes the telegraph system as one which enabled very specific and complex specializations to develop, and this, he believes, is the very stuff of which the metropolitan economy is made.

We assume that the per capita local component of this category will be relatively uniform for all cities, and that the differences between cities will reflect the extra-local effect of this category. The criteria of the service being easily exported to the consumer is met in all instances.

5. Per cent of central city employed in the railroad industry (U. S. Census of Population, 1950)

Railroading is a transportation technique which enables distant cities to communicate with each other, and serves to transport people and goods to each other.

As Gras (1922) describes the development of the metropolitan economy, he places a great deal of emphasis on railroads as being one of the builders of metropolises.

McKenzie emphasizes the railroad in his discussions of metropolitan growth. For example, he writes:

... As rail transportation gradually surmounted the physical barriers that formerly separated these different areas and brought erstwhile remote population groups into direct economic relations with each other, not merely in the mutual exchange of products but in competition for common markets, cities rather than geographic sections became the nuclei in the larger economy (1933, p. 139).

Railroading is an activity which meets all criteria of regional dominance.

6. Per cent of central city population employed in hotels and lodgings (U. S. Census of Population, 1950)

If a city is a metropolis, it integrates the activities of a large area. In order for business transactions and other communications to be carried out, people from far corners of a large area must meet in the metropolis. The number of people employed by hotels and other places of lodging will indicate the number of people who visit the metropolis for a few days while transacting business, attending various types of meetings, and engaging in recreation.

The proportion of people using hotels and lodging places should not be distributed evenly as one moves out from central cities. One criterion does not apply for this measure, however, because this is one type of regional activity which is extremely difficult to export.

7. Number of central offices of formal associations (Gale Research Co., 1956)

The types of associations listed in the Encyclopedia of American Associations (1956) are:

- (1) Trade Associations - example: The Automobile Manufacturers Association and Radio-TV Dealers Association
- (2) Scientific and Engineering Organization - example: The Rocket Research Society

- (3) Educational and Social Welfare Organizations -
example: The American Association of School
Administrators
- (4) Health and Medical Associations - example:
American Dental Association
- (5) General Organizations - example: Veterans of
Foreign Wars

The Encyclopedia of American Associations (1956) states that trade associations enable competitive industries to deal with common problems cooperatively and provide a channel through which American business has elected to operate. If a city contains a central office of one of these associations, then this city is integrating certain activities for units spread all over the nation.

This activity would not, I believe, exhibit a steep gradient pattern, and easily transports its services to the consumers. It is an ideal indicator of regional dominance.

8. Per capita sales of wholesale brokers and manufacturers' representatives (U. S. Census of Business, 1954)

Unlike the wholesaling activity included in the list of local indicators, this Census category includes only those sales made by offices containing no stock. This category represents the activity of salesmen and brokers submitting merchandise orders from distant areas to the home office. McKenzie (1933) speaks of wholesaling on a rather local basis, but he distinguishes a type of wholesaling which stretched far beyond the local boundaries of a community, typified by sales through brokers and manufacturers' representatives.

This activity is easily exported, highly specialized and is transmitted indirectly to the consumer, qualifying it as an indicator of regional rather than local dominance.

9. Number of mail order houses (U. S. Census of Business, 1954)

This activity is very similar to the wholesaling activity just described. Most retail buying is transacted by the consumer traveling to a store and purchasing goods. Some retail purchases, however, are made through the mails. Many cities contain mail order houses which distribute catalogues describing retail merchandise enabling people from every part of the country to order retail goods.

This activity would probably be distributed as a flat gradient and is a rather specialized activity.

10. Number of airplane passengers per capita (Federal Aviation Agency, 1959)

People in any place in the United States can now, through air travel, be in physical contact with any other place in the United States. Air travel, therefore, should enhance the integrative abilities of metropolises by bringing distant places into their daily orbit of influence. Air travel is a long distance carrier of goods and services. For these reasons we are designating this measure of air travel as an indicator of regional dominance.

Measures of coefficients of dissimilarity for each of the twenty indicators of metropolitan dominance provide rather specific checks on whether they are regional or local activities. This coefficient measures how uniformly any particular activity is distributed over an area. A discussion of its meaning and computation is found in Bogue's (1949) metropolitan dominance study.

Let us use apparel sales as an example to describe very briefly how we computed this measure. The percentage of apparel sales, each central city contained, of the total central cities apparel sales was computed, along with the percentage of population, each central city

contained, of the total central city population. For each city we subtracted the percentage apparel sales from the percentage population. If we add the total column of results from these subtractions, our answer would be zero. But by choosing either the negative results (minus numbers) or positive results, and adding them only, we acquire a number which represents the amount of apparel sales in central cities which would have to be redistributed to other central cities in order for apparel sales to be distributed exactly as the population.

A coefficient of dissimilarity was computed for each of the twenty indicators of metropolitan activity, the results of which are listed in Table 1. The left hand column shows the coefficients of dissimilarity for each of the indicators; the right hand column ranks the indicators in terms of their coefficients (from low to high).

The lower the coefficient of dissimilarity the more the distribution of the activity resembles the distribution of the population, and the more likely it is that this activity indicates local rather than regional dominance. Conversely, the higher the coefficient of dissimilarity the more likely it is a regional indicator.

Table 1 shows that only six out of the twenty indicators rank in positions which were not hypothesized. This table, then, supports fourteen of our twenty original designations. The uses to which these indicators will be put later in the study are better served if as many indicators are used as possible. For this reason the designations of the six indicators which were not supported by the coefficients of dissimilarity will be changed as the coefficients direct and retained in the analysis.

Our designation of telecommunications seems most in error. Instead of falling into the category of regional indicators, it has the third lowest coefficient. The Census of Population, Summary Volume (1950) shows that employees in the telephone component of this measure make up 92 per cent of the total measure in the whole United States. This accounts for our error of judgment since telephone employees clearly indicate a local activity.

Hotels and lodgings also rank with the local coefficients. One tends to think of this characteristic as indicating the large "Hilton" type hotels in the larger cities. It is highly probable that, since we are using numbers of employees, the smaller tourist homes and hotels account for many of the employees, and that they service a local population which travel to the city for business and shopping trips for a night or two and return home.

Newspaper employees probably account for a large portion of the printing, publishing, and allied category. No specific breakdown of the components of this category is published by the Census, and therefore we cannot definitely determine the percentage of employees in each component. If newspaper employees do make up a majority of this category, then this fact would account for the local character of this particular indicator.

Three local indicators rank high on the coefficient scale in Table 1: hospital beds, bank debits, and business services. Hospitals, it seems, should cater almost strictly to a local population. However, many people may travel to regional centers for specialized care of long-term illnesses. This seems to be especially the case for the mentally ill and tubercular patients. Hospitals specializing in

psychiatric care seem to be highly centralized institutions. The National Public Health Reports (1959) report that general hospitals in the United States contain 653,082 hospital beds, while mental, chronic, and tubercular hospitals contain 669,095 beds. The large number of hospital beds in the centralized types of hospitals probably accounts for the fact that the characteristic of per capita hospital beds is an indicator of regional rather than local activity.

Table 1
Coefficients of Dissimilarity for
Twenty Indicators of Local and Regional Dominance

<u>Indicators</u>		<u>Coefficients of Dissimilarity</u>	<u>Indicators</u>	<u>Ranked Coefficients of Dissimilarity</u>
1. Apparel sales		10.02	1. Utilities and sanitation	6.73
2. Business services		34.29	2. Apparel sales	10.02
3. Merchant wholesales		16.33	3. Telecommunications	11.04
4. Hospital beds		22.25	4. Trucking and warehousing	11.77
5. Trucking and warehousing		11.77	5. Post office gross receipts	14.02
6. Utilities and sanitation		6.73	6. Finance, insurance, and real estate	14.61
7. Entertainment		14.64	7. Entertainment	14.64
8. Finance, insurance, and real estate		14.61	8. Hotels and lodgings	14.78
9. Bank debits to deposit accounts		26.25	9. Merchant wholesales	16.30
10. Post office gross receipts		14.02	10. Printing, publishing, and allied	16.69
11. National offices of corporations		28.80	11. Wholesale brokers	22.13
12. Per cent employed by corporations		43.55	12. Hospital beds	22.25
13. Printing, publishing, and allied		16.69	13. Air passengers	25.88
14. Railroads and Railway Express		26.17	14. Railroads and Railway Express	26.17
15. Hotels and lodgings		14.78	15. Bank debits to deposit accounts	26.25
16. National offices of associations		48.75	16. National offices of corporations	28.80
17. Wholesale brokers		22.13	17. Mail order houses	30.26
18. Mail order houses		30.26	18. Business services	34.29
19. Air passengers		25.88	19. Per cent employed by corporations	43.55
20. Telecommunications		11.04	20. National offices of associations	48.75

New York City seems to be the cause of the high coefficients in bank debits for New York has a percentage difference of 22.65 from the total--with the overall measure being only 26.25. For business services, New York has a 26.53 measure while the overall measure is 34.29. Even though New York seems unique in these two activities, we still cannot continue to call them local activities. Both bank debits and business services cater to local units, but these local units are probably regional in nature and therefore high degrees of banking and business service activity are found in regional centers.

If the gap between the coefficients of the local indicators and the regional indicators are larger than the variability within the local indicators, we could feel assured that we made rather wise choices. Although the gap is not as great as we had hoped, it is sufficient for us to say that the coefficients of dissimilarity lend credence to most of our earlier designations.

Thus far we have designated and empirically observed a set of ten activities as being indicators of local dominance and a set of ten activities as indicating regionally dominant activity. A city will be locally or regionally dominant to the extent that it performs these various activities for other units. The literature reviewed in Chapter I suggested that a taxonomic problem presents itself when analyzing urban activity. Cities seem to vary considerably in the degree to which they perform services for other units. The city is a mediating point or service center for units located in an area greater in size than the city. In fact, the raison d'être of the city is that it performs a variety of services for outlying units. Some cities, however, perform this role to a greater extent than do others. Some cities exert influence only within a very local area, others seem to

extend their influence over larger regions, and a few cities seem to be supra-regional, exerting national influence.

The existence of the various types of cities, described above, seems apparent in a broad overview of the United States society. Gras (1922) employed the phrase, "metropolitan economy," when describing a society containing these different types of cities. A vast, complex system of specialization is the basis of a metropolitan economy which means that a few cities in a nation will specialize in one or a few activities, servicing all other cities, while the remaining cities in the nation will in turn specialize in other activities. The specialized cities will form a complex network of interdependence. Several cities in this chain of interdependence will perform the function of facilitating the integration between the specialized cities, while spread throughout this same network other cities will be servicing only very local populations.

The few super-cities in a nation--the ones which facilitate integration between many other cities--are the only ones in which we would expect to find many metropolitan activities being performed to a great degree. The other cities will exhibit high degrees of a few metropolitan activities--the ones in which they specialize--and will not perform the other activities to a very great extent. Since cities develop as service centers for outlying units, we would expect to find the local metropolitan activities more evenly distributed among the cities of a nation than regional activities.

In Chapter I we argue that if metropolis is a meaningful sociological concept, we must have variables other than population size to indicate the distinctive metropolitan activity. In our discussions

of the indicators of metropolitan activity, however, we make no mention of population size. It may be that these indicators are all so highly related to population size that they provide us with no added information than simply using population size as the indicator of metropolitan activity. Table 2 demonstrates the way each variable, used as an indicator, relates to population size.

Per capita business services is the only indicator which is closely related to population size. Slightly over 64 per cent of the variance in per capita business services in central cities of Standard Metropolitan Areas is explained by the total population of the Standard Metropolitan Area.

Per capita bank debits to deposit accounts is also related to population size but not as strongly as business services. Both of these variables are local indicators.

If our assumptions that these twenty variables indicate integrative activities of metropolises are valid, then population size tells us very little about metropolitan activity when dealing only with central cities of Standard Metropolitan Areas, all containing at least 50,000 population. Knowing whether a central city is small or large indicates very little, if anything, about the quantity of any one of the metropolitan indicators except business services and bank debits to deposit accounts.

Table 2

Zero Order Correlation Coefficients Relating Each Metropolitan Indicator
to Population Size of Central City and to Population
Size of Standard Metropolitan Area

<u>Indicators</u>	<u>With Central City Population</u>	<u>With SMA Population</u>
1. Per capita apparel sales	.14	.01
2. Per capita business services	.73*	.82
3. Per capita merchant wholesales	.33	.26
4. Number of hospital beds per capita	-.16	-.11
5. Per cent employed trucking and warehousing	.18	.08
6. Per cent employed in utilities and sanitation	-.04	-.07
7. Per cent employed in entertainment	.11	.17
8. Per cent employed in finance, insurance, real estate	.23	.20
9. Bank debits to deposit accounts, per capita	.49	.58
10. Per capita post office gross receipts	.37	.26
11. National offices of industrial corporations, as ratio to central city population	.18	.19
12. Per cent employed by industrial corporations	.24	.26
13. Per cent employed in printing, publishing, and allied	.27	.23
14. Per cent employed in railroads	-.07	-.08
15. Per cent employed in hotels and lodgings	-.02	.00
16. National offices of associations as ratio to central city population	.33	.30
17. Per capita sales by wholesale brokers	.40	.31
18. Number of mail order houses as ratio to central city population	.03	.14
19. Number of air passengers as ratio to central city population	.30	.16
20. Per cent employed in telecommunications	.18	.13

*Correlations .15 or over are significant at the .05 level.

The model of the urban society which we are using as a frame of reference and attempting to present in this paper, is that the total area of the society is dotted with many local service centers, and that superimposed on this area are cities, each specializing in different activities, forcing them to be tied together in a network of exchanges. A few cities will possess many integrative functions and will tend to facilitate the integration of the specialized cities to each other as well as to the local service centers. Our aim is to use the twenty indicators of integration as a means to identify these various types of cities.

Observing the interrelationships between the twenty indicators will help us to discern whether or not the cities of the United States tend to conform to the pattern of a metropolitan economy described above. A correlation matrix involving the twenty indicators will serve this purpose and will provide us with the added information as to whether or not our indicators are actually measuring different kinds of phenomena.

If the concept of a metropolitan economy tends to describe the United States situation, and if the twenty indicators of integrative activity tend to adequately measure the integrative services performed by cities, then we expect a correlation matrix involving all twenty indicators to exhibit relatively low correlations. Most large cities, however, should service a local area in a variety of ways. If so, they would not tend to be specialized in those respects. Hence we expect higher correlations for the local indicators than for the regional indicators. The only cities we would suspect of exhibiting a high degree of activity in many characteristics would be the super-cities--

those cities servicing and integrating the activities of both the specialized cities and the local service centers. The specialized cities, we expect, will show a high degree of activity in one or a few characteristics, but a low degree of activity in the other characteristics. The correlation coefficients will probably have a tendency to be low since the majority of the cities listed in the matrix will be specialized rather than super-cities. Knowing the degree of one activity in a city should not, therefore, permit us to predict the extent of other activities in that city.

Tables 3:A, B, and C are correlation matrices depicting the relationships between the metropolitan activity indicators.

Tables 3:A, B, and C, together, represent a correlation matrix including all twenty indicators of metropolitan activity. They are broken down and presented in three matrices for easier reading and to serve the purpose of viewing the intercorrelations between the regional characteristic alone or the local characteristic alone. They show that generally the indicators are minimally related to each other. There is only one correlation in the total matrix above .70. Per capita business services and per capita bank debits to deposit accounts yield a .71 correlation coefficient. Interestingly enough, these were the only two variables which were highly correlated with population size. They may be describing the same phenomena. Out of the 160 correlations in the matrix, three are between .60 and .70--all involving wholesaling. Per capita sales by wholesale brokers, a regional indicator, is correlated to per capita merchant wholesales, a local indicator, .64. Merchant wholesales per capita is correlated to telecommunications .62, and per capita sales by brokers is correlated .60 with

per capita bank debits to deposit accounts. Twenty-three cells in the matrix show correlations between .40 and .60 which total twenty-seven correlations above .40.

The total correlation matrix fits the interpretation previously presented, that cities in the United States are units of a metropolitan economy. As expected, many of these units probably specialize in a small number of integrative activities and therefore pull the correlation coefficients down to a relatively low level. We must realize that many interpretations could be derived from this correlation matrix. We believe, though, that the description of cities in the United States as being involved in a network of specialization is a plausible one and the correlation matrix conforms to it but does not substantiate it.

The total correlation matrix exhibits small correlations. It follows then that a matrix involving only local indicators would also have small correlations. Previous remarks, though, indicated that the local matrix would generally exhibit higher correlations than the regional matrix and Tables 3:A and 3:B validate this. The average correlation of the local matrix is .24 while the average correlation of the regional matrix is .13.

In the following chapter the twenty indicators of metropolitan activity, discussed in full in this chapter, will be used to classify the 168 Central Cities of Standard Metropolitan Areas into various metropolitan types.

Table 3:A

Correlation Coefficients Indicating Relationships Between
Ten Indicators of Local Dominance

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
1. Per cent number employed in utilities										
2. Per capita apparel sales	.12*									
3. Per cent employed in telecommunications	.37	.14								
4. Per cent employed in trucking and warehousing	.18	-.11	.40							
5. Per capita post office gross receipts	.09	.25	.51	.30						
6. Per cent employed in finance, insurance, and real estate	.12	.06	.44	.25	.43					
7. Per cent employed in entertainment	.17	.22	.34	.16	.16	.30				
8. Per cent employed in hotels and lodgings	.17	.37	.16	-.05	.11	.13	.44			
9. Per capita merchant wholesales	.33	.18	.62	.52	.48	.56	.41	.15		
10. Per cent employed in printing, publishing, and allied	.04	-.08	.21	.23	.57	.17	.12	-.02	.11	

*Correlations of .15 or
over are significant at
the .05 level

Table 3:B

Correlation Coefficients Indicating Relationships Between
Ten Indicators of Regional Dominance

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
1. Per capita wholesale sales through brokers' and manufacturers' representatives										
2. Number of hospital beds per capita	-.07*									
3. Number of people boarding planes per capita	.42	.00								
4. Per cent employed in railroads and Railway Express	.07	.12	-.06							
5. Per capita bank debits to deposit accounts	.60	-.04	.35	-.01						
6. Number of national offices of corporations per capita	.16	-.01	-.16	-.15	.23					
7. Number of mail order houses per capita	.11	-.02	-.18	-.04	.14	.06				
8. Per capita business service receipts	.52	-.10	.42	-.10	.71	.27	.22			
9. Number of employees of corporations having central office in city per capita	.21	-.09	-.06	-.09	.35	.56	.07	.31		
10. Number of national offices of associations per capita	.11	.04	.25	-.05	.21	.02	.10	.28	.07	

*Correlations of .15 or
over are significant at
at the .05 level

Table 3:C

Correlation Coefficients Indicating Relationships Relating
the Regional to the Local Indicators of Metropolitan Activities

	<u>Local</u>										
	Regional	Wholesale Brokers	Hospital Beds	Air Passengers	Railroads	Bank Debits	National Offices of Corporations	Mail Order Houses	Business Service	Employed by Corporations	National Offices of Associations
1. Per cent number employed in utilities		.14	-.01	.20	.06	.08	-.05	.10	.08	-.16	-.04
2. Per capita apparel sales		.03	.11	.26	-.14	.22	.11	.36	.09	.04	.12
3. Per cent employed in telecommunications		.41	.01	.42	.15	.37	-.20	.17	.33	-.01	.13
4. Per cent employed in trucking and warehousing		.50	-.07	.16	.06	.26	.11	-.04	.29	.05	-.05
5. Per capita post office gross receipts		.47	.06	.44	-.01	.50	.23	.34	.51	.15	.44
6. Per cent employed in finance, insurance, and real estate		.36	.03	.42	.02	.45	-.11	.16	.40	-.05	.14
7. Per cent employed in entertainment		.28	.10	.52	-.07	.19	-.13	.15	.27	-.08	.06
8. Per cent employed in hotels and lodgings		.02	.02	.26	-.03	.05	-.16	.17	.07	-.11	.10
9. Per capita merchant wholesales		.52	.04	.58	.07	.52	-.08	.17	.49	-.08	.06
10. Per cent employed in printing, publishing, and allied		.15	.00	.11	.01	.17	.22	.12	.34	.07	.34

Chapter III

THE METROPOLITAN CENTRAL CITIES

"It would be worthwhile to determine statistically what a metropolis really is," Gras declared, "and if satisfactory figures were available, this could be done... Or we may put it this way: That a city is a full-fledged metropolis when most kinds of products of the district concentrate in it for trade as well as transit; when these products are paid for by wares that radiate from it; and when the necessary financial transactions involved in this exchange are provided by it" (1922, p. 294).

The theoretical framework and the indicators of metropolitan dominance, already set forth, along with various statistical techniques available to us, now make it possible to statistically describe degrees of urban activity in which various cities engage.

Before describing the technique used in this analysis, let us review the statistical techniques that have been used in other researches studying similar problems.

One technique was used by Howard Nelson (1955). He attempted to classify 897 American cities according to their specialization in various industrial activities. For each of nine industrial categories, Nelson computed the national average of the per cent employed in each industry. Then he computed how far each city deviated from this national average in standard deviation units. He particularly

distinguishes three types of cities: (1) those cities containing the national average of per cent employed plus one standard deviation, (2) those which contain the national average plus two standard deviations, and (3) those which contain the national average plus three or more standard deviations.

Gunnar Alexandersson (1956), in a study designed to describe the important industries in each American city, utilized a somewhat different measure than Nelson (1955). By using cumulative distribution curves for the per cent employed in each industry in every city in the United States, he arrived at a constant number for each industry, indicating the per cent of employees in the city which were needed to service that city's population. This constant number is similar to the national average of the per cent employed in each industry. When ranking cities in terms of the important industries located within them, Alexandersson (1956) utilized three categories labeled "A," "B," and "C." Category "A" equaled the constant number plus 20 per cent or more of employees in one industry; "B" equaled the constant number plus 10-19.9 per cent of employees; and "C" equaled the constant number plus 5.0-9.9 per cent of employees.

In a discussion of the measure he used for determining basic and non-basic activities, Alexander (1954) attributes it to Homer Hoyt. Hoyt set forth four steps to determine basic activities in a community: (1) Determine the number of people employed in each principal type of employment in the United States; (2) determine the percentage of the national income which is earned by a particular city; (3) apply the percentage resulting from step two to the total number employed in one type of industry in the United States (result of step one). (4) The

result of step three indicates the number of people required in this industry in this particular city in order to maintain the operation of the city. The number of employees exceeding the figure derived from step three are people employed in "urban growth" activities or "basic" industry of the city.

P. Sargent Florence (1955), in an essay discussing various aspects of the metropolitan city, describes industries in terms of a measure which he calls the location quotient. The location quotient is the result of dividing the proportion of local-to-national workers in any branch of industry, by the proportion of local-to-national residential population. For example, an area may have 15.8 per cent of the national total of wholesale employees, but only 8.6 per cent of the national population. Thus the location quotient is 1.8--computed by dividing 15.8 by 8.6. A location quotient of 1.0 indicates that the location of an industry in a given place is no more and no less than would be mathematically expected from the distribution of population. Florence states that location quotients over 1.5 for an industry in a populous area indicate a definite tendency toward localization of the industry in that place.

In their statistical designations of southern metropolises, Vance and Smith (1954) simply converted the measures of six metropolitan activity indices for each of twenty-nine areas into z-scores so that the relative position of each city in the distributions of the six factors would be strictly comparable.

The statistical technique we have chosen to use in measuring metropolitan dominance contains all of the advantages of the measures just described, yet is much more suited to our needs than any of those just mentioned.

Our measure is a slight variation of Florence's (1955) location quotient. It transfers the emphasis which all the previously cited measures place on the internal incidence of industrial activity in a city, to the effect that a city's industrial activity has upon units outside the city. For each of the twenty indicators of metropolitan activity discussed in Chapter II, we will divide the total amount of activity in a particular central city by the total population of that central city. The ratio obtained will then be divided by the ratio of the total amount of the activity in the urban United States, divided by the total urban population of the United States. For example:

$$\frac{a_1}{b}$$

where:

$$\frac{A_1}{B}$$

a_1 - activity of one industry in a central city
 b - total population of central city
 A_1 - total activity in urban United States
 B - total population in the urban United States

In an excellent article discussing the ratio measure described above, Mattila and Thompson (1955) refer to the measure as being an index of local specialization. They criticize it, and present an alternative measure which they feel better accomplishes the desired result. They state that their alternative measure reflects the importance of each industry to each locality, but that the measure which we use reflects the importance of the locality to the industry. Since our efforts in this study will be focused on measuring the influence a city exerts over distant units, we retained the ratio method as the measure to be used here instead of using the substitute measure presented by Mattila and Thompson.

Appendix Tables A and B present the ratios of the twenty indicators of metropolitan activity for each of the 168 central cities of Standard Metropolitan Areas in the United States. If a ratio is above 1.00 it can be interpreted that the city exhibiting this ratio is integrating a larger area or a local area more intensively than is normally the case for the average city. This statistical technique reflects the definition of metropolitan activity set forth in Chapter I, for with it we can discern the degree to which various cities perform integrative activities to an extent greater than urban places in general.

This ratio technique does not measure the actual amount of integrative influence which is exerted by any particular city. It measures the integrative influence of a city, relative to its own population. When the reader interprets this measure, therefore, caution is required when comparing large cities to small cities. Los Angeles may exert a greater amount of influence than Harrisburg, Pennsylvania, but relative to their population sizes Harrisburg may be more active than Los Angeles. All cities in this study contain 50,000 or more people, and therefore we are analyzing the larger cities in the United States, but all the ratios must be interpreted as being relative to the population size of a particular city.

The differences in consumption patterns between cities may also effect the interpretation of the ratios used in this research. The ratios are used as if all cities exhibit the same consumption patterns. Of course, this is not the case, for New York may be a city in which the population buys more wearing apparel than in Laredo, Texas. Using the ratios, computed in this study, in a very general way, however, may have the effect of balancing these various consumption differences.

There are many implications in the first two chapters indicating our belief that a city must engage in more than one integrative activity, and that it must engage in these various activities extensively in order for it to attain metropolitan status. For this reason the ratios of the indicators of metropolitan dominance have been averaged and are presented in Table 4. The ratio technique makes the scores for each city comparable.

Chapter I provides a basis for distinguishing between local and regional dominance. In Chapter II hypotheses attribute various characteristics of cities to one of these two categories of dominance. In this chapter, the magnitude of the operation of the ten variables hypothesized as indicating local dominance and the ten variables indicating regionally dominant activities is determined for each of the 168 central cities of Standard Metropolitan Areas.

Table 4 presents the average ratios of characteristics designated as either local or regional activities. Variation of statistical averages are susceptible to extremes in a distribution of scores. For example, railroading in Altoona and national associations in Washington, D. C. can pull the average ratios for these two cities far above 1.00. For this reason, we also present in Table 4 the number of indicators--either local or regional--which exhibit ratios above 1.10. Expressed in much of the literature dealing with metropolitan structure is the idea that cities attaining the status of metropolises should exhibit a large number of the important metropolitan characteristics. The number of ratios above 1.10 provides the reader with information which can be used to ascertain how diffuse are the activities of a city.

In the Vance and Smith study (1954) of southern metropolises, six indicators of metropolitan activity were used. When delineating the cities which attained metropolitan status, Vance and Smith gave double weight to three of the six indices. They presented no theoretical rationale for their weighting procedure. We think it is highly probable that certain activities play a more important role than others in determining metropolitan status. In attempting to achieve some check of this idea, double weight is given to the economic activities of apparel sales; trucking and warehousing; finance, insurance, and real estate; and sales of merchant wholesales when averaging the ten local indicators. The average ratios of the local indicators, with four having double weight, correlate .97 with the average ratios of the ten nonweighted local indicators. The regional indicators which acquired double weights were the economic activities of wholesale brokers; bank debits to deposit accounts; and national offices of industrial corporations. A correlation coefficient of .94 was attained when correlating the average ratios with three being weighted to the average ratios of the ten nonweighted indicators. These high correlations led to the conclusion that weighting some of the indicators does not change their effect appreciably. Theoretical difficulties arise when attempting to determine which activities should be given more weight in the determination of metropolitan status. Because of these theoretical difficulties and because of the high correlations discussed above, none of the indicators of metropolitan activity will be weighted.

Table 4

Average Ratios of Indicators of Regional and Local Dominance
for Central Cities of Standard Metropolitan Areas

Central Cities	REGIONAL		LOCAL	
	Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
1. Akron	1.33	2	.80	1
2. Albany-Schenectady-Troy	1.58	4	1.07	4
3. Albuquerque	.87	2	.99	3
4. Allentown-Bethlehem-East	.67	2	.87	2
5. Altoona	1.32	1	.68	0
6. Amarillo	.95	3	1.46	7
7. Asheville	.48	2	1.15	4
8. Atlanta	1.81	6	1.51	8
9. Atlantic City	.66	1	2.70	4
10. Augusta	.64	2	.82	2
11. Austin	.67	1	1.00	2
12. Baltimore	.62	0	.94	3
13. Baton Rouge	.41	0	.75	1
14. Bay City	.34	1	.79	1
15. Beaumont-Port Arthur	.24	0	.88	2
16. Binghamton	.84	3	.91	1
17. Birmingham	.75	2	.89	1
18. Boston	1.60	8	1.34	6
19. Bridgeport	.64	3	.84	1
20. Brockton	.77	1	.98	4

Table 4-Continued

	REGIONAL		LOCAL	
	Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
<u>Central Cities</u>				
21. Buffalo	.84	4	.93	2
22. Canton	.97	2	.83	1
23. Cedar Rapids	.81	3	1.12	7
24. Charleston, S. C.	.44	1	.88	3
25. Charleston, W. V.	.96	2	1.38	6
26. Charlotte	1.46	4	1.51	8
27. Chattanooga	.80	2	1.24	4
28. Chicago	2.06	9	1.39	8
29. Cincinnati	1.47	7	1.12	5
30. Cleveland	1.78	8	1.03	4
31. Columbia	1.20	3	1.06	4
32. Columbus, Ga.	.30	0	.73	1
33. Columbus, Ohio	1.12	4	1.08	4
34. Corpus Christi	.33	0	.98	4
35. Dallas	1.34	6	1.64	10
36. Davenport-Rock Island-Moline	.73	2	.91	0
37. Dayton	1.24	6	1.02	3
38. Decatur	.85	2	.91	1
39. Denver	1.21	6	1.22	6
40. Des Moines	1.09	5	1.81	8

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
41.	Detroit	1.53	4	.87	0
42.	Duluth-Superior	.62	2	1.07	4
43.	Durham	.87	3	.67	0
44.	El Paso	.95	4	.95	4
45.	Erie	.38	1	.76	0
46.	Evansville	.64	2	.84	2
47.	Fall River	.29	1	.62	0
48.	Flint	.17	0	.74	1
49.	Ft. Wayne	1.01	3	1.00	2
50.	Ft. Worth	.64	2	1.05	3
51.	Fresno	.97	3	1.22	6
52.	Gadsden	.10	0	.59	0
53.	Galveston	.40	2	1.07	4
54.	Grand Rapids	.98	2	1.13	5
55.	Green Bay	.80	4	1.17	5
56.	Greensboro-Highpoint	1.61	5	1.03	4
57.	Greenville	.70	2	1.09	5
58.	Hamilton-Middletown	.81	2	.65	0
59.	Harrisburg	1.68	7	1.42	6
60.	Hartford	.98	3	1.25	4

Table 4-Continued

Central Cities	REGIONAL		LOCAL	
	Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
61. Houston	.93	3	1.20	6
62. Huntington-Ashland	.91	3	.79	1
63. Indianapolis	1.00	3	1.17	6
64. Jackson, Mich.	1.04	3	1.11	2
65. Jackson, Miss.	.76	2	1.16	5
66. Jacksonville	1.07	5	1.14	6
67. Johnstown	.42	0	.62	0
68. Kalamazoo	1.80	3	1.00	3
69. Kansas City	1.53	8	1.54	8
70. Kenosha	.44	1	.64	1
71. Knoxville	.88	4	.91	2
72. Lancaster	1.64	4	1.15	6
73. Lansing	.38	0	1.06	5
74. Laredo	.36	1	.70	3
75. Lawrence	.25	0	.59	1
76. Lexington	1.69	5	1.27	4
77. Lima	.90	4	.79	0
78. Lincoln	1.06	3	1.13	6
79. Little Rock	1.34	3	1.24	6
80. Lorain-Elyria	.55	2	.57	0

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
81.	Los Angeles	1.19	5	1.31	5
82.	Louisville	.94	4	1.09	3
83.	Lowell	.33	0	.67	2
84.	Lubbock	.53	1	1.18	7
85.	Macon	.65	2	.91	4
86.	Madison				
87.	Manchester	1.30	3	1.27	6
88.	Memphis	.30	0	.89	2
89.	Miami	.96	4	1.21	4
90.	Milwaukee	1.81	3	1.70	7
		.94	4	1.07	4
91.	Minneapolis-St. Paul	1.25	7	1.28	6
92.	Mobile	.68	2	.79	0
93.	Montgomery	.49	1	.84	0
94.	Muncie	.65	2	.73	1
95.	Nashville	1.34	5	1.27	6
96.	New Bedford	.29	1		0
97.	Bristol-New Briton	.78	2	.60	1
98.	New Haven	.94	3	1.00	3
99.	New Orleans	.74	1	1.03	3
100.	New York	2.50	7	1.41	8

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
101.	Norfolk-Portsmouth	.54	2	.63	1
102.	Ogden	1.02	3	.72	1
103.	Oklahoma City	.64	2	1.32	7
104.	Omaha	1.44	4	1.39	7
105.	Orlando	1.14	3	1.30	6
106.	Peoria	1.29	4	.96	1
107.	Philadelphia	.92	3	.95	2
108.	Phoenix	1.46	5	1.42	8
109.	Pittsburgh	2.27	8	1.01	3
110.	Pittsfield	.46	0	.67	0
111.	Portland, Me.	.56	1	1.23	6
112.	Portland, Ore.	1.00	5	1.33	9
113.	Providence	1.06	3	.95	3
114.	Pueblo	1.15	2	.79	1
115.	Racine	1.16	4	.90	2
116.	Raleigh	1.24	5	1.16	6
117.	Reading	.70	2	.90	2
118.	Richmond	1.22	7	1.20	6
119.	Roanoke	1.17	3	1.04	4
120.	Rochester	1.08	3	.92	3

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
121.	Rockford	.67	3	.91	2
122.	Sacramento	.85	3	1.25	7
123.	Saginaw	.53	1	.88	2
124.	St. Joseph	.70	2	.91	4
125.	St. Louis	1.56	8	1.20	5
126.	Salt Lake City	.79	3	1.22	7
127.	San Angelo	.24	0	.87	2
128.	San Antonio	.56	1	.87	1
129.	San Bernardino	1.15	2	.87	3
130.	San Diego	.49	1	.84	2
131.	San Francisco-Oakland	1.37	6	1.37	9
132.	San Jose	1.12	3	1.04	2
133.	Savannah	.67	2	.77	1
134.	Scranton	.55	1	.93	2
135.	Seattle	1.17	4	1.24	6
136.	Shreveport	.61	3	1.05	4
137.	Sioux City	.95	2	1.07	4
138.	Sioux Falls	.71	1	1.14	6
139.	South Bend	.50	1	1.00	2
140.	Spokane	.77	2	1.15	5

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
141.	Springfield, Ill.	.55	1	1.23	7
142.	Springfield, Mo.	.86	2	1.06	4
143.	Springfield, Ohio	.39	0	1.19	3
144.	Springfield-Holyoke	.52	2	1.03	2
145.	Stamford-Norwalk	.61	2	.92	3
146.	Stockton	1.31	3	1.10	5
147.	Syracuse	.91	2	1.09	4
148.	Tacoma	.77	3	.83	1
149.	Tampa-St. Petersburg	1.16	2	1.13	5
150.	Terre Haute	.60	1	.99	4
151.	Toledo	1.30	5	.77	1
152.	Topeka	1.47	3	1.23	5
153.	Trenton	1.16	3	.81	2
154.	Tulsa	.98	4	1.31	7
155.	Utica-Rome	1.07	3	.75	0
156.	Waco	.60	2	.88	0
157.	Washington, D. C.	2.93	5	1.31	5
158.	Waterbury	.42	2	.69	1
159.	Waterloo	1.01	4	.82	0
160.	Wheeling-Steubenville	.91	3	.95	3

Table 4-Continued

	Central Cities	REGIONAL		LOCAL	
		Average ratios of ten indicators	Number of indicators having ratios over 1.10	Average ratios of ten indicators	Number of indicators having ratios over 1.10
161.	Wichita	.85	3	1.13	5
162.	Wichita Falls	.66	1	.91	1
163.	Wilkes-Barre-Hazelton	.59	2	.84	2
164.	Wilmington	3.38	6	.98	2
165.	Winston-Salem	.92	2	.80	2
166.	Worcester	.64	2	.81	1
167.	York	1.19	3	1.09	5
168.	Youngstown	.75	3	.62	0

Assuming that the characteristics chosen as metropolitan indicators indicate metropolitan activity and that the ratio technique used to analyze these indicators is justified, then we can logically proceed to designate the various types of central cities in Standard Metropolitan Areas which engage in varying degrees of metropolitan activity. The list of cities presented in Table 4 depict twelve types of central cities. In an attempt not to use the measures of integrative activities as precise measures, but rather to recognize their crude nature, the following method of classifying the central cities was devised:

	<u>City Type</u>	<u>Regional Average Ratio Score</u>	<u>Local Average Ratio Score</u>
I	Super Metropolis	1.56 and over	1.39 and over
II	Mature Metropolis	1.31 - 1.56	1.24 - 1.39
III	Limited Metropolis	1.10 - 1.31	1.10 - 1.24
IV	Partial Metropolis	1.10+	-1.10
V	Local Service Center	-1.10	1.10+
VI	Average City	.90 - 1.10	.90 - 1.10
VII	Regional Sub-Center	.90 - 1.10	-.90
VIII	Local Sub-Center	-.90	.90 - 1.10
IX	Satellite City	-.90	-.90

Cities in the first type represent those cities which exhibit ratios in the upper third of both the average local and regional measures for all cities exhibiting ratios above 1.10; cities in the second category are those cities which exhibit their lowest ratio in the middle third on one or both of the regional and local measures, and cities in the third category are in the lower third on one or both of the regional and local measures.

The Satellite Cities pose an interesting problem. When comparing the Satellite Cities with all other urban places--including the other central cities--it seems that these Satellite Cities are in reality

sub-cities or nonurban centers. In order to determine whether these Satellite Cities engage in greater degrees of integrative activity than other cities which are not central cities of Standard Metropolitan Areas, we have compared the Satellite Cities with the noncentral city urban population of the United States. The four types of cities presented below emerge when new average ratios are computed for those cities having both original average ratios below .90. The new average ratios have as their base the noncentral city urban activities and the noncentral city urban population. The four types extend our classification of cities, presented on the previous page, to twelve.

The additional four types are defined as follows:

	<u>Satellite City Types</u>	<u>New Average of Regional Ratios</u>	<u>New Average of Local Ratios</u>
IX	Sub-Dominant	1.00+	1.00+
X	Regionally Active	1.00+	-1.00
XI	Locally Active	-1.00	1.00+
XII	Nonintegrative	-1.00	-1.00

Table 5

Central Cities of Standard Metropolitan Areas
Classified by Degree of Metropolitan Activity

<u>I</u>		<u>II</u>		<u>III</u>		<u>IV</u>	
<u>Super</u> <u>Metropolis</u>		<u>Mature</u> <u>Metropolis</u>		<u>Limited</u> <u>Metropolis</u>		<u>Partial</u> <u>Metropolis</u>	
1. Atlanta		1. Boston		1. Cincinnati		1. Akron	
2. Chicago		2. Charlotte		2. Denver		2. Albany-Schenectady-Troy	
3. Harrisburg		3. Dallas		3. Lancaster		3. Altoona	
4. Miami		4. Kansas City		4. Los Angeles		4. Cleveland	
5. New York		5. Lexington		5. Madison		5. Columbia	
		6. Little Rock		6. Minneapolis-St. Paul		6. Columbus, Ohio	
		7. Nashville		7. Orlando		7. Dayton	
		8. Omaha		8. Raleigh		8. Detroit	
		9. Phoenix		9. Richmond		9. Greensboro-Highpoint	
		10. San Francisco-Oakland		10. St. Louis		10. Kalamazoo	
		11. Washington		11. Seattle		11. Peoria	
				12. Stockton		12. Pittsburgh	
				13. Tampa-St. Petersburg		13. Pueblo	
				14. Topeka		14. Racine	
						15. Roanoke	
						16. San Bernardino	
						17. San Jose	
						18. Toledo	
						19. Trenton	
						20. Wilmington	
						21. York	

Table 5-Continued

V		VI		VII		VIII	
Local Service Center		Average City		Regional Sub-Center		Local Sub-Center	
1. Amarillo	1. El Paso	1. Canton	1. Albuquerque	1. Albuquerque	1. Albuquerque	1. Albuquerque	1. Albuquerque
2. Asheville	2. Ft. Wayne	2. Huntington-Ashland	2. Austin	2. Austin	2. Austin	2. Austin	2. Austin
3. Atlantic City	3. Louisville	3. Lima	3. Baltimore	3. Lima	3. Baltimore	3. Baltimore	3. Baltimore
4. Cedar Rapids	4. Milwaukee	4. Ogden	4. Binghamton	4. Ogden	4. Binghamton	4. Binghamton	4. Binghamton
5. Charleston, W. V.	5. New Haven	5. Waterloo	5. Brockton	5. Waterloo	5. Brockton	5. Brockton	5. Brockton
6. Chattanooga	6. Philadelphia	6. Winston-Salem	6. Buffalo	6. Winston-Salem	6. Buffalo	6. Buffalo	6. Buffalo
7. Des Moines	7. Providence	7. Utica-Rome	7. Corpus Christi	7. Utica-Rome	7. Corpus Christi	7. Corpus Christi	7. Corpus Christi
8. Fresno	8. Rochester		8. Davenport-Rock Island-Moline		8. Davenport-Rock Island-Moline	8. Davenport-Rock Island-Moline	8. Davenport-Rock Island-Moline
9. Grand Rapids	9. Sioux City		9. Decatur		9. Decatur	9. Decatur	9. Decatur
10. Green Bay	10. Syracuse		10. Duluth-Superior		10. Duluth-Superior	10. Duluth-Superior	10. Duluth-Superior
11. Hartford	11. Wheeling- Steubenville		11. Ft. Worth		11. Ft. Worth	11. Ft. Worth	11. Ft. Worth
12. Houston			12. Galveston		12. Galveston	12. Galveston	12. Galveston
13. Indianapolis			13. Greenville		13. Greenville	13. Greenville	13. Greenville
14. Jackson, Mich.			14. Knoxville		14. Knoxville	14. Knoxville	14. Knoxville
15. Jackson, Miss.			15. Lansing		15. Lansing	15. Lansing	15. Lansing
16. Jacksonville			16. Macon		16. Macon	16. Macon	16. Macon
17. Lincoln			17. New Orleans		17. New Orleans	17. New Orleans	17. New Orleans
18. Lubbock			18. Reading		18. Reading	18. Reading	18. Reading
19. Memphis			19. Rockford		19. Rockford	19. Rockford	19. Rockford
20. Oklahoma City			20. St. Joseph		20. St. Joseph	20. St. Joseph	20. St. Joseph
21. Portland, Me.			21. Scranton		21. Scranton	21. Scranton	21. Scranton
22. Portland, Ore.			22. Shreveport		22. Shreveport	22. Shreveport	22. Shreveport
23. Sacramento			23. South Bend		23. South Bend	23. South Bend	23. South Bend
24. Salt Lake City			24. Springfield, Mo.		24. Springfield, Mo.	24. Springfield, Mo.	24. Springfield, Mo.
25. Sioux Falls			25. Springfield-Holyoke		25. Springfield-Holyoke	25. Springfield-Holyoke	25. Springfield-Holyoke
26. Spokane			26. Stamford-Norwalk		26. Stamford-Norwalk	26. Stamford-Norwalk	26. Stamford-Norwalk
27. Springfield, Ill.			27. Terre Haute		27. Terre Haute	27. Terre Haute	27. Terre Haute
28. Springfield, Ohio			28. Wichita Falls		28. Wichita Falls	28. Wichita Falls	28. Wichita Falls
29. Tulsa							
30. Wichita							

Vance and Smith (1954) discuss the occurrence of Federal Reserve Banks in cities as being an indication of metropolitan dominance. It is questionable whether Federal Reserve Banks are causes or effects of metropolitanism, but it proves interesting to see how this activity relates to the types of cities just described.

Table 6

Cities Containing District Office Banks
of the Federal Reserve System, and Their Positions
in a Classification of Metropolitan Activity

<u>Federal Reserve Bank District Offices</u>		<u>Metropolitan Type</u>	
1. Atlanta		I	Super Metropolis
2. Boston		II	Mature Metropolis
3. Chicago		I	Super Metropolis
4. Cleveland		IV	Partial Metropolis
5. Dallas		II	Mature Metropolis
6. Kansas City		II	Mature Metropolis
7. Minneapolis		III	Limited Metropolis
8. New York		I	Super Metropolis
9. Philadelphia		VI	Average City
10. Richmond		III	Limited Metropolis
11. St. Louis		III	Limited Metropolis
12. San Francisco		II	Mature Metropolis

	<u>Metropolises</u>	<u>Nonmetropolises</u>	<u>Total</u>
Federal Reserve Bank in City	83%	17%	100.0% (12)*
No Federal Reserve Bank in City	13%	87%	100.0% (156)
	(30)	(138)	(168)
*Total number of cases.			

Three of the twelve cities containing Federal Reserve District Banks are classified as Super Metropolises using the average ratios of integrative activities. The two cities which we classed as Super Metropolises, and which do not contain district banks are Miami and Harrisburg.

Four of the cities having district banks attained the second highest classification from our ranking technique; three attained the third classification. Only two of the Federal Reserve System District Cities are not classified as exhibiting high degrees of both regionally and locally dominant activities. Cleveland is very high on the measure of regional dominance but not on local dominance, while Philadelphia exhibits normal ratios for both local and regional indicators of metropolitan activity.

A further measure of integrative activity extending beyond national boundaries is the occurrence of Foreign Consuls in various cities. One would not expect that these consuls tend to locate in nonmetropolitan cities.

Twenty-seven of the 168 central cities contain ten or more offices of Foreign Consuls. Sixty-one central cities contain between one to ten offices of Foreign Consuls, and the remaining eighty central cities do not contain any Foreign Consul office. Table 7 presents those cities which have ten or more offices of Foreign Consuls, along with their classification on the metropolitan scale.

Table 7

Cities Containing Ten or More Foreign Consuls

<u>City</u>	<u>Number of Foreign Consuls</u>	<u>Metropolitan Type</u>
1. New York	50	Super Metropolis
2. Los Angeles	38	Limited Metropolis
3. Chicago	37	Super Metropolis
4. San Francisco	33	Mature Metropolis
5. New Orleans	30	Local Sub-Center
6. Washington	26	Mature Metropolis
7. Miami	26	Super Metropolis
8. Houston	24	Local Service Center
9. Boston	24	Mature Metropolis
10. Philadelphia	24	Average City
11. Detroit	23	Partial Metropolis
12. Seattle	22	Limited Metropolis
13. Baltimore	19	Local Sub-Center
14. St. Louis	17	Limited Metropolis
15. Portland, Ore.	16	Local Service Center
16. Tampa	15	Limited Metropolis
17. Minneapolis-St. Paul	15	Limited Metropolis
18. Mobile	14	Regionally Active Sat.
19. Cleveland	14	Partial Metropolis
20. Kansas City	13	Mature Metropolis
21. Atlanta	12	Super Metropolis
22. Galveston	12	Local Sub-Center
23. Norfolk	12	Nonintegrative Satellite
24. Savannah	11	Regionally Active Sat.
25. Denver	10	Limited Metropolis
26. Jacksonville	10	Local Service Center
27. San Diego	10	Regionally Active Sat.

	<u>Metropolises</u>	<u>Nonmetropolises</u>	<u>Total</u>
Cities Containing 10 or more Foreign Consuls	52%	48%	100.0% (27)
Cities Containing less than 10 Foreign Consuls	11% (30)	89% (138)	100.0% (141) (168)

All of the cities classed as Super Metropolises except Harrisburg are included in the above list of cities containing ten or more Foreign Consuls. Seven additional cities on the list are classified as being

high on both regional and local indicators of metropolitan dominance. Eight of the remaining thirteen cities on the list are cities which do not attain the status of metropolises by our classification technique. It is interesting to note that twenty of the cities included are located on deep water coasts. This suggests that Foreign Consuls find it more expedient to locate where goods and people from their respective countries tend to arrive, rather than merely locating in areas where dominant activities are performed to a high degree. After checking the cities in which Foreign Consuls from particular countries locate, it seems that these cities tend to be ones which are most easily accessible to the home country.

The manner in which cities containing District Banks of the Federal Reserve System and cities containing Foreign Consuls relate to the classification of metropolitan cities, defined in terms of integrative activities, lends credence to the belief that these integrative activities adequately define metropolitanism. The relationship between population size as an index of metropolitanism and integrative activities as an index of metropolitanism is investigated in an attempt to shed further light on the definition of types of metropolitan cities.

In Chapter I an argument was presented against using population size as the definition of metropolitan status. It was maintained that cities act as service centers for outlying units, with some cities performing these service functions to a much greater degree than others. It was also maintained that a more meaningful classification of the metropolitan status of cities could be achieved by ranking them in terms of the degree to which they perform service or integrative functions for outlying units rather than ranking them merely in terms of

their population size. It still may be that the population size of cities is so closely related to the degree of integrative functions which they perform that a meaningful classification of the metropolitan status of cities could be achieved by separating the cities at convenient breaks in the ordering of their population size.

In order to test for the possibility that population size provides a more adequate and simple means of determining metropolitan status, rank order correlations were computed between population size and metropolitanism. A rank order correlation coefficient between population size and the average ratios of the ten regional activities was .48, while the correlation coefficient between population size and the average ratios of the ten local activities was .47. These two coefficients lead us to conclude that while population size is related to metropolitan activity, it nevertheless would not be an adequate measure for determining various types of cities engaged in varying degrees of metropolitan activity. The rank order correlation coefficients lead us to believe that no meaningful breaking points can be constructed for defining metropolitan activity when simply using the criterion of population size.

Ten indicators of regional types of activity and ten indicators of local types of activity have been presented--all of which have been used as a basis for classifying various types of central cities engaged in varying degrees of metropolitan activity. The discovery that not all of the central cities can be singled out as types of cities which are distinct from other urban places in the United States in terms of metropolitan activity performed is the most important finding of the first three chapters. The typology of cities shows that not all

central cities of Standard Metropolitan Areas as defined by the Census engage in integrative activities to a greater extent than average cities in the United States. An important secondary conclusion is that population size does not adequately depict the amount of metropolitan activity performed by a city.

A cursory investigation of the cities falling into the twelve categories outlined earlier reveals that only five central cities qualify as Super Metropolises. These cities are spread over a large area of the United States; some of them exhibit a relatively small population size. In this category, Miami and Harrisburg are listed, along with New York, Atlanta, and Chicago. Cities such as Louisville and Philadelphia are classified as Average Cities, while Buffalo, Baltimore, and Knoxville qualify as Sub-Centers only.

Sixteen central cities exhibited such low average ratios that it is doubtful whether they are integrating the activities of other units at all.

What are the conditions underlying the metropolitan status of these 168 central cities? Is Baltimore a Sub-Center because it is so close to Washington, D. C. that it functions merely as a suburb? Does San Diego suffer from its geographical surroundings? Are the units so sparse around Durham, New Orleans, and Mobile that they do not support or call for metropolitan functions? Are Fresno and San Bernadino too young to have developed units which are capable of performing metropolitan activities to a large extent? These are representative questions which might logically arise from a perusal of Table 5 and ones which will be explored further in Chapter IV.

Chapter IV

THE LOCATION OF METROPOLITAN ACTIVITY

In this chapter we analyze some of the conditions related to varying degrees of metropolitan activity. Our criteria of defining the twelve types of cities were based on the belief that specialization and industrialization are the heart of a metropolitan economy, and that the kinds of activities which a city draws to itself determine its metropolitan function. McKenzie states, "...once a city becomes established as a regional distributing center, its banking, transportation, and other facilities compel new concerns to select it for their point of operation. This cumulative process is one of the chief factors in explaining the recent rapid growth of many cities..." (1933, p. 164).

Because of the very nature of the definition of metropolitan cities, metropolitan activities cannot be used as independent variables to explain the position of a city in one of the twelve categories. For example, transportation, finance, retailing, and wholesaling are parts of the definition of metropolitan types, and the use of these and other similar variables as independent variables would therefore be redundant.

In earlier discussions of metropolitan types, we suggested that cities attain metropolitan status to the extent that they engage in integrative activities servicing units in outlying areas. The prediction would logically develop, then, that those cities easily accessible to

many outlying units requiring urban services would tend to exhibit greater degrees of metropolitan activity than other cities which are not as easily accessible to units having a demand for metropolitan services.

Both population density of the areas surrounding cities, and the distance between cities are measures of the accessibility of cities to outlying units. The greater the population size of the area surrounding a city, and the greater the distance between the city and other surrounding cities, other things being equal, the greater should be the degree of metropolitan activity performed in the city.

Further hypotheses concerning the performance of integrative activities in cities arise when population size, age, and geographical features of cities are conceptualized as independent variables.

We assume that larger cities must develop more complex units to perform service functions for their populations than do smaller cities, and it seems probable then that these service units could, in larger cities, more easily develop to a degree where they would perform service functions for populations in outlying areas as well. We hypothesize, therefore, that large cities will be more successful than small cities when competing for a dominant position over a surrounding area.

Since a long period of time is required for the growth and development of cities and for the subsequent attraction of various kinds of activities to them, it is logical that, other things being equal, the older a city is, the more likely that it will have attained metropolitan status.

Many students of urban life have noted that cities located at breaks in transportation routes have a greater opportunity to become

metropolitan in nature. One simple hypothesis derived from this idea is that cities which have attained metropolitan status are more likely to be located on deep water coasts than inland.

The remainder of this chapter will be devoted to observing and analyzing how various measures of the above five factors (availability of units to a city, distance between cities, population size of cities, age of cities, and geographic features of cities) are related to our typology of cities based on the performance of metropolitan functions.

First we will analyze the association of these factors with variations in the degree to which cities perform regional activities; then we will analyze their association with the performance of local activities; finally we will analyze their association with classifications combining the degree to which they perform both regional and local activities.

Regionally Dominant Cities

From Table 4, p. 54, of Chapter III, we derive three classes of cities varying in the degree to which they perform integrative activities of a regional nature relative to their population size. The measures were not precise enough to permit our drawing an unambiguous line between cities which do or do not integrate units on a regional scale, so we therefore chose only those cities having average ratios of 1.10 or above on the regional indicators as being cities engaged in metropolitan activities on a regional basis. Because of the crudeness of the data used, "errors" could occur in the use of our indicators. Certain cities having ratios below 1.10 could, in fact, be integrating activities of units located over a region. If a city exhibits a ratio below

.90, however, it is probably safe to assume that it is not integrating the activities of units spread over a large region. Cities exhibiting average ratios between .90 and 1.10, then, can be called Average Cities, with cities having average ratios below .90 called Nonregional Integrators.

Population size of cities is thought to be directly related to the dominant activities of cities. Duncan states that, "forms of dominance vary with size of center, inasmuch as the density gradients lie at a higher level for the largest centers than for all centers combined, both at the center and throughout the extent of the hinterland" (1957, p. 363). Rank order correlations of population size with integrative activities of cities were presented in Chapter III where we found that the two are related, but not to the extent that one can be used as a definition of the other. When we place the 168 central cities of Standard Metropolitan Areas into three classes of regional dominance, however, we find that population size is definitely related to the degree of regional dominance.

Table 8
Central Cities Classified in Terms of Regionally
Dominant Activities, by Population Size of Cities

<u>Population Size</u>	<u>Regional Types</u>			<u>Total</u>
	<u>Regional Metropolises (+1.10)</u>	<u>Average Cities (.90 - 1.10)</u>	<u>Non- Integrators (-.90)</u>	
Under 100,000	23.8%	14.3	61.9	100% (84)*
100,000 - 250,000	23.5%	23.5	52.9	100% (51)
250,000 and over	57.6%	24.2	18.2	100% (33)
	(51)*	(32)	(85)	(168)

*In this table, and all those to follow, the total number of cases in each row and column will be presented in parentheses.

Table 8 indicates that population size is related to the activities located and performed in cities. Larger cities are more successful than smaller cities in attracting activities which perform services for units spread over a vast region. While Table 8 demonstrates that not all large cities are regionally dominant, there is a greater probability that the larger rather than the smaller cities will engage in regionally dominant activities. We hypothesize that cities integrating the activities of other units tend not to be closely located to other central cities because close proximity between cities would cause these cities to share their integrative functions, and because units probably would seek services from the city nearest them. When measuring the distance between central cities and comparing this to the typology of regionally active cities, however, it is found that no such relationship between distance and regional dominance exists.

Table 9

Regional Dominance by Distance
to Nearest Central City

<u>Distance to Nearest Central City</u>	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 50 miles	30.1%	19.2	50.7	100% (73)
50 - 100 miles	33.8%	18.5	47.7	100% (65)
Over 100 miles	23.3%	20.0	56.7	100% (30)
	(51)	(32)	(85)	(168)

Instead of regional dominance being directly related to distance to nearest central city, the tendency is for the relationship to be in a reverse direction (Table 9). It is highly probable that cities attaining the status of Regional Metropolises must be located near other cities of metropolitan status in order to integrate some of the activities of those cities.

Population size is directly related to regional dominance, and large cities probably can compete more successfully than smaller cities for integrative activities. The farther a city is located from a larger city, then, the more chance it should have to perform integrative activities of a regional nature. Table 10 indicates that a direct relationship does exist between degree of regional domination and distance to the nearest, larger central city.

Table 10

Regional Dominance by Distance to
Nearest, Larger Central City

<u>Distance to Nearest, Larger Central City</u>	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 50 miles	22.2%	18.5	59.3	100% (54)
50 - 100 miles	26.4%	22.6	50.9	100% (53)
Over 100 miles	41.0%	16.4	42.6	100% (61)
	(51)	(32)	(85)	(168)

Cities attaining the status of Regional Metropolises seem to require a large supporting area containing only smaller cities for which they perform services.

As one would expect, city size is directly related to distance to larger city, however, imposing population size as a control does not entirely negate the relationship between regional dominance and distance to nearest, larger city, rather it specifies that the relationship is valid only for larger cities. As we see in Table 11, distance to nearest, larger city does not help to explain why cities under 100,000 population are or are not regionally dominant. But for cities having over 100,000 population, the tendency is quite clear for those being a long distance from a larger city to be regionally dominant.

Table 11

Regional Dominance by Distance to Nearest, Larger
City Controlling for Population Size

<u>Distance to Nearest, Larger Central City</u>	<u>Under 100,000 Population</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 50 miles	21.9%	15.6	62.5	100% (32)
50 - 100 miles	28.1%	12.5	59.4	100% (32)
Over 100 miles	20.0%	15.0	65.0	100% (20)
	(20)	(12)	(52)	(84)
	<u>Over 100,000 Population</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 50 miles	23.8%	23.8	52.4	100% (21)
50 - 100 miles	23.8%	33.3	42.9	100% (21)
Over 100 miles	50.0%	19.0	31.0	100% (42)
	(31)	(20)	(33)	(84)

The measurement most often used as an index of the age of a large city is the number of decades it has had a population size of 50,000 or more. The expectation that Regional Metropolises tend to be older than other cities is supported by the data in Table 12.

Table 12

Regional Dominance by Number of Decades
Since City Attained a Population Size of 50,000

<u>Number of Decades</u>	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 7	22.3%	17.4	60.3	100% (121)
7 and Over	51.1%	23.4	25.5	100% (97)
	(51)	(32)	(85)	(168)

We interpret these results as indicating that the longer a city has contained a sizable population the more likely it will have had time to develop units which integrate activities for a large area. Once such integrative mechanisms are established in a city, they tend to remain fixed. Apparently, recently developed cities find it difficult to usurp the integrative activities of an older city.

It is only for larger cities (over 100,000) that older age is associated with regional dominance. The relationship disappears for cities under 100,000 population size, but is strengthened when observing only the large cities (Table 13).

Table 13

Regional Dominance of Cities by Number of Decades
Since City Attained a Population Size of 50,000
Controlling for Population Size

<u>Number of Decades</u>	<u>Under 100,000 Population</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 4*	24.5%	18.4	57.1	100% (49)
4 and Over	22.9%	8.6	68.6	100% (35)
	(20)	(12)	(52)	(84)
	<u>Over 100,000 Population</u>			
Under 7	17.1%	22.0	61.0	100% (41)
7 and Over	55.8%	25.6	18.6	100% (43)
	(31)	(20)	(33)	(84)

*Smaller number of decades for smaller cities were used because empty cells are exhibited when using larger number of decades.

An even greater amount of the variation between the three types of cities is accounted for when the variable of distance to nearest, larger city is added to the age variable for the larger cities (Table 14).

Table 14

Regional Dominance of Cities Over 100,000 by
Distance to Nearest, Larger City and Number
of Decades Since City Attained a Population
Size of 50,000

<u>Number of Decades</u>	<u>Less Than 100 Miles</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 7	10.0%	20.0	70.0	100% (20)
7 and Over	36.4%	36.4	27.3	100% (22)
	(10)	(12)	(20)	(42)
	<u>100 or More Miles</u>			
Under 7	23.8%	23.8	52.4	100% (21)
7 and Over	76.2%	14.3	9.5	100% (21)
	(21)	(8)	(13)	(42)

The three factors of population size, age, and proximity to a larger place, account for much of the differences between the three types of cities classified in terms of regional dominance. Cities which are regionally dominant tend to be larger, a greater distance from larger cities, and older (in terms of decades containing a population size of 50,000). Still twenty of the 84 central cities under 100,000 population are classified as regionally dominant metropolises, and neither their distance from larger cities nor their age helps to

account for the fact that they are regional integrators. Several cities with more than 100,000 population are not high regional integrators, relative to their population size, but with two exceptions their distance from larger places and age account for their low level of integrative activity. Other factors are obviously related to the degree of metropolitan activity performed by a city and will add to the explanation of why some cities contain mechanisms which engage them in regionally dominant activity, while other cities do not.

In addition to the three factors already considered, we shall now investigate number of population units readily accessible to cities, developmental maturity of cities, and a geographic feature of cities (Table 15).

Table 15

Regional Dominance by Population Potential,
Decades Since Ring has Grown Faster than Central
City, and Geographic Feature of Central City

<u>Population Potential</u>	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 300,000	26.1%	18.8	55.1	100% (69)
300,000 and Over	33.3%	10.2	47.5	100% (99)
	(51)	(12)	(85)	(168)
<u>Decades Since Ring Grew Faster than Central City</u>				
Under 3	25.9%	20.5	53.6	100% (112)
3 or Over	39.3%	16.1	44.6	100% (56)
	(51)	(32)	(85)	(168)
<u>Geographic Feature</u>				
Coast	28.6%	11.9	59.5	100% (42)
River	38.6%	25.0	36.4	100% (44)
Other	26.8%	19.5	53.7	100% (82)
	(51)	(32)	(85)	(168)

Table 16

Regional Dominance by Population Potential, Number of Decades Since Ring
Has Grown Faster than Central City, and Geographic Feature of Central City,
Controlling for Population Size

Population Potential	Under 100,000 Population				Over 100,000 Population			
	Regional Metropo- lises	Average Cities	Noninte- grators	Total	Regional Metropo- lises	Average Cities	Noninte- grators	Total
Under 300,000	21.1%	15.8	63.2	100% (38)	32.3%	22.6	45.2	100% (31)
300,000 or Over	26.1%	13.0	60.9	100% (46)	39.6%	24.5	35.8	100% (53)
	(20)	(12)	(52)	(84)	(31)	(20)	(33)	(84)
Decades Since Ring Grew Faster Than Central City								
Under 2 2 or Over								
	Number of Decades							
	Under 3	Under 3	Under 3	Under 3	Under 3	Under 3	Under 3	Under 3
	19.4%	16.7	63.9	100% (36)	31.1%	28.9	40.0	100% (45)
	27.1%	12.5	60.4	100% (48)	43.6%	17.9	38.5	100% (39)
	(20)	(12)	(52)	(84)	(31)	(20)	(33)	(84)
Geographic Feature								
Coast	7.7%	0.0	92.3	100% (13)	36.7%	16.7	46.7	100% (30)
River	18.8%	25.0	56.3	100% (16)	51.9%	25.9	22.2	100% (27)
Other	29.1%	14.5	56.4	100% (55)	22.2%	29.6	48.1	100% (27)
	(20)	(12)	(52)	(84)	(31)	(20)	(33)	(84)

Otis Dudley Duncan describes the variable of population potential as follows:

The concept of 'population potential,' suggested by Stewart (1947a) has been applied by several investigators, notably Harris (1954), and now appears to be on its way to adoption as a standard part of demographic-ecological method.

The potential of population at any given point, L_0 , in a territory is a function of the disposition of each population unit over that territory. Theoretically, one would compute potential at L_0 by measuring the distance of each person from that point and summing the reciprocals of these distances. Potential, therefore, is expressed in person-mile units. If potential at L_0 figures out at 350,000, this means that, 'on the average,' a person at L_0 is within a mile of 350,000 other persons. The general rationale of such a computation is the assumption that the influence of persons at a distance is inverse to their distance--a proposition that finds support in a wide variety of empirical findings. In practice, of course, the computation of potential is accomplished by measuring the distance from L_0 of each of a manageable number of areal subdivisions, assuming, in effect, that every person in an areal subdivision is located at its center, and calculating the quantity, $\sum P_i/D_i$, where P_i is the population of area i , and D_i is its distance from L_0 . A special formula is used for calculating the potential of the area containing L_0 'on itself' (Steward, 1947a). The precision of the results is, of course, generally in direct proportion to the number of areal subdivisions employed in the calculation.

After computing potential for a number of points, it is possible to interpolate graphically for other points, and to construct a map of isopotential lines, that is, lines which are the loci of points having equal population potentials (1957, p. 368)⁵.

One can see from Table 15 that population potential is only slightly related to types of regionally dominant cities. Population

⁵The author wishes to express his gratitude to Dr. O. D. Duncan for supplying data and material on the concept of population potential.

size of cities is related to population potential, but when population size is imposed as a control on the relationship between population potential and regional dominance, as in Table 16, the percentage differences persist, but especially for larger cities. The measure of population potential used in this study does not permit an adequate judgment of the efficacy of population potential because the isopotential map and interpolation, which we used, results in the concept being measured too grossly.

Controlling for distance to nearest, larger city overcomes the effect of the grossness of the measure somewhat, and the relationship is considerably stronger. Higher percentages of cities with population potentials over 300,000 are regionally dominant, than is the case for cities exhibiting population potentials under 300,000 (Table 17).

Table 17

Regional Dominance by Population Potential
Controlling for Distance to Nearest, Larger Central
City

<u>Population Potential</u>	<u>Less Than 100 Miles</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 300,000	17.2%	17.2	65.5	100% (29)
300,000 or Over	27.3%	20.8	51.9	100% (77)
	(26)	(21)	(59)	(106)
	<u>100 Miles or More</u>			
	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 300,000	32.5%	20.0	47.5	100% (40)
300,000 or Over	54.5%	13.6	31.8	100% (22)
	(25)	(11)	(26)	(62)

The number of decades since the ring has grown faster than the central city⁶ may provide a measure of the maturity of a city which is more developmental in character than the number of decades since the central city attained 50,000 population. The hypothesis that the earlier cities develop to the point where their rings are growing faster than they, the more likely they will have developed units which engage in regionally integrative activities, is somewhat substantiated by Tables 15 and 16. The relationship reported in Table 15 is in the predicted direction, but the differences between percentages are not great. Controlling for population size, the original relationship between developmental age and regional dominance is maintained.

Schnore and Varley (1955) found a strong relationship between population size and whether or not a city was located on deep water coasts, rivers, or other locations. We do not find regional integration related to this geographic feature. In fact, the tendency is slightly reversed. Among cities of the same size class, the nonregional cities tend to be located on deep water coasts more than do regional metropolises. This suggests that even though population size is related to metropolitanism, different sets of conditions are underlying population size than are giving rise to metropolitan activity. Regional metropolitan activity apparently is not a function of overseas shipping and direct contact with foreign countries. Being located on a river seems to be the most important feature of the three when relating them to regional dominance.

⁶Dr. Amos Hawley supplied the data for computing the number of decades since the ring has grown faster than the central city for each of the 168 Standard Metropolitan Areas.

Of the variables we have investigated in this study, population size of city, number of decades city has attained a population size of 50,000, and distance to nearest, larger central city were found to be related to regionally dominant activity in an important manner. Population potential, and number of decades since the ring has grown faster than the central city were also related to regional dominance in the expected direction. Whether a city is located on a coast, river, or other geographic feature was found to deviate from the expectation more than any of the variables investigated.

Table 18 is presented in order to indicate the combined effect of population size, distance to nearest, larger city, and number of decades since city has attained 50,000 population. It shows that a high percentage of those cities ranking high on these characteristics are regionally dominant.

Table 18

Regional Dominance by a Combined Measure of
Population Size, Distance to Nearest, Larger City,
And Number of Decades Since City has Attained 50,000
Population

<u>Combined Measure</u> *	<u>Regional Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Large, Distant, Old	76.2%	14.3	9.5	100% (21)
Others	19.2%	20.2	60.6	100% (99)
Small, Close, Young	33.3%	18.8	47.9	100% (48)
	(51)	(32)	(85)	(168)

*Those cities having a population over 100,000, being 100 or more miles from a larger city, and attaining 50,000 population at least 7 decades ago are in the first category. Cities exhibiting directly opposite characteristics are in the third category. All other combinations are in the second category.

Now let us turn to an analysis of the conditions underlying locally dominant activity.

Locally Dominant Cities

In attempting to determine some of the characteristics associated with cities performing various degrees of locally dominant activity, the 168 central cities are divided into three types in much the same manner used to define the regional types. Cities exhibiting average ratios of 1.10 or above for the ten indicators of local dominance are classified as Local Metropolises; cities exhibiting local average ratios between .90 and 1.10 are termed Average Cities; and cities below .90 on the average of the local indicators are classified as Non-integrators.

The same variables used to analyze the regional types of cities are used to investigate local dominance.

Population size of cities is related to local dominance, but the percentage differences are slightly smaller than was found for the regional types (Table 19).

Table 19

Local Dominance by Population Size of City

<u>Population Size</u>	<u>Local Types</u>			<u>Total</u>
	<u>Local Metropolises (+1.10)</u>	<u>Average Cities (.90 - 1.10)</u>	<u>Non- Integrators (-.90)</u>	
Under 100,000	29.8%	29.8	40.5	100% (84)
100,000 - 250,000	34.0%	34.0	32.0	100% (50)
250,000 or Over	52.9%	32.4	14.7	100% (34)
	(60)	(53)	(55)	(168)

Table 19 shows that Local Metropolises tend to be larger than other types of cities. Cities containing mechanisms to completely service their own population probably influence outside units to partake of these services as well, since it would be more economical, in many instances, for these outside units to travel short distances to acquire these services, than to provide the services themselves. It would also seem that many services require large supporting populations and that a high proportion of the supporting population is furnished by the larger cities themselves. Smaller cities could not develop such units and would, therefore, rely on larger cities for these services. The findings in Table 19, then, are not surprising. Still, twenty-five cities under 100,000 population are classified as Local Metropolises and twenty-one cities over 100,000 population, five of which are over 250,000, have not attained metropolitan status. Variables other than population size then are also, of course, related to local dominance. Distance from a larger city probably has a bearing on the determination of whether a city is locally dominant. Cities having a wide area separating them from other, larger cities have a greater opportunity to integrate the local activities of outlying units than do cities having close proximity to other larger cities (Table 20).

Table 20

Local Dominance by Distance to Nearest, Larger
City Controlling for Population Size

<u>Distance to Nearest, Larger Central City</u>	<u>Under 100,000 Population</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 50 miles	18.8%	31.3	50.0	100% (32)
50 and Over	36.5%	28.8	34.6	100% (52)
	(25)	(25)	(34)	(84)
	<u>Over 100,000 Population</u>			
Under 100 miles	14.3%	45.2	40.5	100% (42)
100 and Over	69.0%	21.4	9.5	100% (42)
	(35)	(28)	(21)	(84)

Local Metropolises tend to be located farther from a larger city than do other types of cities. Distance to nearest, larger city is related to population size, but the relationship between local types and distance persists when city size is controlled. For cities over 100,000 population especially, distance is an extremely important factor. Almost all of the larger cities which do not attain Local Metropolitan status are within 100 miles of a larger city, and consequently do not have a sufficient area to integrate to give them a position of dominance. Distance to nearest, larger city also helps to explain why some of the smaller cities, in spite of their size, have attained Local Metropolitan status. Those over 50 miles from a larger city are twice as likely as other cities to be locally dominant.

The reader will note that for those cities under 100,000 population, 50 miles was used as the breaking point in measuring distance,

whereas for the larger cities 100 miles was used. Population size is so highly related to the distance variable that most of the cities under 100,000 population are within 100 miles of a larger place. This fact suggests that regions having a dense population can support smaller cities as Local Metropolises while regions not densely populated cannot.

Both population size and distance to nearest, larger central city are important when accounting for regional metropolitanism, and they also have emerged as important variables when analyzing local metropolitanism. Population size, when related to regional metropolitanism exhibits somewhat greater differences between percentages than when related to the local types, while distance to nearest, larger city is more important in explaining local metropolitanism than regional metropolitanism. Distance to nearest, larger city is related to local dominance for both larger and smaller cities. It is only related to regional dominance for the larger cities.

For cities with more than 100,000 population the extent of both local and regional dominance increases with the number of decades since the city reached 50,000 population. There is no such relationship for cities of less than 100,000 population.

Table 21

Local Dominance by Number of Decades Since City
Reached 50,000 Population, Controlling for Population
Size

<u>Number of Decades</u>	<u>Under 100,000 Population</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 4	31.9%	27.7	40.4	100% (47)
4 and Over	27.0%	32.4	40.5	100% (37)
	(25)	(25)	(34)	(84)
	<u>Over 100,000 Population</u>			
Under 7	37.5%	25.0	37.5	100% (40)
7 and over	45.5%	40.9	13.6	100% (44)
	(35)	(28)	(21)	(84)

Table 20 shows that distance is an important factor of local dominance while Table 21 indicates that age is related to local dominance only for those cities over 100,000 population. In Table 22, the data show that controlling distance does not wipe out the apparent relationship between age and local dominance for those cities over 100,000 population. It shows that for cities in both distance categories, higher percentages of those cities reaching 50,000 population 7 or more decades ago are Local Metropolises than is the case for cities reaching 50,000 population more recently. In fact, for these larger cities, distance and age are powerful indicators of dominance.

Table 22

Local Dominance of Cities over 100,000 by
Distance to Nearest, Larger City and Number
of Decades Since City Attained a Population
Size of 50,000

<u>Number of Decades</u>	<u>Less Than 100 Miles</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 7	9.5%	33.3	57.1	100% (21)
7 and Over	19.0%	57.1	23.8	100% (21)
	(6)	(19)	(17)	(42)
	<u>100 or More Miles</u>			
Under 7	61.9%	23.8	14.3	100% (21)
7 and Over	76.2%	19.0	4.8	100% (21)
	(29)	(9)	(4)	(42)

Other factors investigated in this study such as the number of decades since the ring surrounding the city has grown faster than the central city itself, population potential, and the density of the non-Standard Metropolitan Area counties surrounding the Standard Metropolitan Area add less to our understanding of the conditions underlying the three types of cities classified in terms of local dominance than the three factors discussed above. Table 23 presents the relationship between local dominance and number of decades since ring has grown faster than the central city. This table shows that for cities under 100,000 population, a slight relationship in the expected direction exists. For those cities over 100,000 population, the percentage differences are much less and do not provide information concerning the

conditions underlying local dominance which is not already known from the investigation of population size, age of city, and distance to nearest, larger city. The measure of developmental age was expected to be more significantly related to metropolitanism than it has proven to be. The conditions causing expansion are probably bound in with factors other than the integrative mechanisms located in cities. The manner in which some central cities annex outlying territories probably causes this index to be an inadequate measure of developmental age.

Table 23

Local Dominance by Number of Decades Since Ring
Has Grown Faster than Central City

<u>Decades Since Ring Grew Faster Than Central City</u>	<u>Under 100,000 Population</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 3	28.4%	28.4	43.3	100% (67)
3 and Over	35.3%	35.3	29.4	100% (17)
	(25)	(25)	(34)	(84)
	<u>Over 100,000 Population</u>			
Under 3	42.2%	28.9	28.9	100% (45)
3 and Over	41.0%	38.5	20.5	100% (39)
	(35)	(28)	(21)	(84)

Tables 24, 25, and 26 are presented in order to investigate the relationship between population potential and the local dominance typology. Population potential is slightly related to the regional dominant types, as reported earlier, but should be tied in more strongly with the conditions giving rise to local dominance, because the measure

of population potential is meant to be an index of the number of people accessible to a given city, and locally dominant cities should have a greater number of people accessible to them than would cities which are not locally dominant. This hypothesis is not substantiated; in fact, the findings show a reverse relationship (Table 24).

Table 24
Local Dominance by Population Potential

<u>Population Potential</u>	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 300,000	49.3%	21.7	29.0	100% (69)
300,000 and Over	26.3%	38.4	35.4	100% (99)
	(60)	(53)	(55)	(168)

Table 25
Distance to Nearest, Larger City by Population Potential

<u>Population Potential</u>	<u>Distance to Nearest, Larger City</u>		<u>Total</u>
	<u>Under 100 Miles</u>	<u>100 Miles and Over</u>	
Under 300,000	42.0%	58.0	100% (69)
300,000 and Over	77.8%	22.2	100% (97)
	(106)	(62)	(168)

Table 24 shows that the slight relationship between population potential and local dominance tends to be in the direction of Local Metropolises exhibiting lower population potentials than other types of cities. This may be because cities near larger cities exhibit the same high population potential scores as the larger cities, and because cities relatively near larger cities tend not to attain locally dominant

status. Therefore, if population potential is inversely related to distance to nearest, larger city, one would expect Local Metropolises to exhibit smaller population potentials than other cities. Table 25 shows that the inverse relationship between distance to nearest, larger city and population is a strong one.

It may be that if distance to a larger city is controlled, the relationship between local dominance and population potential will be as expected. This is not the case. Even under this controlled condition (Table 26) the tendency is for Local Metropolises to have relatively low population potentials.

Table 26

Local Dominance by Population Potential Controlling
For Distance to Nearest, Larger City

<u>Population Potential</u>	<u>Less Than 100 Miles</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 300,000	31.0%	24.1	44.8	100% (29)
300,000 or More	19.5%	40.3	40.3	100% (77)
	(24)	(38)	(44)	(106)
	<u>100 or More Miles</u>			
Under 300,000	62.5%	20.0	17.5	100% (40)
300,000 or More	50.0%	31.8	18.2	100% (22)
	(36)	(15)	(11)	(62)

In an attempt to investigate the effect that the number of population units surrounding a city has on the dominant status of the city, a measure other than population potential was defined. The density of

the non-Standard Metropolitan Area counties surrounding each Standard Metropolitan Area was used as a measure of number of people accessible to each central city. It seems likely that the greater the density of the population in non-Standard Metropolitan Area counties around a city, the more probable that the city will be locally dominant, because they will have more people to service. Table 27 presents data to test this hypothesis. The relationship is stronger, because of the greater percentage differences, for the cities farther from a larger city, than for those near a larger city, but it does not add further explanatory information to the knowledge already gained.

Table 27

Local Dominance by Density of Non-Standard Metropolitan Area
Counties Surrounding Central Cities, Controlling for
Distance to Nearest, Larger City

<u>Density of Non-SMA Counties Surrounding City</u>	<u>Under 100 Miles to Larger City</u>			
	<u>Local Metropolises</u>	<u>Average Cities</u>	<u>Non- Integrators</u>	<u>Total</u>
Under 70/sq. miles	28.8%	25.4	45.8	100% (59)
70/sq. mi. and Over	14.9%	48.9	36.2	100% (47)
	(24)	(38)	(44)	(106)
	<u>100 Miles and Over to Larger City</u>			
Under 30/sq. miles	52.2%	21.7	26.1	100% (23)
30/sq. mi. and Over	61.5%	25.6	12.8	100% (39)
	(36)	(15)	(11)	(62)

In summary we have found that the same variables proved to be important for understanding regional and local dominance. Population

size, number of decades since city attained 50,000 population, and distance to nearest, larger place account for a considerable degree of the variation between types of cities defined by regional or local dominance. The association is stronger for cities over 100,000 population than for those below the 100,000 figure. Stronger relationships are observed for the locally dominant types under 100,000 population than for the small regional types.

Three factors, then, aid our understanding of metropolitanism, but certainly do not explain why all cities classified as metropolises have attained this status. It may be that further light can be shed on this matter if we analyze cities classified in terms of both regional and local dominance.

Regionally and Locally Dominant Cities

The factors most important to understanding regional metropolitan activity and those most important in understanding local metropolitan activity, have been located and analyzed. Now an attempt is made to locate the most important factors underlying the typology of cities which combines the regional and local measures.

The classification of twelve types of central cities in terms of the metropolitan activity each performs, presented in Table 5 (pp.65-66 of Chapter 3), shows that sixteen central cities engage in even less integrative activity, on the average, than the average for urban places. Twenty-five central cities--far below the normal urban place including all central cities--perform average or above average integrative activities when compared to only the noncentral city urban places. Forty-six central cities exhibit average integrative abilities on one

or both of the regional and local classifications when compared to all urban places. Thirty central cities emerge as metropolitan types on a local basis only, while twenty-one attain regional metropolitan status only. Thirty central cities exhibit high degrees of both regional and local metropolitan activities. When we cut the thirty cities exhibiting ratios above 1.10 on both the regional and local measures into three categories, in terms of the magnitude of the respective ratios, five cities are in the upper third on both the regional and local ratios; eleven exhibit their lowest ratio in the middle third on one or both of the local and regional measures; and fourteen exhibit one or both of their ratios in the lower third.

Table 28 is a master table showing the relationship between the twelve types of cities, classified in terms of their performance of both regionally and locally dominant activities, and each of the six major independent variables investigated in this study. Table 28 is not percentagized, but depicts the actual number of cities occurring in each cell. This table is not only important for showing the distributions of cities on the six characteristics across the twelve types of cities, but also provides a convenient form for choosing the more important comparisons for an analysis of the conditions related to the various types of cities.

A comparison of the extreme types, those cities which are both local and regional dominants (I, II, and III), with those cities which are Nonintegrators (XII), shows that the same three factors which proved to be important when analyzing regional dominance and local dominance, separately, also yield the greatest percentage differences for these two extreme types.

Table 28

Twelve Types of Cities by Population Size, Age, Distance, Population Potential, Decades Since Ring Grew Faster than Central City, and Density of Counties Surrounding City*

	<u>I</u>	<u>II</u>	<u>III</u> *	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	<u>X</u>	<u>XI</u>	<u>XII</u>	<u>Total</u>
<u>Population Size</u>													
Under 100,000	10			10	15	2	5	16	2	8	7	9	84
100,000 and Over	20			11	15	9	2	12	3	4	1	7	84
	30			21	30	11	7	28	5	12	8	16	168
<u>Age</u>													
Under 7 Decades	15			12	25	4	7	17	3	8	4	12	107
7 Decades or More	15			9	5	7	0	11	2	4	4	4	61
	30			21	30	11	7	28	5	12	8	16	168
<u>Distance to Larger City</u>													
Under 100 Miles	10			16	14	9	6	18	4	8	7	14	106
100 Miles or More	20			5	16	2	1	10	1	4	1	2	62
	30			21	30	11	7	28	5	12	8	16	168
<u>Population Potential</u>													
Under 300,000	15			3	19	2	2	12	2	3	6	5	69
300,000 or More	15			18	11	9	5	16	3	9	2	11	99
	30			21	30	11	7	28	5	12	8	16	168
<u>Ring Grew Faster</u>													
Under 3 Decades	16			13	22	5	7	18	4	8	8	11	112
3 Decades or More	14			8	8	6	0	10	1	4	0	5	56
	30			21	30	11	7	28	5	12	8	16	168
<u>Density of Non-SMA Counties</u>													
Under 70	24			7	24	5	5	20	2	6	8	12	113
70 or Over	6			14	6	6	2	8	3	6	0	4	55
	30			21	30	11	7	28	5	12	8	16	168

*This table contains actual number of cities in each cell. The categories are as follows:

- I II III - Metropolis, Mature Metropolis, and Limited Metropolis VIII - Local Sub-Center
 IV - Partial Metropolis (Regionally Dominant) IX - Sub-Dominant Satellite
 V - Local Service Center X - Regionally Active Satellite
 VI - Average City XI - Locally Active Satellite
 VII - Regional Sub-Center XII - Nonintegrative City

Greater percentages of cities in the large population category, in the older age category, and in the greater distance from larger city category are Metropolitan type cities rather than Nonintegrative Cities (Table 29).

Table 29
Metropolitan and Nonintegrative Cities by
Population Size, Age, and Distance

<u>Population Size</u>	<u>Metropolitan Cities (I II III)</u>	<u>Nonintegrative Cities (XII)</u>	<u>Total</u>
Under 100,000	33.3%	56.2%	(19)
100,000 or More	<u>66.7</u>	<u>43.8</u>	<u>(27)</u>
TOTAL	100.0% (30)	100.0% (16)	(46)
<u>Age (50,000 Population)</u>			
Under 7 Decades	50.0%	75.0%	(27)
7 or More Decades	<u>50.0</u>	<u>25.0</u>	<u>(19)</u>
TOTAL	100.0% (30)	100.0% (16)	(46)
<u>Distance to Larger City</u>			
Under 100 Miles	33.3%	87.5%	(24)
100 or More Miles	<u>66.7</u>	<u>12.5</u>	<u>(22)</u>
TOTAL	100.0% (30)	100.0% (16)	(46)

Table 29 shows that the greatest percentage differences occur when comparing the Metropolises with the Nonintegrative Cities in terms of their distance from a larger city. If a city is near a larger city the probability is not great for that city to develop mechanisms which engage dominant activities.

Table 30 shows the comparison between regionally dominant cities which are normal or below normal on the measure of local dominance (IV) and the two extreme types of cities (I, II, III, and XII).

For each of the three characteristics, population size, age, and distance, the directions of the percentage differences are consistent with the direction of the city types of the dominance scale. The lowest percentages of the large cities, old cities, and cities distant from a larger city are Nonintegrative Cities. Conversely, the highest percentages of these three characteristics are metropolitan type cities. Distance to a larger city differentiates the Partial Metropolises (IV) from the Metropolises more than does population size or age, whereas age differentiates the Partial Metropolises from the Nonintegrative Cities more than the other two factors.

A higher percentage of the cities having large population potentials and surrounded by counties having large density ratios are Partial Metropolitan type cities. Cities which are near larger cities and exhibit high population potentials will tend to be Partial Metropolises rather than Metropolises or Nonintegrative Cities. It seems probable that an area of high population potential can more readily support regionally dominant cities but not locally dominant cities, because an area of low population potential contains fewer large cities, and those which do exist perform both the regional and local services for that area.

Table 30

Metropolises, Partial Metropolises, and Nonintegrative Cities,
By Population Size, Age, Distance, Population Potential,
And Density of Surrounding Counties

<u>Population Size</u>	<u>Metropolises (I II III)</u>	<u>Partial Metropolises (IV)</u>	<u>Non- Integrative Cities (XII)</u>	<u>Total</u>
Under 100,000	33.3%	47.6%	56.2%	(29)
100,000 and Over	<u>66.7</u>	<u>52.4</u>	<u>43.8</u>	<u>(38)</u>
TOTAL	100.0% (30)	100.0% (21)	100.0% (16)	(67)
<u>Age (50,000)</u>				
Under 7 Decades	50.0%	57.1%	75.0%	(39)
7 Decades and Over	<u>50.0</u>	<u>42.9</u>	<u>25.0</u>	<u>(28)</u>
TOTAL	100.0% (30)	100.0% (21)	100.0% (16)	(67)
<u>Distance to Larger City</u>				
Under 100 Miles	33.3%	76.2%	87.5%	(40)
100 Miles and Over	<u>66.7</u>	<u>23.8</u>	<u>12.5</u>	<u>(27)</u>
TOTAL	100.0% (30)	100.0% (21)	100.0% (16)	(67)
<u>Population Potential</u>				
Under 300,000	50.0%	14.3%	31.2%	(23)
300,000 and Over	<u>50.0</u>	<u>85.7</u>	<u>68.8</u>	<u>(44)</u>
TOTAL	100.0% (30)	100.0% (21)	100.0% (16)	(67)
<u>Density of Surround- ing Non-SMA Counties</u>				
Under 70 Miles	80.0%	33.3%	75.0%	(43)
70 Miles and Over	<u>20.0</u>	<u>66.7</u>	<u>25.0</u>	<u>(24)</u>
TOTAL	100.0% (30)	100.0% (21)	100.0% (16)	(67)

Table 31 depicts the relationship between the extreme types of cities, Metropolises (I, II, III) and Nonintegrative (XII), and Local Service Centers, cities which are only locally dominant (V). A greater percentage of those cities in each of the under 100,000 population, less than 7 decades since reaching 50,000 population, less than 100 miles from a larger city, and under 300,000 population potential categories are classified as Local Service Centers (V) rather than as Metropolises or Nonintegrative Cities. Metropolises tend to be located farther from larger cities than do Local Service Centers, and Local Service Centers exhibit a much greater percentage of those cities over 100 miles from a larger city than is the case for Nonintegrative Cities. Tables 30 and 31 show that those cities which are Partial Metropolises differ from those cities which are Local Service Centers when comparing them to Metropolises and Nonintegrative Cities. Table 32 shows the major differences between Local Service Centers (V) and Partial Metropolises (IV).

Table 31

Metropolises, Local Service Centers, and Nonintegrative Cities, by Population Size, Age, Distance, and Population Potential

<u>Population Size</u>	<u>Metropolises (I II III)</u>	<u>Local Service Centers (V)</u>	<u>Non- Integrative Cities (XII)</u>	<u>Total</u>
Under 100,000	33.3%	50.0%	56.2%	(34)
100,000 and Over	<u>66.7</u>	<u>50.0</u>	<u>43.8</u>	<u>(42)</u>
TOTAL	100.0% (30)	100.0% (30)	100.0% (16)	(76)
<u>Age (50,000)</u>				
Under 7 Decades	50.0%	83.4%	75.0%	(52)
7 Decades and Over	<u>50.0</u>	<u>16.6</u>	<u>25.0</u>	<u>(24)</u>
TOTAL	100.0% (30)	100.0% (30)	100.0% (16)	(76)
<u>Distance to Larger City</u>				
Under 100 Miles	33.3%	46.7%	87.5%	(38)
100 Miles and Over	<u>66.7</u>	<u>53.3</u>	<u>12.5</u>	<u>(38)</u>
TOTAL	100.0% (30)	100.0% (30)	100.0% (16)	(76)
<u>Population Potential</u>				
Under 300,000	50.0%	63.4%	31.2%	(39)
300,000 and Over	<u>50.0</u>	<u>36.6</u>	<u>68.8</u>	<u>(37)</u>
TOTAL	100.0% (30)	100.0% (30)	100.0% (16)	(76)

Those cities which are Partial Metropolises (IV) do not differ greatly in population size from those which are Local Service Centers (V) (Table 21). Table 32 shows, however, that the Partial Metropolises, when compared to the Local Service Centers, have a higher probability of being in the high population potential category, being under 100

miles from a larger city, and having reached 50,000 population 7 or more decades ago.

Cities classified in both of these categories could be emerging as dominant cities on both a regional or local scale, or they could be declining from that level of integrative activity. Since Table 32 shows that it is more probable for the Local Service Centers to be younger, it is more likely that these cities rather than the Partial Metropolises are developing. The percentage distribution for the regionally dominant cities on the three characteristics of age, distance, and population potential (Table 32) leads one to hypothesize that the Partial Metropolises are developed, and probably will remain in this classification quite some time. A further hypothesis stemming from these considerations is that the Partial Metropolises are specialized cities, providing a wide area with one or two important functions. These cities tend to be near larger cities, which probably perform the local service functions for the area, whereas those cities which are only locally dominant (Local Service Centers) tend to be over 100 miles from a larger city and therefore have little competition in dominating the local area. Because cities which are only locally dominant tend to be in low population potential areas, a further hypothesis maintains that as these areas grow in population size and density, some of these cities which are only locally dominant will emerge as regional dominants, also.

Table 32

Partial Metropolises and Local Service Centers
By Age, Distance, and Population Potential

<u>Age (50,000)</u>	<u>Partial Metropolises (IV)</u>	<u>Local Service Centers (V)</u>	<u>Total</u>
Under 7 Decades	57.1%	83.4%	(37)
7 Decades and Over	<u>42.9</u>	<u>16.6</u>	<u>(14)</u>
TOTAL	100.0% (21)	100.0% (30)	(51)
<u>Distance to Larger City</u>			
Under 100 Miles	76.2%	46.7%	(30)
100 Miles and Over	<u>23.8</u>	<u>53.3</u>	<u>(21)</u>
TOTAL	100.0% (21)	100.0% (30)	(51)
<u>Population Potential</u>			
Under 300,000	14.3%	63.4%	(22)
300,000 and Over	<u>85.7</u>	<u>36.6</u>	<u>(29)</u>
TOTAL	100.0% (21)	100.0% (30)	(51)

Thus far the analysis of cities classified jointly on regional and local dominance has been confined to those cities which engage in one or both of these types of activities more than the normal city and to those cities which are classified in the extreme category of Nonintegrative Cities.

Considering cities on the lower end of the scale of dominance, we find that the differences between types are not great. Cities classified as Average Cities (VI), Regional Sub-Centers (VII) and Local Sub-Centers (VIII) are cities exhibiting average ratios of integrative activities between .90 and 1.10 for either one or both of the regional

or local measures. In terms of the integrative activities performed these cities differ from each other in the same way that Metropolises (I, II, III), Partial Metropolises (IV), and Local Service Centers (V) differ from each other, except on a lower level of dominance.

Cities relatively high on both the regional and local measures (Average Cities, VI) tend to be large and have developed early, when compared to Regional Sub-Centers, Local Sub-Centers, and Nonintegrative Cities (XII). Most of the cities in these three average categories are near larger cities, but the Local Sub-Centers (VIII) have a higher percentage of the cities over 100 miles from a larger city than do the other types (see Table 28).

Those cities which are below normal in integrative activities performed, when including other central cities of Standard Metropolitan Areas in the total number of urban places (Types IX, X, VI, and XII) do not differ, strikingly, from one another in terms of the major independent variables investigated in this study. The population size and population potential distributions are interesting, however, because the Nonintegrative Cities (XII) exhibit rather high percentages in the higher categories of these two characteristics (see Table 28).

Several factors were examined in this chapter in an attempt to discover what characteristics are related to metropolitanism defined in terms of degree of integrative activity engaged in by cities.

Regional metropolitanism is found to be highly related to population size, distance to nearest, larger city, and number of decades since city reached 50,000 population. Local metropolitanism is found to be related to the same three characteristics. Population potential, number of decades since ring grew faster than central city, density of

non-Standard Metropolitan Area counties surrounding the city all exhibited lower percentage differences, than the previous factors mentioned, when related to regional and local dominance. Whether cities are located on rivers, deep water coasts, or inland is not related to metropolitanism in the expected manner.

Comparing cities classified in terms of the degree to which they perform both regional and local activities shows that no common variables explain differences between all the types.

Population size, age, and distance are the main independent variables investigated, explaining the difference between Metropolises and Nonintegrative Cities. Population potential and distance differentiate regionally dominant cities from all other types. Age is the main variable explaining the difference between Local Metropolises and cities which are dominant in both local and regional activities. Population size is the main factor which emerges when comparing cities which are ranked low on the scale of dominance.

By no means have all the differences between cities classified in terms of their performance of metropolitan activity been explained, but a fuller understanding of the conditions underlying metropolitanism, as defined in this study, has been achieved.

Chapter V

SPECIAL ANALYSES OF DIVERSITY AND DISTANCE

The analysis of metropolitanism thus far presented has focused entirely on the degree to which cities perform integrative activities relative to their population. A second aspect of metropolitanism--the number of integrative activities performed by cities--is analyzed in this chapter. Distinguishing between cities engaged in many, varied, integrative activities to a high degree and cities performing only a few integrative activities adds further to our understanding of the taxonomy of metropolitanism.

The analysis of Chapter IV revealed that distance between cities is an important independent variable for understanding the differences existing between cities when classified in terms of the metropolitan activities which they perform. In this chapter, distance is utilized to describe the location of various types of cities in a more graphic sense than was achieved in Chapter IV.

Diversity

Table 4 of Chapter III (p. 54) lists the central cities of Standard Metropolitan Areas, showing their average ratios for both the ten local indicators and the ten regional indicators. This table also shows the number of the local and regional indicators having ratios above 1.10 for each city. Some cities contain no activities having ratios

over 1.10 while others show almost all of the ratios above 1.10.

Table 33 is a frequency distribution showing the number of cities exhibiting various numbers of the ratios over 1.10 for both the regional and local indicators.

Table 33

Number of Cities by Number of Ratios over 1.10

<u>Regional</u>		<u>Local</u>	
<u>No. of Ratios Over 1.10</u>	<u>No. of Cities</u>	<u>No. of Ratios Over 1.10</u>	<u>No. of Cities</u>
10	0	10	1
9	1	9	2
8	5	8	7
7	5	7	10
6	6	6	20
5	11	5	15
4	19	4	25
3	39	3	17
2	43	2	26
1	24	1	26
0	<u>15</u>	0	<u>19</u>
TOTAL	168	TOTAL	168

The division of these frequency distributions into three parts, each being as equal as possible, yields the following categories:

Regionally Diversified = 4 - 10 indicators above 1.10 (47 cities)

Regionally Average = 3 indicators above 1.10 (39 cities)

Regionally Nondiversified = 0 - 2 indicators above 1.10 (82 cities)

Locally Diverse	= 5 - 10 indicators above 1.10	(55 cities)
Locally Average	= 3 & 4 indicators above 1.10	(42 cities)
Locally Nondiversified	= 0 - 2 indicators above 1.10	(71 cities)

A comparison between three types of cities classified in terms of their regional differences for each of the six main independent variables previously discussed, is presented in Table 34. This table shows that for each of the six independent variables, the relationships exhibited are of the expected nature: a higher percentage of large cities are regionally diversified than small cities; it is more probable that older cities are regionally diversified than younger cities; a greater percentage of cities over 100 miles from a larger city are regionally diversified than those within 100 miles of a larger city. The differences between the percentages for the variables of population potential, number of decades since the ring grew faster than the central city, and the density of surrounding non-Standard Metropolitan Area counties, are not as great as for the former three variables, but the slight differences do exhibit direct relationships. When these variables were related to regional dominance, in Chapter IV, the percentage distributions were very similar to those found in Table 34.

Table 34

Regional Diversity by Population Size,
Age, Distance, Population Potential, Number
Of Decades Since Ring Grew Faster than Central
City, and Density of Surrounding Non-SMA Counties

<u>Population Size</u>	<u>Regionally Diversified</u>	<u>Average Diversity</u>	<u>Non- Diversified</u>	<u>Total</u>
Under 100,000	11.9%	26.2	61.9	100% (84)
100,000 - 250,000	26.0%	24.0	50.0	100% (50)
250,000 and Over	70.6%	14.7	14.7	100% (34)
	(47)	(39)	(82)	(168)
<u>Age (50,000)</u>				
Under 7 Decades	15.7%	26.4	57.9	100% (121)
7 Decades or More	59.6%	14.9	25.5	100% (47)
	(47)	(39)	(82)	(168)
<u>Distance to Nearest, Larger City</u>				
Under 100 Miles	17.9%	26.4	55.7	100% (106)
100 Miles and Over	45.2%	17.7	37.1	100% (62)
	(47)	(39)	(82)	(168)
<u>Population Potential</u>				
Under 300,000	23.2%	24.6	52.2	100% (69)
300,000 and Over	31.3%	22.2	46.5	100% (99)
	(47)	(39)	(82)	(168)
<u>Ring Grew Faster</u>				
Under 3 Decades	23.2%	21.4	55.4	100% (112)
3 Decades or More	37.5%	26.8	35.7	100% (56)
	(47)	(39)	(82)	(168)
<u>Density of Surround- ing Counties</u>				
Under 70/sq. miles	26.5%	23.9	49.6	100% (113)
70/sq. mi. and over	30.9%	21.8	47.3	100% (55)
	(47)	(39)	(82)	(168)

A comparison of the three types of cities classified in terms of local diversity, as in Table 35, yields different results than did the regionally diverse comparison. Population size, age, and distance are

the three variables again showing large percentage differences in the expected direction. Population potential is highly related to local diversity, however the relationship is indirect; a higher percentage of the cities having population potentials under 300,000 are locally diverse than for those cities with population potentials over 300,000. These findings are consistent with the results of the analysis of local dominance presented in Chapter IV.

Population size and age yield the greatest percentage differences for the regionally diverse comparison, whereas distance shows the greatest percentage differences in the analysis of local diversity. This difference was also found in the analysis of dominance in Chapter IV.

Table 35

Local Diversity by Population Size, Age, Distance
To Larger City, Population Potential, Number of Decades Ring
Grew Faster than Central City, and Density of Surrounding
Non-SMA Counties

<u>Population Size</u>	<u>Locally Diversified</u>	<u>Average Diversity</u>	<u>Non- Diversified</u>	<u>Total</u>
Under 100,000	27.4%	25.0	47.6	100% (84)
100,000 - 250,000	30.0%	22.0	48.0	100% (50)
250,000 and More	50.0%	29.4	20.6	100% (34)
	(55)	(42)	(71)	(168)
<u>Age (50,000)</u>				
Under 7 Decades	30.6%	20.7	48.8	100% (121)
7 Decades and Over	38.3%	36.2	25.5	100% (47)
	(55)	(42)	(71)	(168)
<u>Distance to Nearest, Larger City</u>				
Under 100 Miles	19.8%	27.4	52.8	100% (106)
100 Miles and Over	54.8%	21.0	24.2	100% (62)
	(55)	(42)	(71)	(168)
<u>Population Potential</u>				
Under 300,000	47.8%	23.2	29.0	100% (69)
300,000 and Over	22.2%	26.3	51.5	100% (99)
	(55)	(42)	(71)	(168)
<u>Ring Grew Faster</u>				
Under 3 Decades	32.1%	23.2	44.6	100% (112)
3 Decades or More	33.9%	28.6	37.5	100% (56)
	(55)	(42)	(71)	(168)
<u>Density of Non-SMA Surrounding Counties</u>				
Under 70/sq. miles	39.8%	21.2	38.9	100% (113)
70/sq. mi. and Over	18.2%	32.7	49.1	100% (55)
	(55)	(42)	(71)	(168)

Diversity and dominance are both related to the major independent variables of this study in the same manner. Therefore, diversity probably affects the relationship of dominance to the major independent

variables. In order to test this hypothesis the twelve integrative types used previously were further divided into diverse and nondiverse groupings in one comparison, while in another diverse cities are divided into the various metropolitan types.

The first three types of cities, those which are metropolitan in both a regional and local nature, are called nondiverse if the number of local ratios over 1.10 are four or under, or if the number of regional ratios over 1.10 are three or under. The Partial Metropolises, those which are metropolitan on a regional basis only (Type IV), are designated as nondiverse if the number of regional ratios above 1.10 are three or less. The Local Service Centers, those cities which are metropolitan on only a local basis (Type V), are called nondiverse if the number of local ratios above 1.10 are four or under (See Table 33 and the following list on pp. 114-115).

Of the 46 cities in Types VI, VII, and VIII (Average Cities, Regional Sub-Centers, and Local Sub-Centers), only seven had four or more ratios over 1.10. Of course the cities in these three types are not engaging in great degrees of integrative activity, and therefore the diverse - nondiverse dichotomy is not analyzed for them. Likewise, Types IX, X, XI, and XII have no cities which could be designated as diverse and therefore they cannot be dichotomized in terms of this dimension.

Eight of the thirty cities in Types I, II, and III are nondiverse, while seven of the thirty Local Service Centers (Type V) are nondiverse. Ten of the twenty-one Partial Metropolises (Type IV), however, are nondiverse. The cities of these types which are nondiverse are specialists, having average ratios which cause them to be classified as

metropolises, but performing only a few integrative services to a high degree, relative to their population. Table 36 shows that the Partial Metropolis (Type IV) classification contains the highest percent of the specialized cities.

Table 36
Metropolitan Types by Diversity

<u>Diversity</u>	<u>Metropolises (I II III)</u>	<u>Partial Metropolises (IV)</u>	<u>Local Service Centers (V)</u>	<u>Total</u>
Diverse	39.3%	19.6	41.1	100% (56)
Nondiverse	32.0%	40.0	28.0	100% (25)
	(30)	(21)	(30)	(81)

Table 37 shows that diversity is explained in great part by the independent variables of population size, age, and distance within each one of the metropolitan types of cities. Diverse Metropolises (Types I, II, and III) exhibit a higher probability of being larger cities, older cities, and cities which are distant from larger cities. The Partial Metropolises (Type IV) exhibit the same relationships as the Metropolises, but the distance factor does not yield percentage differences as high between diverse and specialized cities as is the case for Metropolises. Similar relationships are evident for Local Service Centers also, but distance distinguishes the diverse from specialized cities in this category more than population size and age, whereas these latter two factors distinguished the diverse from specialized cities for Metropolises and Partial Metropolises in a more pronounced manner than distance. Tables 37 and 38 show that a better

classification of metropolitanism is achieved by using both the number of activities performed and the extent of integrative influence, relative to a city's population, exerted by a city, because by adding diversity we have helped the independent variables explain some of the exceptions which were unexplained in earlier analyses.

Table 37

Diversity by Population Size, Age, and Distance
Controlling for Metropolitan Types of Cities

<u>Population Size</u>	<u>Metropolises</u> (I II III)			<u>Partial Metropolises</u> (IV)			<u>Local Service Centers</u> (V)		
	<u>Diverse</u>	<u>Non-Diverse</u>	<u>Total</u>	<u>Diverse</u>	<u>Non-Diverse</u>	<u>Total</u>	<u>Diverse</u>	<u>Non-Diverse</u>	<u>Total</u>
Under 100,000	18.1%	75.0%	(10)	18.2%	80.0%	(10)	47.8%	57.2%	(15)
100,000 and Over	81.9	25.0	(20)	81.8	20.0	(11)	52.2	42.8	(15)
TOTAL	100.0% (22)	100.0% (8)	(30)	100.0% (11)	100.0% (10)	(21)	100.0% (23)	100.0% (7)	(30)
<u>Age (50,000)</u>									
Under 7 Decades	31.8%	100.0%	(15)	27.2%	90.0%	(12)	86.9%	71.5%	(25)
7 Decades or More	68.2	00.0	(15)	72.8	10.0	(9)	13.1	28.5	(5)
TOTAL	100.0% (22)	100.0% (8)	(30)	100.0% (11)	100.0% (10)	(21)	100.0% (23)	100.0% (7)	(30)
<u>Distance to Larger City</u>									
Under 100 Miles	22.7%	37.5%	(10)	72.8%	80.0%	(16)	39.1%	71.5%	(14)
100 Miles and Over	77.3	62.5	(20)	27.2	20.0	(5)	60.9	28.5	(16)
TOTAL	100.0% (22)	100.0% (8)	(30)	100.0% (11)	100.0% (10)	(21)	100.0% (23)	100.0% (7)	(30)

In Chapter IV, a comparison is shown between the Metropolitan cities and the extreme type of Nonintegrative cities in order to gain a more concise understanding of the manner in which the independent variables related to dominance. Table 38 shows this comparison with only the diverse metropolises being included.

Table 38 shows similar relationships to the comparisons in Chapter IV except the percentage differences are much more pronounced when including only diverse metropolises than when including all metropolises.

Metropolises (I, II, and III) include the highest percentages of cities over 100,000 population, of older cities and of cities over 100 miles from a larger city. Partial Metropolises (IV) differ from Metropolises in terms of distance and from Nonintegrative cities in terms of size and age. Local Service Centers (V) differ from Metropolises in terms of size and age, and from Nonintegrative cities in terms of distance. All three independent variables differentiate the Partial Metropolises from the Local Service Centers to a marked degree (Table 38).

Table 38

Diverse Types of Metropolises and all Nonintegrative Cities
By Population Size, Age, and Distance

<u>Population Size</u>	<u>Metropolises (I II III)</u>	<u>Partial Metropolises (IV)</u>	<u>Local Service Centers (V)</u>	<u>Non- Integrators (XII)</u>	<u>Total</u>
Under 100,000	18.1%	18.2%	47.8%	56.2%	(26)
100,000 and Over	<u>81.9</u>	<u>81.8</u>	<u>52.2</u>	<u>43.8</u>	<u>(46)</u>
TOTAL	100.0% (22)	100.0% (11)	100.0% (23)	100.0% (16)	(72)
<u>Age (50,000)</u>					
Under 7 Decades	31.8%	27.2%	86.9%	75.0%	(44)
7 Decades and Over	<u>68.2</u>	<u>72.8</u>	<u>13.1</u>	<u>25.0</u>	<u>(28)</u>
TOTAL	100.0% (22)	100.0% (11)	100.0% (23)	100.0% (16)	(72)
<u>Distance to Larger City</u>					
Under 100 Miles	22.7%	72.8%	39.1%	87.5%	(36)
100 Miles and Over	<u>77.3</u>	<u>27.2</u>	<u>60.9</u>	<u>12.5</u>	<u>(36)</u>
TOTAL	100.0% (22)	100.0% (11)	100.0% (23)	100.0% (16)	(72)

Adding the dimension of diversity enables us to identify and understand the specialized cities in comparison to cities which engage in diverse activities. Specialized cities tend to be Partial Metropolises (IV), small, young, and near larger cities. Adding the dimension of diversity makes the analysis of dominance clearer and more complete.

Distance

Distance has emerged as an important independent variable in the analysis of metropolitanism. Because of the importance of distance, the hypothesis that a hierarchy or sphere of influence exists between the various types of cities, logically arises. This hypothesis is a statement relating the metropolitan status of cities to their location relative to other cities, i.e., cities dominating other cities are located farther from dominant cities than are cities which are dominated. If this hypothesis is correct, then the average distance of each type of city, as defined in this study, from metropolitan types should decrease as the integrative activity performed by these cities decreases. Table 39 shows the average distance from nearest, larger city, for each type, and also the average distance from the nearest Metropolis for each city type. In the latter measure of distance, Type II Cities were measured from Type I Cities, Type III Cities from Type II Cities, and Type IV through XII from the nearest Metropolis (Type I, II, or III).

Table 39

Metropolitan Types Ranked by Average Distances

<u>City Type</u>	<u>Average Distance from Nearest, Larger City</u>	
	<u>$\bar{X}$</u>	<u>N</u>
IX Sub-Dominant Satellite	49	5
XII Non-Integrative Cities	54	16
VII Regional Sub-Center	56	7
X Regionally Active Satellite	60	12
IV Partial Metropolis	77	21
XI Locally Active Satellite	95	8
VIII Local Sub-Center	96	28
VI Average City	109	11
V Local Service Center	136	30
II Mature Metropolis	189	11
III Limited Metropolis	315	14
I Super Metropolis	426	4

	<u>Average Distance from Nearest Metropolis (Types I, II, or III)</u>	
IX Sub-Dominant Satellite	109	5
IV Partial Metropolis	116	21
X Regionally Active Satellite	118	12
XII Nonintegrative Cities	128	16
VI Average Cities	133	11
VIII Local Sub-Center	136	28
V Local Service Center	158	30
XI Locally Active Satellite	163	8
VII Regional Sub-Center	166	7
III Limited Metropolis	279	14
II Mature Metropolis	592	11

The ratio technique used, in this study, to define a city's degree of integrative activity measures such integrative activity relative to the city's population, but furnishes no information concerning the absolute number of people or absolute area which a city influences. This fact limits the range of interpretation for Table 39. Another fact, causing Table 39 to be interpreted with caution, is that smaller numbers of cities have less chance of being located near another city

than do large numbers of cities. Therefore, the number of cities in each category could effect the average distance that these cities are from another city. Bearing these two cautionary statements in mind, Table 39 still yields interesting results.

On the average, Sub-Dominant Satellites and Nonintegrative Cities are nearer to larger cities than are any other type of city. These cities are so close to larger cities, on the average, that the larger city probably services the surrounding area exclusively, including the Sub-Dominants and Nonintegrative Cities. After the Sub-Dominants and Nonintegrative Cities, in terms of average distance from a larger city, are the three types of cities which are regionally active. The Regional Sub-Centers (Type VII) average 56 miles from a larger city, the Regionally Active Satellites (Type X) average 60 miles from a larger city, and the Partial Metropolises (Type IV) average 77 miles from a larger city. The locally active cities are grouped together also, and follow the regionally active cities in terms of average distance from a larger city. Locally Active Satellites (Type XI) average 95 miles from a larger city; Local Sub-Centers (Type VIII) average 96 miles from a larger city; Average Cities (Type VI) are 109 miles, on the average, and Local Service Centers (Type V) are 136 miles, on the average, from a larger city. These findings are consistent with the results reported in Chapter IV. They indicate that cities engaging in regional activities, only, are very near larger cities. Previously, it was noted that regional integrators tend to be specialists, and, because of their close proximity to larger places, the tendency toward specialization is understandable. Many of the services which outlying units require can be obtained from the nearby, larger city. Consequently these

functions do not develop in the regionally dominant city. The Local Service Centers, however, require larger supporting areas, and therefore are found to be relatively distant on the average from larger cities. The Metropolises, as expected, exhibit the highest average distance from larger cities. Mature Metropolises (Type II) are 189 miles, on the average, from larger cities, while Limited Metropolises (Type III) are 315 miles, and Super Metropolises (Type I) are 426 miles, on the average, from larger cities.

When measuring the average distance of the types of cities from the nearest Metropolis (Types I, II, and III), patterns emerge similar to those previously discussed when measuring the average distance from the nearest, larger city. Sub-Dominant Satellites (Type IX) are, on the average, again closest to the nearest Metropolis. The Regionally Active cities are next in terms of average distance to nearest metropolis; the Partial Metropolis (Type IV) exhibit an average distance of 116 miles, while the Regionally Active Satellites (Type X) show an average of 118 miles to the nearest Metropolis. The Regional Sub-Centers (Type VII) seem to be ranked out of place in terms of average distance to nearest Metropolis, since they exhibit an average of 166 miles, the greatest average distance shown except for the metropolises themselves. There are only 7 cities in this category, with Ogden, Utah being one of the 7. Ogden is 350 miles from the nearest Metropolis. If Ogden were excluded, the other six cities would average 113 miles from the nearest metropolis, putting this category with the other regional types. The regional types are separated from the local types, in terms of average distance from nearest Metropolis, by the Nonintegrative Cities (Type XII) being 128 miles away, on the average.

The locally dominant cities are again grouped together in terms of the average distance dimension; Average Cities (Type VI) are 133 average miles away; Local Sub-Centers (Type VII) average 138 miles; Local Service Centers (Type V) average 158 miles, and Locally Active Satellites (Type XI) average 163 miles. Type III cities, Limited Metropolises, are 279 miles, on the average, from Type II cities. Type II cities average 592 miles from the nearest Super Metropolis (Type I).

Since the regionally active cities rank together and the locally active cities rank together in terms of average distance from nearest Metropolis, and average distance from nearest, larger city, it indicates that these types are actually similar but engage in their respective activities to varying degrees. The Partial Metropolis (Type IV) is probably similar to the Regional Sub-Center (Type VII) and the Regionally Active Satellite (Type X), but the latter two types are respectively engaging in these activities to a much less degree. This is also probably true for the local type cities.

When measuring distance from the nearest Metropolis, it is interesting to note that the more active cities are always separated, on the average, by less active satellite cities. It may be that these satellite cities, along with the cities which are not centers of Standard Metropolitan Areas, are dominated by the active cities and cause the active cities to exhibit such high degrees of service functions. Each metropolitan city may require several satellite cities quite near in order to achieve metropolitan status.

The central cities of Standard Metropolitan Areas are the only cities investigated in this study. If other cities were also included, the analysis of distance and the presentation of a hierarchy of cities

would be more complete and would probably shed much more light on the subject of metropolitan location than is possible within the confines of this study.

Chapter VI

SPECIAL ANALYSIS OF DEVIANT CASES

The taxonomy of cities presented in Chapter III shows that many of the Central Cities of Standard Metropolitan Areas, as defined by the Census, are not classified as metropolitan types when measured in terms of their integrative functions. Since the main criterion of the Census definition is population size, and since many of the students of urban society and metropolitanism have relied on the dimension of population size as a measure of metropolitanism, an analysis of nine of the thirty largest cities in the United States, not classified as metropolises of any type by the technique used in this study, is presented in this chapter. By specifically focusing attention on these nine "deviant" cases, additional information concerning metropolitanism is achieved. The additional information is not of the form of adding several new independent variables to the analysis, but rather of pulling out several cities from the obscurity of percentages and averages so that particular cities, which are interesting because they do not conform to the patterns established earlier, may be analyzed as individual cases. These case studies may provide the reader with further understanding of the phenomenon of metropolitan influence.

Philadelphia, Baltimore, Milwaukee, Buffalo, New Orleans, San Antonio, Louisville, San Diego, and Rochester are among the thirty

largest cities in the United States. Each one of these cities has been included in the special classification of metropolitan cities by many students of urban society. Each of these cities, however, are ranked below the metropolitan types as defined in this study. Four of the cities, Philadelphia, Milwaukee, Louisville, and Rochester rank as Average Cities (Type VI). Three of the nine cities, Baltimore, Buffalo, and New Orleans, are classified as Local Sub-Centers (Type VIII), while San Diego is a Regionally Active Satellite (Type X) and San Antonio is a Locally Active Satellite (Type XI). Why do these nine cities, often treated as metropolises, fail, in this study, to be included as metropolitan types? It may be that these cities are so isolated from the rest of the metropolitan economy that they are required to service their own populations and not to perform integrative services for out-lying units. These cities may, on the other hand, be located so near other metropolises that they are large residential areas rather than integrative centers. Table 40 presents data which are analyzed and discussed in order to shed light on the apparent deviancy of these nine cities. As indicated in Table 40, Milwaukee, Louisville, and Rochester come close to being metropolises; Milwaukee and Louisville on the local level, and Rochester on the regional level. The other six cities exhibit low average ratios of the metropolitan indicators.

Table 40

Characteristics of the Nine Largest Cities not Classified as
Metropolises

<u>Cities</u>	<u>City Type</u>	<u>Average Regional Ratio</u>	<u>Average Local Ratio</u>	<u>Population Size</u>	<u>Distance To Larger City</u>	<u>Distance To Nearest Metropolis</u>	<u>Decades 50,000 Or More</u>	<u>Population Potential</u>
1. Philadelphia	VI Average City	.92	.95	Over 500,000	83	53	Over 7	Over 400,000
2. Baltimore	VIII Local Sub-Center	.62	.94	Over 500,000	90	25	Over 7	Over 400,000
3. Milwaukee	VI Average City	.94	1.07	Over 500,000	81	50	Over 7	300,000- 400,000
4. Bullalo	VIII Local Sub-Center	.84	.93	Over 500,000	173	210	Over 7	300,000- 400,000
5. New Orleans	VIII Local Sub-Center	.74	1.03	Over 500,000	318	360	Over 7	Under 300,000
6. San Antonio	XI Locally Active Satellite	.56	.87	250,000- 500,000	189	252	4-7	Under 300,000
7. Louisville	VI Average City	.94	1.09	250,000- 500,000	90	60	Over 7	300,000- 400,000
8. San Diego	X Regionally Active Satellite	.49	.84	250,000- 500,000	112	120	4-7	Under 300,000
9. Rochester	VI Average City	1.08	.92	250,000- 500,000	67	240	Over 7	300,000- 400,000

Philadelphia is located 83 miles from New York City, only 50 miles from Lancaster, and slightly farther from Harrisburg. New York is, of course, an extremely active city, performing integrative services for the whole nation and certainly for the surrounding territory. Harrisburg and Lancaster are active, small cities and as their average ratios indicate, they service a small area very intensively and fully. Their domains may have been preserved for them by accidents of terrain and transportation routes. Philadelphia, because of its location near these other active places, is not required to perform many service functions for outlying units. It is highly probable that New York provides Philadelphia with many services. Philadelphia exhibits ratios above 1.10 on three of the 10 regional indicators and two of the ten local indicators. These services, which Philadelphia does provide above the normal, are wholesale brokers, business services, and national offices of associations of a regional nature, and the local services of trucking and printing. It is interesting to note that both New York and Harrisburg exhibit low ratios for trucking, but are high on almost all the other local characteristics. This area seems to be serviced adequately; New York performing most of the services and Philadelphia providing a trucking service. Philadelphia suffers, then, from its close proximity to other active metropolises.

Baltimore is also located near other larger cities and metropolises. It is less than 30 miles from Washington, D. C. and only 90 miles from Philadelphia. Baltimore exhibits no regional ratios over 1.10. Washington probably is the center for regional services in this area, and none are required to locate outside of Washington. Five of the ten regional ratios are over 1.10 for Washington, and one of them, the

number of central offices for associations, is exceedingly high. Baltimore performs three of the ten local functions to a relatively high degree. Utilities, trucking, and merchant wholesales, are all above 1.10. Baltimore is lacking, however, in the performance of the other seven local activities. It may be that this Eastern belt of cities, including Baltimore and Philadelphia, combine to form one or two large, active metropolitan centers, but when viewing these cities separately, several of them seem below normal in terms of the performance of service functions for outlying areas.

Milwaukee is the most active of the nine cities singled out as deviant cases. Milwaukee performs integrative functions to such a degree that four of the ten local ratios and four of the ten regional ratios are above 1.10. Regionally, Milwaukee is active in terms of wholesale trade, containing national offices of corporations, mail order businesses, and business services. On the local level, utilities, telecommunications, trucking, and printing are all performed to a high degree by Milwaukee. Apparel sales, finance, entertainment, and hotels are all functions which are not performed to a high degree by Milwaukee. These four functions cause the average local activity of Milwaukee to be lower than cities which are designated as local metropolises. Air travel, banking, railroads, hospital facilities, and national associations are all regional activities which are not found in Milwaukee to any great degree. Milwaukee is only 80 miles from Chicago, and Chicago services this area with most of the functions which Milwaukee lacks. Most of the potential population requiring metropolitan services in this area are located south of Milwaukee and, of course, these units tend to be serviced by Chicago. North of Milwaukee the number of

people requiring metropolitan services diminishes, and helps to cause Milwaukee's relatively low rank on the scale of dominance.

New Orleans does not suffer from being too near another active city, but rather from being too isolated. New Orleans is 318 miles from a larger city, and the area surrounding New Orleans is relatively sparsely populated. The only regional activity performed to a high degree by New Orleans is that of providing services for air travel. Entertainment and lodgings, along with merchant wholesales, are local services provided by New Orleans. All other indicators of metropolitan activity are relatively lacking in New Orleans. Apparently there are not enough units requiring metropolitan services around New Orleans to support it as a metropolitan center.

Vance and Smith (1954), in their analysis of Southern metropolises, found that New Orleans ranked as a "Third Order Metropolis." Their classification places New Orleans into a much more active type than the Local Sub-Center (Type VIII) classification which New Orleans receives in the present study. Vance and Smith (1954) used six characteristics to define metropolises: (1) Wholesale Sales, (2) Business Services Receipts, (3) Number of Branch Offices of Manufacturers, (4) Retail Sales, (5) Bank Clearings, and (6) Value Added by Manufacturing. The two authors gave the first three characteristics a weight of two to one. In the present analysis, New Orleans exhibits a high degree of wholesaling activity. This activity may be enough to place New Orleans in a Southern Metropolis category using the definitive technique of Vance and Smith (1954).

The deep South is still an agricultural region, and does not approach the degree of industrial activity found in the North-East. It

may be that Atlanta and Dallas are sufficient integrative centers for this agricultural region, because the region would not require great degrees of centralized integrative services. However, the agricultural region would definitely require a storage and shipping center. New Orleans and Houston seem to specialize in these functions. New Orleans is definitely a point of export for Southern produce.

Louisville and Rochester both can be viewed, in part, as victims of an arbitrary cutting point. Louisville exhibits an average ratio of 1.09 on the local indicators, and, of course, cities with average ratios 1.10 or over are designated as metropolises on a local basis. Rochester shows an average regional ratio of 1.08, and slightly increased activity of this nature would have enabled Rochester to be designated as a Partial Metropolis (Type IV). Actually, Louisville only performs three local functions to a degree that gives them ratios over 1.10, and therefore is certainly not a diverse city. Louisville tends to specialize in wholesaling activity, but the other local functions tend to pull its average ratio down. Louisville is 90 miles from Cincinnati, and the distance between Lexington and Louisville is less than that. Both Cincinnati and Lexington are metropolises, containing mechanisms which perform regional activities to a high degree, and the location of these mechanisms in Cincinnati and Lexington probably cause the relatively low degree of this type of activity in Louisville. Louisville seems to be a service center for the agricultural areas surrounding the city, as is evident in its wholesaling activity, but this activity alone does not permit it to blossom as a metropolitan center, in relation to other cities in the United States.

Rochester specializes in the integrative activities of manufacturers. The ratios for the two characteristics of manufacturing activity are both well over two (2.00). Rochester is lacking in the other regional characteristics, and exhibits only three local ratios over 1.10. These are printing, utilities, and apparel sales. Rochester is 67 miles from a larger city, and its local services may suffer because of this.

Of the larger cities, San Antonio and San Diego rank the lowest on the scale of dominance; San Diego is a Regionally Active Satellite (Type X), and San Antonio is a Locally Active Satellite (Type XI). The average ratios depicted in Table 40 are misleading in connection with these two cities, because, as the reader will recall, the Satellite Cities (those falling below .90 on the average ratios when compared to all urban places including other central cities) were compared with all other urban places excluding central cities. The latter comparison determined the typing of the Satellite Cities. Both San Diego and San Antonio suffer from their isolated location. San Antonio is 189 miles from a larger city, and over 250 miles from the nearest metropolis. Normally this would give San Antonio a great probability of becoming at least a Local Metropolis, but the low population potential and geographic features surrounding San Antonio are the causes for the absence of metropolitan requirements in this area. The dry, arid land to the west and southwest of San Antonio does not support dense populations. San Antonio is a large, residential center and services its own population, but does not perform metropolitan functions. Of the twenty metropolitan activities, San Antonio only exhibits two having ratios over 1.10--mail order houses and hotels.

San Diego in the extreme southwestern corner of California also suffers from desert environs. San Diego is somewhat of a resort area as indicated by the fact that air travel, entertainment, and hotels are the only three metropolitan activities performed to a high degree. San Diego is 120 miles south of Los Angeles, and those units located between Los Angeles and San Diego are serviced by Los Angeles. Not many units requiring metropolitan activity exist to the west and south of San Diego.

It should be noted that San Diego is a huge military center. Its large size may be a function of the service needs generated by the military establishment. A military center is similar to a manufacturing center in that it draws many workers to it and many people to service the workers. Flint, Michigan is an example of a city which is a manufacturing center, being relatively large, but not exhibiting a high degree of metropolitan influence as we have defined it.

Buffalo is not an isolated city, and certainly is not near other larger cities, yet it is a large city which does not attain metropolitan status in this study. Wholesaling, hospital services, air travel, and railroad employees all are performed to such a degree, by Buffalo, that they exhibit ratios over 1.10. The regional activities of banking, business services, and offices of corporations are lacking to such an extent, however, that they tend to prevent the overall average ratio from being high. Buffalo only contains two local activities performed to a high degree. These are apparel sales and merchant wholesales. It may be that the location of Buffalo on the Canadian border prohibits much interaction between Buffalo and units to the west of it, thus causing the relative lack of metropolitan activity in Buffalo.

The wholesaling activity of Buffalo is great, for both the regional and local characteristics, and is consistent with its functions as a port on Lake Erie. When a city like Buffalo, New Orleans, or Louisville specializes in wholesaling, relative to other cities, it may cause the population size of that city to be large, in order to provide this service to a great extent, and therefore cause the ratios of the other services it performs to seem low.

Isolation, close proximity to other, larger metropolises, and poor surrounding environs are offered as explanations of why these "deviant cases" are not metropolitan cities. Viewing these nine cities, specifically, raises one interesting question which may prove to be important in future analyses. This question concerns the causes of population growth. Cities can be large, and still not perform metropolitan services for outlying areas. Why? It may be that two dimensions of the structure of urban places must be analyzed in order to adequately answer this question. One dimension is the one considered in this study--mechanisms which relate to the dominant character of a city. The second dimension, possibly, is the degree of specialization between cities. Population size, as we discovered in Chapters IV and V, is related to metropolitan influence; however the analysis of the nine "deviant cases" indicates that some degree of independence exists between metropolitan influence and population size. It may be that cities which specialize in one or a few functions, tied to other specialized cities in an interdependent network, do not engage in enough metropolitan functions to be designated as metropolises by our definition. These specialized cities, however, may contain large populations to produce their specialized commodity. By trading with other cities

for the necessary requirements, these specialized cities can sustain their large populations.

Many functions relating cities to outside areas have not been included in this study. It is quite possible that these characteristics could explain the emergence of so called "deviant cases" in this study. Such factors as automobile and railroad transportation routes, military establishments, and production of specialized consumer goods may cause a city to be large by attracting a large labor force and of course this would not be evident, unless indirectly, within the confines of this study.

Chapter VII

SUMMARY AND IMPLICATIONS

Since civilization began and cities emerged as prominent points on the landscape, writers have been aware of the influence exerted by cities over outlying areas, and over the years this influence of the great cities has been described by the term metropolitan influence. In relatively recent times urban sociologists and more specifically, human ecologists, have described the influence of cities in terms of the biological concept of dominance. Studies of metropolitan influence have done little more than demonstrate that some cities do dominate the activities of other areal units, and that this influence follows rather specific and particular patterns. Little is known of the emergence and dynamics of metropolitan influence. Metropolitanism is mainly defined and discussed descriptively rather than empirically. Briefly, the descriptive definition of metropolitanism has evolved first from the definition of cities as service centers for the areas surrounding them. All cities, then, exert some influence over outlying areas. As the major activities of an area are controlled, increasingly, by mechanisms which centralize in one city, then of course, this city exerts an increasing amount of influence and becomes a dominant city. The literature dealing with metropolitan influence contains discussions of two types of dominance; one is described as the influence which a city exerts over its local surroundings, and the other describes the

influence of a city over units spread throughout a vast region, sometimes a whole nation. This study investigates aspects of both the local and regional manifestations of dominance in an attempt to add to the growing body of knowledge concerning metropolitan dominance.

This study sheds some light on the dynamics of metropolitan dominance, but its central concern is with the analysis of a particular taxonomic problem arising whenever metropolitan influence is studied. A city exerts metropolitan dominance if major integrative activities centralize in that city. A metropolis, then, is a center which organizes the activities of the hinterland, but in practice any city with a large population is usually referred to as a metropolis. Which cities are metropolises, the large ones or the integrative centers? When selecting cities to analyze as metropolises, most urban researchers have relied solely on the variable of population size, selecting only the large cities. These researchers have found the United States Census classification of central cities of Standard Metropolitan Areas a convenient metropolitan classification. The most important criterion of the definition of a central city is that the city must contain at least 50,000 people.

A taxonomic problem exists, then, because if the metropolitan character of a city is defined as the ability of a city to dominate units located outside of the city, then this ability may not be found in all cities within a particular size category. It may be that all large cities are not metropolises, and that some small cities also exert forms of metropolitan dominance. It is also possible that all cities are metropolises to some extent. In order to analyze this taxonomic problem, this study confines its attention to the manageable

question, "Are all central cities of Standard Metropolitan Areas special types of cities performing integrative services for outlying areas far in excess of the normal urban place?"

Twenty indicators of metropolitan or integrative activity are selected and analyzed in Chapter II. Ten of these characteristics were observed to indicate integrative activities of a local nature more than of a regional nature, and ten indicate regional activities rather than local ones. By designating these two types of metropolitan activity, both the local and wide-areal or regional aspects of metropolitan dominance may be analyzed in this study. The twenty indicators selected in this study do not encompass all of the integrative activities performed by cities. While it is possible that the findings of this study would be altered if other characteristics were added to the list of twenty integrative activities, it is believed that the problems raised in this study are adequately analyzed by limiting the list to these twenty characteristics.

In Chapter III, a particular ratio is defined to measure the degree of metropolitan activity performed by each Metropolitan Area central city. For each of the twenty indicators, per capita activity for each central city is divided by per capita activity for all urban places in the United States. Accepting the fact that populations of various cities have somewhat varying consumer patterns, and trusting that it does not affect the overall results greatly, a city that exhibits an average ratio of 1.00 is integrating at the level of the average urban population. If a city exhibits a ratio above 1.00 it is integrating the activity of outlying areas, whereas a ratio under 1.00 indicates sub-normal integrative activity. Because the indicators are

gross and because the consumption habits of people may vary, an average ratio of 1.10 or higher is selected as indicating above average performance of integrative services, while an average ratio below .90 is selected as indicating below average integrative services. Average ratios between .90 and 1.10 are designated as representing a normal or average provision of integrative service.

This particular ratio technique measures the integrative activity of a particular city entirely in relation to its population size. Comparisons between cities in terms of the actual amount of integration each city performs are not possible with this technique. An interesting, and probably fruitful, study evolving from this one would be to multiply the population size of each city by their ratios, in an attempt to measure the amount of integration each city is performing for outlying units. In this way comparisons of actual amounts of integration may be carried out.

A list of the 168 central cities and their average local and regional ratios is presented in Chapter III. The cities vary greatly in the degree to which they engage in the twenty integrative activities. Twelve types of cities are delineated on the basis of their per capita performance of the twenty activities. Five of the 168 central cities integrate far above the average levels for both the regional and local activities, and are called Super Metropolises. The fact that only 30 of the 168 central cities perform integrative activities above the average for both the local and regional types of dominance, and that 41 central cities perform well below the average for urban places for both local and regional activities, provides a strong negative answer to the taxonomic question of whether all central cities of Standard

Metropolitan Areas should be included in a special metropolitan city classification. The full list of central cities in each of the twelve city types is presented on page 65 of Chapter III.

Several independent variables are hypothesized to account for the differences between the types of central cities emerging from the analysis of their performance of integrative activities. Population size, age, distance, and population potential are the major independent variables analyzed. Summarizing, most generally, cities which are large, are located relatively far from larger cities, and are relatively old, exhibit a high probability of performing integrative activities for outlying units, thereby qualifying as metropolitan types.

The major results of the hypotheses tested in Chapters IV and V are presented below.

Population Size

Population size is directly related to cities classified in terms of both scales of regional dominance and local dominance. Population size is more strongly related, however, to the scale of regional dominance than to the scale of local dominance. Metropolises tend to be larger than nonintegrative cities, and diverse metropolises, those which perform many metropolitan functions, tend to be larger than non-diverse metropolises.

Distance

Of the major independent variables, distance has the strongest association with cities classified in terms of both regional and local dominance. If a city is near a larger city it has a low probability

of developing the performance of large scale integrative activities. The one glaring, and important, exception to this general finding is the tendency for cities which are regionally dominant, but not locally dominant, to be located near larger cities.

Analyzing regional and local dominance separately, population size is more closely associated with regional dominance than is distance, and distance exhibits a stronger association with local dominance than does population size.

Dividing cities into two size classes, large and small, shows that distance is more closely associated with cities ranked in terms of metropolitan dominance for large cities than for small cities.

Metropolises are separated from each other, on the average, by greater distances than they are from other types of cities. The twelve types of cities, classified in declining order from Type I to Type XII in terms of the per capita metropolitan influence displayed by each type, do not rank, in order from Type I to Type XII, in terms of their average distances from larger cities. An interesting pattern of influence is suggested by the ranking of average distances, however, for the Metropolises (Types I, II, and III) are separated, on the average, from the Partial Metropolises (Type IV) by Satellite cities, and Satellite Cities separate the Partial Metropolises (Type IV) from the Local Service Centers (Type V).

Age

The number of decades since a city attained 50,000 population, and the number of decades since the ring of a city has grown faster than the central city, are the two measures of age used in this study.

The number of decades since a city reached 50,000 population is more closely related to metropolitanism than is the ring-central city growth measure of age.

Older cities tend to be metropolitan in character more than younger cities. Large cities, as a group, show this relationship more clearly than small cities. Dividing cities into distance categories shows that the relationship between age and metropolitanism is maintained for both those cities which are near and far from larger cities.

Population Potential

Cities vary in terms of the number of people accessible to them. This accessibility variable is not as closely associated with metropolitanism as are the variables of size, distance, and age. Analyses involving this variable show that accessibility is most clearly related to local dominance. The relationship is not as one would expect, however, for cities having low population potentials tend to be locally dominant more than do cities exhibiting high population potentials.

Implications of the Study for Future Research

Because of the results of this study, it is the author's belief that the study contains implications for future research in the area of metropolitan dominance. Studies designed to analyze characteristics of metropolitan centers and their influence over the hinterland will find it fruitful to maintain the distinction between the population size of cities and the integrative activities performed by cities. The Standard Metropolitan Area defined by the Census is a convenient unit for analysis, because of the availability of data, but this unit

may not conform to the definition of a metropolitan complex which the researchers utilize in their analyses. By using a taxonomy of cities based on the integrative activities performed by cities more adequate units of analysis may be identified, and the results of future metropolitan research may be more meaningful.

This study provides a basis for future research designs analyzing other problems of urban society. A discussion of a few of those problems follows.

An important continuation of this study would be to provide a more complete metropolitan taxonomy of urban places than is found here. Because many central cities of Standard Metropolitan Areas are not acting as metropolises, it may be that one would find that some of the cities, not included in the Census classification of central cities, do behave as metropolises. All urban places, for which data are provided, should be included in a larger taxonomic study.

This study analyzed the problem of per capita metropolitan influence--the amount of influence exerted by a city relative to its population size. In a larger taxonomic study, one could also include the population size of a city in the metropolitan typology in such a way as to determine whether one city is influencing more units in outlying areas than another city. On the basis of such a typology graphic analyses of the areas dominated by particular cities could be designed.

A very general and prominent sociological hypothesis maintains that as an organization grows in size the controlling agencies of that organization tend to centralize. On the basis of the findings of this study, a specific case of the above, general, hypothesis could be investigated. One would suspect, on the basis of this hypothesis, that

as the nation grows in size the integrating activities of the nation will also grow in volume and tend to centralize in fewer and fewer cities. A test of this hypothesis could be designed so that the degree of integrative activity performed by each city could be designated, much as it is in this study, for each decade from 1920 to 1960. If the hypothesis is to be substantiated, the study would find that in 1920 cities performed less integrative activity, and that this activity was distributed more evenly over many cities than in each succeeding decade up to 1960 where a few cities would perform high degrees of integrative activity relative to the rest of the cities of the nation.

The migration of people is a major area of investigation for sociologists. Of recent concern is the problem of why some areas of the nation attract more migrants than others, some of which are even losing population due to migration. A hypothesis, known as the "push-pull" hypothesis, explains many aspects of this phenomenon. This hypothesis maintains that economically dynamic and growing areas attract migrants, while areas which tend to be stagnant or are declining, economically, tend to experience greater emigration than other areas. The metropolitan taxonomy developed in this study can be applied to the problem of explaining the variation of migration into and out of various urban areas in the United States. Those cities which qualify as metropolises in our taxonomy are more active and their economic activities are performed more intensively than other cities of a similar population size. We would expect, therefore, that these cities would attract more migrants than the other city types. If the cities of the United States were studied for several different periods, as

was suggested earlier, then those cities which emerged as metropolises most rapidly, would tend to show the greatest rates of immigration.

Studies designed to arrive at a more complete metropolitan taxonomy of urban places; to analyze metropolitan activity graphically; to investigate the centralization trend of metropolitan influence, and to provide information concerning the problem of migration in urban areas, are only a few of the possible analyses that can be based on the results of this study. It is hoped that the brief description of these possible research designs provide the reader with an indication of the fruitfulness of the findings of this investigation.

Appendix Table A - Local Activities

The Ratios of the Local Activities to the Local Population
Expressed to the Ratio of the Total Activity in the United States
To the Total United States Urban Population

	1*	2	3	4	5	6	7	8	9	10
Akron	.79	.57	.68	1.70	.82	.62	.90	.50	.64	.68
Albany - Schenectedy - Troy	.86	1.64	1.50	.75	1.48	.79	.75	.91	.88	1.10
Albuquerque	.87	1.20	.71	.85	.74	.97	.83	1.57	1.26	.52
Allentown - Bethlehem - Easton	1.40	1.44	.57	.91	.84	.53	.67	.75	.79	.84
Altoona	.87	.67	.70	.92	.50	.47	.69	.80	.51	.60
Amarillo	1.71	1.64	1.38	2.02	.80	1.09	1.12	2.05	1.74	1.00
Asheville	.76	.98	1.11	.92	.69	.87	1.35	2.80	1.02	.95
Atlanta	1.17	1.29	1.64	1.60	2.02	1.40	1.04	1.48	2.42	1.00
Atlantic City	1.29	2.21	.89	.51	.93	.75	1.65	17.41	.80	.52
Augusta	.75	1.39	.54	.60	.56	.68	.98	1.36	.80	.47
Austin	.97	1.11	.91	.64	.84	.98	.94	2.14	.48	.99
Baltimore	1.21	.76	.82	1.15	.84	1.02	.73	.59	1.25	1.05
Baton Rouge	1.02	1.10	.79	.51	.56	.74	.81	.80	.61	.54
Bay City	1.43	.98	.61	.66	.52	.43	.94	.68	.98	.61
Beaumont - Pt. Arthur	1.44	1.04	.91	.72	.41	.74	.96	1.30	.71	.51
Binghamton	1.08	.92	.63	1.06	.82	.71	.94	.93	.91	1.11
Birmingham	1.13	.95	.89	1.00	.69	1.00	.63	.82	1.07	.75
Boston	.89	1.28	1.20	1.04	2.30	1.28	.85	1.57	2.16	.86
Bridgeport	.81	1.15	.50	1.06	1.04	.53	.67	.55	.99	.63
Brockton	1.19	1.15	1.38	1.04	1.95	.60	.71	.36	.63	.73
Buffalo	.95	1.13	.70	1.09	.80	.76	.81	.89	1.26	.87
Canton	.84	1.19	.68	1.04	.71	.57	1.00	.55	.94	.78
Cedar Rapids	1.24	1.33	.79	.98	.98	1.14	1.21	1.27	1.16	1.15
Charleston, S. C.	.98	1.47	.57	.51	.66	.77	1.12	1.27	.91	.58
Charleston, W. V.	1.87	1.72	1.66	1.08	1.33	1.05	.98	1.52	1.66	.90
Charlotte	1.25	1.11	1.52	2.79	1.22	1.31	1.62	1.09	2.18	1.08

*See p. 164 for column headings

Local Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Chattanooga	.95	1.11	.64	.94	.80	3.95	.85	1.25	1.46	.53
Chicago	.84	1.43	1.25	1.55	1.75	1.25	.94	1.41	1.46	2.06
Cincinnati	.87	1.03	.70	1.11	1.49	.97	1.08	1.25	1.23	1.47
Cleveland	1.06	.85	.86	1.34	1.21	.75	.88	.93	1.32	1.13
Columbia	.81	1.30	1.09	.81	.98	1.26	.79	1.34	1.60	.62
Columbus, Ga.	.78	1.26	.54	.60	.58	.73	.98	.66	.67	.61
Columbus, Ohio	.94	1.05	.89	1.08	1.13	1.21	.88	1.34	1.18	1.09
Corpus Christi	1.33	.83	.82	1.13	.52	.89	.96	1.61	1.26	.47
Dallas	1.33	1.22	2.09	1.79	1.62	1.92	1.44	1.27	2.61	1.18
Davenport - Rock Island - Moline	.97	.66	.89	.96	.89	1.05	.98	.91	.79	1.04
Dayton	.87	1.16	.70	.81	1.54	.65	.79	.86	.94	1.92
Decatur	1.17	.98	.64	.85	.82	.91	.92	.82	1.05	.97
Denver	.97	.83	1.46	1.47	1.24	1.33	1.04	1.43	1.40	1.05
Des Moines	.86	.94	1.36	1.55	1.85	2.22	1.33	1.57	1.87	2.51
Detroit	1.08	.83	.82	.94	.82	.84	.83	.75	.94	.78
Duluth - Superior	1.22	.89	1.34	.81	.68	.74	.85	1.36	1.94	.87
Durham	.75	.86	.59	.64	.59	.90	.63	.68	.41	.65
El Paso	1.30	1.17	.89	1.04	.69	.77	.83	1.18	1.13	.54
Erie	.91	.90	.86	.77	.68	.57	.73	.57	.86	.78
Evansville	.83	1.19	.59	1.23	.67	.67	.90	.77	.79	.77
Fall River	.81	.98	.36	.89	.55	.43	.58	.23	.57	.73
Flint	.51	1.34	.68	.87	.69	.63	.83	.50	.69	.63
Ft. Wayne	1.21	1.02	.82	1.57	.90	1.04	.90	.75	.94	.89
Ft. Worth	1.13	.78	1.04	.92	.93	1.06	1.06	1.23	1.35	.94
Fresno	1.33	1.85	1.21	1.21	.87	1.05	.96	1.23	1.83	.72
Gadsden	1.03	.75	.48	.72	.25	.63	.81	.55	.22	.42
Galveston	.68	1.07	.77	1.13	.58	1.47	1.25	2.30	.93	.62
Grand Rapids	.87	1.09	1.09	1.38	1.16	.94	.83	1.16	1.43	1.34
Green Bay	1.30	1.25	1.45	1.92	.80	.66	1.02	1.05	1.48	.76
Greensboro - High Point	.62	1.24	.79	1.30	1.36	1.05	1.04	.93	1.24	.77
Greenville	1.03	1.26	.93	1.19	.94	1.14	1.00	1.16	1.31	.92

Local Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Hamilton - Middletown	.57	.92	.54	.68	.57	.85	.67	.57	.36	.68
Harrisburg	.97	1.88	1.79	.89	2.45	1.04	.81	1.64	1.70	1.15
Hartford	.91	1.41	.64	.85	1.64	3.10	.75	1.02	1.55	.75
Houston	1.29	1.09	1.20	1.36	.75	1.17	.85	1.25	2.19	.82
Huntington - Ashland	1.06	1.13	.75	.75	.56	.66	.79	.82	.87	.52
Indianapolis	1.13	.72	1.07	1.53	1.30	1.31	.96	.98	1.52	1.24
Jackson, Mich.	3.21	1.45	.82	.83	.91	.66	.77	1.05	.76	.68
Jackson, Miss.	1.44	1.08	1.57	.98	.91	1.22	.85	1.61	1.18	.80
Jacksonville	.73	1.15	1.23	1.40	.84	1.25	.96	1.73	1.46	.66
Johnstown	.97	.85	.41	.53	.61	.39	.75	.68	.63	.47
Kalamazoo	.87	1.43	.79	1.02	1.25	.65	.88	.96	1.05	1.15
Kansas City	1.02	1.34	1.18	1.77	2.38	1.57	1.06	1.59	2.24	1.29
Kenoska	.60	.89	.50	.83	.58	.45	1.00	.27	.27	1.11
Knoxville	.87	.92	.75	.94	.74	.72	.94	1.23	1.19	.67
Lancaster	1.25	1.38	.63	1.55	1.23	.57	.79	1.48	1.06	1.49
Lansing	1.29	1.19	.93	.98	1.31	1.11	.73	.80	1.38	.90
Laredo	1.02	1.26	.59	1.19	.23	.37	.54	1.25	.32	.24
Lawrence	.86	1.22	.38	.57	.48	.44	.60	.30	.66	.38
Lexington	.92	1.96	.63	.96	.96	.75	2.19	2.25	1.46	.65
Lima	1.06	.86	.73	1.00	.76	.88	.88	.77	.47	.58
Lincoln	1.17	.91	1.29	.79	1.10	1.51	1.02	1.36	.74	1.46
Little Rock	.95	.89	1.20	1.13	1.16	2.07	.85	1.50	1.50	.94
Lorain - Elyria	1.05	.99	.48	.45	.51	.46	.77	.27	.34	.53
Los Angeles	.95	.93	1.13	.75	1.03	1.35	3.52	1.16	1.23	1.00
Louisville	1.02	1.02	1.02	1.09	1.01	.94	1.08	1.11	1.30	1.29
Lowell	1.11	.79	.59	.68	.46	.49	.69	.30	.27	1.22
Lubbock	1.17	1.12	1.23	1.47	.59	1.03	1.10	1.36	2.28	.58
Macon	.81	1.24	1.29	.62	.63	.91	1.15	1.16	.85	.44
Madison	1.08	1.54	1.07	.74	1.35	1.17	1.12	2.41	1.01	1.18
Manchester	1.03	1.10	.89	1.17	.70	.91	.85	.68	.84	.63

Local Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Memphis	1.11	.88	.89	1.49	.91	.97	.90	1.32	2.96	.67
Miami	1.05	1.76	1.13	.68	1.23	1.27	2.06	5.05	1.77	.95
Milwaukee	1.24	.91	1.13	1.17	1.06	.94	.83	.91	1.02	1.41
Minneapolis - St. Paul	.94	1.02	1.00	1.36	1.54	1.46	.98	1.14	1.76	1.54
Mobile	.73	1.07	.63	.62	.57	.83	.94	.98	1.02	.53
Montgomery	.76	1.02	.75	.64	.71	1.03	.81	1.09	1.00	.61
Muncie	.97	.94	.68	1.21	.54	.57	.71	.61	.40	.77
Nashville	.81	1.41	1.07	1.32	1.62	1.04	.92	1.30	1.50	1.70
New Bedford	.81	1.05	.43	.83	.61	.46	.56	.34	.50	.46
New Britain - Bristol	.71	1.17	.54	.55	.67	.74	.58	.30	.19	.51
New Haven	.73	1.76	1.27	1.09	1.22	.73	.77	.52	1.08	.87
New Orleans	1.02	.92	1.04	1.09	.64	1.02	1.31	1.20	1.42	.63
New York	.95	1.36	1.11	.98	1.17	1.75	1.31	1.36	2.20	1.57
Norfolk - Portsmouth	.62	1.36	.61	.62	.56	.62	.81	.64	.91	.43
Ogden	.62	1.23	.59	.57	.69	.63	.79	.71	.74	.52
Oklahoma City	1.25	1.02	1.50	1.77	.99	1.45	1.31	1.57	1.40	.96
Omaha	1.30	.92	1.39	1.75	1.24	1.87	1.08	1.68	1.75	.92
Orlando	1.11	2.04	.93	.81	.85	1.56	1.23	2.07	1.70	.78
Peoria	.78	1.00	.86	1.06	1.03	.94	.96	.57	1.26	1.09
Philadelphia	.83	1.01	.79	1.13	1.04	.99	.69	.59	1.09	1.29
Phoenix	1.52	1.83	1.11	.87	1.24	1.27	1.21	2.07	2.26	.82
Pittsburgh	1.06	.76	.96	1.21	1.11	.98	.96	.93	1.28	.84
Pittsfield	.81	1.05	.68	.58	.60	.70	.75	.66	.39	.54
Portland, Me.	.89	1.17	1.32	1.43	1.03	1.18	.83	1.86	1.79	.80
Portland, Ore.	1.27	.86	1.43	1.45	1.25	1.43	1.12	1.27	2.19	1.10
Providence	1.08	1.29	.89	.91	1.15	.80	.75	.71	1.30	.67
Pueblo	1.08	.84	1.20	.75	.52	.68	.77	.82	.71	.57
Racine	1.13	.82	.54	.75	1.04	.50	.88	.43	.33	2.60
Raleigh	1.33	1.24	.89	.68	1.28	1.46	1.08	1.36	1.31	1.01
Reading	1.17	1.33	.52	1.06	.76	.70	.96	1.09	.69	.68

Local Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Richmond	.94	.95	1.16	1.38	1.24	1.64	.92	1.27	1.50	1.05
Roanoke	1.36	1.26	.75	1.19	.75	.91	.77	1.57	.98	.81
Rochester	1.13	1.15	.89	.64	1.08	.74	.79	.75	.91	1.15
Rockford	1.02	1.17	.71	.77	1.11	.95	.85	.75	.97	.82
Sacramento	1.14	1.41	1.70	.94	1.44	1.18	.96	1.52	1.26	.91
Saginaw	.79	1.23	1.38	.96	.62	.61	.90	.61	.98	.66
St. Joseph	1.11	.84	.73	1.15	.60	.75	1.12	.91	1.12	.84
St. Louis	1.05	.77	.95	1.72	1.58	1.03	.83	1.30	1.62	1.20
Salt Lake City	1.03	.86	1.16	1.38	1.02	1.29	1.37	1.39	1.46	1.16
San Angelo	1.06	.68	.86	1.34	.45	.79	.96	1.27	.74	.56
San Antonio	.71	.93	.89	.91	.61	.86	.96	1.23	.87	.68
San Bernardino	1.14	1.24	1.16	.34	.67	.85	.85	.96	.93	.52
San Diego	.94	.96	.75	.43	.61	.90	1.12	1.30	.60	.70
San Francisco - Oakland	.87	1.19	1.48	1.25	1.41	1.73	1.17	1.70	1.75	1.22
San Jose	.94	1.70	1.04	1.21	.84	.98	.94	1.00	.99	.84
Savannah	.84	1.00	.61	.68	.48	.81	.83	1.27	.77	.42
Scranton	.86	1.04	.66	1.60	.95	.65	.79	.84	.77	1.15
Seattle	.87	.93	1.39	1.00	1.19	1.54	1.15	1.70	1.73	.96
Shreveport	1.43	1.41	.91	.96	.70	.93	.92	1.30	1.31	.66
Sioux City	1.10	.82	.80	1.32	.85	.95	.83	1.20	2.01	.82
Sioux Falls	1.32	.91	1.89	1.74	.94	1.22	1.27	.91	1.54	.71
South Bend	1.06	1.24	.71	1.32	.94	.98	.65	.80	.79	.73
Spokane	1.05	.84	1.29	1.32	.78	1.25	.96	1.68	1.56	.89
Springfield, Ill.	1.27	1.20	1.68	.87	1.49	1.35	.85	1.39	1.16	.99
Springfield, Mo.	.84	.88	1.05	1.64	.76	.83	1.06	1.23	1.26	1.11
Springfield, Ohio	.83	.75	.70	1.25	1.69	.62	.85	.80	.34	4.10
Springfield - Holyoke	1.00	1.19	.96	.91	.88	1.06	.73	1.00	.89	1.65
Stamford - Norwalk	1.10	1.23	.89	.74	.66	.77	.88	.36	.66	1.97
Stockton	1.03	1.63	.93	1.32	.75	.87	1.19	1.61	1.19	.54
Syracuse	.91	1.30	1.27	1.06	.91	1.05	.96	1.50	1.14	.91

Local Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Tocona	.87	.68	.88	.66	.72	.94	.92	.71	1.26	.67
Tampa - St. Petersburg	1.14	1.14	.61	.66	.78	.94	1.65	2.32	1.31	.76
Terre Haute	.92	.74	.71	1.74	.70	.66	1.23	1.16	.78	1.22
Toledo	.94	.78	.66	1.13	.81	.71	.25	.86	.91	.72
Topeka	1.24	1.03	1.32	.68	1.46	1.28	1.00	.98	.98	2.33
Trenton	.73	1.63	.64	.87	1.20	.57	.67	.50	.68	.60
Tulsa	1.17	1.32	1.14	1.17	.89	1.39	1.04	1.36	1.35	1.00
Utica - Rome	.76	1.06	.64	.91	.65	.77	.75	.77	.69	.54
Waco	1.02	.63	.88	.94	.64	.97	.85	1.00	1.06	.77
Washington, D. C.	.92	1.14	.98	.62	2.41	1.23	.92	2.09	.69	2.37
Waterbury	.92	1.38	.54	.79	.54	.48	.63	.41	.43	.77
Waterloo	.89	.90	.70	.94	.74	.65	1.02	.89	.78	.77
Wheeling - Steubenville	1.11	1.43	.96	1.06	.63	.73	1.12	.84	.96	.65
Wichita	1.08	1.30	.96	1.21	.84	1.25	1.02	1.07	1.42	1.13
Wichita Falls	1.06	1.09	.96	1.08	.62	.85	.88	1.11	1.01	.47
Wilkes-Barre - Hazelton	1.14	1.41	.71	.91	.87	.54	.65	.64	.82	.77
Wilmington	1.06	1.83	.75	.66	1.21	1.04	.90	.89	.86	.60
Winston-Salem	.57	1.30	.48	1.42	.64	.81	.77	.91	.66	.57
Worcester	.95	1.13	.71	.91	.72	.82	.54	.68	.89	.75
York	1.03	1.47	.52	1.74	1.03	.55	.92	1.14	1.27	1.30
Youngstown	.71	.60	.55	.83	.56	.54	.79	.50	.74	.43

Appendix Table B - Regional Activities

The Ratios of the Regional Activities to the Local Population
Expressed to the Ratio of the Total Activity in the United States
To the Total United States Urban Population

	1	2	3	4	5	6	7	8	9	10
Akron	.74	.36	.62	.43	.48	1.67	.00	.48	8.34	.22
Albany - Schenectady - Troy	.60	.79	.90	1.66	1.52	.27	1.11	.48	7.91	.62
Albuquerque	.37	.85	2.64	1.01	.55	.00	2.33	.72	.00	.31
Allentown - Bethlehem - Easton	.11	1.45	.25	.91	.36	1.53	.56	.48	.50	.50
Altoona	.24	.66	.13	11.95	.20	.00	.00	.12	.00	.00
Amarillo	.96	.70	1.59	2.28	.74	.87	.00	.72	1.22	.41
Asheville	.56	1.33	.77	1.37	.50	.00	.00	.23	.00	.00
Atlanta	4.73	.62	5.01	1.49	1.43	.60	1.67	1.75	.05	.75
Atlantic City	.23	.57	.84	.31	.46	.00	2.72	.51	.00	1.00
Augusta	.41	2.17	.96	1.17	.44	.93	.00	.29	.10	.00
Austin	.30	2.79	.90	.22	.50	.00	.83	.34	.00	.72
Baltimore	.93	.71	.35	.97	.57	.53	1.06	.63	.10	.37
Baton Rouge	.09	.38	.60	.46	.42	.53	.44	.32	.15	.75
Bay City	.34	.70	.00	.52	.34	1.27	.00	.14	.13	.00
Beaumont - Pt. Arthur	.26	.44	.48	.48	.46	.00	.00	.25	.00	.00
Binghamton	.23	3.50	1.50	1.00	.40	.00	1.39	.35	.00	.00
Birmingham	1.27	.52	1.01	1.84	.57	.60	.67	.48	.34	.19
Boston	2.39	1.30	2.27	.72	1.71	2.00	1.72	1.73	.74	1.44
Bridgeport	.40	.66	.02	.27	.47	1.27	1.39	.43	1.55	.00
Brockton	.36	.29	.00	.20	.38	.00	6.28	.23	.00	.00
Buffalo	1.25	1.10	1.33	1.73	.53	.80	.28	.92	.20	.16
Canton	.40	.50	.00	.93	.52	4.00	.00	.37	2.92	.00
Cedar Rapids	.69	.49	.81	1.31	.57	.93	1.56	.63	1.13	.00
Charleston, S. C.	.30	.77	1.40	.61	.46	.00	.00	.43	.00	.44
Charleston, W. V.	.68	1.01	2.83	.47	.94	.87	.78	.58	.19	1.28
Charlotte	5.12	.83	3.18	.70	1.13	1.00	1.22	.78	.16	.47

Regional Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Chattanooga	.90	.79	1.07	1.40	.60	.53	2.11	.55	.23	.00
Chicago	1.97	.58	1.80	1.49	1.22	2.40	2.28	3.14	2.19	3.51
Cincinnati	3.11	1.37	1.74	1.14	.98	1.87	1.00	1.26	1.21	1.06
Cleveland	2.12	.92	1.57	1.09	1.10	3.80	1.11	1.90	2.47	1.81
Columbia	.76	6.67	1.16	.85	.62	.00	1.28	.34	.00	.37
Columbus, Ga.	.38	.33	.95	.77	.41	.00	.00	.20	.00	.00
Columbus, Ohio	.78	1.66	1.29	1.83	.77	.53	1.06	.65	.04	2.75
Corpus Christi	.31	.73	.98	.25	.48	.00	.00	.54	.00	.00
Dallas	1.17	.50	3.72	.68	1.47	1.40	1.78	1.52	.70	.44
Davenport - Rock Island - Moline	.87	.57	.69	.79	.31	.40	1.72	.46	1.29	.19
Dayton	1.46	1.70	1.72	.28	.52	1.93	.89	1.89	1.75	.37
Decatur	1.10	.86	.31	3.12	.56	1.00	.83	.32	.50	.00
Denver	1.83	1.22	2.59	1.41	.68	.93	1.22	.91	.20	1.19
Des Moines	1.17	.70	1.27	.80	.83	1.13	2.50	.91	.07	1.56
Detroit	1.70	.38	1.09	.47	1.02	1.93	.44	1.97	5.81	.56
Duluth - Superior	.65	.57	.31	3.73	.48	.00	1.22	.34	.00	.22
Durham	.39	1.29	.00	.23	.75	.93	1.56	.37	.95	2.19
El Paso	.74	1.44	2.31	2.34	.60	.00	1.72	.46	.00	.00
Erie	.31	.56	.57	1.10	.37	.00	.44	.34	.00	.25
Evansville	.63	1.29	.97	1.31	.50	.53	.44	.31	.13	.25
Fall River	.23	.55	.00	.10	.23	1.20	.00	.15	.40	.00
Flint	.33	.51	.27	.16	.32	.00	.00	.37	.00	.00
Ft. Wayne	.44	1.92	.64	1.53	.49	3.00	.44	.69	.78	.22
Ft. Worth	.75	.72	1.31	1.27	.70	.27	.61	.77	.01	.12
Fresno	1.21	.99	1.02	.80	.84	.73	1.11	.88	.35	1.69
Gadsden	.10	.35	.14	.23	.19	.00	.00	.09	.00	.00
Galveston	.10	1.30	.03	1.71	.54	.00	.00	.35	.00	.00
Grand Rapids	.84	.90	.85	.84	.57	3.00	1.28	.97	.55	.00
Green Bay	1.28	1.23	.75	2.14	.56	1.20	.00	.58	.23	.00
Greensboro - High Point	1.28	.49	1.12	.59	.60	2.93	1.44	.55	6.86	.28
Greenville	1.53	.90	1.45	.71	.81	.00	.00	.52	.00	1.06

Regional Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Memphis	2.23	1.21	1.32	1.44	.82	.33	.56	.63	.12	.94
Miami	.60	.50	11.43	.62	.56	.27	2.67	1.26	.04	.25
Milwaukee	1.24	.58	.83	.86	.75	1.67	1.11	1.17	.76	.50
Minneapolis - St. Paul	1.65	.78	1.21	1.86	1.00	1.47	1.28	1.51	1.26	.62
Mobile	.59	.58	1.06	1.38	.52	.00	2.17	.55	.00	.00
Montgomery	.57	.87	.60	1.47	.40	.00	.50	.20	.00	.28
Muncie	.14	.37	.00	.52	.34	1.13	2.89	.95	.21	.00
Nashville	.95	2.63	2.02	1.37	1.00	.40	1.89	.82	.96	1.44
New Bedford	.10	.38	.32	.11	.25	1.20	.00	.12	.41	.00
New Britain - Bristol	.04	.34	.00	.12	.66	3.66	.00	.20	2.02	.84
New Haven	1.00	.64	.06	1.42	.66	.40	1.67	.62	.05	3.03
New Orleans	.94	.97	1.80	.95	.68	.33	.11	.83	.28	.50
New York	2.17	.74	.94	.44	2.73	2.40	3.00	4.58	3.75	4.24
Norfolk - Portsmouth	.40	1.07	1.31	1.15	.39	.67	.00	.25	.10	.09
Ogden	1.27	.84	.08	4.41	.57	1.20	1.00	.17	.12	.56
Oklahoma City	1.44	.68	1.18	.43	.74	.27	.22	.94	.01	.37
Omaha	3.35	.77	1.32	2.76	1.09	.80	.89	1.31	.75	.37
Orlando	.54	1.24	3.34	.24	.61	.00	4.28	.66	.00	.59
Peoria	1.54	2.99	.66	.94	.82	1.20	.50	1.05	2.66	.56
Philadelphia	1.28	.95	.58	.70	.86	1.00	.89	1.11	.69	1.13
Phoenix	1.35	2.48	4.19	.46	1.02	.60	3.17	1.14	.12	.28
Pittsburgh	2.17	.83	2.19	1.37	1.72	3.53	.72	1.58	7.37	1.28
Pittsfield	.23	.66	.09	.35	.33	.00	.28	.15	.00	.00
Portland, Me.	.84	.91	.94	1.39	.55	.00	.72	.32	.00	.00
Portland, Ore.	1.47	.77	1.51	1.47	.80	.87	1.17	1.14	.26	.59
Providence	.73	.75	.84	.39	.77	2.13	1.78	.94	1.23	1.00
Pueblo	.22	8.17	.25	2.32	.35	.00	.00	.23	.00	.00
Racine	.27	1.10	.00	.24	.43	4.67	1.56	.91	1.98	.44
Raleigh	.17	4.50	2.94	1.18	1.13	.00	1.72	.77	.00	.00
Reading	.58	.64	.23	1.87	.47	1.80	1.00	.68	.63	.00

Regional Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Richmond	1.44	1.43	1.01	1.71	1.12	1.47	1.22	.68	1.75	.53
Roanoke	.54	2.51	1.27	5.55	.56	.00	.61	.69	.00	.00
Rochester	.72	1.70	1.00	.51	.52	2.80	.83	.00	2.31	.37
Rockford	.41	.72	.50	.21	.57	1.47	1.22	1.11	.45	.00
Sacramento	.46	.60	1.51	2.41	1.90	.00	.00	.85	.00	.69
Saginaw	.50	.83	.78	.77	.83	.00	1.22	.42	.00	.00
St. Joseph	.61	3.33	.06	1.65	.66	.00	.00	.28	.00	.41
St. Louis	1.89	1.30	1.42	1.50	.96	2.73	1.17	1.81	1.84	1.00
Salt Lake City	1.11	.58	1.83	1.56	.67	.33	.61	.77	.03	.50
San Angelo	.20	.50	.42	.51	.38	.00	.00	.43	.00	.00
San Antonio	.42	1.07	.94	.78	.39	.13	1.33	.51	.02	.00
San Bernardino	.27	.64	.28	3.30	.44	.00	6.17	.46	.00	.00
San Diego	.24	.87	1.54	.13	.39	.40	.17	.66	.41	.09
San Francisco - Oakland	1.92	.98	2.37	1.01	1.31	1.60	.61	2.23	1.34	.37
San Jose	.60	.77	.38	.73	.70	1.40	4.11	.89	1.56	.00
Savannah	.67	.57	.55	2.30	.41	.53	.00	.22	1.22	.25
Scranton	.38	.81	.00	1.93	.41	1.07	.44	.22	.07	.25
Seattle	1.60	.90	2.58	.69	.79	.87	.94	1.12	1.68	.59
Shreveport	.63	1.32	1.44	1.23	.60	.00	.00	.69	.00	.25
Sioux City	4.25	.64	.56	1.64	.92	.00	.67	.46	.00	.37
Sioux Falls	2.89	1.05	1.06	.66	.72	.00	1.06	.51	.00	.00
South Bend	.57	.51	.86	.25	1.01	1.13	.94	.89	.24	.00
Spokane	.59	.70	1.11	2.14	.53	.00	.67	.57	.00	.19
Springfield, Ill.	.81	1.37	.63	1.00	.47	.80	.00	.77	.57	.37
Springfield, Mo.	.76	2.78	.59	3.03	.46	.00	.00	.37	.00	.00
Springfield, Ohio	.20	.64	.00	.76	.30	.87	.00	.32	.38	.41
Springfield - Holyoke	.45	.58	.02	.63	.50	1.20	1.56	.52	.70	.56
Stamford - Norwalk	.23	.54	.00	.49	.26	1.60	1.83	.43	.41	.25
Stockton	.74	6.06	.30	.93	.50	.93	1.56	.48	1.22	.44
Syracuse	1.52	1.08	1.54	.95	.55	.93	1.00	.68	.63	.28

Regional Activities-Continued

	1	2	3	4	5	6	7	8	9	10
Tacoma	.28	1.68	.00	1.56	.51	.47	1.17	.49	1.05	.22
Tampa - St. Petersburg	.82	.82	2.97	.69	.49	.00	4.78	.60	.00	.56
Terre Haute	.36	.63	.25	2.31	.56	1.07	.00	.29	.02	.50
Toledo	.60	1.43	.57	1.84	.64	2.00	1.11	.77	3.36	.72
Topeka	.16	4.18	.22	4.38	.60	.87	2.83	.52	.16	.78
Trenton	.43	3.37	.02	.90	.74	2.06	2.61	.69	.19	.72
Tulsa	1.40	.45	1.69	.51	1.46	1.07	.28	.83	.42	1.72
Utica - Rome	.39	4.30	.52	1.28	.41	1.87	.78	.43	.48	.22
Waco	.33	2.53	.27	.68	.38	.00	1.33	.38	.00	.00
Washington, D. C.	.75	1.62	3.98	.73	.56	.00	1.33	1.00	1.22	18.18
Waterbury	.41	.65	.00	.23	.32	1.27	.00	.15	1.20	.00
Waterloo	.38	.37	.56	1.56	.48	2.07	1.72	.51	1.45	.97
Wheeling - Steubenville	.45	.79	.31	.80	.50	2.13	1.17	.23	2.74	.00
Wichita	1.02	.77	1.10	.75	.72	1.20	.33	.65	.83	1.12
Wichita Falls	.36	3.54	.48	.68	.49	.00	.83	.28	.00	.00
Wilkes-Barre - Hazelton	.39	1.16	1.08	1.03	.42	.60	1.50	.40	.30	.28
Wilmington	3.47	1.01	.27	1.99	1.50	5.47	3.56	1.05	14.92	.56
Winston-Salem	.63	.85	.68	.43	.87	1.53	.61	.97	1.95	.72
Worcester	.27	1.93	.36	.42	.38	1.33	.83	.31	.32	.31
York	.89	.35	.00	.50	.64	3.33	3.78	.40	1.60	.50
Youngstown	.51	.63	.60	1.31	.51	1.20	.67	.46	1.77	.00

COLUMN HEADINGS

Appendix Table A - Local Activities

1. Per cent of central city population employed in utilities and sanitation
2. Per capita apparel sales
3. Per cent of central city population employed in telecommunications
4. Per cent of central city population employed in trucking and warehousing
5. Per capita post office gross receipts
6. Per cent employed in finance, insurance and real estate
7. Per cent of central city population employed in entertainment
8. Per cent of central city population employed in hotels and lodgings
9. Per capita merchant wholesale receipts
10. Per cent of central city population employed in printing, publishing, and allied industries

Appendix Table B - Regional Activities

1. Per capita wholesale sales through brokers' and manufacturers' representatives
2. Number of hospital beds per capita
3. Number of passengers boarding planes in central city airports as ratio to central city population
4. Per cent of central city population employed by railroads
5. Per capita bank debits to deposit accounts
6. Number of national offices of corporations as ratios to central city population
7. Number of mail order houses as ratio to central city population
8. Per capita business service receipts
9. Number of employees of corporations represented by home offices in central city as ratios to central city population
10. Number of central offices of national associations as ratio to central city population

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