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SPATIAL TRENDS IN THE REVITALIZATION OF MAJOR
U. S. INNER-CITIES, 1970-1980

by

Martin A. Stepper

A DISSERTATION

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ABSTRACT

SPATIAL TRENDS IN THE REVITALIZATION OF MAJOR U. S. INNER-CITIES, 1970-1980

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Private-market residential revitalization of inner-city housing is a phenomenon that has gained momentum during the 1970s. Revitalization, normally occurring only in specific neighborhoods, involves two distinct processes known as gentrification and incumbent upgrading.

This study, attempting to update and expand on the research done by Lipton (1977), was divided into two major parts. First, an attempt was made to determine the amount, or extent, of revitalization that has occurred in the urban cores of 32 selected cities with 1970 populations of 250,000 or more. The second part concerned the determination of characteristics, or changes in characteristics, of those cities which have experienced revitalization.

The results of the first part of this study indicate that revitalization has not occurred, in the cities studied, during the 1970s. Regression analysis, used in an attempt to answer the second part of the study yielded inconclusive results, as the regression equation was statistically insignificant. In an attempt to more realistically quantify revitalization the dependent variable was redefined twice. The results obtained from the subsequent regression analyses also were inconclusive. It was felt that perhaps the pre-

Martin A. Stepper

dictive model was inappropriate. In order to determine if this was the case a survey questionnaire, indicating those census tracts flagged by the model as revitalized, was sent to the mayors of each city. Based on the answers and comments obtained from the respondents, weaknesses in the questionnaire were revealed. Thus the poor results of the survey are suspect.

The main contribution of this research is the realization that the extent of revitalization that occurred during the 1970s maybe such that its impact on the census tract(s) within which it is occurring is relatively minor. Its effects, perhaps, being masked by the housing situation in the rest of the census tract.

Since aggregate statistics have not been able to reveal evidence of the process it is felt that a more direct approach may be necessary. Unless, or until, the process encompasses large spatial units of land, perhaps, the only accurate way of monitoring the extent of revitalization is via field work done in individual cities and neighborhoods.

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To my niece Rebecca Shona Gelfand.

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CHAPTER I

URBAN REVITALIZATION

Introduction

After many years of decline and disinvestment many inner-city neighborhoods are experiencing rehabilitation, new construction, and rising property values. This is counter to the classical urban theories which tend to predict the inevitable deterioration of inner-city residential areas as the middle and upper-classes continue their exodus to the suburbs and other non-central city locations.

As central cities declined, municipal officials, business groups, and private citizens pressured the federal government to intervene. This resulted in a series of urban renewal programs enacted between 1949 and 1974. Many of these programs did not live up to their expectations.

"Urban Renewal and expressways were expected to reverse the declining fortunes of central cities; however both contributed to the burgeoning social and economic problems. Cities were not transformed into foci of economic growth. Model Cities¹, moreover, was not able to stabilize

¹The Model Cities Program, authorized by Congress in 1966, was a multifaceted community service program whose main purpose was to be a concentrated attack on poverty, inferior education, unemployment, and slum housing. The philosophy behind the Program was that each community should have the freedom to shape those programs it undertook, to combat these problems, according to their own needs.

Prior to this time most federally funded urban programs imposed strict limitations on the use of federal funds for purposes other than that specifically specified. The Model Cities Program was an attempt to reverse this situation by encouraging the development of programs tailor-made to meet the needs of individual communities once certain general standards were met (Williams, 1969).

inner-city neighborhoods. Instead, urban conditions worsened with interregional shifts of population, employment, and investment, and a weakened fiscal condition." (Holcomb and Beauregard, 1981, p.12).

Urban revitalization differs from the urban renewal projects undertaken by the federal government by being less dependent on governmental initiative and funding. Urban revitalization refers to a diverse set of processes such as gentrification and incumbent upgrading often undertaken by the private sector. It is often not integrated into a single redevelopment effort, as were many of the large projects undertaken by various urban renewal programs. The goals of urban revitalization consist of two major components. These are:

1. The redevelopment of the central business district, and to a lesser extent local neighborhood commercial areas.
2. The rehabilitation of inner-city houses and urban neighborhoods.

The focus of this study is on this latter component.

Private market revitalization of inner-city housing tended to be a phenomenon that has gained momentum during the 1970s. It tends to occur only in certain neighborhoods and involves the two distinct processes of gentrification and incumbent upgrading. The first process consists of middle and upper-income people moving into a deteriorated neighborhood. Through the use of their own money and 'sweat equity' they renovate the housing in the area. Occasionally a private developer will buy up a group of houses, renovate them, and offer them for sale. The New Commons Center in Detroit,

Michigan is such a project. The General Motors Corporation is the major developer. In a relatively short period of time the former lower-income residents are replaced by the 'gentry'. Incumbent upgrading occurs when the residents of a deteriorated neighborhood remain in the area and invest their money and labor in rehabilitating their homes. A good, well maintained neighborhood results in a economically sound community which in turn fosters more jobs, increased city revenues, and additional capital for financial institutions.

The processes of gentrification and incumbent upgrading are part of the recovery process of the inner-city housing market that is significant in many cities. Where one or both processes are occurring clear benefits have been derived. "[Incumbent] upgrading reflects neighborhood confidence and is evidence of a selective and small-scale reversal of more than two decades of sagging confidence and disinvestment in urban neighborhoods." (Clay, 1979, p.35). Gentrification, while not a wide spread phenomenon in any given city, has nevertheless occurred in more than one area in several cities. City fathers see this process as having positive benefits, but there are also negative aspects. The effects of gentrification in the context of the entire urban area are gradual. On a local level it can have dramatic negative effects, such as displacement, on the original poor and middle-income residents (Goldfield, 1980; Hodge, 1980; O'Loughlin and Munski, 1979). Its positive impacts include increased property values, the rehabilitation of dilapidated

or abandoned buildings, and the attraction of new businesses to downtown locations.

Lang (1982, p.13) states that;

"Another reason for studying gentrification is that it is a major operational component of an emerging pattern of neighborhood resegregation occurring in America's major cities"

Resegregation is a result of the dynamics of a free housing market and is not caused by gentrification. Once an area becomes an 'in-place' to live, all things being equal, the rich will always be able to displace the poor. This results in a pushing out of the original residents, often low-income members of minority groups, and a succession of newcomers, usually middle and upper-income whites.

Background of this Study

This study will attempt to update and expand on research done by Lipton (1977) regarding central city revitalization. Lipton examined the twenty largest cities in the United States (Appendix A) in order to determine if there was any evidence of central city revitalization. He looked at the changes that occurred between 1960 and 1970 in the number of census tracts containing middle and upper-income families living within two miles of the central business district (CBD). He found that a number of the cities that he looked at did register an increase in such tracts, and concluded that predictions of central city decline and decay were not a foregone conclusion.

Lipton used two variables, median family income and median educational attainment of adults, as indicators of

socio-economic status. He concluded that increases in the number of census tracts within two miles of the Central Business District, over time, that ranked high on these two variables were evidence of central city revitalization.

Purpose of This Study

The primary purpose of this study is to determine if the centers of the major cities in the United States have had an increase in the number of middle and upper-class neighborhoods during the 1970s. There is a growing amount of evidence to suggest the inappropriateness of the idea of the central city as a residential site for those persons who are financially able to live elsewhere. The classical urban models of Burgess, Hoyt, and Harris and Ullman did not predict the revitalization process.

A study done by the Urban Land Institute (Black, 1975) concluded that 67.9 percent of all cities in the United States with populations of 250,000 or more had some private market revitalization occurring. This study will examine all cities in the contiguous forty eight States with a population of 250,000 or more, as determined by the 1970 U. S. Census of Population. This cut off was chosen for two reasons. First, in order to obtain a sufficient number of cities so that regression analysis can be done, and still be of manageable size. Secondly, the Urban Land Institute's report (Black, 1975) showed a trend of a decrease in the percentage of cities experiencing central city private-market housing renovation as the population class decreased. Revitaliza-

tion seems to be a phenomenon of large cities. There are 53 cities² in this population range (Appendix A).

Table 1.1

Number and Percent of Central Cities Experiencing Private-Market Housing Renovation in Older, Deteriorated Areas, by Population-Size Class, 1975

Population-Size Class	Total Number of Cities in Class	Cities Experiencing Renovation Activity*	
		Number	Percent
500,000 and over	25	19	73
250,000-500,000	30	19	63
100,000-250,000	79	46	58
50,000-100,000	<u>125</u>	<u>40</u>	<u>32</u>
Total	260	124	48

* Estimated from survey responses by applying percent of positive responses for each class to total number of cities in each class. Assuming no bias in the responses for the two lower-size classes, their percentages and the overall percentage are subject to a relative sampling error of +10 percent at a confidence level of 90 percent. (Black, 1975, p.6).

The specific questions that this study will address are;

1. What is the extent of revitalization that has occurred in the urban cores of cities over 250,000 population between 1970-80?
2. What are the changes, if any, in the amount of revitalization in each city between 1970 and 1980?
3. What are the variables that explain the occurrence of revitalization in some cities and not others?

²In this study New York City is not counted in its entirety. The boroughs of Manhattan (New York County) and Brooklyn (Kings County) each have a separately defined central business district. Thus, each borough will be considered as cities unto themselves.

Based on the expected answers to these questions it is hypothesized that in those cities in which privated-market residential revitalization has been most evident, much of the employment base would be in professional and white-collar jobs. It is expected that the greatest amount of private-market revitalization had occurred in those cities that had higher percentages of their work force engaged in white-collar employment, and conversely a lower percentage in blue-collar employment. Value added and new capital expenditures in the central city during the 1970s would have been less than in those cities which had little or no private-market revitalization occurring during this time period.

Accessibility to the place of employment has been found to be important to most inner-city resettlers. It is thus expected that those cities which had greater commuting distance from their suburbs to the CBD would have experienced a greater amount of revitalization than those cities whose suburbs were more accessible to the downtown area.

Studies have indicated that revitalization tends to be positively correlated with the size of a city's population (Black, 1975). In addition, as the revitalization of an area progresses the population density and racial composition of the area changes. It is expected that larger cities would experience a greater amount of revitalization than smaller cities. There would also be an increase in the white population, and conversely a decrease in the non-white population in the urban cores of those cities experiencing revitalization.

As a result of the high cost of new housing construction, inner-city units have become more attractive. These units tend to be more affordable than suburban homes. It is expected that the results of this study will show that those cities experiencing the greatest amount of revitalization would have the greatest price differentials between central city and suburban housing. Those cities in which there is a greater percentage of older, historically or architecturally significant housing stock would also be found to have had experienced a greater degree of private-market revitalization compared to those cities whose housing stock was newer, and thus more comparable to the housing found in the suburbs.

Most gentrifiers tend to be single or young couples with few or no children. It is thus expected that a decrease in the percent of families in the urban core with children under 18 years of age will be found in those cities which have undergone the greatest amount of revitalization.

On a regional basis it is expected that the greatest amount of revitalization will be found in the older northeastern industrial region of the United States. This would be Regions II and III of Bogue and Beale's economic regionalization scheme.

Organization of the Study

This study is divided into six chapters. Chapter Two is a review of the relevant literature that concerns itself with urban growth and the process of revitalization. It discusses various theories and models of urban growth and residential

neighborhood changes, looking at both the positive and negative aspects of the process. A overview of the cities, and their economic regions, investigated in this study is the subject matter of Chapter Three. This chapter also highlights the general socio-economic trends that have occurred in these cities, and the United States as a whole, during the 1970s. Chapter Four describes the procedures used, and the rationale for their use, in an attempt to determine the extent and causes of private-market revitalization in major inner-city areas of the Nation. The analysis and interpretation of the data is found in Chapter Five. Chapter Six, the conclusion and summary, looks at the difficulties encountered in this research and discusses areas for future study.

CHAPTER II

PRIVATE-MARKET REVITALIZATION IN U. S. CITIES: THEORY AND PRACTICE

Introduction

The purpose of this chapter is two fold. First, to review the literature pertaining to theories of urbanization and their application to North American, highly industrialized cities. The purpose being to provide background information necessary for an examination of a phenomenon, revitalization, that started in some cities just after World War II, but did not become prominent until the 1970s. Secondly, to examine the characteristics of gentrifiers, revitalized areas, and those problems, and proposed solutions, that have arisen as a result of this process.

Journalists and scholars have come up with a compilation of terms, such as, gentrification, back-to-the-city, renovation, revitalization, urban pioneers, and urban homesteaders to describe the recently renewed interest in city living. Each term implies a somewhat different meaning of the process and to the people involved.

"'Gentrification,' a term originated by Ruth Glass in London, attributes more elite status to renovators than most middle-class Americans like to acknowledge. 'Back-to-the-city' is a technical misnomer, because few renovators have actually moved back from the suburbs. This term is appropriate, however, as a symbol of a recommitment to the city as a place to live. 'Renovation' is probably the least value-laden term.

...'Revitalization' implies that central cities previously lacked social and economic vitality. 'Private-market rehabilitation' or 'reinvestment'

focus on the economic investment in physical structures - the housing more than the people.

There are almost as many names for the participants as for the process. 'Renovators' is the most commonly used label, denoting people who do much of their own work on the house. 'Urban pioneers' and 'urban homesteaders' connote a frontier mentality - brave homeowners staking out dangerous urban territory. Like 'revitalization,' the terms 'pioneering' and 'homesteading' imply that former residents and their culture must be 'conquered.' The 'urban gentry' enter and the frontier has been won, and they are also sometimes called 'young professionals.' Finally, once the advertising industry is convinced of a new market these become 'upscale' households whose incomes place them in the upper ten percent" (Spain, 1981, p.16).

In this study the term revitalization will be used to denote the two processes of urban change known as incumbent upgrading and gentrification. The exception will be used in direct quotes where terms may be used somewhat differently.

According to Smith (October, 1979, p.538);

"Following a period of sustained deterioration many American cities are experiencing the gentrification of select central city neighborhoods. Initial signs of revival during the 1950s intensified in the 1960s, and by the 1970s these had grown into a widespread gentrification movement affecting the majority of the countries older cities."

Gentrification is not only a North American occurrence. It is also occurring in European cities (Gale, 1981; Christano, 1982) where the amount of previous middle class suburbanization is less extensive. In European inner cities the relationship between cities and their suburbs is different than in North America. In Europe the government has greater control in determining land use than in the United States, where land use is strongly dependent upon private

decisions. Gale (1981) found evidence of gentrification occurring in London, Paris. Stockholm, and Amsterdam.

Following World War II, many American cities, particularly in the northeast and north central regions, underwent a series of social, economic, and physical changes which resulted in, or at least reflected, the deterioration of the inner city. Many middle class, predominately white, residents moved out to the suburbs resulting in the start of a downward fiscal spiral in land values for the city. This outward movement of the middle class caused an erosion of the city's tax base which historically supplied the revenues for needed public services. The void left by the middle class was filled by predominately poor, and disadvantaged, blacks and other minorities. The reduction in city tax revenues, in combination with the increased costs of providing public services, due to inflation, and the increased need for these services by the entering groups resulted in an increased tax burden on the city. This burden fell on those residential and manufacturing facilities still within the city, thus increasing the attractiveness of the suburbs for those who could afford to move because the tax rates in the suburbs were generally lower. In spite of this trend, predictions that the inner cities in North America would become inhabited by minorities, the poor, and the elderly seem not to becoming true.

The Urban Land Institute's study of 260 central cities, conducted in 1976, revealed that in seventy-five percent of all cities with populations of 500,000 or more, private market rehabilitation was taking place in older deteriorated

neighborhoods (ULI Research Report #26, 1980). This trend is still small, and a greater number of people are moving out of the cities than into them. In those areas where revitalization is occurring most of the units that undergo rehabilitation are single-family homes.

The pattern of central city decay and suburban growth has often been seen as inevitable in the evolution of the city. This sequence of events has been explained by both economic and social models. The predominant economic theoretical explanation is the filtering model, which stipulates that buildings, over time, deteriorate and become obsolete. "Due to the fact that buildings of the same age and type are concentrated together, this deterioration becomes a neighborhood phenomenon" (Bradford and Rubinowitz, 1975, p.78). This results in the formation of an area of concentrated poverty. The process is seen as an efficient way in which natural market conditions provide for the lower socio-economic strata of society.

Classical Models of Urban Structures

When Burgess (1925) undertook his research, cities were growing as a result of the large scale in-migration of poor Americans and Europeans. Industry was labor intensive and the age of the automobile had not yet arrived in force. The predominant forms of transportation for industry was still by rail and water. Under these conditions a centralized location for most activities was advantageous. Economic activity took place in the central part of the city and radiated outward. Neighborhoods adjacent to the business and manufacturing core

tended to be points of entry into the city for the unskilled in-migrant. Their arrival enabled previous homeowners, whose economic situation had improved, since their arrival, to recapture their first housing investment and move on. This continuing economic growth in the central city, with its demand for low and unskilled workers, attracted a continuous flow of low income migrants which provided an increasingly expanding market for substandard housing.

In 1925, Burgess formulated his concentric zone model of urban land use. His basic assumption was that land values and accessibility decline in a regular fashion in all directions from the central business district. Burgess described five concentric zones from the center of the city to its periphery (Burgess, 1925; de Souza and Foust, 1979). He labeled these zones as follows:

- Zone I: The Central Business District
- Zone II: The Zone of Transition
- Zone III: The Zone of Working Class Homes
- Zone IV: The Zone of Better Residences
- Zone V: The Commuter Suburbs

Zone I, the Central Business District, was the focus of the commercial, social, and civic life of the city. Surrounding this downtown retail center was a district consisting of a mixture of wholesale outlets and light manufacturing industries. Throughout, and surrounding this zone were the old deteriorated homes of the lower working class. This situation existed until the end of World War II.

For the most part, light manufacturing industries have

since moved to the suburbs where land prices and tax rates are lower. Nevertheless, in some cities, because of the nature of the industry, light manufacturing adjacent to the CBD still can be found. An example is the garment industry in New York City.

Zone II, the Zone of Transition, is a region of residential deterioration caused by the expansion of Zone I industries into the area. This zone consists of a factory district in an inner belt, with an outer area of rooming houses and in-migrant colonies. Slum housing is generally characteristic with its associated ills. As individuals improved their economic conditions, they moved outward from the central city into Zone III and beyond.

In 1939 Hoyt indicated that there was also a tendency for heavy industry to move outward from the transition zone.

"Factory location in slum areas is not now desired for the clerks and factory workers no longer live there. All the reasons I cited in 1939 for industry moving to suburban areas apply with greater force in 1964" (Hoyt, p.225).

Zone III, the Zone of Working Class Homes, as its name implies contains the homes of independent working people. Burgess found this zone existing in northern industrial cities. Residents located here desire to live close, but not too close to their place of employment. The housing, usually two-family frame structures, is neither dilapidated nor consisting of tenements. In some cities housing in this area has become the target of gentrification, resulting in an exception to Burgess' model.

According to his model the middle and upper class should not be moving back into this zone, but ought to remain further out. Examples of where gentrification is occurring in Burgess' Zone III are Georgetown in Washington, D. C., Rittenhouse Square in Philadelphia, and the New North Side in Chicago.

Zone IV, the Zone of Better Residents, is the area where the middle class lives. This was originally an area of single-family detached homes and luxury apartment buildings.

Zone V, the last zone of Burgess' model, is referred to as the Commuter Zone. Here one finds better homes. It is, for the most part, an area of incomplete development in which small satellite towns are located along rail lines and major highways. These are the dormitory suburbs of larger cities.

Burgess later added two more zones to his model. Zone VI was the agricultural region of the metropolis and Zone VII consisted of the hinterlands.

In 1939 Hoyt formulated his sector model of urban structure. This model takes into account differences in accessibility, and hence land values, along transportation routes radiating outward from the CBD. He contended that high income areas of cities were located in sectors, which followed major transportation routes, not in concentric zones.

He was mainly concerned with the changes occurring in residential areas, but his model was also applicable to other land uses. He noted the development of a linear extension of commercial facilities that extended beyond the central business district, and the development of satellite business

centers. These satellite centers were usually located near suburban railroad stations and at the intersections of main highway routes.

After World War II regional shopping centers, pretty much unforeseen in the 1920s and 1930s, took hold. These centers duplicated the retail stores located in the central business district. In addition office centers also located around some of these regional shopping centers. Central city hotels and convention centers declined in importance as a result of new hotels and motels locating on the outskirts of cities. During the same period there was limited construction of retail stores in the downtown areas of major cities. Nevertheless the main office building district in most cities is still located in the central business district. Today, some cities are trying to revitalize these central business districts by building new convention centers in their downtown areas. Prime examples are Baltimore, MD, and Washington, D. C.

In 1945 Harris and Ullman proposed their multiple-nuclei model of the city. In this model, zones of land use are developed around discrete urban centers. The number, and location, of these centers varies depending on the size of the city, its structure, and its history. These discrete centers develop because of the specialized requirements of certain activities resulting in economies of scale or agglomeration.

The ability to pay different amounts of rent, and varying land requirements force the concentration of certain activities into separate areas of the city. Where these areas

of activity develop they act as growth nuclei around which predictable patterns of land use arrange themselves in concentric circles. For American cities, Harris and Ullman were able to identify five zones, or areas, that develop around a nucleus. They are:

1. The central business district.
2. An area of wholesaling and light manufacturing located near inter-urban transportation facilities.
3. A district of heavy industry located near the past or present outskirts of the city.
4. A residential district.
5. The dormitory suburbs of the city (deSouza and Foust, 1979, p.222).

The models of Burgess, Hoyt, and Harris and Ullman, developed under the assumption that land use decisions were privately determined, did not predict the revitalization of the inner-city. Thus they better fit the pattern of earlier, rather than present day, American cities.

"Models of reality are useful so long as they are predictive. When permitted to age without adjustment for new facts, they can be positively harmful" (Sternlieb and Ford, 1979, p.227).

Since Burgess' model was proposed in the 1920s many changes have occurred in the United States' economy which has profoundly altered the expected structural growth of American cities. In addition, much more detailed data is now available about various aspects of cities to help shed more light on urban structures.

"Apartment buildings, once confined to locations along subways, elevated lines or near sub-

urban railroad stations, are now springing up in the suburbs, far from mass transit. Many families without children of school age desire the convenience of an apartment, involving no work of mowing lawns, painting and repairing, and with the comforts of air conditioning and often a community swimming pool. Complete communities are now being developed in the suburbs, with a mixture of single family homes, town houses and apartments, and with their own churches, schools, shopping centers and light industries, some even with a golf course and bridle paths, of which the 7,000-acre Reston development near the Dulles Airport in the Washington, D. C., area is an outstanding example. Thus the dynamic changes of the past quarter century make it necessary to review concepts developed from studies of American cities in 1925 and 1939" (Hoyt, 1968, p.228).

Hoyt (1968) observed that as the demand for unskilled labor decreased many substandard housing units were abandoned. Also, the assumption that the upper class would continue to prefer to move outward from the center of the city was found not to be universally true.

"Hoyt noted that luxury apartments were being built in the center of New York City. These apartments catered to those with great mobility who could easily afford to live in the suburbs... A reverse succession, not postulated by Burgess, was taking place" (Lipton, 1977, p.137).

In 1964, Hoyt commenting on both his and Burgess' models of urban growth stated that;

"... in view of the shifting of use in the central business districts, the overall decline in the predominance of central retail areas, the rapid growth of office centers in a few cities compared to a static situation in others, the emergence of redeveloped areas, and intown motels, the former description of patterns in American cities must be revised to conform to the realities of 1964" (Hoyt, 1968, p.224).

Housing

Residential areas are a major component of the urban structure. Thus, a brief discussion of housing is warranted

at this point. Housing is a complex factor composed of many variables. It would be difficult to find two dwellings that do not differ in some important respect as far as the consumer is concerned. Houses differ in such obvious features as style, number and arrangement of rooms, construction, types of appliances, etc. Stengel (1976) has broken down housing into three dimensions: 1) residential site, 2) neighborhood, and 3) public services.

Residential site refers to the location of the house in relation to its access to other parts of the urban area. Neighborhood characteristics such as housing density, the condition of nearby structures, and the type and amount of available public services is also part of this complex called housing.

Ahlbrandt and Brophy (1975) define a neighborhood;

"... as a distinct housing submarket. A given neighborhood is distinguished from other locations because it offers housing choices that are somewhat unique... A metropolitan area may consist of many such markets...

The boundaries of a neighborhood may be based upon social, historic, political, geographic, and/or economic considerations. Social aspects include the visiting and shopping patterns of the residents or areas of relatively homogeneous socioeconomic characteristics...

Geographic considerations consist of natural boundaries such as rivers, railroads, hills, expressways, commercial districts and parks. Economic considerations that comprise the delivery areas for governmental services may also define neighborhood boundaries.

Neighborhood boundaries are apt to be fluid on the edges and may change over time. The primary characteristic that defines a neighborhood at a given point in time, however, is the uniqueness of its total living environment" (Ahlbrandt and Brophy, 1975, p.4).

Invasion and Succession

There are several theories that attempt to explain changes in residential areas. Hunter (1974) looked at two aspects of urban community structure in Chicago, IL, namely socio-economic status and family status. He found that each of these status categories had a most probable direction of change and that these were directional in nature. Over the 30 year time period of his study, he found four stages of community change. These stages consisted of various combinations of the socioeconomic class of the residents in a neighborhood and their family life cycle. These empirically derived stages, when mapped, formed a pattern that fit Burgess' concentric zone model. The significance of Hunter's study was that it showed a neighborhood and a city as dynamic entities which evolve and change over time. These changes are the result of a social science concept, borrowed from plant ecologists, called invasion and succession.

Van Lierre (1977) contends that what sociologists call succession does not refer to the same process cited by ecologists. According to Van Lierre, sociologists and other social scientists have been studying the succession of human populations, not communities.

"... merely studying replacement and its consequences for a community, rather than succession, we can expect the post-invasion population to be functionally very similar to the preinvasion population, assuming that significant environmental change was not simultaneously occurring. In such instances the invading population would be found to end up using the environment in relatively the same form as the previous inhabitants. This has indeed been the case with regard to racial succession" (Van Liere, 1977, p.13).

An ecologist, using the term community, is referring to all the living organisms within a definable area, and their interaction. As a community progresses from one stage to the next its survival chances and stability increases. Succession occurs as a result of a habitat being altered by area organisms carrying on their daily life functions. As a result of these alterations, conditions are produced which allow for a new association of organisms to exist. A climax stage is reached when the reactions of the various groups of organisms in the community are complementary. That is, the waste products of one or more groups of organisms are utilized as nutrients by other groups, and their waste products are in turn utilized by the first group

A climax community is thus one in which all available materials and energy are recycled through the system. In actuality a sustained equilibrium cannot exist in natural communities since no community exists in total isolation. Cities have not yet reached a climax stage. When social scientists use the term climax community they are usually referring to the tipping point¹.

Burgess (Van Liere, 1977) emphasized invasion first with site modification afterwards, whereas ecologists talk about succession occurring only after the environment has been modified by the previous members of the community. The former condition, invasion, is what has been occurring in those

¹The tipping point is that proportion, usually 10 to 15 percent, of minority households a white neighborhood will allow before a complete turnover in its racial composition occurs (Hartshorn, 1980).

neighborhoods undergoing gentrification. A process similar to the ecologists definition of invasion and succession would be taking place in those areas in which incumbent upgrading has occurred in a lower class neighborhood, followed by the immigration of the middle and upper classes.

Stage Theories of Neighborhood Change

Over time neighborhoods, like cities, change. Hoover and Vernon (1962) describe five stages that a neighborhood undergoes. They are:

Stage 1 - New Single Family Subdivision

Stage 2 - Apartment Development

Stage 3 - Downgrading.

Stage 4 - Thinning-out

Stage 5 - Renewal

In Stage 1 - New Single Family Subdivisions, as its name implies, there is residential development characterized by single family, detached homes. Rapid population growth is associated with this stage.

Stage 2 - Apartment Development, is referred to as the transition stage. A substantial amount of new construction and population increase is occurring. In addition, there is an increasing proportion of apartment houses being built, resulting in a rise in the population density of the area. The beginning of this stage is reached when the proportion of multifamily units is at least ten percent of the total dwellings in the neighborhood.

Stage 3 - Downgrading. This stage is usually associated

with conversion. Little actual new construction is taking place. Existing structures are being subdivided, resulting in some population growth and increases in density. The distinction, or cut-off point between Stage 2 and Stage 3 is not often clear. Neither is the downgrading of the area inevitable. It is possible that an area which has been converted to predominantly apartment units may not undergo any downgrading at all. An example of such a neighborhood is Fifth Avenue, along Central Park, in New York City. This very exclusive neighborhood consists predominately of apartment buildings.

During the downgrading stage there may still be some new construction taking place but it usually consists of the replacement of single-family units by multifamily units. Often associated with this stage is an increase in the population of minority groups.

Stage 4 - Thinning-out, is characterized by a reduction in the population density and dwelling occupancy rates of the area. This usually comes about as a result of a reduction in household size, the merging of dwelling units, vacancy, demolition, and abandonment. There is little, if any, construction occurring during this time.

The families living in the area during stage four are usually recently arrived unskilled or semiskilled in-migrants with low earning potential. Their limited housing choices, due to economics, is often compounded because of race. Many of these in-migrants tend to be of child rearing age. Household expansion occurs because of two processes; 1) by the arrival of children, 2) by the taking in of newly arrived

relatives and friends. Hence, at a time when the neighborhood is physically deteriorating there is likely to be an increase in households per structure, and more people living in each unit.

Usually, once settled, the main couple of a household does not readily move. This tendency to stay in one place strengthens after people pass their early twenties. The thinning out of the area is thus caused, to a considerable extent, by a decrease in household size as the children of this couple grow up and leave home.

Stage 5 - Renewal, the overall population density of the area may remain the same, but older housing is either renovated or replaced, resulting in an improvement in the quality and effective use of space. Renewal of the area can occur in one of three forms. First, there is subsidized low and medium income housing. Secondly, there is the construction of new buildings or the renovation of old buildings into luxury apartments. Thirdly, there is the piecemeal restoration of originally high income, but now deteriorated structures. This usually occurs in older areas that are centrally located and have houses of historical importance or design (Hoover and Vernon, 1962).

Birch (1971) describes six stages of neighborhood evolution. Like Hoover and Vernon, his model is described in terms of housing types and population densities. His stages two through six are comparable to Hoover and Vernon's stages one through five, but he has added an additional stage to the beginning of his morphology. He calls his stage 1, Rural. It

is characterized by having a low population density and a predominance of single family houses.

Ahlbrandt and Brophy (1975) have proposed another morphology of the urban residential neighborhood consisting of five stages. The process differs in specifics for different neighborhoods, but in general as the city expands and ages, there is a general decline in the inner city housing market.

Stage 1 - Healthy Viable Neighborhoods. In this stage there are areas where new housing construction is occurring in addition to older, well maintained areas. There is a high rate of home ownership and the ethnic or racial composition of the neighborhood tends to be homogeneous. Property values are steadily increasing and mortgage money is readily available. The average family income is greater than the city norm, and the quality of life is good. That is, the crime rate is low, the schools are good, and there are sufficient public services.

Stage 2 - Incipient Decline. As the housing stock ages it becomes technologically obsolete and maintenance requirements increase. There tends to be a decrease in maintenance and repair expenditures. Residential properties begin to be converted into multiple dwelling units, resulting in increased population density. The racial and/or ethnic composition of the area may also change.

Stage 3 - Clearly Declining. The conditions described in Stage 2 become more apparent. The rate of home ownership decreases. There tends to be a change in the social structure of the area as more stable households are replaced by members

of a lower socio-economic class. These newer families are, in many cases, on welfare and tend to be larger than that of the previous occupants. Property values decline, or their rate of increase slows down relative to that of the rest of the city.

Stage 4 - Accelerated Decline. The socio-economic level of the residential composition continues to decline as those who have limited housing options available to them, due to economic or social barriers, move in. Housing is badly deteriorated, public services are inadequate, and much of the property in the area is owned by absentee landlords. Property values continue to fall.

Stage 5 - Abandoned. Buildings are badly deteriorated and many are abandoned. "Renewal is only possible through public intervention because of the high costs associated with the assemblage and preparation of the land for redevelopment" (Ahlbrandt and Brophy, 1975, p.9).

Renewal

This study concerns itself with the renewal stage of development of an area. It occurs after the last stage described in both Hoover and Vernon's and Birch's models. These researchers have developed theories, or models, which describe the evolution of an urban area from its settlement through its 'inevitable' decline into a slum. In this section several models will be presented that attempt to describe the process by which a rundown neighborhood becomes revitalized.

A major prerequisite for a neighborhood to successfully be revitalized is some general attraction. The area usually

has a clearly defined boundary, unusual topography, and/or other qualities, such as historic importance that distinguishes it from the rest of the city. The housing stock tends to have special characteristics, such as unusual architecture, which makes it particularly desirable. The neighborhood also tends to be conveniently located to the CBD. Ironically, it first needs to undergo deterioration and out migration before gentrification can occur.

After the initial pioneers move in there is a need for a strong, active, and influential community organization in order for an area to be successfully rehabilitated. There needs to be a belief by the renovators and/or the real estate industry that a significant amount of renovation will occur and that the neighborhood will be attractive to other middle class households (ULI Research Report #26).

Travis (1973) has developed a model of neighborhood change that results from historic preservation. His model consists of three stages which he calls: 1) prehabilitation, 2) early rehabilitation, and 3) advanced rehabilitation.

In the first stage, prehabilitation, the neighborhood consists of abandoned retail outlets, abandoned residences, and dilapidated multifamily dwellings. In general terms the place is a slum. The end of this stage occurs when the neighborhood is 'discovered' by outsiders because of its historic character. The 'pioneers' tend to be predominately young middle class white singles or childless couples.

In the early rehabilitation stage, several different groups focus on the area. They are: 1) Preservation groups

which initiate legal action in an attempt to prevent the destruction of historic structures. 2) Media attention is attracted to the area and the neighborhood is put in the 'limelight'. 3) Lending institutions become more willing to grant mortgages and home repair loans than in the past. After this stage the area undergoes large scale revitalization and neighborhood change.

The final or advanced rehabilitation stage of Travis' model is characterized by highly inflated prices for both renovated and dilapidated houses. Large scale real estate development interests in the area cause inflated rents that result in the departure of the original tenants. This stage is also marked by the closure of small neighborhood businesses (O'Loughlin and Munski, 1979).

Clay (1979), basing his work on Pattison's (1977) study of Boston, MA, has concurred with Pattison's notion of four stages in the evolution or development of a gentrified neighborhood. Stage One occurs when a small group of people move into the area and renovate houses for their own use. There is little displacement of former residents because the new owners often buy vacant houses or the housing turnover is part of the 'normal' pattern in the area. Private monies are used almost exclusively since conventional mortgages are unavailable. This group of pioneers usually consists of a significant number of professionals or artists who have the necessary skills, time, money, and ability to undertake extensive renovation. Usually the area involved is quite small, many times consisting of only a couple of blocks.

During Stage Two a few more 'pioneers' move in. Some speculators may buy and renovate a few houses for resale or rental. At this time the media and some public agencies usually begin to pay some attention to what is occurring in the area. Renovation starts spreading to contiguous blocks and sometimes mortgage money becomes available. Housing is still relatively inexpensive.

At Stage Three major media or official attention is attracted to the neighborhood. Urban renewal programs, many of the houses are considered blighted, or a group of private developers may move in. The physical character of the area becomes markedly improved. Prices of real estate begin to rise rapidly. Displacement of older, lower class tenants may increase if building codes are rigidly enforced, or if reassessments are made to reflect the increased property values of the area, even unimproved properties. This stage is one in which there is an increasing number of people who, in addition to living space, are also seeking investment property. The community begins to organize and make demands for public resources.

In Stage Four much of the property in the area has been renovated. The newer residents differ from the initial middle class pioneers in that they are "more from the business and managerial middle class than from the professional middle class (Clay, 1979, p.59)." At this stage efforts may be directed towards having the area declared an historic district.

Types of Urban Revitalization

Johnson (1980) and Clay (1979) have indicated that there are two different types of private market urban revitalization occurring in the downtowns of many American cities. These are referred to as gentrification and incumbent upgrading. In gentrification there is a resettlement of professional and upper middle class homeowners in city neighborhoods that are/were recently composed of lower class residents. Many of the houses in the area were run down. The newer residents, on an individual basis, spend money and their own labor in revitalizing their houses. The end result is a visible physical change in the neighborhood, but more important is the shift in the socio-economic composition of the area. "The 'gentry' create a neighborhood ambience and a style that reflect upper middle class tastes and values; their tastes and values supplant those of the lower-income population that dominated the area before revitalization" (Clay, 1979, p.6).

Incumbent upgrading is an entirely different type of neighborhood revitalization. In this process there is the physical improvement of the housing stock by the incumbent residents, but there is no major change in the socio-economic characteristics of the population. "The lower or working class ambience of the neighborhood is not changed, and the physical investments reflect greater confidence on the part of owner-investors in the neighborhood" (Clay, 1979 p.7).

Filtering: A Prerequisite for Revitalization

Revitalization is usually preceded by a period of downward filtering of an area's housing stock. The resulting depreciation of the area's property values produces the economic conditions that makes private market revitalization a rational market response. Proponents of the filtering process feel that it is an effective means of providing safe, decent, and sanitary housing units for all members of a community.

As a house ages it deteriorates with use and at the same time it becomes technologically obsolete. Except for government subsidized housing, new homes are usually constructed for upper income people. "... it is rare for a new house to be inhabited by residents below the top quarter of the income distribution" (Mills, 1980, p.122). Gradually, as the upper income occupants move to newer, more modern accommodations, a supply of older buildings is left behind.

"Lower income families can then move up to occupy these units. At some point in the filtering process units become occupied by renters... Every move from one house to another results in a vacancy. The chain of vacancies that occurs as a result of a move produces a ripple effect throughout the city"(Hartshorn, 1980, pp.244-45).

The chain ends when a building is demolished, becomes permanently vacant or is consolidated into another unit.

"The construction industry could build houses for the poorest peoples. In many countries, the poorest people build their own housing. But the filter-down process provides higher quality housing for the poor than can be provided by construction of new houses for them" (Mills, 1980, p.123).

Lowry (1960) discusses several worker's definitions of filtering and then presents his own;

"Radcliff defines filtering as 'the changing of occupancy as the housing that is occupied by one income group becomes available to the next lower income group as a result of decline in market price, i.e., in sales price or rent value" (Lowry, 1960, p.362).

Fisher, Winnick and Grebler's (1951) definition states that "Filtering... is a change over time in the distribution of housing rents and prices in the community as a whole" (Lowry, 1960, p.362).

Lowry's definition, and subsequent theoretical model, of filtering allows the process to occur upward or downward. He states;

"I propose to define 'filtering' simply as a change in the real value (price in constant dollars) of an existing dwelling unit."

"... the definition contains a minimum of implicit theory - that is to say it makes no attempt to stipulate the causes or consequences of filtering. By this definition the dwelling unit can filter up in value as well as down; occupancy may change as a consequence, or it may not; other units may be similarly affected, or not" (Lowry, 1960, p.363).

According to Lowry (1960) the direction of the filtering process will be determined, on a given housing unit, by the function of economic supply and demand.

"... filtering up must cease when the price of an existing unit of given quality exceeds the supply price of a new unit of that quality. Filtering down will cease when expected revenues no longer covers the prime costs, in which case the dwelling unit has only scrap value" (Lowry, 1960, p.363).

How efficient and equitable the process works depends on the speed in which values decline, relative to quality

declines, occur. If the value of housing units depreciates rapidly enough so that low income households can afford shelter that is above the standards of quality considered socially adequate, then the private housing market has been an effective vehicle of public policy.

Lowry (1960) makes the assumption that a decline in the value of a housing unit is purely a function of time. He feels that, over time, three factors account for the decrease in a particular unit's value. They are: 1) style obsolescence, 2) technological obsolescence, and 3) physical deterioration. Other factors, such as overcrowding and the quality of the neighborhood, are related to the quality of the other housing units in the area and hence are not solely dependent on the conditions of a specific unit.

From a public policy point of view only technological obsolescence and physical deterioration affect the quality of a particular unit in question, the latter being the most important. The style of a house does not affect its social adequacy as a dwelling. Social adequacy is defined as housing that is decent, safe, and sanitary.

A homeowner's or landlord's expenses fall into two categories. These are: 1) User costs - expenses that accrue as a result of the unit being occupied. Examples of such costs are heat, water, garbage collection, etc. 2) Fixed costs - expenses which are incurred regardless of whether or not the unit is occupied. Fixed costs include such items as property taxes, insurance, and normal maintenance costs.

When a landlord's expenses for a particular unit becomes greater than their income they are very likely to disinvest in the units. This can be accomplished in several ways: 1) renting to more families, thereby crowding the unit and hastening its physical deterioration, and 2) reducing maintenance which has the same effect. A similar situation can occur in owner occupied units in which the owner can no longer afford adequate maintenance due to the rising cost of repairs, property taxes, etc., relative to his/her income.

When the value of a housing unit has depreciated sufficiently it is then within the purchase price, or rental range of someone lower down on the socio-economic scale than the previous occupant(s). Theoretically the process should be a fairly efficient and equitable method of providing adequate housing to people in all socio-economic levels. In actuality the process has not been effective for several reasons.

First, the filtering process requires that there be a stable demand for housing with a continuing supply. The situation in the late 1960s, in metropolitan areas, was one in which total population had been surging upward. In addition, the children of the post war baby boom had reached home buying age, thus increasing demand (Schorr, 1968).

Secondly, the price of a unit depends on competition. If there is a shortage, the price of a substandard unit will not decrease. "For example, the median rent (in real dollars) in the lower East Side of New York City actually rose over a long period of time. Yet the housing had clearly declined in a scale of values relating it to other

housing" (Schorr, 1968, p.487). Even when the filtering process is operating as desired, the process will not be of benefit to a family whose income is still too low to enable it to purchase, or rent, a unit that is adequate for its needs in terms of space, safety, etc.

Finally, when a unit becomes available to a lower class resident it usually means that an individual has to live where the middle class did under different circumstances. Usually this is in an area of the city that once was convenient to jobs located in the central business district. With the advent of the automobile, the highway system, and changes in technology, many of the potential jobs that lower class citizens would normally qualify for are no longer located in the central city. These jobs have moved out to the suburbs.

In most cities the public transportation system is not geared to readily accommodate people who live in the city and work in the urban fringe. The costs in money and time makes it difficult for many unskilled and semiskilled workers to find and/or maintain employment. "Thus, for some, filtration may provide shelter, but it does not provide what we seek--housing that affords the optimum opportunity for escaping from poverty" (Schorr, 1968, p.487).

Causes of Neighborhood Deterioration

The sociological or human ecology model of invasion and succession is basically the same as the filtering or trickle down model. "... it, too, defines the neighborhood

change where 'invasion' and 'succession' leads to a neighborhood's falling into the hands of a poor, less self-sufficient group until it becomes a slum" (Bradford and Rubinowitz, 1975, pp.78-9). Both models see neighborhood deterioration as a natural phenomenon which will inevitably occur. Hence the process seems to be outside the realm of policy intervention. The real estate, development, and investment industries are seen as actors in, and not as the creators and shapers of the process. Bradford and Rubinowitz contend that this fatalistic scenario is not inevitable. They feel that neighborhood deterioration is the result of "... identifiable private and public investment decisions, made by identifiable public actors and members of the real estate investment and development industry. These decisions can be made otherwise, with different consequences for older neighborhoods" (Bradford and Rubinowitz, 1975, p.79).

Developers' responses to increased construction costs include the construction of multifamily, rather than detached single-family units. Planned Unit Development (PUD) enables the developer to meet density requirements by clustering the units so as to reduce construction costs by decreasing the costs of roads, sewers, excavation, etc. Developers can also reduce costs per unit by increasing the scale of their projects. These three responses - multifamily construction, PUD's, and increased scale - necessitate a larger outlay of money. Developers thus have become dependent on larger financial institutions for construction loans. As

greater amounts of money are required, developers find themselves looking toward larger sources of capital such as life insurances companies and large banks, rather than local banks and savings and loan associations. One of the reasons for this is the fact that local banks and savings and loan associations are regulated as to the amount of money they can invest in a single project. The larger lending institutions are not restricted to real estate investments, hence, the builder has to compete with alternative investments such as stocks and corporate bonds.

Investors often feel that they are simply responding to the proposals that developers offer them, but in reality the developer anticipates the investors response. The amount of money that a entrepreneur can borrow is not dependent upon the cost of the project, but on the expected income or profit that can be generated. Knowing this, they adjust their projects accordingly. The main actors in the process by which the central cites have become disinvested, with the concurrent investment in the suburbs, are members of the real estate industry. They encourage people to move out of decent central city homes and move into the suburbs.

The result of the private sector's decision to invest in the growing suburbs, and disinvest from the older central city neighborhoods, decreases the viability of these neighborhoods. Older middle class neighborhoods are left without an adequate supply of conventional mortgage credit. The void left by the withdrawal of these funds is filled by Federal

Housing Administration (FHA) backed lenders who constitute the disinvestment complex.

The actions of the Federal Housing Administration, and those mortgage bankers and real estate agents, who participate in the federal programs, has resulted in the abandonment of many homes with the consequent rapid decline of neighborhoods. In many instances a neighborhood has had physically sound structures, but lacked conventional loan funds for home purchases and improvements. Conventional lenders, who are not federally insured, in the past have redlined such areas as potentially risky investments. FHA insured loans filled this gap, but in doing so led to the decline of numerous central city neighborhoods. (Bradford and Rubinowitz, 1975)

"For single-family homes, the crucial actors are the savings and loan associations. Their decisions are critical since they financed approximately one-half of all single-family home loans in the first half of the 1970s. Savings and loan associations may choose not to make loans in older, middle class, viable neighborhoods - even if they are located in those neighborhoods, their deposits come primarily from that area, and they have outstanding mortgages in that area to protect" (Bradford and Rubinowitz, 1975, p.83).

Thus the only source of loans is through institutions that issue FHA loans which are insured by the United States Government. If the borrower defaults on the loan, the lending institution is protected against loss by the federal government. Because lenders are not taking a financial risk in granting such loans, they do not exercise as much care in assessing the risks involved in a particular loan transaction as a conventional lender would. In addition, there have been

serious problems in regard to administrative abuses and fraud. Thus there has been a large number of foreclosures and abandonment in neighborhoods that have had a concentration of FHA loans. Because FHA loans usually are concentrated in those neighborhoods often avoided by conventional lenders, the process is called disinvestment. It is felt that if the FHA loans were scattered randomly throughout a metropolitan area, instead of being concentrated in specific neighborhoods, given the same high level of foreclosures, no individual neighborhood would be in danger of losing its vitality.

Multifamily dwellings in older neighborhoods have traditionally looked to life insurance companies as a source of loans. But, like local banks and savings and loan associations, they too have tended to invest in new suburban developments. As a result, it has become increasingly difficult for buyers, and owners, of apartment buildings in these areas to obtain mortgages or improvement loans. When they do, it is usually at higher interest rates and for shorter periods of time. This results in rent increases without an appreciable increase in quality. The more affluent, mobile tenants look elsewhere for housing.

"In short, both in single-family and multifamily housing, older neighborhoods are at a serious financial disadvantage compared to newly developing suburban areas. Older communities are without major institutional investments to help increase or even maintain their desirability and value" (Bradford and Rubinowitz, 1975, p.8).

The cost of construction has increased to the point that new housing construction is geared to the third quartile of the income scale, where profits are to be made.

"This is not a market of need, but a market where developers are seeking to define what kinds of buildings, with what kinds of amenities, will attract people already in adequate housing into a new development" (Bradford and Rubinowitz, 1975, p.82).

The result is that the investor-developer complex is not using a finite source of real estate investment capital in areas where it is needed, the central city populated with poor and minority citizens. It is investing these monies in areas where a 'market of preference', not need exists. Investments in older, central city neighborhoods are perceived as unacceptably risky. The ideological and economic analysis tend to be mutually supportative. The investor in the investor-development and disinvestment complexes are one and the same and thus are a single entity. Ironically, it then builds to suit those who do not need housing and it withdraws resources from older viable neighborhoods that it feels are deteriorating. The prophecy is thus self-fulfilled (Bradford and Rubinowitz, 1975).

Despite this pattern, many cities with once run down, blighted inner city areas are now attracting affluent whites, and to a limited extent affluent blacks. This is especially true in the north and northeastern parts of the country. It seems that this return of the middle and upper class to the inner city runs counter to the classical models of neighbor-

hood succession initially proposed by Burgess and later modified by Hoyt.

Dynamics of Urban Revitalization

According to Smith (1979) it is only when the housing stock has depreciated sufficiently that the economic conditions are such that capital revaluation of the area becomes a rational market decision. He feels that gentrification is a back to the city movement, not of people, but of capital.

"If the city continues to attract productive capital (whether for residential or other construction) we may witness a fundamental restructuring of urban space comparable with suburbanization. Then, indeed, it would become a back to the city movement of people too - middle- and upper-class people, that is - while the working class and the poor would inherit the old declining suburbs in a cruelly ironic continuation of the filtering process. They would then be trapped in the suburbs, not the inner city" (Smith, 1979, p.547).

Birch (1971) has defined six stages of residential development in his study of New Haven, CT. His description of stage six, which he calls "Recapture", states that;

"At some point the land occupied by an old slum becomes too valuable to justify its use as an old slum, and its inhabitants become too weak politically to hold onto it. Property is then reacquired, leveled or rehabilitated and put to more efficient use, such as high-income apartments or office buildings or public housing" (Birch, 1971, p.81).

The process of gentrification is a relatively new phenomenon. Clay (1979) cites four reasons that may explain the increased desire among some people to buy and renovate older inner city houses. These are:

"1) the diversity of the city, 2) its convenience for those working in the city, 3) its position as

theaters, restaurants, and sports events, and 4) the opportunity it offers for good, even stylish housing at bargain prices" (Clay, 1979, p.4).

Many participants, besides the gentrifier, take part in the process. Taking the roles of producers, as well as consumers, are builders, developers, landlords, mortgage lenders, government agencies, tenants, and real estate agents. If a high return on investment is the primary stimulus for gentrification, then the specific costs of production (renovation and upgrading costs) are the main determinants of price. It appears that the primary reason behind gentrification is the profit motive, or more specifically a sound financial investment, rather than consumer preference. The preference, and demand, of the consumer for gentrified housing can be created.

In a capitalistic country, financial institutions play an important role in the urban land market because of the large amounts of capital needed to finance the building of a structure. While land is considered permanent, improvements on it, which usually have a long turnover period, are not.

Smith (1979, p.542) states that, "... the value of a commodity is measured by the quantity of socially necessary labor power required to produce it. Only in the market place is value translated into price." Thus, while the price of a house is a reflection of its value, they are not equivalent. Price is set in the market place by the forces of supply and demand, whereas value depends on depreciation through use and appreciation resulting from the addition of more value.

The value of a parcel of property, which is generally taken to mean the price a building sold for, including the value of its land, can be disaggregated into four parts. They are: 1) house value, 2) sale value, 3) capitalized ground rent, and 4) potential ground rent.

The sale price of a house includes the value of the house and the land it is situated on. The ground rent of a house is the amount claimed by the landlords from users of their property. Capitalized ground rent is the actual rent the landlord receives from his tenants. In a situation where the house is owner-occupied, the owner realizes ground rent when the structure is sold. Capitalized ground rent is therefore part of the sale price. "Thus, sale price = house value + capitalized ground rent" (Smith, 1979, p.543). Potential ground rent is that rent that could be realized when the land is put to its highest and best use.

The rent gap is the differential between the potential ground rent and the actual ground rent being realized by a parcel of land under its present land use.

"Only when this gap emerges can redevelopment be expected since if the present use succeeded in capitalizing all or most of the ground rent, little economic benefit could be derived from redevelopment. As filtering and neighborhood decline proceeds, the rent gap widens. Gentrification occurs when the gap is wide enough that developers can purchase shells cheaply, can pay the builder's costs and profits for rehabilitation, can pay interest on mortgage and construction loans, and can then sell the end product for a sale price that leaves a satisfactory return to the developer" (Smith, 1979, p.545).

Smith claims that "... empirical evidence suggests strongly that the process is initiated not by the exercise of those

individual consumer preferences much beloved of neoclassical economists, but by some form of collective action at the neighborhood level" (Smith, 1979, p.545).

A prerequisite for gentrification to occur is the availability of mortgage capital. It is commonly found that private market renovation is stimulated in a particular area by one or more financial institutions reversing a policy of redlining. Smith (1979) identifies three types of developers that operate in a gentrifying neighborhood. They include: 1) professional developers, 2) owner-occupied developers, and 3) landlord developers. Of the three the most important to the process is the owner-occupied developer. He feels that gentrification is not a chance process or some unexplainable reversal of the filtering process. He claims that it is an inevitable process that will occur when there is a;

"... depreciation of capital in nineteenth century inner-city neighborhoods, together with continued urban growth during the first half of the twentieth century, have combined to produce conditions in which profitable reinvestment is possible" (Smith, 1979, p.546).

The Gentrifiers: Who Are They?

Cities, in which revitalization is most evident, have their business district located far from the suburbs and much of their employment base in professional and white-collar jobs (Sumka, 1979b; O'Loughlin and Munski, 1979). Travis (1973) found that middle class whites moved into inner-city neighborhoods for two reasons: 1) The availability of cheaper

housing easily accessible to the CBD. 2) The attractiveness of older historic buildings (O'Loughlin and Munski, 1979).

"Newcomers tend to be relatively affluent professionals between ages 25 and 44 who live in childless households... they can be classified according to the stage of revitalization at which they entered the neighborhood. Early entrants tend to be 'risk oblivious', they are followed by the 'risk takers' and, finally, by the 'risk averse' (Sumka, 1979b, p.482).

"... the initial renovation of buildings is undertaken by individual homeowners who, because they bought the property cheaply, can spend a large amount of money on renovation materials and labor. Rebuilding costs can be reduced by 'sweat equity', as many new homeowners perform the interior renovation themselves" (O'Loughlin and Munski, 1979, p.57).

Gale's analysis of Mount Pleasant and Capital Hill;

"... suggests that most Washington resettlers are young, relatively affluent, and highly educated. With middle and upper-middle incomes and few, if any children; they have a greater latitude of choice in housing than households with lower incomes and/or more children. Though most grew up in a suburban or suburban-like setting, they have spent most of their college and/or post-college years living in cities such as Washington" (Gale, 1980, pp.112-112).

In Seattle, WA, Leach (1978) found that more than 75 percent of the newcomers were professionals compared to 30 percent of the out migrants. The racial composition of the in-migrants and out-migrants also differed. Of the in-migrants, 88 percent were white compared to 79 percent of the out-migrants (Hodge, 1980).

"It seems as if newcomers moving into rehabilitated houses in inner cities display consistent attitudes that reflect an attraction based on a combination of historic preservation and place utility reasons. The precise importance of each factor will vary from city to city, but this consistency of attitude allows us to predict future rehabilitation based on the distribution of historic areas and access to

urban services" (O'Loughlin and Munski, 1979, p.66).

Changing life styles and family needs have also influenced revitalization. More people are marrying later and when they do they have fewer children. In addition, many more families today, than in the past, have two incomes.

The Gentrifiers: Where They Come From

In the past cities have been staging areas, that is places where young people met, married, but did not raise families if they could afford to move to the suburbs. This was especially true for the white middle class.

For decades prior to the 1970s, the population of metropolitan areas grew more rapidly than that of their nonmetropolitan surroundings. During the decade 1970-80 there was a striking reversal of this trend. (Current Population Report, No. 363, 1980)

Nonmetropolitan counties were experiencing net immigration at a greater rate than urban or metropolitan counties. Some researchers felt that this trend could be a statistical artifact. That is, the growth of nonmetropolitan counties was simply the expansion of urban sprawl. Beale's research in 1975 indicated that this was not the case. The greatest change occurred "... from net out-migration in the 1960s to net in-migration in the 1970s occurred in the relatively remote nonadjacent counties that had no urban places of 2,500 or more population" (Long, 1980, p.63).

Studies (Gale, 1980; Hodge, 1980; Goldfield, 1980; Hamnett and Williams, 1980) have indicated that gentrification-

ion is not a back-to-the-city movement. Most gentrifiers have moved from other parts of the same city or from other cities, but not the suburbs. The majority of people living in the suburbs are content to remain there.

Thus it seems that the stay in the city trend will not increase urban population as the back to the countryside/stay in the countryside trend continues to produce population growth in rural areas. Even those cities in the Sun Belt such as Los Angeles, Dallas, and Atlanta, that had rapid population growth in the past have experienced stabilization or declining populations in the late 1970s. Thus, it is doubtful if gentrification will result in a resurgence in central city population. (Long, 1980)

The people who are coming to the city from the suburbs are often not those who fled the city in the 1940s and 1950s, but their sons and daughters. "With the exception of the new role of women (more are child-free and working) the demographic profile of the young settlers looking for their first house is similar to that of the early suburban emigrants... their parents" (Allen, 1980, p.412).

Most gentrifiers are from the city and not from suburbs as the popular media tends to lead one to believe.

"... 119,000 mover households in the District from 1970 to 1974, more than half (57%) of the mover households resided in the city prior to their move, while only six percent of all movers came from the Washington-area suburbs" (Goldfield, 1980, p.456).

A study done on the Mount Pleasant and Capital Hill areas of Washington, D. C. (Gale, 1979) found that while two-thirds of the movers grew up in the suburbs most had

resided in older city neighborhoods prior to moving into a gentrifying area. Gale's (1979) study found that most resettlers chose to move into these neighborhoods for reasons that included; the affordability and investment potential of the house, the accessibility to the place of employment, and the historical/architectural character of the house and/or neighborhood. Other, though lesser, factors, included the social and cultural attractions available in the city.

His analysis of Mount Pleasant and Capital Hill;

"... suggests that most Washington resettlers are young, relatively affluent, and highly educated. With middle and upper-middle incomes and few, if any children; they have a greater latitude of choice in housing than households with lower incomes and/or more children. Though most grew up in suburban-like settings, they have spent most of their college and/or post-college years living in cities such as Washington" (Gale, 1980, pp.112-113).

In Seattle, WA; "Most newcomers move from other parts of central Seattle, about one-sixth (16 percent) move in from suburban Seattle locations" (Hodge, 1980, p.193).

"In Baltimore, housing administrator Jerry Doctorow has noticed that 'older people in the suburbs aren't moving back in. But their children are buying in the city.' Similarly, the New York survey... counted 38% of the movers to renovated housing as suburbanites in their previous residences..." (Goldfield, 1980, p.457).

Hamnett and Williams (1980, p.473) found that in London "... the great majority of gentrifiers emanate from the inner city itself rather than from the suburbs. They are not return migrants by and large."

"The overwhelming consensus is that the parents of revitalization are the children of the post-war baby boom, who entered the housing market at a time when the volume of new construction was low and the

price of suburban housing very high... revitalization of inner-city neighborhoods is the result of macro trends in housing market economics and in demographic and lifestyle changes" (Sumka, 1979b, p.482).

The perception of a back-to-the-city movement of people is perhaps caused by the fact that those people who, by their socio-economic background, would have been moving to the suburbs a generation ago are now marginally, though by an increasingly large margin, choosing inner-city housing accommodations (Weiler, 1980).

Desire For Diversity

It seems that renovators are more receptive to integration and social diversity as evidenced by their choice of residence. But it is an irony of the process that "Often not by choice, but by the very fact of living there, renovators induce resegregation due to higher property values and taxes" (Laska and Spain, 1979, p.530).

It is not clear if gentrifiers chose a neighborhood because of its diversity or for other reasons first. Then after having settled in the area they discover its differences and view it in a positive light (Allen, 1980)

Despite the merits of social diversity, historically there has been an overwhelming preference for homogeneity. Neighborhoods have been differentiated on the basis of socio-economic status, stages of the life cycle, race, and nationality. Other factors such as sexual preference may also be a determining factor in the evolution of a neighborhood.

Winters (1979) describes the appearance of several types of rejuvenated neighborhoods that have become apparent in the last decade. In those cities which have more than one revitalized area each tends to exhibit a different ambience which tends to become self-fulfilling.

"Viewing rejuvenation as a single economic or architectural process neglects one of its most curious aspects - its relationship to the inclination of many middle-class Americans of the 1970s to sort themselves out by lifestyle, occupation, or politics" (Winters, 1979, p.14).

As a neighborhood acquires a social identity it attracts people who value those particular aspects exhibited by the area. Winters uses the term "specialized or unconventional neighborhood social character." This is not a new phenomena in American urbanization but it seems to have become more prevalent in the 1970s. He feels that neighborhoods undergoing gentrification tend to acquire a distinctive social flavor, "... because these neighborhoods experience a great deal of voluntary and highly self-conscious in-migration in a short period" (Winters, 1979, p.8). These distinctive neighborhoods evolve because people need to express themselves and identify themselves by their choice of residence.

According to Winters several different types of rejuvenated neighborhoods can be identified. These include:

1. self-consciously heterogeneous neighborhoods like Manhattan's Upper West Side, which has an economically and ethnically diverse population.
2. chic neighborhoods, such as the area between Georgetown and Dupont Circle in Washington, D. C. Chic

neighborhoods have recently become "in places" to live. They are usually adjacent to long established high status areas.

3. artist neighborhoods, such as New York City's Greenwich Village, which has a long history, to the more recently established SoHo district.
4. gay neighborhoods, such as the West Village in New York City, tend to have a disproportionate concentration of homosexuals and commercial establishments catering to this clientele. Gay neighborhoods are distinct from other neighborhoods by virtue of the fact that sexual orientation, not the more traditional variables of race and socio-economic class seems to be the sorting factor.
5. family neighborhoods, where nuclear families seem to predominate.
6. working class revitalized neighborhoods which tend to experience incumbent upgrading, rather than a change in the areas population.
7. black revitalized neighborhoods.

If a mixture does exist in a neighborhood how much meaningful interaction actually takes place? Powerful arguments have been made for social segregation as well as social mix. Allen tends to feel that at a certain scale and to a certain degree segmentation is necessary. Most people prefer that; ... irritating aspects of other styles of life be softened by the haze of distance ..." (Allen, 1980, p.423).

This distancing should be a voluntary choice thus enabling pluralism to work.

"... the concept of neighborhood diversity is complex, involving the demographic composition of a neighborhood, the social and moral landscape, and the perception of diversity" (Hodge, 1980, p.199).

Geographic scale is also an important aspect of diversity. For example, the Madrona area of Seattle, WA is diverse because it consists of two completely separate contiguous neighborhoods. One black, the other white. "In many ways Madrona serves as a successful model of segregated (segmented) pluralism. At one geographic scale, the neighborhoods are homogeneous. At a higher geographic scale they are heterogeneous" (Hodge, 1980, p.199).

There is also a temporal aspect to neighborhood change that affects the perception of diversity in an area. With the increasing passage of time there is a tendency to remember the social mix that existed in an area with romantic nostalgia. There is the tendency to attribute past diversity as being permanent when in actuality it more likely existed during the transition of a neighborhood from a higher to a lower socio-economic class. Confusion also exists over reality and opportunity. A low income area has a potential for diversity by virtue of the fact that higher income families can afford to move into the neighborhood if they desire to do so. The reverse in opportunity, that is low income families moving into a higher income area, does not exist.

Once urban pioneers have started to move into and renovate dilapidated housing in an inner city area they tend to attract others from a similar background. One procedure by which gentrifiers can stabilize a neighborhood, and protect their investment is by successfully petitioning and getting the area designated an historic district. "... once the neighborhood is stabilized and its character unequivocally defined and legally defended, it is identified as a safe investment and a desirable place to live" (Tournier, 1980, p.174). This results in the creation of highly segregated areas of historically and architecturally significant homes. By virtue of their superior economic leverage the middle and upper classes are able to thus create homogeneous areas.

"Rather than producing a heterogeneous, multi-faceted community historic preservation - at least in Charleston - seems to be resulting in the displacement of one group of urban residents by another group and the replacement of one form of segregation by another" (Tournier, 1980, p.183).

Tournier (1980) feels that the long term effects of an area being designated an historic district is to drive out the poorer, long term residents and to create a gilded ghetto. In addition, much renewal activity has been targeted for the rich. In Philadelphia, "For example, Society Hill, with its historically certified houses, gas lanterns and cobblestone streets, was specifically designed to become a wealthy neighborhood" (Levy and Cybriwsky, 1980, p.141). For the poor who own homes in such area restoration changes are often beyond their ability to afford and many times they have no other alternative but to sell.

"To urban planners, a historic district is a jewel to be cherished, for it can often serve as a magnet with which to draw people - and taxes - back into the city. To those who see cities not as places but as people, who see cities as settings within which heterogeneous populations meet and interact, historic preservation promises much less, for it can herald the replacement of one form of segregation with another" (Tournies, 1980, p.184).

It seems that the diversity that gentrifiers seem to value is of a particular type. That is 'safe diversity' (Allen, 1980; Laska and Spain, 1979).

"Wilson believes that the few urbanites who value diversity usually mean 'safe' diversity, by which they mean 'a harmless variety of speciality stores, esoteric bookshops, 'ethnic' restaurants, and highbrow cultural enterprises. The ethnic diversity that is valued, when it is valued, is that of communities whose residents are not so socially different or hostile as to threaten peace in the streets. The ethnicity of the lower classes, perennially viewed as the 'dangerous classes', usually is not part of the diversity sought by the new settlers. Some of those seeking a new community ambience are hoping to find Old World, European café charm, while the reality also includes (and increasingly so) transplanted settlements of Third World poverty and sometimes threatening street life" (Allen, 1980, p.418).

What the present day urban settler seeks in the city is perhaps in many ways similar to those things their parents sought when they moved to the suburbs. "... their parents sought a selective, buffered, and entertaining encounter with small-town and 'rural life'" (Allen, 1980, p.420). The urban renovator is perhaps seeking, in addition to cheap housing and convenience to the work place, "... a selective, buffered, and entertaining encounters with the social diversity of city life" (Allen, 1980, p.420).

Tension Between Long-Term Residents and Gentrifiers

Despite the decline in the population of inner city neighborhoods and the disinvestment in property, most older urban neighborhoods do not become wastelands devoid of people, economic institutions, and supportive social structures. Many northeastern and north central cities have been, and still are, the home of various ethnic and socio-economic groups.

Economic factors of gentrification have exacerbated tensions which otherwise might be considered as intriguing contrasts. As revitalization proceeds market pressures cause rent increases that force long-term residents, who can no longer afford these increases, to leave the area. New construction and rehabilitation increase the tax assessments of houses, forcing those on fixed incomes, in many instances the elderly, to sell their homes.

Chernoff (1980) describes the conflict arising in the Little Five Points section of Atlanta, GA between the established business community and housing renovators. The conflict reflected the changing composition of the business and residential community.

"It started a number of years ago when the Stone-Mountain (Interstate 485) Freeway was proposed... And the business community felt it would be the greatest boon to business that had ever come through the neighborhood and the restoration group said no, it would just totally destroy everything they'd been working for... That was the beginning of some conflicts and some disagreements. There have been quite a few other issues" (Chernoff, 1980, p.209).

Weiler (1980) discusses the "anything-is-an-improvement" syndrome that often catches long-time residents off-guard. They usually welcome the first developer into the neighborhood who plans to transform a local eyesore, such as a vacant lot or abandoned building, into something else. Often the improvement brings with it other problems. The neighborhood would have been better off if it had been prepared to wait until it got what was wanted, and not merely settling for the first offered 'improvement'.

"In our experience, if one person wants to develop a property in a reinvestment area, another person soon will, also. Therefore, the neighborhood should decide what it wants, say no, and work constructively until it gets what it wants" (Weiler, 1980, p.232).

Tension, due to differing life styles, have been generated as a result of the mutual coexistence of incumbent residents and the incoming 'gentry'. Tensions revolve around cultural differences in attitudes toward the neighborhood, sex roles, work, childrearing, the home, etc. Traditionally these conflicts have been avoided because these economic and social groups have been segregated (Levy and Cybriwsky, 1980).

Gale (1980) found that points of dissatisfaction among gentrifiers with their neighborhood included inadequate public schools, insufficient play areas for children, inadequate parking space, high crime rate, and excessive traffic. Forty-eight percent of the respondents in Capitol Hill (Washington, D. C.) hoped that the area would become about equally populated by both whites and blacks.

Twenty-three percent preferred a white majority. Almost none wanted an all white or all black neighborhood. Some respondents indicated that they were not concerned about race as much as having people from a similar socio-economic class as neighbors.

The way the neighborhood is used by long-term residents and the newcomers are indicative of the differing values and importance the community has to these two groups. In the Queens Village and Fairmount areas of Philadelphia, PA some long-time residents have lived there for 50 or more years. Many have life-long friends and relatives in the area. The porches of their homes, and the streets, for these people are extensions of their homes.

"Certain doorsteps have become regular congregation points for groups of residents defined variously by age, kinship, ethnicity, and proximity. Children play hopscotch, stickball, and street hockey where there are vacant parking spaces or tour the neighborhood on their bicycles, while street corners and playgrounds belong to teenagers who frequently hang out in large groups.

Newcomers are not part of this way of life. Most are not interested in participating, but even those who came to the neighborhood 'to be with the people' generally find that the 'people' will have little to do with them. Outdoor life in Fairmount and Queens Village, as it was observed in other urban villages, is tightly bonded by social networks, friendships from childhood, common ethnicity, and common work experiences. Outsiders cannot possibly share this. Neighboring relations between established residents might be cordial, but full intergration of the two groups rarely occurs. Only in those specific instances when the two share a common external enemy, such as Queens Village's battle against exit ramps for Interstate 95, have effective bonds been established" (Levy and Cybriwsky, 1980, p.146-7).

Displacement

The revitalization of inner city areas is seen by many as a major turn around in the declining fortune of our cities. It is seen as one of the answers to the financial problems many cities have been facing in recent years by giving a boost to the tax base. But there are also negative aspects to the process.

Displacement is probably as old as human history. It occurs not only in urban areas, which is our main concern here, but in rural and suburban areas as well. While it seems to be an urgent problem specific to gentrifying areas it also occurs in declining and stable neighborhoods as well. The people displaced are not all poor, or members of minority groups. They can be renters or owners, from all races, and they span a considerable range of ages, incomes, and household types. But, the economics of the process suggests that minorities, people with low or moderate incomes, and the elderly are displaced more than other groups. From a historical perspective, displacement in America dates back to the settling of this continent. The first settlers having started the process by displacing the original native Americans.

"In a recent survey of 43 cities, Phipps found that the most significantly impacted segment of society in neighborhood displacement is the elderly, irrespective of the size and location of the city, and renters would be second" (O'Loughlin and Munski, 1979, p.56).

"... private neighborhood redevelopment in Washington has generated a vicious side effect; the displacement of hundreds; perhaps thousands, of poor, black households by middle income black and

white newcomers. The extent of displacement can only be inferred from the extent and rapidity of the private redevelopment process" (Goldfield, 1980, p.457).

It is difficult to get a handle on the number of people who are forced to move as a result of gentrification because twenty percent of the households in the United States move annually. Many of these moves are voluntary.

Grier and Grier (1980, p.256) defined displacement as occurring;

"... when any household is forced to move from its residence by conditions which affect the dwelling or its immediate surroundings, and which:

- 1) are beyond the household's reasonable ability to control or prevent;
- 2) occur despite the household's having met all previously imposed conditions of occupancy; and
- 3) make continued occupancy by that household impossible, hazardous, or unaffordable."

They have identified three types of displacement; 1) disinvestment displacement, 2) reinvestment displacement, and 3) displacement due to enhanced competition. It is possible that all three types can occur at the same time, in the same city, and in the same neighborhood, and that it is often hard to distinguish clearly among them. All three seem to be a basic aspect of the overall changes occurring in the housing market. "... changes which are making housing more expensive for everyone, and are particularly hurting those at the lower end of the income scale" (Grier and Grier, 1980, p.255).

Displacement is not considered to have occurred in the following situations:

1. a resident is forced to move because of defaults on rent, mortgage, or taxes, except where unaffordable increases have occurred.
2. voluntary moves to more suitable housing where the previous residence was still habitable.
3. moves as a result of job transfers, etc.
4. the occupant violates a condition of the lease or agreement.

Chernoff (1980) distinguishes between social and physical displacement. He defines social displacement as;

"... the replacement of one group by another, in some relatively bounded geographical area, in terms of prestige and power... to be recognized by outsiders as the legitimate spokesman for the area. Social displacement is then a typical accompanying feature of physical displacement. Yet physical displacement need not always go along with social displacement" (Chernoff, 1980, p.205).

Social displacement can manifest itself in several different ways. The loss of political control in an area by the long-term residents can lead to demoralization or a sense that one's life-style is being threatened. Because of this, residents or business may leave an area. Thus the physical displacement, in this instance, results from social rather than economic factors. Chernoff (1980) discusses the resentment and impotence felt by the older businessmen in Little Five Points, an area of Atlanta, GA, as they lost their dominant position in the community to 'new' businesses.

Displacement can be initiated in many ways in addition to a formal notice to vacate. The displacee can be subjected to a variety of actions which include subtle or direct

actions. Examples include a marked decrease in maintenance, heat, or other vital services to the building. On the other extreme, threats and violence (Schanberg, 1982) have been used to 'encourage' the present tenants to move. The withdrawal of public services to the neighborhood, large increases in property taxes, or rents can make continued occupancy by the present resident(s) economically unfeasible. As the above situations suggest displacement can be a result of actions, intended or not, not only of the landlord, but a public agency, a quasi-public agency, or a private institution.

The irony of displacement is that;

"Displacement can occur under market conditions which appear to be diametrically opposite. For example:

1) The value of the dwelling declines to the point where it is no longer profitable to maintain. The owner cannot sell it. He finds it more economical to vacate it and board it up for a time - or simply let it run down until it becomes uninhabitable. This is the disinvestment-related displacement.

2) The value of the dwelling increase to the point where it becomes attractive to a more affluent category of residents. It is resold or rerented, and the previous tenants are forced to move. This is reinvestment-related displacement". (Grier and Grier, 1980, p.253).

The above may occur as two successive stages in the cycle of a neighborhood, thus the supply and demand of housing can be working at cross purposes, as has been the case in recent years.

"Private upper-income rehabilitation decreases the supply of low-cost housing without decreasing the demand. It can thus only impose uprooted people on contiguous neighborhoods, create overcrowding,

and further strain already overextended social services" (Levy and Cybriwsky, 1980, p.152).

Households that are displaced as a result of private market redevelopment tend to follow a similar route as households that were displaced by the urban renewal and slum clearance projects of the 1950's and 1960's. Usually they move to another location on the same block or in the same neighborhood. Goldfield (1980) points out that the major difference today is that if a family relocates near its former residence it faces the probability of successive displacements as renewal progresses. In Washington, D. C., where vacancy rates are low;

"It is the poor's very limited housing options, not necessarily displacement per se, that is the greatest aftershock of private redevelopment. Gentrification and destruction of housing stock have forced the poor to double- and triple-up in shoddy rooming houses and deteriorating dwellings" (Goldfield, 1980, pp.459-60).

Goldfield (1980) concedes to the fact that Washington, D. C. has a unique economic and demographic base that may intensify the displacement problem brought about by gentrification. The combination of high status employment, the large singles population, and the low vacancy rate are unique to Washington, D. C. only in degree. Boston, Chicago, and San Francisco also have strong redevelopment movements and an extensive professional and administrative employment base.

There is a fear that if displacement continues without moderation some form of backlash will follow. Levy and Cybriwsky cite instances of, "... damage to new people's cars, graffiti painting on their homes, verbal abuse and

harrassment in the street..." (Levy and Cybriwsky, 1980, p.152) (Cybriwsky, 1980).

Grier and Grier (1980) studied several cities in an effort to determine the extent of displacement caused by; 1) public action, 2) direct displacement resulting from private investment forces, and 3) other types of private displacement. They found that gentrification was wide spread, but that in most cities in which it was occurring it was limited in scope.

"In cities where we made comprehensive inquiries, displacement caused by private reinvestment appears generally to be below the amounts resulting from public action - if displacement resulting from code enforcement is included within the category considered to be publicly caused, as we believe it should" (Grier and Grier, 1980, p.261).

While it may not be widespread the Griers still feel that the displacement problem cannot and should not be ignored. Direct reinvestment displacement is highly visible and as such it is potentially explosive.

Displacement is most evident in neighborhoods subject to real estate speculation due to the fact that speculation leads to a rapid turnover of recently acquired properties. The first residents affected are renters. As gentrification proceeds owner-occupants are then likely to be affected in two ways. Many may sell too rapidly and eagerly thinking the neighborhood is still on the decline. Having not realized the true potential value of their property they may find it difficult, if not impossible, to purchase similar homes in areas similar to their old neighborhood. Secondly, as a

neighborhood's property values increase, tax assessments go up. Those owner-occupants on fixed incomes or low incomes may be forced to sell, being unable to keep up their payments.

Between 1974-79, according to the Annual Housing Survey "... displacement moves did not exceed 4% of all moves in any of the years included in the study" (Sumka, 1979b, p.484). Sumka cautions the reader that the results of the survey are potentially biased, in an undetermined direction, because moves due to rent increases, which could be the result of revitalization, are not included. In addition evictions were included in the data even though they may be due to factors unrelated to revitalization."

Hodge, studying Seattle in 1978, found that condominium conversions, "... have a disproportionate impact on low-income, elderly households" (Hodge, 1980, p.198).

In contrast to the above findings Pattison's (1977) study in Boston indicated that most residents saw revitalization as an opportunity for them to move to the suburbs and thus fulfill a long-term goal. Here again the study had weaknesses because of sampling biases (Sumka, 1979b.)

Sumka feels that;

"... while displacement may be a serious problem in some neighborhoods, there is little support for the notion that a substantial trend is occurring or that in the aggregate large numbers of poor households are being affected" (Sumka, 1979b, p.480).

He states that hard data concerning displacement is sparse and that; "We have largely impressionistic views that are based on case studies of individual neighborhoods and

affected by the biases of particular observers" (Sumka, 1979b, p.481).

Public Policy Influences on Revitalization

Public policies such as federal anti-redlining and federal open housing legislation have encouraged revitalization. Open housing legislation has helped open up the suburbs to blacks. Their departure from the central city has created housing opportunities for others, thus reducing some of the tension felt in some neighborhoods undergoing "white invasion". This trend is also encouraged by suburban no growth policies and large lot zoning. Both tend to keep housing prices high in the suburbs thus increasing the attraction of the city.

Government using its power of eminent domain, has reduced the supply of low-cost housing. The construction of highways and other public works were viewed as being necessary for the good of the general public. As an added bonus these projects also eliminated slums. While slums, as such, are considered in a negative light they do provide housing for low and moderate income groups which often consists of blacks and other minorities.

"Eminent domain proceedings have been authorized on behalf of power companies, railroads, highways, universities, and many other enterprises whose operation was defined as in the public benefit" (Nager, 1980, p.243).

One wonders if there has not been abuse of this power.

On the positive side, revitalization has saved many housing units from decay, reduced overcrowding, and increased

the tax base of the cities in which it has occurred. None of these benefits, however, have been beneficial to the displaced. Their problems, rather than being eliminated, have been shifted elsewhere. To discourage gentrification would be counterproductive, but government assistance is needed to help the poor.

Weiler, a resident of Queens Village, a revitalized neighborhood in Philadelphia; "... would term much inner-city reinvestment as distinctly suboptimal" (Weiler, 1980, p.220). He feels that by proper planning on the part of developers and planners the negative effects of reinvestment can be decreased.

Problems such as increased traffic and insufficient resident parking spaces, are some of the negative effects that surface when an area becomes revitalized. This is a function of the types of stores and restaurants that are attracted to such areas resulting in the area becoming a tourist and entertainment district.

Increased traffic results in increased noise, pollution, and dirt. It also increases the danger to neighborhood children. The lack of parking becomes serious when one is obliged to park several blocks away from one's home where cars are subject to theft and/or damage. Lack of convenient parking increases the personal danger to a driver who may have to walk through an unsafe area especially at night.

"In considerable measure displacement and its injuries to those displaced and the community in general stem from too rapid and too concentrated reinvestment. The 'boom town' effect so often seen in inner-city reinvestment neighborhoods causes

precipitate, seemingly uncontrollable change and dramatically rapid increases in property values within a fairly small area for several years before eventually moving further outward downtown...

There is much development going on simultaneously, and long-term residents are simply unable to cope in such short order with the rapid changes, either in their personal life-styles or their personal budget" (Weiler, 1980, p.230).

Gathering data in order to determine the extent and effect of displacement due to gentrification has been difficult because of problems in tracing the movements of individual households. (Hamnett and Williams, 1980) It is also difficult to determine how much change has occurred in a gentrifying neighborhood due to other factors such as changes in employment structure, both locally and nationally.

It is Gale's opinion that;

"... regulations, tax disincentives, and public subsidies merely nibble at the edge of the displacement dilemma, the root cause of which is the inadequate supply of sound low- and moderate-income housing in the Washington area in the wake of resettlement... there are few, if any incentives for the private sector to build such units" (Gale, 1980, p.112).

Sumka feels that the role of the federal government is to make available to local governments resources so that they can lessen the displacement problem without stifling the positive benefits of inner city revitalization. Low income families, by being forced out of their homes are being excluded from the benefits of revitalization in attractive, or potentially attractive, neighborhoods while they are forced to bear many of the costs.

"This process reflects the normal functioning of a price-driven economy, which is as efficient a resource allocation system as exists. Unfortunately, the price mechanism stands neutral with respect

to equity, and those concerned with social justice must look to the government for mechanisms for achieving equity" (Sumka, 1979a, p.493).

Rent control, condominium conversion restrictions, anti-speculator taxes, and eviction restrictions are some of the antidisplacement strategies that can be used. Community Development Block Grants, housing subsidies, and rehabilitation programs when sensitively applied can help expand the supply of low income housing units and slow down rapidly escalating housing prices in gentrifying neighborhoods. (Sumka, 1979b)

The process of revitalization has called into question the adequacy of the classical urban models as being applicable to present day urban areas. Several additional theories have been advanced which attempt to describe, and account for, the method by which slums become revitalized. The process, which has both positive and negative aspects to it, has been brought to the attention of the public by journalists and scholars. In order to minimize the negative aspects of revitalization it is necessary to have a realistic understanding of the process and its extent. The next chapter will give an overview of the cities, and their economic regions, that were examined in this study.

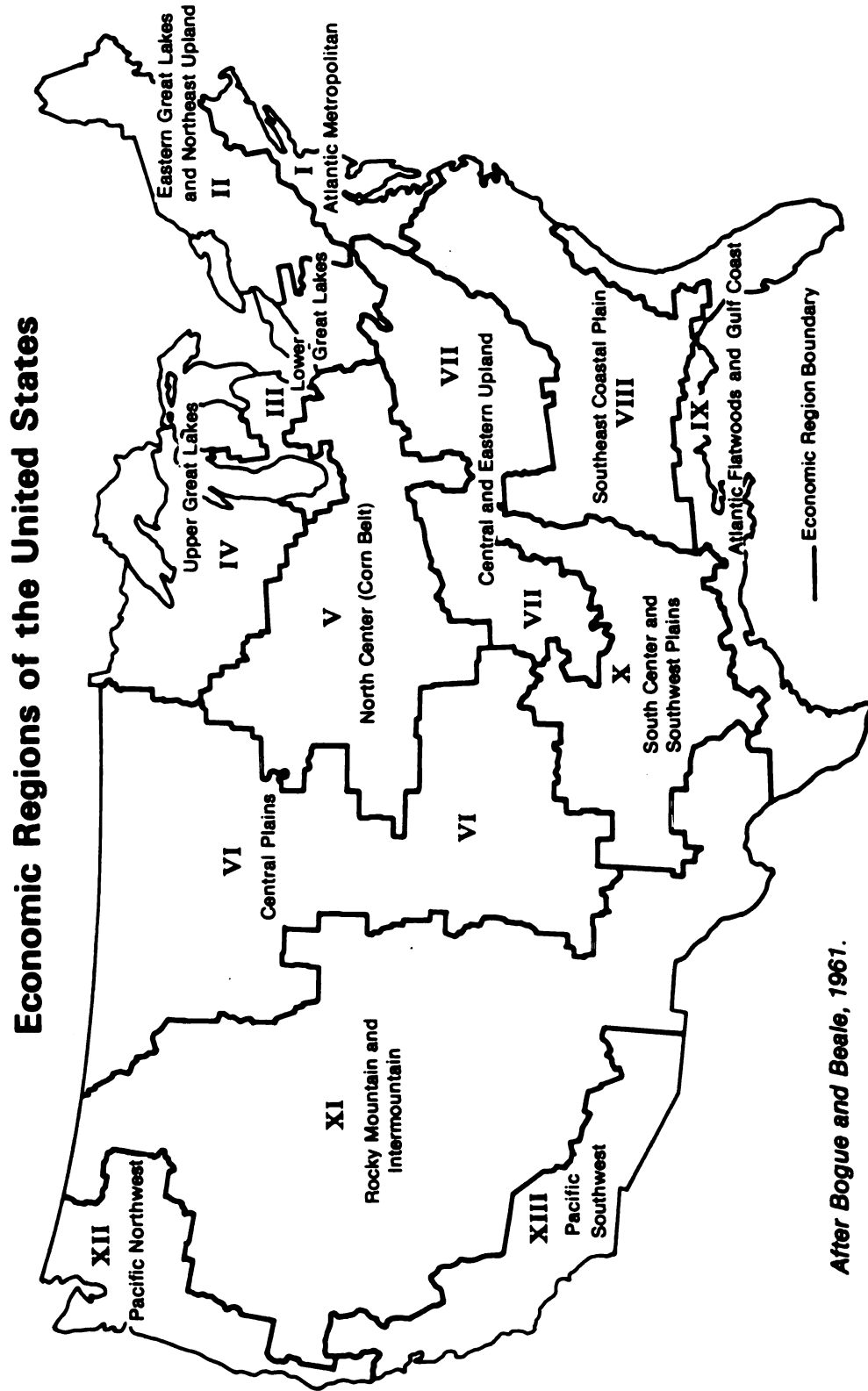
CHAPTER III

THE CITIES AND THEIR ECONOMIC REGIONS: AN OVERVIEW

The Urban Land Institute (Black, 1975) determined that 67.9 percent of all United States cities with populations of 250,000 or more had experienced some private-market revitalization. Of the 53 cities that had populations of 250,000 or more in 1970, 32 were examined in this study. These cities were located throughout the contiguous United States, with nearly half of them being found on or near either oceanic coast. The majority of the cities were located east of the Mississippi River.

The purpose of this chapter is to: 1) Give a general description of the major economic characteristics of the regions within which these 32 cities are located. 2) To compare the general socio-economic trends that have occurred in the United States, within the intercensal period 1970-80, with that found in these cities during the same time period.

Bogue and Beale (1961) have divided the United States into 13 Economic Regions (Fig. 1). These "... economic areas were developed by subdividing the entire land area of the United States into clusters of land that are as homogeneous in their general livelihood and socio-economic characteristics as it is possible to make them on a practical basis and yet be able to obtain statistics for each unit of area. This was accomplished by grouping similar counties" (p.xii). Bogue and Beale chose counties as their basic spatial unit for several reasons, these being: 1) County boundaries



After Bogue and Beale, 1961.

Figure 1

tend to be very stable over time, resulting in few boundary changes from census to census and 2) The county is the smallest spatial unit for which large quantities of statistical data are available. Bogue and Beale felt that townships tended to be too small and their boundaries unstable over time, whereas states are much too large and heterogenous for precise analysis.

Characteristics of the Economic Regions

The 32 cities in this study (Fig. 2) are located in 10 of the 13 Economic Regions. These cities, in their respective regions, are as follows:

I Atlantic Metropolitan Belt Region

Baltimore, MD
 Boston, MA
 Kings County (Brooklyn), NY
 New York County (Manhattan), NY
 Newark, NJ
 Norfolk, VA
 Philadelphia, PA
 Washington, D. C.

II Eastern Great Lakes and Northeastern Uplands Region

Buffalo, NY

III Lower Great Lakes Region

Chicago, IL
 Cleveland, OH
 Milwaukee, WI
 Pittsburgh, PA
 Toledo, OH

IV Upper Great Lakes Region

Minneapolis, MN
 St. Paul, MN

V North Center (Corn Belt) Region

Kansas City, MO

VII Central and Eastern Upland Region

Louisville, KY
 Nashville-Davidson, TN
 St. Louis, MO

- VIII Southeast Coastal Plain and Piedmont Region
 Atlanta, GA
 Memphis, TN
- IX Gulf Coast and Atlantic Flatwoods Region
 Jacksonville, FL
 Miami, FL
 New Orleans, LA
- XII Pacific Northwest Region
 Seattle, WA
- XIII Pacific Southwest Region
 Long Beach, CA
 Los Angeles, CA
 Oakland, CA
 Phoenix, AZ
 San Diego, CA
 San Francisco, CA

The predominant characteristics of these regions, according to Bogue and Beale (1961) are as follows:

Region I - Atlantic Metropolitan Belt Region - This region comprises the heavily populated strip of land along the Atlantic Coast known as Boswash. It is characterized by its large numbers of people, high population density, and high degree of urbanization and suburbanization. The large commercial and industrial centers of the east coast are located here.

Some of the oldest cities in America are found here in this region that contained most of the original thirteen colonies. It is an area with a high diversity of commercial and industrial enterprises despite a relative lack of natural resources. Agriculture is specialized, with cash crops, poultry, and dairy predominating.

The physical and climatic characteristics of the region have less significance on the region's economic life than in the other regions where physiographic differences are very

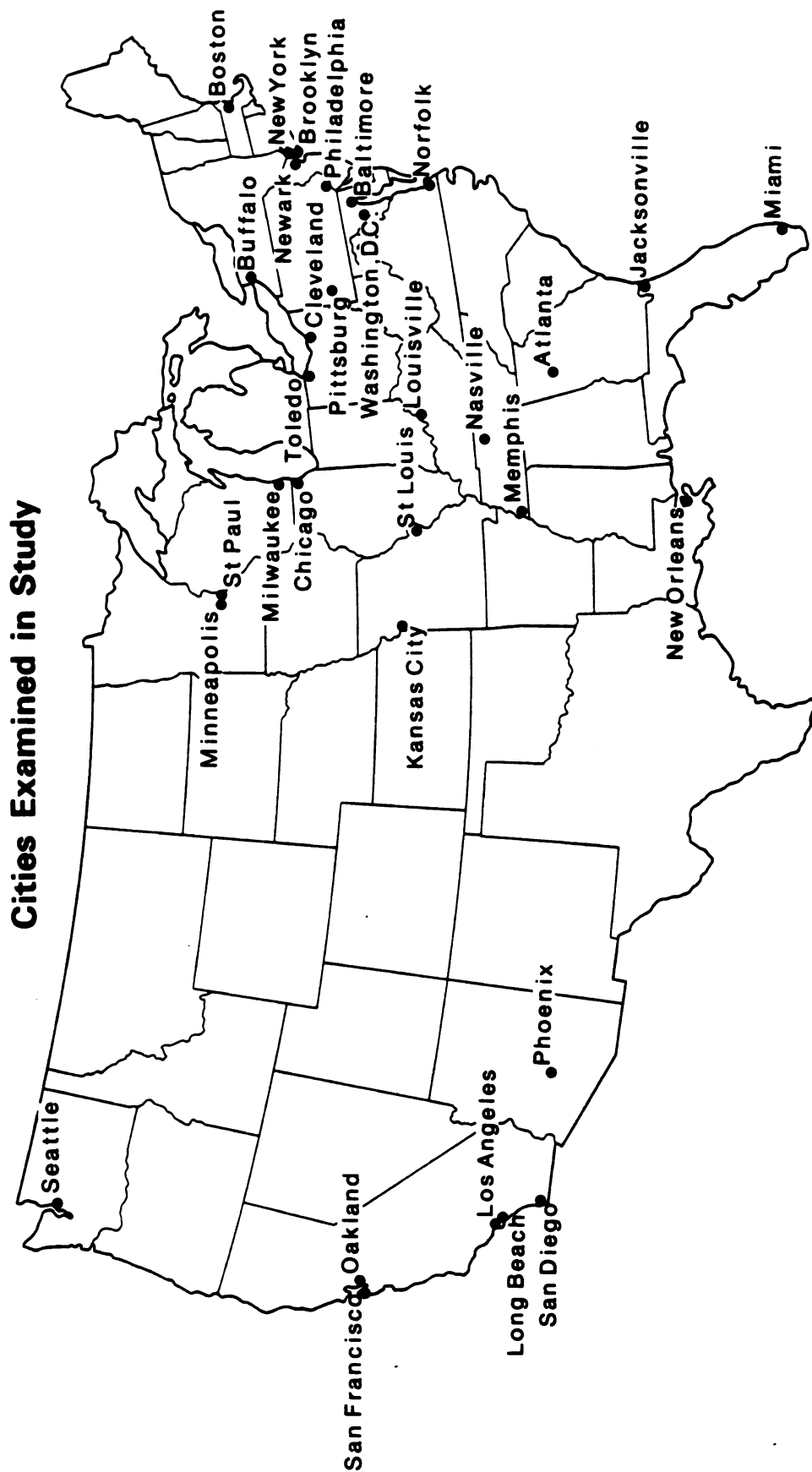


Figure 2

important. Of the 13 regions, Region I is the most important economically, culturally, administratively, and financially. It has a highly developed inland transportation system with easy access to the rest of the country (Bogue and Beale, 1961, pp.4-13).

Region II - Eastern Great Lakes and Northeastern Uplands - this region is characterized by mountains, steep hills, or forest wastelands. Many of the cities in this region are small and foster a slow pace of life. "Region II, most broadly defined, is a strip of scenically, picturesque, mountainous or woodland territory which is sandwiched between the great population concentrations of the Atlantic Metropolitan Belt and the Lower Great Lakes Region, but which is itself only moderately urbanized and industrialized (Bogue and Beale, 1961, p.31)." Only a few urban areas, notably Buffalo and Albany, NY, have large concentrations of industry.

Except along lake shores and river valleys the topography of the region consists of wooded uplands averaging 1,500 to 4,000 feet above sea level. The highest points are about 6,000 feet above sea level (Bogue and Beale, 1961, pp.37-39).

Region III - Lower Great Lakes Region - This region supports one of the Nation's largest concentration of industry and commerce. Much of the manufacturing is concerned with durable goods emphasizing the production and utilization of steel. While the region as a whole is industrially diverse, metropolitan centers tend to specialize in one, or

at most, a few types of manufacturing. For example, Detroit, MI's industrial base is in the automobile industry, while Akron, OH specializes in rubber production (Bogue and Beale, 1961, pp.73-77).

Region IV - Upper Great Lakes Region - The three major urban areas of Minneapolis-St. Paul, MN, Duluth, MN-Superior, WI, and Madison, WI are the major focal points in the political, economic, and cultural life of the area. These cities are all located at the crossroads of major transportation networks.

The rural areas, once active in the mining and lumbering industries, have declined. Growth in this region is based upon tourism, sports, and vacation facilities. The predominate form of agriculture in the region is dairy farming (Bogue and Beale, 1961, pp.113-115).

Region V - North Center (Corn Belt) Region - This is predominately an agricultural region. Four factors help to contribute to the agricultural productivity of the area. They are, 1) fertile soil, 2) level or gently rolling topography, 3) abundant precipitation which is well distributed seasonally, and 4) a long, warm growing season. The urban places are regional centers for the processing and marketing of agricultural products (Bogue and Beale, 1961, pp.135-139).

Region VII - Central and Eastern Upland Region - This area was first settled by the pioneers from the original colonies as the country's population expanded westward. Two principal routes into the interior followed the Ohio River Valley and the Cumberland Gap-Tennessee Valley through the

mountains. Much of the region was accessible via navigable rivers.

The region is rich in coal and petroleum, but the production peak has passed. Initially manufacturing was based on the processing of local raw materials, or in the furnishing of goods needed in the region and then expanded to nationwide and worldwide types of industries .

Three major commerical centers, Cincinnati, OH, Louisville, KY, and St. Louis, MO-IL grew and prospered as a result of their river location. With the advent of the railroad and, later, the highway system, the region experienced a decline as its rough landscape made the construction of railroads and highways prohibitively expensive. The above mentioned cities have still retained their importance, but their industrial importance is now more national in nature and much less dependent on local raw materials (Bogue and Beale, 1961, pp.218-223).

Region VIII - Southern Coastal Plain and Piedmont Region

- This region is the least industrialized, and has the highest percentage of its labor force in agriculture, of the 13 regions.

The major urban centers of the area are widely separated. Atlanta, GA, which has a diverse industrial base, is considered the transportation, communication, and distribution hub of the region. Memphis, TN, located on the Mississippi River, is also a great commerical center with diverse industrial base (Bogue and Beale, 1961, pp.276-277).

Region IX - Gulf Coast and Atlantic Flatwoods Region -

This region extends along the southern Atlantic Coast from South Carolina along the Gulf of Mexico to the Mexican border. It has a low lying landscape less than 250 feet above sea level. The land, which is poorly drained, contains numerous tidal marshes and swamps. This in combination with hot summers and short, mild winters makes the area poorly suited for agriculture.

The western half of the region contains some of the major oil and natural gas fields in the world. Manufacturing plants, to serve the petroleum industry and to utilize its products, have located in this area.

With the exception of San Antonio, TX all the major cities in the region are port cities. Some of these port cities, such as New Orleans, LA and Jacksonville, FL, are located inland on navigable rivers and have become trade, transportation, and commercial centers (Bogue and Beale, 1961, pp. 319-328).

Region XII - Pacific Northwest Region - Much of the region, which also includes Alaska, is too mountainous or rocky for habitation, but interspersed between these areas are fertile valleys and plateaus that support agriculture and urban places.

Irrigated lands produce a large variety of vegetables, fruits, berries, and flowers. In addition to being a leading dairy area it is one of the nation's principal lumbering regions.

A major source of energy in the region is water power. The development of hydroelectric dams, such as the Grand Coulee and Bonneville Dams, has led to the development of industries dependent on a cheap supply of electricity, such as the aluminum industry. (Bogue and Beale, 1961, pp.419-427)

Region XIII - Pacific Southwest Region - This is a predominately dry, subtropical region, which also includes Hawaii. It is a highly urbanized area with a large and diverse economy. It has excellent transportation facilities consisting of ports and railroad terminuses.

The region, which has a predominately dry subtropical climate, contains large amounts of irrigated, arable farmland. This permits the growing of a wide variety of crops, many of which cannot be grown elsewhere in the United States. The demands created by agriculture have created a large migratory farm population in addition to the establishment of food processing facilities.

The mild climate and picturesque scenery has resulted in this region being a favorite spot for retirees. Its strategically location with respect to the Orient, in combination with large tracts of land having little economic value, has resulted in a heavy concentration of military installations. This has resulted in numerous defense related industries locating here (Bogue and Beale, 1961, pp.447- 455).

Socio-economic Trends in the Cities Comprising This Study

The national patterns revealed by an analysis of the changes that have occurred between the 1970 and 1980 Census'

are, for the most part, reflected by changes that have occurred in the cities examined in this study, both on a regional and individual basis. The following is a descriptive survey of the socio-economic trends that have occurred, during the same time period, in these cities. Quantitative details of this analysis are located in Appendix C.

Region I, the Atlantic Metropolitan Belt Region, with eight cities, contains the largest number of cities in this study. Region XIII, the Pacific Southwest Region, with six cities is second in ranking. Two regions, Region II, the Eastern Great Lakes and Northern Uplands Region, and Region XII, the Pacific Northwest Region, each have one city.

All the cities, in this study, in Regions I, II, III, IV, V, and XII experienced a decrease in their total central city populations during the 1970s. All these regions, except for Region XII, comprise the major industrial areas of the Nation. The bulk of the population of the United States is also located here. Conversely most of the cities in the study located in the south and southwestern part of the nation, Regions IX and XIII, experienced growth in their total central city populations during this time same period.

The 1970 Census of Population and Housing splits the racial composition of an area into two classes of 'White' and 'Negro.' In using the 1970 data it was found that in many instances the total of these two classes did not equal the total for all persons in the spatial unit being examined. Thus, in order to account for 100 percent of the population, race, in this study, was categorized into two groups, white

and non-white. Values for non-white individuals were determined by subtracting the value of the white population from the total population in a given spatial unit. This was done for both time periods, 1970 and 1980.

In 1980 the U. S. Bureau of the Census increased the number of reported racial categories to five major classes and twelve subclasses. The five classes are, White; Black; American Indian, Eskimo, and Aleut; Asian and Pacific Islanders; and Others.

Changes in the distribution of the black population, in the 32 cities between 1970-80, was analyzed in this part of the study so that a comparison could be made with the national trends revealed by the U. S. Bureau of the Census' analysis (Current Population Report, No. 363, 1980). The Bureau did not analyze changes in the distribution of the non-white segment of the population.

The total central city white population, for the 32 cities in this study was 18,800,427 individuals in 1970. By 1980 this figure had dropped by -21.7 percent to 14,716,278 persons. Of the 30 cities which experienced decreases 26 were substantial, being double digit values. These decreases ranged from a low of - 3.9 percent for Nashville-Davidson, TN to a high of - 42.9 percent for Atlanta, GA.

The two cities which experienced increases in their central city white populations were both located in Region XIII - Pacific Southwest Region. They are Phoenix, AZ and San Diego, CA with 22.2 percent and 7.6 percent increases, respectively.

During this same time period 23 of the cities experienced increases in their black central city populations. The total central city black population, for all the cities being examined, increased from 7,186,790 persons in 1970 to 7,455,471 in 1980. This was a 3.7 percent increase.

Except for San Diego, CA, located in Region XIII - Pacific Southwest Region, cities that experienced decreases in their black populations were located in the mid-western and the northeastern parts of the country. These cities were located in Region I - Atlantic Metropolitan Belt Region, Region III - Lower Great Lakes Region, and Region VII - Central and Eastern Upland Region.

The non-white central city population increased 26.6 percent between 1970-80. Numerically this was an increase from 7,806,784 in 1970 to 9,885,769 in 1980. All 32 cities experienced an increase in the percent of their total central city population which was non-white. But, five of these cities registered a decrease in the absolute number of their non-white residents. These five cities are also found in the group of nine central cities that had decreases in their black populations. They are located in Regions I, III, and VII.

In general there was an increase in the percentage of the total central city work force engaged in white-collar employment during the 1970s. Only two cities out of 32, Boston, MA and New York County (Manhattan), NY, both located in Region I, experienced a percentage decrease. Thirty-one of the 32 cities experienced a decrease in the percent of their

total central city work force engaged in blue-collar employment. The only city to experience an increase was New York County (Manhattan), NY, located in Region I.

Urban Socio-economic Trends During the 1970s

Analysis of 1980 census data has revealed several reversals in the socio-economic trends of previous decades. In general the population in non-metropolitan areas grew more rapidly in the 1970s than the population in metropolitan areas. Only in the South were metropolitan increases greater than non-metropolitan increases. The explanation for this reversal seems to be a combination of the availability of cheaper housing, new employment opportunities, and the attractiveness of these areas to retirees. Nevertheless the population of the United States continues to be urban in nature. In 1980, 73 percent of the 226,500,000 residents resided in metropolitan areas.

In general, central cities experienced a loss in population during the 1970s. They had a greater decrease in white population than they gained in black population resulting in a net loss. The total U. S. population increased 11.4 percent while the black population increased 17 percent during this decade.

The age structure of the population also changed, reflecting the high fertility of the baby boom years with the subsequent low fertility. The 14 year old and younger age group decreased by 11.5 percent between 1970-80.

As a group, only the smaller metropolises grew faster

than in the previous decade. The growth rates in metropolitan areas tended to be inversely related to population size.

"...smaller metropolitan areas generally grew faster than the larger ones during the 1970s, while the metropolitan areas of various sizes had roughly similar growth rates during the 1960's" (Current Population Report, No.363, 1980, p.6). "CPR [Current Population Report] data indicates a continuing increase in the black central-city population and a decrease in the white population" (Current Population Report, No. 363, 1980, p.7). Complete data revealed the same results.

"The 1980 census confirmed the pattern of population redistribution from the North to the South and West that was already evident from intercensal estimates made during the 1970's" (Current Population Report, No. 363, 1980, p.5). The states with the greatest growth rates were located in the South and West. Forty-two percent of this growth occurred in California, Texas, and Florida.

According to Long and DeAres (1980 p.26):

"One of the ironies of the present is that the Nation is still metropolitanizing but only because of population growth in non-metropolitan areas. This paradox results from the fact that all of the increase between 1970 and 1978 in the percent of the population defined as metropolitan is attributed to the growth of nonmetropolitan cities and towns into metropolitan areas and to fusion of other nonmetropolitan counties with existing metropolitan areas."

In the economic sector, 85 percent of the increase in employees during 1972-80 consisted of white-collar and service workers. Blue-collar and sales occupations had a different growth pattern. In the years 1972 to 1976 some

occupational groups in these categories has slight increases while others had decreases. From 1976 to 1980 most occupational groups in these categories registered increases (Current Population Report, No. 363, 1980).

SUMMARY

An analysis of the changes in population in the 32 cities comprising this study revealed that most of those cities located in the major industrial areas of the nation experienced decreases in their total central city population. The opposite trend existed in most of those cities located in the south and the southwest. The total white population for 30 of the 32 cities registered a decrease, while 23 of the cities experienced increases in their total black central city populations. All 32 cities experienced increases in their total non-white central city populations.

Thirty of the 32 cities registered increases in the percent of their total labor force engaged in white-collar employment. During the same time period 31 of the cities experienced decreases in the percent of their total work force engaged in blue-collar employment.

This chapter has presented an overview of the cities, and their economic regions, that are examined in this study. It also discussed some of the general socio-economic trends that have occurred in the United States as a whole, and the study area, during the 1970s. The methodology used in attempting to measure the extent, and causes, of revital-

ization in these major urban areas of the United States are detailed in Chapter IV.

CHAPTER IV

IDENTIFYING URBAN CHARACTERISTICS THAT EXPLAIN PRIVATE-MARKET RESIDENTIAL REVITALIZATION: THE STUDY METHODOLOGY

The primary purpose of this study, as stated in Chapter I, was to determine if the major cities in the United States had experienced a revival of their inner-city neighborhoods during the 1970s. While there has been a growing body of evidence, from numerous studies done on individual cities and neighborhoods, (Chernoff, 1980; Gale, 1980; Goldfield, 1980; Levy and Cybriwsky, 1980; Hodge, 1980; Johnson, 1980) that tends to support this contention few multiple city studies, especially from the approach of geography, have been undertaken. The purpose of this chapter is to describe, in detail, the methodology used to determine the extent of and factors related to revitalization in major cities across the United States.

Method of Determining Revitalization

This research consisted of two parts. First, an attempt was made to determine the amount, or extent, of revitalization that had occurred in the 32 selected cities between 1970 and 1980. A model consisting of five independent variables was used to pinpoint those census tracts that had become revitalized during the decade under consideration. Previous research has shown that specific socio-economic and demographic characteristics are associated with areas that have undergone, or are undergoing, private-market renovation

(Gale, 1980; Hodge, 1980; O'Loughlin and Munski, 1979; Sumka, 1979a). Data for this part of the study was obtained from the U. S. Bureau of the Census' Reports at the census tract level. The five variables used were:

- I. Median Family Income
- II. Educational Attainment
- III. Median Value of Owner-Occupied Housing
- IV. Percentage of Total Work Force Engaged in White Collar Employment
- V. Percent of Total Population that is White

The second part of this research focused on the characteristics, or changes in characteristics, of those cities that had experienced or were experiencing revitalization.

For each city, census tracts in the central city were ranked from high to low based on the five socio-economic variables cited above. The sum of the rankings of each census tract for all five variables was calculated. Each census tract in the central city was again ranked according to its summed ranking among all five variables. Those census tracts that were in the upper quartile of this summed ranked distribution were referred to as 'high status census tracts.' This procedure was followed for all 32 cities.

Initially it was decided that only those census tracts which were in the upper quartile of the distribution, for each of the five independent variables, in each city were to be considered high status tracts. But, in order to avoid the elimination of a tract just because it ranked slightly below the top quartile on one or more of the variables, the upper

quartile of the summed rank of the scores was used.

The use of the upper quartile as the cut off point, while somewhat arbitrary, was based on work done by Lipton (1977). It was felt that if the median was used instead, a slight shift below or above the 50 percent point would be sufficient to reclassify the tract. Lipton felt that, "... a census tract could have a large decrease in the number of upper income families with a corresponding increase in families with incomes just above the median and still be considered a high status tract" (Lipton, 1977, p.141). By using the top quartile, even if there were slight shifts below or above the 75 percent point, one would still be dealing with a group that is in the upper range of the distribution. In this way a more accurate picture of the 'high status' condition of the tract would be established.

The fact that urban renewal programs, under government auspices, were active from 1949 to 1974 must be kept in mind. During this time period over 2,000 urban renewal projects, in approximately 1,250 cities, were funded (Holcomb and Beauregard, 1981). While for the most part urban renewal projects did not accomplish their goals, some tracts designated 'high status' may have been a result of changes brought about by these programs, not private-market forces. The available data does not offer any way that the effects of these government sponsored projects can be identified, at the census tract level, and thus be eliminated from the study so that only private-market revitalization is accounted for. The assumption is being made that, since urban renewal programs

existed only until 1974, most revitalization that occurred in the 1970s has been the result of private-market forces.

Sorting Variables and Rationale for their Selection

In order to determine which tracts were high status in each city, the data for each of the five variables had to be ranked. This was done via a FORTRAN sorting program written by Robert Matson of the Michigan State University Computer Laboratory. Below is a listing of these variables and the rationale for their selection.

I. Median Family Income. This variable was chosen as an indicator of social status. Income is also an indicator of a person's ability to choose, and have greater freedom in choosing, housing locations (Lipton, 1977). While there are restrictions, now illegal, on housing occupancy based on race and ethnicity, studies have shown that income still plays a part in determining where one lives. Income has had a strong influence even in areas where racial and ethnic discrimination determined where certain groups were allowed to settle. The spatial arrangement of ghetto residents, based upon income, is a reflection or microcosm of the city as a whole (Deskins, 1972; Darden, 1974). In Detroit, Deskins found; "... that the internal structure of the segregated Negro subcommunity is similar to the internal neighborhood arrangements found in the white community" (Deskins, 1972, p.110). Similarly Darden's study in Pittsburgh revealed; "As distance from the CBD increase housing values and rent also increase" (Darden, 1974, p.7).

The category median family income of adults living alone or with nonrelatives was not used in this study. It was felt that changes in this figure could be a reflection of changes in the composition or mix of family members to unrelated individuals and not to changes in the income level of the population group as a whole. Therefore, only information aggregated under the category 'median family income all families' was used from the 1970 census data. For 1980 the U. S. Bureau of the Census used the category 'families-median income.'

A cursory look at 1970 census tract data for three randomly selected cities, Seattle, WA; Columbus, OH; and Toledo, OH, revealed census tract(s) in the suburbs which had median values of owner-occupied housing below that of census tracts located in the urban cores of their respective cities. It is thus assumed that those census tracts which met high income status criteria contained families which could afford to live in the suburbs, if they chose to do so, but decided for various reasons to live in the city.

II. Educational attainment is related to social status and is positively correlated with income. It was determined by calculating the percent of the total population in a census tract that had completed four or more years of college. This variable will tend to act as " ... a check of the findings using median income..." (Lipton, 1977, p.139). Studies done on private-market revitalization have indicated that in those cities, where this has occurred, much of the employment base is in professional and white-collar jobs

(Sumka, 1979b; O'Loughlin and Munski, 1979). Many jobs in these categories usually require the attainment of at least some post high school education.

III. The variable 'median value of owner-occupied housing' was chosen as an indicator of central city revitalization because sharp increases in property values usually accompany this process. One of the major advantages to cities experiencing the revitalization of their inner-city areas is the boost that occurs to the tax base as a result of increased property values. This has been underscored by the fact that much renewal activity has been targeted for higher income families. An example is Philadelphia's Society Hill.

Rent, a housing variable used by the U. S. Bureau of the Census, was not used for several reasons. First, rent increases are a function of several factors such as the escalation in maintenance and utility costs, in addition to rises in property taxes. Secondly, private-market revitalization tends to be primarily a result of the actions of residents who own their homes.

IV. White Collar Employment. Those cities in which revitalization is most evident have much of their employment in professional and white-collar jobs. Therefore, the fourth variable to be considered is the percentage of the total work force engaged in this type of employment.

"Customarily occupations are divided into white-collar occupations - professional and technical, managerial, clerical, and sales jobs; blue-collar occupations - craft, operative, and labor jobs; service occupations; and farm

occupations" (Occupational Outlook Handbook, 1982, p.17).

The headings that the U. S. Bureau of the Census' reports used for white-collar employment in 1970 are; 1) professional, technical and kindred workers, 2) managers and administrators, except farm, 3) sales workers, and 4) clerical and kindred workers.

In the 1980 U. S. Bureau of the Census' reports occupational categories were grouped differently from the above. According to the U. S. Bureau of the Census (phone conversation, Hugg, November 7 and 8, 1983) the best comparable measure of white-collar employment is captured under the following two headings; 1) managerial and professional and 2) technical. These two categories cover essentially the same population as the four categories used in 1970.

V. The fifth variable used was the percent of the total population that is white. Studies have indicated that most inner-city resettlers are affluent whites (Gale, 1976; Hodge, 1980).

The above five variables were used to pinpoint those census tracts in which revitalization had occurred. The advantage of using census tract data is that it is readily available, easily accessible, and the collection procedures for obtaining this data are standardized.

The advantage of using the median, as a measure of central tendency, over the mean is that; "... it is not affected by extreme scores and thus is a more representative

measure of central tendency for very skewed distributions" (Kirk, 1978, p.58). Income distributions, for example, tend to be positively skewed. The median, unlike the mean, can also be determined when extreme scores are unknown. The upper end of the highest class interval for median income and median owner-occupied housing values used by the U. S. Bureau of the Census are open ended.

Variables related to housing conditions such as inadequate plumbing were not used. The reason for this decision is based on the fact that the value of even delapidated houses, especially in the later stages of revitalization, appreciate substantially due to speculation. Thus, an area can be undergoing substantial private-market revitalization and, at the time the census data was collected, still have a substantial number of substandard housing units.

"As the pace of revitalization picked up and the future of the neighborhood became more assured, the values of the houses increased substantially. In recent years shells in Boston's South End needing total rehabilitation were selling for as much as \$35,000. Similar prices were evident in Washington, San Francisco, and New York" (Clay, 1979, p.19).

Definition of Terms

Looking at the process of revitalization from a geographic perspective necessitates the use of spatial component(s). The spatial units that were used in this research (Fig. 3) are defined on the following pages.

I. Census Tract

The areal unit of interest, in terms of data collection, for the first part of study was the census tract as defined

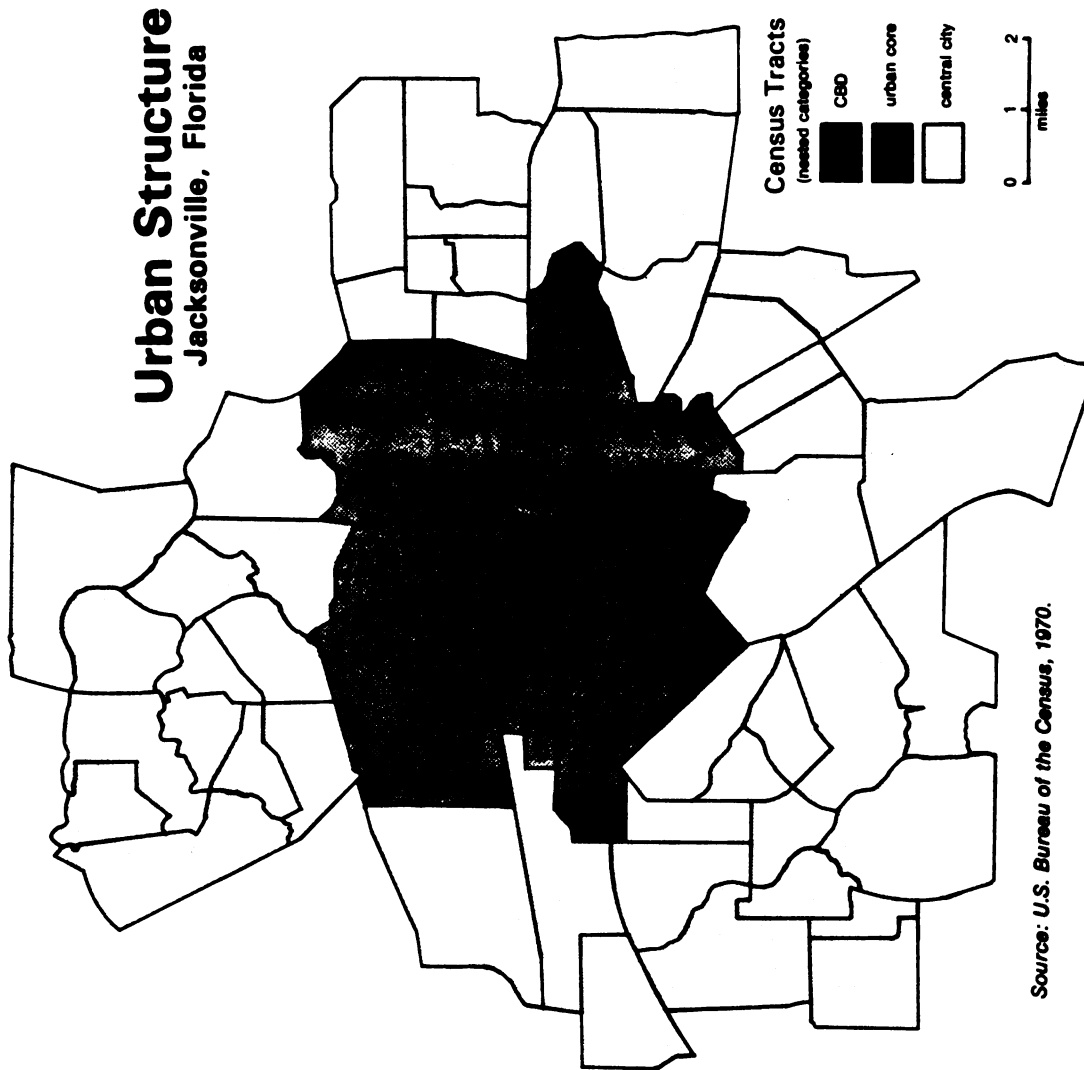


Figure 3

by the U. S. Bureau of the Census for 1970. The census tract was chosen because it was the smallest spatial unit for which the U. S. Bureau of the Census released data for the variables of interest.

Census tracts are small areas into which large cities have been divided. Their boundaries are established with the intention of being maintained over a substantial period of time so that comparisons can be made between censuses.

The tracts are designed to be relatively homogenous in regard to living conditions and socio-economic status. Their population averages about 4,000 residents.

Several adjustments had to be made when compiling tract data. In situations in which a tract had been split or consolidated, in the decade between 1970 and 1980, the tract was eliminated from the study due to the incompatibility of some of the data. For two of the five variables used in the sorting program the median was used. These variables are 'value of owner-occupied housing' and 'family income'. Because the data for these two variables are grouped by the U. S. Bureau of the Census into unequal intervals it was impossible to calculate a median value for those tracts that had been altered.

As a result of the elimination of many tracts in some of the cities under consideration only 32 of the 53 cities with a population of 250,000 or more in 1970 were included in this study. Those cities in which 78 percent or more of their 1970 census tracts had not been changed were used. This percentage value was decided upon in order to be able to include

Washington, D. C., a city that has experienced extensive revitalization activity during the 1970s and continuing into the 1980s.

II. Central Business District

The central business district (CBD) consisted of those contiguous census tracts that the U. S. Bureau of the Census defined as such, for each city examined, in the 1972 Census of Retail Trade.

"Since there were no generally accepted rules for determining what a CBD area should include or exclude, the Census Bureau did not provide rigid specifications for defining the CBD but (1) provided a general characterization of the CBD, describing it as 'an area of very high land valuation; an area characterized by a high concentration of retail businesses, offices, theaters, hotels, and 'service' businesses; and an area of high traffic flow'; and (2) required that the CBD ordinarily should be defined to follow existing tract lines, i.e., to consist of one or more whole census tracts. The emphasis on tract boundaries was based on the fact that census statistics, other than those derived from the census of retail trade, are identified in terms of tract location and therefore, can conveniently be tabulated for CBD's" (Census of Retail Trade, 1972. Part 1, p. vi.).

III. Urban Core

The focus of this study was the urban core. The urban core was defined as the area consisting of all the census tracts within two miles of the border of the CBD, including those tracts which composed the CBD, while still being within the politically defined boundary of the city. Those census tracts that were located partially within and partly outside of the two mile limit were considered as being part of the urban core.

While two miles was a somewhat arbitrary, designation this distance is within a 30 minute walk, or a ten minute ride of the CBD. One of the amenities of living in the city, for the middle and upper classes, is the ease of access to the work place (Gale, 1979; O'Loughlin and Munski, 1979). Lipton felt that this distance "... would be about the limit that someone would live from downtown who felt accessibility to the center to be important" (Lipton, 1977, p.138).

Clay found that;

"Several locational features of gentrification neighborhoods are apparent. The first is the proximity of these neighborhoods to the city's central business district. Half the gentrified neighborhoods are within one mile of the central business district, and most (38 percent of the neighborhoods studied) are within one-half mile of the central business district" (Clay, 1979, p.21).

The tracts composing the urban core were identified by using a mechanical drafting compass, set at the appropriate scale, and taking measurements from the limits of the CBD from the U. S. Bureau of the Census' Census Tracts Maps for 1970 for each city. On those maps where scale was expressed in feet a distance of 10,500' was used in determining this limit. Those maps that had their scale marked in miles a distance of two miles was used.

Tracts that were superscripted by the letter ^P in the 1980 Census were eliminated from this study. A tract so designated is one that is "...Split by the boundary of a place of 10,000 or more" (1980 Census of Housing and Population, ATLANTA, GA., August 1983, p.ix). This means that part of the tract was in another subdivision, and thus

under a different set of influences and policies after the split than before.

Table 4.1 contains a listing of the number of tracts in the urban core of each city and the method used in determining its outer limit.

IV. Central City

The central city was defined as consisting of those census tracts comprising the politically defined central city in 1970. This was done in order to standardize the area of study and to prevent the artificial increase of high status tracts in the central city. It was assumed that any annexation of land to the central city, that may have occurred in the decade between 1970 and 1980, had happened at the periphery. For example, if a tract located in Chevy Chase, MD, an upper-income, prestigious suburb of Washington, D. C., was annexed, the city would have experienced an increase of one high status census tract. This increase would not have been a function of changes in demographics, but merely a function of the change in the political control of a land area of the city.

Use of Census Data

The census data used in this study was taken directly from the appropriate tables of relevant reports. No corrected data was used as this data in some instances would have resulted in computational errors. The U. S. Bureau of the Census, in making corrections in its reports, tended to be lax in following through in making all the changes that would have been necessary so that mathematically correct tables

Table 4.1

<u>Determination of the Urban Core</u>			
City	No. Census Tracts in Urban Core	2 Mile Limit	10,500 ft. Limit
Atlanta, GA	73		X
Baltimore, MD	98		X
Boston, MA	46	X	
Buffalo, NY	41		X
Chicago, IL	64		X
Cleveland, OH	86		X
Jacksonville, FL	25	X	
Kansas City, MO	37		X
Los Angeles, CA	101		X
Long Beach, CA	44		X
Louisville, KY	46	X	
Memphis, TN	36		X
Miami, FL	26		X
Milwaukee, WI	90		X
Minneapolis, MN	74		X
St. Paul, MN	45		X
Nashville-Davidson, TN	36		X
New Orleans, LA	93		X
Kings County (Brooklyn), NY	165		X
New York County (Manhattan), NY	177		X
Newark, NJ	88		X
Norfolk, VA	30		X
Philadelphia, PA	115		X
Phoenix, AZ	27	X	
Pittsburgh, PA	92		X
St. Louis, MO	33		X
San Diego, CA	35		X
Oakland, CA	59		X
San Francisco, CA	87		X
Seattle, WA	42		X
Toledo, OH	44	X	
Washington, D. C.	82		X

would result. A correction would be made in perhaps one entry of a category but changes would not be carried through to the other entries in that category. For example, for census tract 1233, in Table P-1 for Cleveland, OH in 1970, the racial breakdown is as follows;

All persons	747
White	745
Negro	--
Percent Negro	--

The "Correction Note" indicates that the entry for "All Persons" should be 723, not 747. No adjustments were indicated for 'Whites' or 'Negroes'. Mathematically this situation cannot exist since it is impossible to have a component of a set, in this case 'White', larger than the sum of the parts. The researcher had no way of determining what the true values of the uncorrected entries were. Thus, for consistency, the values as found in the published tables were used as is. The corrections that had been made by the Census Bureau were, for the most part, minor.

Sorting Procedure for Flagging Revitalized Census Tracts

For each city in the study, a list was compiled of all the census tracts in the central city in 1970 and 1980. Several adjustments were made in order that the central city for both time periods was identical. The Tract Comparability Table for the 1980 Census of Population and Housing, for each city in the study was consulted. Tract equivalents, as per this table, were used even if inspection of the respective census tract maps were in conflict. 1970 tracts that were split into two or more tracts in 1980 were eliminated from

the study. Those tracts that did not exist in 1970 but were created for the 1980 Census were also eliminated.

The sorting program ranked all five variables for each city in the study individually. The ranks across all five variables for each census tract were summed. Those census tracts in the upper quartile of the distribution of summed rankings were marked by the sorting program with an asterisk. A sample print out is provided in Appendix D. These marked census tracts were called High Status Census Tracts. Data for each city, for the five variables, was sorted for the two time periods, 1970 and 1980.

The tracts of interest in this study were those High Status Census Tracts that were located in the urban core of each city. A comparison was made, for each city, of the number of High Status Census Tracts located in the urban core in 1970 and 1980. The percentage increase or decrease between 1970 and 1980 was calculated as follows:¹

$$\% \text{ Change} = \frac{\begin{array}{c} \# \text{ 1980 H.S.C.T.} \\ \text{in U.C.} \end{array} - \begin{array}{c} \# \text{ 1970 H.S.C.T.} \\ \text{in U.C.} \end{array}}{\begin{array}{c} \# \text{ 1970 H.S.C.T.} \\ \text{in U.C.} \end{array}} \times 100$$

The calculated urban core percentage change in the High Status Census Tracts in each city was used as the dependent variable in the regression analysis in the second part of the study.

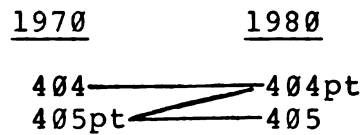
¹ H.S.C.T = High Status Census Tract
U.C. = Urban Core

Urban Characteristics that Explain Revitalization

Whereas the first part of this research attempted to detect how much revitalization had, occurred the second part attempted to determine the characteristics of those cities that had experienced revitalization and what variables helped explain the rate of revitalization that had occurred. In compiling the data for this second phase, it was possible to combine tracts that were split in 1980 in order to get the equivalent 1970 tract. This was possible because the characteristics of spatial units larger than census tracts were being examined. These included the urban core, the central city and its SMSA. The data values were such that they could be determined by the addition of those values in the specific census tracts comprising the larger spatial unit(s). The median values that were used were not census tract specific. Thus some of the census tracts that had to be eliminated for the sorting programs could and were included in this part of the research if their equivalents for 1970 and 1980 were available.

Where part of a tract is indicated as a component of another tract, the tract is used only when all the parts in 1980 equal the whole tract as defined in 1970. For example, census tract 404 in 1980, in Boston, MA, consisted of 1970's census tract 404 and part of census tract 405. Tract 404 could be used because the rest of census tract 405 was also a component of the central city or urban core, whatever the case maybe.

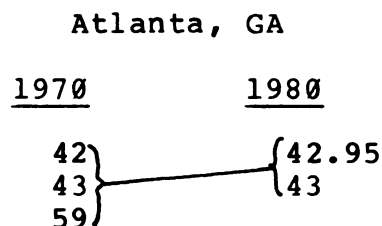
Boston, MA



Where the symbol 'pt' is used it indicates that part of the indicated census tract is a component of those tract(s) to which a connecting line has been drawn. The sum of the indicated parts, which are connected, constitutes equivalent spatial areas. Tract 404 in 1980 is equivalent to part of tract 405 in 1970 and the whole of tract 404 in 1970. Tract 405 in 1970 is part of tract 404 and part of 405 in 1980. In other words the combined areas of tracts 404 and 405 in 1970, in Boston, MA, is the same as the combined areas of tracts 404 and 405 in 1980.

Brackets are used to indicate those tracts that have been combined in one time period that equal a different combination of tracts in the other time period. A line is drawn to their spatial equivalent in the other time period.

In the example given below, for Atlanta, GA, census tracts 42, 43, and 59 in 1970 have been combined to form census tracts 42.95 and 43 in 1980.



In both time periods the indicated spatial area is the same. No census tract was used unless all its components were used.

Appendix E contains a listing, by city, of tract comparability between the 1970 and 1980 U. S. Census.

A review of the literature has revealed 30 variables, grouped into six categories, which have had a bearing on revitalization. The capital letters in parenthesis, after the variable number, are the codes for the respective variables. These variables, used in the factor analysis and subsequent regression analysis, and the rationale for choosing them are as follows:

A. One of the amenities of living in the city is the convenience of being close to one's place of employment (Gale, 1979). Studies (Sumka, 1979; O'Loughlin and Munski, 1979) have shown that cities in which revitalization is most evident have much of their employment base in professional and white-collar jobs. The variables used to measure the level of administrative activity are:

Variable 1 (PERWC) - The percentage of the total central city work force engaged in white collar employment in 1980. This figure was obtained from Table P-10 of the 1980 Census of Population and Housing by totaling the data in the following categories for the central city; 1) managerial and professional specialty occupations and 2) technical, sales, and administrative support occupations This value was divided by the central city total given for 'Employed persons 16 years and over' and the results were multiplied by 100.

Variable 2 (CHANWC) - Change in the percent of the total central city work force engaged in white collar employment between 1970 and 1980. The percent of the 1970 total central

city work engaged in white collar employment was calculated by summing the values given in Table P-3 of the 1970 Census of Population and Housing, for a specific city, in the following categories; 1) professional, technical and kindred workers, 2) managers and administrators, 3) sales workers, and 3) clerical and kindred workers. This value was divided by the central city total for 'Total employed, 16 years and over', and then multiplied by 100. This value was then subtracted from the value obtained for Variable 1, for each city, resulting in the value of Variable 2.

B. Manufacturing Activity; It was expected that the level of manufacturing activity would be inversely associated with the level of revitalization.

"Manufacturing has been moving to the fringe of urban centers. These plants may be followed by the urban externalities from which the middle class fled. If this happens, why move to the suburbs" (Lipton, 1977, p.147)?

Manufacturing activity was measured by the following variables:

Variable 3 (PERBC) - The percent of the 1980 total central city work force engaged in blue-collar employment. This value was obtained by summing the values of two categories in Table P-10 of the 1980 Census of Population and Housing and dividing this sum by the central city total given for 'Employed persons 16 years and over.' The resulting quotient was multiplied by 100. The categories are as follows; 1) precision production, craft, and repair occupations and 2) operators, fabricators, and laborers.

Variable 4 (CHANBC) - Change in the percent of total central city work force engaged in blue-collar employment between 1970 and 1980. The percent of the 1970 total central city work force engaged in blue-collar employment was calculated by first summing the values given in Table P-3 for the following categories (phone conversation, Priere, August 9, 1985); 1) craftsmen, foremen and kindred workers, 2) operatives, except transportation, 3) transport equipment operatives, and 4) laborers, except farm. This sum was divided by the central city total for 'Total employed, 16 years and over' and then multiplied by 100. The results of the above computations were subtracted from the value of Variable 3 yielding the value for Variable 4.

Variable 5 (VALADD) - Value added by manufacturers (million dollars) in the central city. Value added is a measure of the manufacturing activity of an area and/or industry. It "... is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas" (1977 Census of Manufacturers - Geographic Area Series, p.7). Data for this variable was obtained from the 1977 Census of Manufacturers. Geographic Area Statistics, General Summary.

Variable 6 (CAPEXP) - New capital expenditures incurred by manufacturers (million dollars) in the central city. New capital expenditures are a measure of industrial growth. It includes; "... expenditures for (1) permanent additions and major alterations to manufacturing establishments, and (2) new machinery and equipment used for replacement and

additions to plant capacity if they are the type for which depreciation accounts are ordinarily maintained" (1977 Census of Manufacturers - Geographic Area Series, p.8). This data was obtained from the 1977 Census of Manufacturers. Geographic Area Statistics, General Summary.

The data for New Capital Expenditures Incurred by Manufacturers for St. Louis, MO was suppressed by the U. S. Bureau of the Census. Since the Pearson product-moment correlation between New Capital Expenditures Incurred by Manufacturers and Value Added by Manufacturers was $r = 0.9687$ for the remaining 31 cities in the study an estimated value for St. Louis, MO was derived by calculating the ratio between the sums of the two variables, for the 31 cities. This ratio was then used to determine an estimated value for New Capital Expenditures Incurred by Manufacturers for St. Louis, MO from the given value for Value Added by Manufacturers.

C. Accessibility to the place of employment. One major reason cited by resettlers for moving into inner-city neighborhoods is the convenience of being close to work (Gale, 1979; Clay, 1979). The length of the commuting distance to the CBD was used to measure accessibility. This researcher realizes that commuting distance does not necessarily refer to linear distance, but to commuting time. Nevertheless, linear distance was the most readily obtainable measurement. Because commuting distances in an urbanized area are not equal in every direction, three different types of measurements were made for each city.

Variable 7 (LONGDIS) - The longest distance from the CBD to the urban fringe. The urban fringe is indicated on maps in the Metropolitan Map Series 1970 Census of Housing Block Statistics. The urban fringe is the outermost edge of the built up area surrounding the central city. The urban fringe, as it existed in 1970 was used, rather than its 1980 extent, because it was felt that one of the forces encouraging revitalization was accessibility to the place of employment (Gale, 1979; Clay, 1979). Thus lack of accessibility in 1970 would have tended to encourage revitalization during the 1970s. The situation as it existed in 1980 would perhaps have an effect on the process in the 1980s, but would be irrelevant for this study.

The shapes of the CBD's for each city varied. In general the intersection of the longest and shortest axis of the figure formed by the census tracts comprising the CBD, that fell within the boundaries of the CBD, was considered the center. If the shape of the CBD was highly irregular then an approximate center was estimated visually.

The urbanized area is indicated on the Census Bureau's maps by a broad gray line approximately 1/4" in width. The outer edge of this line was used to delineate the urbanized area. The decision to use the outer edge was based on the fact that if a street ran along this boundary it was indicated by a thin line located along the outer edge. Distance was calculated to the nearest whole mile.

The maps in the Metropolitan Map Series consisted of numerous sections on individual sheets. The number varied

from 16 sheets for the MEMPHIS, TENN-MISS. URBANIZED AREA to 167 sheets for the NEW YORK, N.Y.-NORTHEASTERN NEW JERSEY URBANIZED AREA. Except as noted in the following list, all measurements were taken from a composite map of the city. As a result of the distortions inherent in joining together numerous sheets of paper, the resulting measurements can only be considered estimates.

For several cities distance measurements were taken off the smaller Index to Sheets map, supplied with each set, rather than off the larger composite map. This was done for one of several reasons: 1) Map sheets were missing in the Michigan State University Library Government Documents Collection. 2) The urbanized area consisted of too many sheets and it was impractical to attach the sheets to form a composite map. Each sheet was approximately 22" long and 17" wide. 3) In some cases, such as Boston, MA, the CBD was located on an inset sheet that had a different scale than the rest of the map sheets in the set. Cities from which measurements were taken off the Index to Sheets map were:

Boston, MA
Chicago, IL
Los Angeles, CA
Long Beach, CA
Pittsburgh, PA
San Francisco, CA

Variable 8 (SHORTDIS) - The shortest distance from the center of the CBD to the inner-most boundary of the urbanized area. This variable was obtained in a similar manner as the previous variable. The difference being that the measurement

was made from the center of the CBD to the nearest boundary of the urbanized area.

In most cases, for variables 7 and 8, two measurements were made and the average of this values was used. All distances were calculated as straight line distances.

Variable 9 (AVERDIS) - The average distance from the center of the CBD to the edge of the urbanized area. This was calculated by taking the number of square miles of the urbanized area and computing the radius of a circle that had the same area. The value of the radius was the value of interest.

D. Population Characteristics. The Urban Land Institutes' study (Black, 1975) indicated that revitalization was occurring to a greater extent in the more populous cities. Studies have also indicated that as revitalization in an area progresses the racial characteristics and population density of the neighborhood change. "Whereas half these neighborhoods before gentrification were dominated by whites and half by nonwhites, 82 percent of the gentrified neighborhoods are dominated by whites and only 2 percent of the neighborhoods by nonwhites" (Clay, 1979, p.20). Variables related to population that were used were:

Variable 10 (TOTPOP) - Total central city population in 1980.

Variable 11 (CHTOTPOP) - The change in the total central city population between 1970 and 1980.

Variables 10 and 11 are self-explanatory.

Variable 12 (POPUC) - Total population of the urban core

in 1980. This is the sum of the 1980 population in the census tracts that comprised the urban core.

Variable 13 (CHPOPUC) - Change in the total population of the urban core between 1970 and 1980. This variable was calculated by determining the total urban core population in 1970 and subtracting this value from variable 12. The 1970 urban core population was obtained by summing the 1970 population in the urban core census tracts.

Variable 14 (PCCPUC) - The percent of the 1980 total central city population that resides in the urban core. The 1980 urban core population, for a specific city, was divided by that city's total 1980 central city population and the quotient was multiplied by 100.

Variable 15 (CHPCCPUC) - Change in the percent of the total central city population residing in the urban core between 1970 and 1980. As gentrification progresses the population density of the area in which it is occurring tends to decrease (Clay, 1979). The percent of the total central city population living in the urban core in 1970 was calculated in the same way as variable 14. This value was subtracted from the value of variable 14 to yield variable 15.

Variable 16 (NWCCPOP) - Total non-white central city population in 1980. The total 1980 central city white population was subtracted from the 1980 total central city population in order to obtain the 1980 total non-white central city population.

Variable 17 (CHNWCPOP) - The change in the total non-white central city population between 1970 and 1980. The

1970 total central city non-white population, calculated in the same manner as variable 16 was calculated, was subtracted from the 1980 value.

Variable 18 (NWUCPOP) - Total non-white urban core population in 1980. The 1980 values for the non-white population of the urban core census tracts were summed.

Variable 19 (CHNWUPOP) - Change in the total non-white urban core population between 1970 and 1980. The 1970 total non-white population of those census tracts comprising the urban core were summed. This value was subtracted from the 1980 total non-white urban core population yielding the 1970-80 change.

Variable 20 (PNWCCPOP) - The percent of the total central city population that was non-white in 1980. The 1980 non-white central city population was divided by the total central city population and this quotient was multiplied by 100.

Variable 21 (CHNWPOP) - Change in the percent of the total central city population which was non-white between 1970 and 1980. The percent of the 1970 total central city population that was non-white was subtracted from the value of variable 20.

Variable 22 (PNWUCPOP) - The percent of the 1980 urban core population that was non-white. The 1980 non-white urban core population was divided by the 1980 total urban core population. This value was then multiplied by 100.

Variable 23 (PCHNWUP) - The change in the percent of the urban core population which is non-white between 1970-80. The

percent of the urban core population which was non-white in 1970 was subtracted from the percent of the 1980 urban core population that was non-white. This difference was the percentage change.

E. Housing Characteristics. There are various reasons that explain the revitalization movement of the 1970s. One factor is the availability of houses and neighborhoods with historic and/or architectural significance. Houses of this nature tend to be attractive to young middle class urbanites.

"The price of housing in recent years has escalated sharply. In 1970 about half the population could afford the average new home, which was priced at less than \$30,000. By 1977 the average new home cost more than \$44,000 and was affordable by only a quarter of American households. The cost of existing housing has also increased but not as drastically. In many of the large cities prices are still in the \$20,000 to \$30,000 range for housing in standard condition, and houses that need work are often available for less. Older homes sometimes offer more land, style, interior space, and individuality than affordable new housing" (Clay, 1979, p.15).

Travis (1973) found that middle class whites moved into inner-city neighborhoods for two reasons. First, was the availability of cheaper housing easily accessible to the CBD. Second, was the attraction of older historic buildings (O'Loughlin and Munski, 1979). The following variables concerned with housing were used:

Variable 24 (HOUSEVAL) - 1980 median owner-occupied housing value in the central city. This value was obtained directly from Table H-1, 1980 Census of Population and Housing.

Variable 25 (CHHOUVAL) - Change in the median owner-occupied housing value in the central city between 1970-80. This value was obtained by subtracting the 1970 value, obtained from Table H-1 of the 1970 Census of Population and Housing, from the 1980 value.

Variable 26 (HOUSMSA) - 1980 median owner-occupied housing value in the SMSA. This value was obtained directly from Table H-1 of the 1980 Census of Population and Housing.

Variable 27 (CHHOUSMA) - Change in the median owner-occupied housing value in the SMSA between 1970 and 1980. This variable was obtained by subtracting the 1970 value, obtained from Table H-1 of the 1970 Census of Population and Housing, from the value for variable 26.

Variable 28 (A1939) - The percent of all-year housing units in the urban core built on or before 1939. This variable was calculated by taking the sum of all the 1970 all-year housing units in the urban core census tracts that were built, on or before 1939, and calculating what percent this was of the total number of 1970 all-year housing units in the urban core.

F. Family Characteristics. Family size, changing life styles, and family needs have also had their influence upon revitalization. More people are marrying later, and when they do, they are having fewer children. "... demographic shifts which tend to favor central city housing locations. Possibly the most significant change in this area is the increase in adult-only households, including families with no children and single persons living alone or with nonrelatives" (Urban

Land Institute Report #25, 1976, p.9). The following variables dealing with family size were used:

Variable 29 (PERCHILD) - The percent of the total number of families in the urban core that had children under 18 years of age. Data for the number of families, in each census tract of the urban core were summed, as were the number of families with children under 18 years of age in these tracts. The percentage of total families with children under 18 years old was calculated by dividing the number of families with children under 18 years old in the urban core by the total number of families in the urban core. This figure was then multiplied by 100 to yield a percentage.

Variable 30 (CHCHILD) - The change in the percentage of total families in the urban core that had children under 18 years of age between 1970 and 1980. The percentage of families in the urban core who had children under 18 years of age in 1970 was calculated in the same manner as variable 35. This value was subtracted from variable 35 to yield the value for variable 36.

Statistical Methods Used in the Analysis of the Data

Chi Square Test

The chi square test (χ^2) was used to determine if any change in the amount of revitalization, within each city and between the time periods under consideration, were statistically significant. Chi square is a statistical test; "... that can be used whenever we wish to evaluate whether or not frequencies which have been empirically obtained differ

significantly from those which would be expected under a set of theoretical assumptions" (Blalock, 1979, p.279).

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

O_i = the observed frequency of high status census tracts in city i .

E_i = the expected frequency of high status census tracts in city i . The expected frequencies of high status census tracts in 1980 is equal to the number of such tracts identified in city i in 1970.

Degrees of freedom; $df = k-1$

k = the number of categories.

$H_0: O_i = E_i$; The null hypothesis (H_0) is that there has been no change in the number of high status census tracts in the urban core of each city between 1970 and 1980.

$H_1: O_i > E_i$; The alternative hypothesis (H_1) is that there has been an increase in the number of high status census tracts in the urban core of each city between 1970 and 1980.

The level of significance for this, and all statistical tests done in this study, was $\alpha = 0.05$. This level of significance is in keeping with convention as regards statistical tests applied to studies in the social sciences.²

²All hand computations in this study were done on a Hewlett-Packard HP-32E calculator rounded to the first or second decimal place. Computed values using U. S. Bureau of

Factor Analysis

In order to reduce the number of variables, and to insure the independence of these variables, factor analysis on the original 30 variables was carried out. "Factor analysis refers to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical variables" (Kim and Mueller, 1978, p.9). The assumption is that there are some underlying factors, fewer in number, than the observed variables which are responsible for the covariance among the observed variables. Common or classical factor analysis assumes that the observed variables are influenced by, shared or common determinants, and that part is influenced by unique determinants. The unique part of a variable does not contribute to the relationship among the variables. "The basic factor postulate assumes the existence of residual variance, which is not accounted for by the common factors and does not contribute to the inter-correlations of the variables" (Nie, Hull, et. al., 1975, p.472).

The method of factor analysis initially used in this study was principal factoring with iteration (PA2 from the SPSS program package). "At present this is the most widely accepted factoring method" (Nie, Hull et. al., 1975, p.480).

The R-mode experimental design was used in order to obtain factor scores for the regression analysis. In the R-mode design, factor loadings are obtained for variables and

the Census' data was rounded to the first decimal place as per the Bureau's published tables.

factor scores are obtained for locations. In this study the locations were the 32 cities being examined.

The number of initial factors extracted was determined by using a rule-of-thumb criteria known as the Kaiser or eigenvalue criteria. Those factors with eigenvalues equal to or greater than 1 were extracted (Kim and Mueller, 1978).

To achieve the simplest possible factor structure the factor matrix was rotated orthogonally. The method of rotation used is called VARIMAX. VARIMAX rotation tends to give a clearer separation than does QUARTIMAX or EQUIMAX, the other two alternative methods of orthogonal rotation available in SPSS (Kim and Mueller, 1978). This results in more high and low loadings and fewer moderate loadings than that obtained with the unrotated matrix. "... no method of rotation improves the degree of fit between the data and the factor structure. Any rotated solution explains exactly as much covariance in the data as the initial solution" (Kim and Mueller, 1978, p.7). The reason for the rotation is to enable one to more easily interpret the factors.

Regression Analysis

Regression analysis was used in order to determine the characteristics, or changes in characteristics, of those cities that had experienced revitalization. The dependent variable in the regression equation was the percentage change in the number of high status tracts, located in the urban core of the cities in the study, in the decade between 1970 and 1980. The independent variables consisted of the factor

scores, on each city, that were derived from the factor analysis.

The form of the regression equation is;

$$Y = a + b_i X_i + e$$

Y = the dependent variable.

a = the Y intercept.

b = the amount of contribution of 1 unit increase of X_i causing a variation in the dependent variable.

X = factor scores on the derived factors. These factor scores are 'independent variables.'

e = error term.

Conclusion

This chapter detailed the methodology used in this study to determine the extent of, and factors related to, revitalization. The next chapter, Chapter V, presents the results of the above analysis. Chapter VI discusses the implications of these results and areas for further study.

CHAPTER V

DATA ANALYSIS

The primary purpose of this study is to determine if during the 1970's the centers of the major cities in the United States have had an increase in the number of middle and upper-class neighborhoods. There is a growing amount of evidence to suggest the inappropriateness of the idea of the central city as a residential site for those persons who are financially able to live elsewhere. The questions that are posed are;

1. What is the extent of revitalization that has taken place in the cities in this study during the time period 1970-80?

2. What are the characteristics, or changes in characteristics of those cities that have experienced revitalization?

Chi Square Results

The chi square (χ^2) test was used to determine if any change in the amount of revitalization, within the cities, and between the time period under consideration, was statistically significant. The indicator used to measure revitalization was the percentage change in the number of high status tracts in the urban core between 1970-80.

The expected values, (E_i), of the number of high status census tracts in the urban core of each city were the number of such census tracts that existed in 1970. The observed, (O_i), 1980 values for the cities were the actual number of

1980 high status census tracts that were obtained from the summed ranking procedure, for each city, as outlined earlier.

The null hypothesis states that there is no change in the number of high status census tracts in the urban core between 1970 and 1980. Mathematically the test is expressed as:

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

$$H_0: O_i = E_i$$

$$\alpha = 0.05$$

$$H_1: O_i > E_i$$

As a general rule the chi square test should not be applied when expected frequencies, in this instance census tracts, in 20% of the cells of the contingency table are less than 5 (Taylor, 1977). Ten of the 29 cities, or 34% of the cells, had less than five census tracts per cell. In order to overcome this problem the 29 cities were grouped using the Economic Regionalization Scheme of Bogue and Beale(1961). Their scheme, rather than the nine geographic divisions currently being used by the U. S. Bureau of the Census, was used for the following reasons:

1. It is a finer system of regionalization consisting of 13 regions.

2. It is more current than the U. S. Bureau of the Census' geographic division.

The individual cities, in their respective regions, and their observed and expected frequencies are given in Table 5.1.

The chi square calculation is given below:

$$\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

$$H_0: O_i = E_i \quad df = K-1 = 8$$

$$H_1: O_i > E_i \quad \alpha = 0.05$$

$$\text{critical } \chi^2 = 15.51$$

$$\text{calculated } \chi^2 = 18.93$$

Reject H_0

The null hypothesis of no change or growth in revitalized census tracts in the 1970's is rejected. It seems that the centers of selected major United States cities have had a statistically significant increase in the number of middle and upper-class census tracts during the 1970s.

Not all the cities examined showed an increase in high status tracts. Los Angeles, Memphis, Miami, Norfolk, Phoenix, San Diego, and Oakland showed no change. One city, Milwaukee, even recorded a decrease during this time period. It appears that the amount of increase was sufficient enough to call into question the assumption of the inevitable, and seemingly irreversible, decline of the urban cores of major U. S. cities.

Table 5.1

Observed and Expected Freq. of High Status Census Tracts

I. Atlantic Metropolitan Belt Region

	Observed (1980)	Expected (1970)
Baltimore, MD	8	4
Boston, MA	17	8
Kings County (Brooklyn), NY	18	8
New York County (Manhattan), NY	69	67
Newark, NJ	19	17
Norfolk, VA	5	5
Philadelphia, PA	19	9
Washington, D. C.	23	20
	<u>178</u>	<u>138</u>

II. Eastern Great Lakes and Northeastern Uplands Region

Buffalo, NY	$\frac{6}{6}$	$\frac{5}{5}$
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III. Lower Great Lakes Region

Pittsburgh, PA	8	7
Cleveland, OH	3	2
Chicago, IL	15	10
Milwaukee, WI	5	6
	<u>31</u>	<u>25</u>

IV. Upper Great Lakes Region

Minneapolis, MN	9	6
St. Paul, MN	3	2
	<u>12</u>	<u>8</u>

VII. Central and Eastern Upland Region

Nashville-Davidson, TN	4	2
Louisville, KY	4	3
	<u>8</u>	<u>5</u>

VIII. Southeast Coastal Plain and Piedmont Region

Atlanta, GA	12	10
Memphis, TN	2	2
	<u>14</u>	<u>12</u>

IX. Gulf Coast and Atlantic Flatwoods Regions

Miami, FL	6	6
Jacksonville, FL	4	3
New Orleans, LA	<u>14</u>	<u>11</u>
	24	20

XII. Pacific Northwest Region

Seattle, WA	<u>11</u>	<u>9</u>
	11	9

XIII. Pacific Southwest Region

Phoenix, AZ	2	2
Los Angeles, CA	1	1
Long Beach, CA	7	6
San Diego, CA	2	2
San Francisco, CA	24	21
Oakland, CA	<u>16</u>	<u>16</u>
	52	48

Factor Analysis And Regression Analysis

The statistical procedure used in an attempt to answer the second question, which concerns itself with the characteristics or changes in characteristics of those cities which have experienced revitalization, is regression analysis. In order to reduce the number of variables, and to insure the independence of these variables, factor analysis on the original 30 variables was done. "Factor analysis refers to a variety of statistical techniques whose common objective is to represent a set of variables in terms of a smaller number of hypothetical variables." (Kim and Muller, Intro. to Factor Analysis:..., 1978,p.9). Common or classical factor analysis assumes that the observed variables are influenced by shared or common determinants, and that part is influenced by unique determinants. The unique part of a variable does not contribute to the relationship among the variables. "The basic factor postulate assumes the existence of residual variance, which is not accounted for by the common factors and does not contribute to the intercorrelations of the variables." (Nie, Hull et. al., SPSS: Statistical Package..., 1975, p.472).

Factor analysis was chosen over principle component analysis because it was felt that the latter, being a closed model, is unrealistic and forms a poor basis in which to try to describe reality. Principle component analysis assumes that all the variance is accounted for by the given variables. Thus, while it makes for a `neat` analysis, this situation is unlikely to exist in reality. "As a theoretical

tool, the model is severely hampered by its unrealistic assumptions." (Taylor, 1977, p.243).

The results obtained from the factor analysis, or in SPSS terminology, principle factoring with iterations (PA2), were meaningless. The program ran but, the the output had to be discounted because the correlation matrix was singular. A statement on the print-out indicated that the 'original correlation matrix is not invertible'. It also indicated that factor scores were not able to be computed. See Appendix F, Table F.1.

Philosophically common factor analysis would normally be the procedure of choice. But, since the results obtained using this method were meaningless the same data was subjected to principle component analysis (principle factoring without iterations, PA1). Using Varimax rotation, a rotated matrix of meaningful factor loadings was obtained with eigenvalues of 1.000 or greater. Seven factors were extracted. Upon inspection it was decided that the seventh factor should be eliminated because the variable mix with high loadings was not interpretable. A second run with the same data specified that six factors were to be extracted and the final matrix rotated. The results of the rotated matrix for this run is given in Appendix F, Table F.2.

Factor loadings are correlation coefficients between a factor and a given variable. The higher the factor loading the more highly correlated are the factor and the variable, and vice versa. By examining the 'mix' of variables that load highly on a particular factor, an attempt is made to inter-

prete the factor and usually a descriptive name is given to the factor.

The six extracted factors and their variables with high loadings are given in Table 5.2.

Factors 1, 2, 4, and 6 have loadings on variable combinations that enable them to be interpreted. Factor 1 is labeled Residential Growth. The variables that have high positive loadings on this factor measure housing and population characteristics. Factor 2 called Industrial and Minority Growth, has high loadings on variables concerned primarily with industrial growth and non-white population changes. Factor 3, called the Yuppies' factor, has a high positive loading on the percent of the total work force that was in white collar employment in 1980. It also has high negative loadings on the percent of the total work force in blue collar employment in 1980 and the percent of urban core families that had children under 18 years old in 1980. Factor 6, labeled 1980 Non-White Population has only two high loadings both of which relate to the 1980 non-white population. The variable mixes on Factors 3 and 5 with high loadings do not lend themselves readily to interpretation and hence were not named.

The factor scores that were generated by the principle component analysis were used as the independent variables in the regression analysis. The six factors contained 79.8 percent of the variance, or information, that was contained in the original 30 variables.

Table 5.2

Principle Component Analysis - Data from 29 Cities
Six Factors Extracted - Varimax Rotation

Factor 1 - Residential Growth

<u>Variable</u>	<u>Loading</u>
CHNWPOP	0.69296
PCHNWUP	0.71136
CHCHILD	0.75731
HOUSVAL	0.68786
CHHOUVAL	0.73370
HOUSMAS	0.89091
CHOUSMA	0.88465

Factor 2 - Industrial and Minority Growth

VALADD	0.85572
CAPEXP	0.90271
TOTPOP	0.92823
PCCPUC	- 0.67142
NWCCPOP	0.87125
CHNWCPOP	0.83201

Factor 3

CHANBC	0.68587
SHORTDIS	0.75847
POPUC	0.84171

Factor 4 - Yuppies

PERWC	0.89734
PERBC	- 0.92799
PERCHILD	- 0.77363

Factor 5

CHTOTPOP	0.78405
CHPOPUC	0.66810
A1939	- 0.75299

Factor 6 - 1980 Non-White Population

PNWCCPOP	0.77644
PNWUCPOP	0.87970

Initially the dependent variable, used in the regression analysis, was defined as the percentage change in the number of high status census tracts found in the urban core between 1970 and 1980. Of the original 32 cities in the study three, namely Kansas City, MO, St. Louis, MO, and Toledo, OH, had to be eliminated at this stage of the analysis. The reason for this was that these cities had no high status census tracts in their urban cores in 1970. In division, when the value of the denominator is zero the quotient is mathematically undefined. In the calculation of the dependent variable the number of 1970 high status tracts, in the city of interest, is divided into the difference in the number of high status census tracts between 1970-80 in the urban core. Table 5.3 gives a listing of the 29 cities and their dependent variable.

Stepwise regression analysis was done on the remaining 29 cities in the study. In a stepwise regression analysis the factors, from best to worst in explanatory value, are entered into the regression equation one at a time, provided that certain established statistical criteria are met. The variable, or in this case factor, that explains the greatest amount of variance in the dependent variable is entered first. At the next step in the process, the factor not yet in the equation that explains the greatest amount of the remaining variance, in conjunction with the factor already in the equation, is entered into the formula. This process is repeated until the statistical criteria for inclusion are not met. At each step in the construction of the final equation

Table 5.3

Dependent Variable I

Percentage change in the number of urban core census tracts
that are high status - 1970-80.

<u>City</u>	<u>Percent Change</u>
Atlanta, GA	20.0%
Baltimore, MD	100.0
Boston, MA	112.5
Buffalo, NY	20.0
Chicago, IL	50.0
Cleveland, OH	50.0
Jacksonville, FL	33.3
Los Angeles, CA	0.0
Long Beach, Ca	16.7
Louisville, KY	33.3
Memphis, TN	0.0
Miami, FL	0.0
Milwaukee, WI	- 16.7
Minneapolis, MN	50.0
St. Paul, MN	50.0
Nashville-Davidson, TN	100.0
New Orleans, LA	27.3
Kings County (Brooklyn), NY	125.0
New York County (Manhattan), NY	3.0
Newark, NJ	11.8
Norfolk, VA	0.0
Philadelphia, PA	111.1
Phoenix, AZ	0.0
Pittsburgh, PA	14.3
San Diego, CA	0.0
Oakland, CA	0.0
San Francisco, CA	14.3
Seattle, WA	22.2
Washington, D. C.	15.0

factors are deleted which no longer meet the statistical criteria for inclusion. The SPSS default values for inclusion and deletion were used. This allowed for the most complete regression output. Appendix F, Table F.3 contains a copy of this output.

The program entered all six factors into the equation in the following sequence; Factors 5, 1, 2, 6, 3, and 4. While the equation as a whole was significant, at $\alpha = 0.036$, the factors comprising the equation did not yield any descriptive explanation. Five of the six factors in the equation were not statistically significant at $\alpha = 0.05$. The one factor, Factor 5, that was statistically significant, $\alpha = 0.004$, was entered into the equation on Step 1 of the regression run. This factor was uninterpretable.

If it was felt that perhaps the dependent variable as defined was not measuring revitalization accurately. Using the present definition, Dependent Variable I, it is conceivable that a city which had a few high status census tracts in 1970 and had a small increase in the number of such tracts by 1980 could register a large percentage increase. Conversely a city that had a large number of high status census tracts in its urban core in 1970, with a substantial increase in such tracts between 1970 and 1980, could register a smaller percentage increase than that portrayed in the previous scenario. The reality is that the greater amount of change had taken place in the second city than in the first but was hidden because of the relative magnitude of the urban size.

Perhaps this can be made clearer by use of the following example. If City i had two high status tracts in its urban core in 1970 and four in 1980 it experienced an increase of 100%. If City y had 10 high status tracts in its urban core in 1970 and 15 in 1980 it had only a 50 percent increase. While the percentage increase is less in City y than in City i, City y has undergone a greater total amount of change in terms of spatial units.

In the defining of the dependent variable in this part of the study three cities were eliminated because of mathematical considerations. They had no urban core high status census tracts in 1970, but of the three, two had one urban core high status census tract in 1980. If the dependent variable did indeed measure revitalization, these two cities had to be ignored even though, in reality, the phenomenon had occurred here.

In an attempt to more realistically quantify revitalization, it was decided to redefine the dependent variable, in the hopes of obtaining more meaningful results from the regression analysis. The dependent variable was redefined to consist of the change in the percent of the urban core that consisted of high status census tracts between 1970 and 1980. For each city the number of census tracts in its urban core in 1970 was used as the base at both points in time, thus standardizing the results. The amount of revitalization would be a function of the change in the percent of this base. This newly defined dependent variable, referred to as Dependent Variable II, was calculated using the formula given below.

$$\text{Dep. Var. II} = \frac{\frac{\# \text{ 1980 H.S.C.T. in U.C.} - \# \text{ 1970 H.S.C.T. in U.C.}}{\# \text{ of census tracts in U.C. in 1970}} \times 100$$

The values of these new variables and their respective cities is given in Table 5.4

Because of this redefinition, data from the three cities that were eliminated earlier was now added to the data set. This addition necessitated that a new principle factoring with iterations (PA2) be performed on the 30 independent variables for the 32 cities now in the study. A copy of this output will be found in Appendix F, Table F.4.

Six meaningful, rotated, factors were extracted from the data. These six factors accounted for 83.1 percent of the variance of the original 30 variables. They are listed in Table 5.5.

Factor 1 is considered a growth factor. The variables reflecting industrial growth, namely capital expenditures and value added load high on this factor. The 1980 total population, 1980 non-white population and change in the non-white population between 1970-80 also have high loadings on this factor. Factor 2, Housing Value, is concerned with housing values and changes in the non-white urban core population. Factor 3 is uninterpretable and thus has not been named. Factor 4 is called the Yuppie factor. Two factors that have high loadings on this factor deal with employment. The third variable is the percent of families in the urban core, in 1980, that had children under 18 years of age. The white collar employment variable is positively correlated with the

Table 5.4

Dependent Variable II

Change in percent of urban core that consists of high status
census tracts - 1970-80.

<u>City</u>	<u>Percent Change</u>
Atlanta, GA	2.7%
Baltimore, MD	4.1
Boston, MA	19.6
Buffalo, NY	2.4
Chicago, IL	7.8
Cleveland, OH	1.2
Jacksonville, FL	4.0
Kansas City, MO	2.7
Los Angeles, CA	0.0
Long Beach, Ca	2.3
Louisville, KY	2.2
Memphis, TN	0.0
Miami, FL	0.0
Milwaukee, WI	- 1.1
Minneapolis, MN	4.1
St. Paul, MN	2.2
Nashville-Davidson, TN	5.6
New Orleans, LA	3.2
Kings County (Brooklyn), NY	6.1
New York County (Manhattan), NY	1.1
Newark, NJ	2.3
Norfolk, VA	0.0
Philadelphia, PA	8.7
Phoenix, AZ	0.0
Pittsburgh, PA	1.1
St. Louis, MO	3.0
San Diego, CA	0.0
Oakland, CA	0.0
San Francisco, CA	3.4
Seattle, WA	4.8
Toledo, OH	0.0
Washington, D. C.	3.7

Table 5.5

Factor Analysis - Data from 32 cities - Six factors
extracted - Varimax Rotation

Factor 1 - Industrial and Minority Growth

Variable	Loading
VALADD	0.84828
CAPEXP	0.89617
TOTPOP	0.93323
NWCCPOP	0.87634
CHNWCPOP	0.81372

Factor 2 - Housing Value

HOUSEVAL	0.68477
CHHOUSVAL	0.73041
HOUSMAS	0.91786
CHHOUSMA	0.90393
CHNWPOP	0.62341
PCHNWUP	0.63601
CHCHILD	0.61101

Factor 3

SHORTDIS	0.69900
POPUC	0.88213
NWUCPOP	0.62173

Factor 4 - Yuppie

PERWC	0.86922
PERBC	- 0.90779
PERCHILD	- 0.74395

Factor 5 - Population Change

CHTOTPOP	0.78722
CHPOPUC	0.68395

Factor 6 - Non-White Population

PNWCCPOP	0.67009
PNWUCPOP	0.92272

factor. The blue collar employment variable and the child related variable are both negatively correlated with this factor. One of the characteristics of revitalizers is that they tend to have jobs in white collar employment and have few or no children. Population Change is the name given to Factor 5. This factor has high loadings on variables that are concerned with absolute total population changes in the central city and the urban core. Factor 6, Non-white Population, has high loadings on variables measuring the percentage change in the non-white population between 1970 and 1980.

Using the factor scores generated by the factor analysis as independent variables and the newly defined dependent variable, a stepwise regression analysis was performed (see Appendix F, Table 5). Five of the six factors were included in the final regression equation. These were Factors 5, 6, 2, and 4 with Factor 3 being excluded. The results of this regression analysis were, like the previous analysis, inconclusive. At all steps of the regression run both the significance of the overall equation and that of the individual factors in the equation were much greater than $\alpha = 0.05$. Thus one has to conclude that nothing was explained by this regression analysis.

Revitalization is a process that has spatial and temporal dimensions. A third, and final, attempt was made in an effort to redefine the dependent variable in the hope that the regression analysis would yield some meaningful results. Values for the dependent variable for each city were deter-

mined by examining those census tracts in the urban core that experienced the greatest amount of positive change in the five ranked variables between 1970-80. This was done by calculating the difference for each variable, for each census tract, in each city, between 1970 and 1980 using a modified version of the FORTRAN sorting program used earlier.

The difference between the 1970 and 1980 values for all five variables in each census tract was calculated. Each census tract was then ranked, from high to low, on the extent of difference that occurred on each variable. The ranks were summed and those tracts in the upper quartile of this ranked distribution were flagged high change tracts. The high change tracts that were not high status tracts in 1970 were considered revitalized. The dependent variable was now defined as the percentage of the total urban core tracts that were high change tracts. This value was calculated using the following formula:

$$\text{Dep. Var. III} = \frac{\begin{array}{c} \# \text{ of high change tracts} \\ \text{in City } i \end{array}}{\begin{array}{c} \# \text{ of urban core tracts} \\ \text{in City } i \end{array}} \times 100$$

The values for this dependent variable, referred to as, Dependent Variable III, are listed in Table 5.6.

The same factor scores used in the previous regression analysis were used in this regression analysis (Appendix F, Table 6). Once again the results were inconclusive. Five factors were entered into the stepwise regression equation,

Table 5.6

Dependent Variable III

Percent of total urban core census that are high change tracts in 1980 and were not high status tracts in 1970.

<u>City</u>	<u>Percent Change</u>
Atlanta, GA	11.0%
Baltimore, MD	28.6
Boston, MA	28.3
Buffalo, NY	12.2
Chicago, IL	17.2
Cleveland, OH	12.8
Jacksonville, FL	4.0
Kansas City, MO	10.8
Los Angeles, CA	0.0
Long Beach, CA	18.2
Louisville, KY	19.6
Memphis, TN	5.6
Miami, FL	3.8
Milwaukee, WI	6.7
Minneapolis, MN	20.3
St. Paul, MN	15.6
Nashville-Davidson, TN	22.2
New Orleans, LA	17.2
Kings County (Brooklyn), NY	25.5
New York County (Manhattan), NY	17.5
Newark, NJ	21.6
Norfolk, VA	33.3
Philadelphia, PA	22.6
Phoenix, AZ	11.1
Pittsburgh, PA	15.2
St. Louis, MO	30.3
San Diego, CA	20.0
Oakland, CA	16.9
San Francisco, CA	27.6
Seattle, WA	16.7
Toledo, OH	6.8
Washington, D. C.	25.6

but none were significant at the $\alpha = 0.05$ level of statistical significance. The equation as a whole was also not significant at this level.

Factor Analysis And Regression Analysis With Reduction In The Number Of Variables

Because of the inconclusive results of the regression analysis and the fact that some of the factors that were obtained from the principle component and factor analysis were uninterpretable, it was decided to reduce the number of initial variables that were to be factored. Taylor (1977) cautions that one must be careful to ensure that there are more cases than variables. Twelve of the original 30 variables that dealt with change were chosen, since revitalization is a process that is reflected in, and results in, socio-economic changes in a neighborhood. In addition four absolute values were also included that by their very nature could not undergo change. For example, the variable LONGDIS which is the longest distance from the CBD to the furthestmost extent of the urbanized area of a city. The 16 variables selected were:

CHANWC
CHANBC
VALADD
CAPEXP
LONGDIS

CHTOTPOP
CHPOPUC
CHPCCPUC
CHNWCPOP
CHNWUPOP

CHNWPOP
PCHNWUP

CHHOUVAL
CHHOUSMA
A1939

CHCHILD

In doing the factor analysis for the data for the original 29 cities one variable, PCHNWUP, had to be eliminated because its estimated communality exceeded 1.000000 and the program stopped before convergence. After this variable was taken out of the data set, the program ran to convergence (see Appendix F, Table F.7). Four factors with eigenvalues greater than 1.000000 were extracted. These four factors, which contained 73.3% of the variance of the original 15 variables, with those variables that had high loadings are given in Table 5.7. Using the above four factors a regression analysis was attempted (Appendix F, Table F.8) using the originally defined dependent variable (Dependent Variable I).

Only one factor that was entered into the regression equation was statistically significant. This was factor 3, with an alpha = 0.004, which was entered into the equation on step 1. On step 1 the whole equation is also statistically significant at the same alpha value.

Factor 3 has three variables with high loadings. Two of them deal with increases in population between 1970-80, namely the population of the central city as a whole and the urban core. The third variable is the percentage of all year housing in the urban core that was built on or before 1939.

The adjusted R square for the equation was 24.4%. The

Table 5.7

Factor Analysis - 29 Cities - 15 Variables

Factor 1 Industrial and Minority Growth

VALADD	0.93664
CAPEXP	0.95071
CHNWCPOP	0.79497

Factor 2 Residential Growth

CHHOUVAL	0.76510
CHHOUSMA	0.95698
CHCHILD	0.61784

Factor 3

CHTOTPOP	0.81333
CHPOPUC	0.70806
A1939	0.59734

Factor 4

CHANWC	- 0.60806
CHPCCPUC	0.73880

adjusted R square rather than the R square was used due to the relatively small number of observations, or cities used. By using the adjusted R square, any potential biases is eliminated that can arise from a small number of observations.

While the amount of variance explained by the equation is relatively small, some conclusions can be drawn. Those cities that had a percentage increase in the number of urban core high status census tracts between 1970-80 were those that had a higher percentage of their urban core housing built on or before 1939. These cities also experienced greater population increases in both their urban core and the central city as a whole.

Two additional attempts were made using the two revised definitions of the dependent variable (see page 133 and page 137). As discussed earlier, it was now possible to use 32 rather than 29 cities in this part of the analysis. Using the same 16 variables a factor analysis was executed. Due to estimated communalities exceeding 1.00000, two of these variables had to be eliminated before the program was able to converge (Appendix F, Table F.9). These variables were PCHNWUP and CHHOUSMA.

Four factors with eigenvalues greater than 1.00000 were obtained. These, with their variables that have high loadings, are given in Table 5.8.

The stepwise regression (Appendix F, Table F.10) done with the factor scores from the above factor analysis and Dependent Variable II had only one statistically significant factor. This factor, Factor 2 - Total Population Growth, entered into the equation on step one. The adjusted R square for the equation was 0.13245.

Using the same set of factor scores, as independent variables, and Dependent Variable III a final regression analysis was executed (Appendix F, Table F.11). The results were substantially the same as the previous regression analysis. That is, Factor 2 - Total Population Growth entered into the equation on the first step and was statistically significant at $\alpha = 0.05$. The equation as a whole was also statistically significant on step one. Factors entered into the equation on subsequent steps were not significant. The adjusted R square was slightly higher than in the

Table 5.8

Factor Analysis - 32 Cities - 14 Variables

Factor 1 Industrial and Minority Growth

VALADD	0.97390
CAPEXP	0.97314
CHNWCPOP	0.64841

Factor 2 Total Population Growth

CHTOTPOP	0.93068
CHPOPUC	0.74528

Factor 3 Non-White Population

CHNWCPOP	0.60391
CHNWPOP	0.78114

Factor 4

CHANWC	- 0.58305
CHPCCPUC	0.76144

previous analysis but was still relatively small. Its value was 0.17800.

The chi square test could not be applied to the data gathered for the dependent variable as defined for the second regression analysis because one of the parameters of the test was violated. According to Taylor(1977) the test should not be used when expected frequencies of any of the cells is less than one. The expected frequencies for each of the three additional cities is the same as the number of high status census tracts in their respective urban cores in 1970. This value in all cases was zero.

In the previous analysis of 29 of the present 32 city data set the null hypothesis was rejected. Two of the three

additional cities (Kansas City, MO and St. Louis, MO) had one high status census tract in their urban core in 1980 where none existed in 1970. The third city, Toledo, Oh, had no high status census tracts in either time period. It is therefore a reasonable assumption to conclude that revitalization has occurred, even though testing for it statistically creates problems.

The third refinement of the dependent variable looked at the percent of a city's urban core census tracts that were classified as high change census tracts in 1980. Since there is no 'before' and 'after' quantification, there was no expected and observed outcomes to be compared. Thus, the chi square test could not be performed.

If there was no revitalization occurring in the urban cores of these cities, then it would be expected that no high change census tracts would be located in the urban core. Of the 2,085 census tracts that comprise all the urban cores of the 32 cities in this study 369, or 17.7%, of the urban core census tracts were classified as high change tracts in 1980. This tends to lend credence to the fact that there appears to be evidence that the urban cores of our central cities are becoming revitalized, even though the results of the present study were inconclusive.

Mail Survey And The Determination Of The Coefficient Of Areal Correspondence

Due to the failure of the regression analysis in yielding any conclusive results, an additional procedure was initiated in an attempt to determine why the results were so

inconclusive. It was felt that perhaps the predictive model was at fault. A survey questionnaire (Appendix G) was sent to the mayors of each city in the study. In some cases a response was received from the county planning office or some such similar agency rather than directly from the mayor's office. The questionnaire indicated those census tracts, in a given city in question, that this study had flagged as being either high status or high change tracts in 1980. The mayor was asked if these tracts had or had not undergone revitalization during the 1970s. They were also asked to indicate any other tracts, not mentioned, which might have also undergone revitalization.

In order to determine if those census tracts that were classified as high status or high change, by the model, and those indicated as having undergone revitalization by city officials are one and the same, the coefficient of areal correspondence was calculated. The coefficient of areal correspondence "... is basically a numerical extension of traditional map overlay procedures (Taylor, 1977, p.177)," which was developed by R. F. Minnick. The map overlay procedure involves taking two identical maps, indicating one variable on each of the maps, and laying one map on top of the other in register. One can then make a visual determination as to where the two variables occur in the same place. With this procedure it is difficult to quantify the results. This difficulty is overcome by the use of set theory.

A set is a collection of objects and the objects in a set are referred to as elements. The elements, or areal

units, used in this study are census tracts. There are two basic operations in set theory that correspond to addition and multiplication in arithmetic. They are referred to as union and intersection respectively.

A union of two sets is indicated by $A \cup B$. This means that all the elements belonging to set A and set B are combined. The intersection of the two sets, $A \cap B$, is formed by the elements that belong to both sets.

In this study there are two sets of census tracts, one from the model and the other classified as revitalized by a city official.

The formula for the coefficient of areal correspondence is;

$$C_A = \frac{A \cap B}{A \cup B}$$

$A \cap B$ is the intersection of set A with set B. This is the area in which both phenomena are located. The area covered by either variable is the sum of the area of set A and B or, using the terminology of set theory, the union of a and B ($A \cup B$).

The coefficient of areal correspondance is a relative measure in that the total area in which both phenomena are actually found is divided by the maximum amount of unit areas that the phenomena can be found. C_A ranges from 0, in which the distributions are completely separate, to $C_A = 1$, in which the two distributions correspond or overlap completely.

The results of the analysis which follows indicated how

accurate the model was in locating census tracts in which inner-city revitalization had occurred. Eighteen of the 21 surveys which were returned contained responses which enabled it to be used in this part of the analysis.

The value A/B is the number of census tracts in which both the model and a city official agreed that revitalization had occurred. AUB is the total number of census tracts in which revitalization could have occurred. It is the sum of the tracts indicated by the model and the additional tracts listed by the city in which revitalization had occurred. The results, listed in descending order of the value of areal correspondence, are found in Appendix H.

The results of this part of the analysis indicated that the predictive model did not accurately pinpoint those tracts that had become revitalized during the 1970s. Except for Newark, NJ which registered a perfect index of areal correspondence of $C_A = 1.00$ all the other cities had either moderate, extremely low or no areal correspondence between those tracts flagged by the computer sorting runs as having undergone revitalization and those indicated by city officials. The perfect areal correspondence for Newark, NJ is suspect. One does not usually expect to find absolute perfection in the real world, especially in light of the fact that for the rest of the cities, that answered the survey, the areal correspondence is so low.

There were several weaknesses in the questionnaire that became apparent only after responses started to be received. Several respondents were not clear as to what was meant by

the term revitalization. There were several responses in which revitalization was indicated in terms of residential and commercial. It was not known what criteria the respondents used in determining just how much revitalization had to have occurred in a census tract in order for it to have been considered revitalized.

Because of the failure of the regression analysis to yield anything conclusive one has to look at the results of the chi square, and subsequent analysis with caution. The question that comes to mind at this point is, 'Has revitalization, in actuality, been measured by any or all of the variations of the dependent variable?' The theoretical basis for choosing the five variables used in the construction of the dependent variable, is strongly supported by research done on individual cities (O'Loughlin and Munski, 1979; Sumka, 1979; Gale, 1980; Hodge, 1980; Levy and Cybriwsky, 1980; Baldassare, 1984).

Based on the results of this study it appears that private-market residential revitalization has not occurred in selected major United States cities during the 1970s. The final chapter summarizes the research results, indicates areas of further research, and examines possible reasons why the present research has been inconclusive.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study, like Lipton's (1977), attempted to look at the process of revitalization in a number of cities, to evaluate the extent of the process, and to identify any associated underlying pattern(s). Like Lipton, this researcher assumed that the socio-economic model that was developed for detecting revitalized census tracts was valid and accurate. It was felt that the present model would be even more sensitive than Lipton's because changes in five, rather than two, variables that are affected by revitalization were utilized. These variables are consistent with those characteristics that define revitalization as identified by numerous previous studies.

The research was divided into two major parts. First, an attempt was made to determine the amount, or extent, of revitalization that has occurred in the urban cores of the 32 selected cities. A FORTRAN sorting program was used to rank the census tracts, in each city, on five socio-economic variables that are associated with revitalization. Those census tracts that were in the upper quartile of the summed ranked distribution of all five variables were considered revitalized.

A chi square test was done on the originally defined dependent variable, the percentage change in the number of high status census tracts in the urban core between 1970-80.

Due to violations of some of the assumptions of this statistical test, the cities could not be tested as individual entities. The cities were grouped according to Bogue and Beale's Economic Regions and tested. The results indicated that there was a statistically significant increase in the number of high status census tracts between 1970-80 in the grouped cities. While this increase was statistically significant, the results of the mail survey indicated that revitalized census tracts are not being detected by the ranked variable sorting model. It was felt that this was due, not to the theoretical basis of the model itself, but to the inappropriate spatial unit, the census tract, at which the available data was aggregated. Because of additional constraints associated with the chi square test, it could not be applied to the two subsequently redefined dependent variables.

The second part of the study was an attempt to determine what are the characteristics, or changes in characteristics, of those cities which have experienced, or are experiencing revitalization. Regression analysis was used in an attempt to answer this part of the research. As a result of the inconclusive results obtained from the first regression analysis, the dependent variable, obtained in the first portion of this study, was redefined two times. Those census tracts found in the urban core, that were in the upper quartile of the summed, ranked, sorting distribution, constituted the raw data needed to calculate the dependent variable. The regress-

ion analysis based on the two redefined dependent variables also yielded inconclusive results.

As was pointed out by Spain (November, 1981), trying to determine the extent of 'gentrification' using census tract data may be fruitless. But unfortunately it is at this level that the theoretically pertinent information is available. Several recent studies have indicated that the examination of revitalization using data at the census tract level is inappropriate. Lee and Mergenhagen (1984) have implied that the use of data at this level of spatial aggregation results in a loss of necessary information. In their study of Nashville, Tennessee they concluded "...that revitalization may take place in small, scattered pockets rather than encompassing an entire neighborhood... - revitalization remains a difficult phenomenon to detect at more than a minimal level of aggregation using population and housing characteristics" (p.524). Thus, searching for signs of revitalization at a more macro level than the census block may prove fruitless. The results of the present study appear to support this. The procedures used in this study did not yield any conclusive results regarding the extent of, and factors involved in, private-market residential revitalization in 32 major cities in the United States during the 1970s.

The reality of revitalization maybe such that its impact on the census tract(s) within which it is occurring is relatively minor. Its effects being masked by the housing situation in the rest of the census tract, and the city as a whole.

"... only a tiny part of renovation and repair spending occurs in revitalizing neighborhoods, which are themselves a small fraction of all urban neighborhoods" (Downs, 1981, p.74). There are only a few cities in which revitalization is occurring in many neighborhoods. Washington, D. C. is one such city which is "... widely acknowledged as a gentrification 'hotbed'." (Lee, Spain, and Umberson, 1985, p.582).

Revitalization's effects in a particular neighborhood or on specific blocks are often locally significant but these localized changes should not be confused with changes in the size and composition of the total city population. Media coverage of specific areas in selected cities has tended to contribute to the misperception about a back-to-the-city movement. "A back-to-the-city article has the attraction of a man-bites-dog story. In a era of urban decline, any offsetting change is noteworthy - and especially when it arises through private action" (Goodman, 1980, p.15).

The results of this study indicate that there has been no evidence of revitalization having occurred in the cities studied, during the time period from 1970 to 1980. Previous studies, using different methodologies tend to be at variance with this conclusion. However, this research indicates that better results might be obtained through some different approaches to the problem.

Recommendations for Further Study

A major problem associated with research done on private-market residential revitalization is the lack of a

precisely defined definition of the phenomenon. There is a need for such a definition that can be quantitatively operationalized. This is in order that studies between and among cities can be compared and updated. Until a precise, agreed upon definition exists, the phenomenon cannot be realistically researched in a systematic fashion. Because of a lack of available data, that is properly disaggregated, there are problems in constructing a workable definition of this sort.

The Use of Questionnaires

One method in which the model, used for detecting revitalization in this study, can be empirically tested involves the use of a questionnaire more rigorously constructed than the one used in the present study. Also, it would be sent to three individuals in each city; the local city planning director, the chief building department official, and the president of the local realtor's association. This questionnaire would indicate the census tracts, in the particular city, that the model has flagged as having been revitalized. The head of each department would be asked if these tracts have, or have not, undergone private-market residential revitalization, defined as gentrification and/or incumbent upgrading, during the 1970s. They would also be asked to indicate any other tracts, not mentioned, which may have also been thus affected. Ideally a response from all three officials would be desirable, but a response from at least one of the three would be judged acceptable.

One must keep in mind that revitalization, especially in its early stages, is a somewhat subjective phenomenon. It would be expected that officials from different interest groups might perceive it differently. It would also be informative to ask these officials if they consider the census tract an appropriate spatial unit to use in indicating areas of revitalization in their city.

Redefining the Indicators of Revitalization

In the present study all five of the variables used to determine the location of revitalized census tracts were given equal weight as predictors. This was done because of an absence of any convincing evidence that they should have been handled otherwise. Perhaps these variables should have been weighted, but if so and by how much is an unknown at this time.

Redefining the Urban Core

Perhaps the criteria utilized for defining the urban core need to be changed. For example Spain (November, 1981) studied gentrification in ten major cities in the United States, using census tract data, focusing on a area within a three mile radius of the CBD of each city because it included "all known renovating neighborhoods in each city." (Spain, November, 1981, p.14).

Census Bureau Block Level Analysis

Another approach would be to use census blocks as the major spatial unit for analysis. This would entail analysis

of census data by the U. S. Bureau of the Census itself as such data is not available to others due to confidentiality restrictions. It does have the theoretically pertinent information at the census block level. It is assumed that the U. S. Bureau of the Census can use this data for its own analysis. To undertake a study similar to the present one using block data, rather than tract data, would result in a much larger data set, with its inherent increase in problems of data collection and manipulation. Just the sorting routines of the present study involved data from 20 variables, for thousands of census tracts. The U. S. Bureau of the Census may be the best organization for doing a more detailed study of this sort given its data base and resources.

Field Research

Since available aggregate statistics have not been able to reveal much evidence of the revitalization process, it is felt that a more direct approach may be necessary. Unless, or until, the process encompasses larger spatial units of land, perhaps, the only accurate way of monitoring the extent of revitalization is via field work done in individual cities and neighborhoods. But one must be aware that this procedure also has its weaknesses, such as observer biases (Cicin-Sain, 1980).

Revitalization and the Future of Cities

Studies (Gales, 1980; Hodge, 1980; Goldfield, 1980; Hammett and Williams, 1980) have indicated that gentri-

fication is not a back-to-the-city movement. Most people living in the suburbs are content to remain there, while most gentrifiers have moved from other parts of the same city, or from other cities, not the suburbs.

The stay in the city trend will not increase the urban populations as the back to the countryside/stay in the countryside trend continues to produce population growth in rural areas. Even those cities in the Sun Belt such as Los Angeles, Dallas, and Atlanta, that have had rapid population growth in the recent past, have experienced stabilization or declining populations in the late 1970s. Thus it is doubtful that gentrification will result in central city population growth. (Long, 1980, p.67).

From a national perspective revitalization holds out the hope and means of regenerating the nation's central cities. The positive aspects of this process means renewed vitality to declining central cities and the possible reduction in socio-economic disparities between the central city and its suburbs. The negative aspects of this process are that the inner-city problems which have plagued many cities are not rectified. The interconnected problems of poverty, unemployment, and dispare of dependent poverty populations are most likely only shifted to other parts of the same metropolitan area. What the present and future costs, and benefits of revitalization, are not known at this point. For this reason this researcher agrees that more reasearch is needed. (Cicin-Sain, 1980).

If it is found that private-market revitalization is, indeed, an important process in urban development then becoming aware of those characteristics associated with it will enable planners and other city officials to more realistically and effectively encourage the positive aspects of this phenomenon, while at the same time reducing its negative consequences. Plans are needed to smooth the transition of our economy from a traditional industrial base to one of high technology and administrative service. The central city will obviously be impacted by this change.

APPENDICES

APPENDIX A

Cities Studied By Lipton

- | | |
|--------------------|-----------------------|
| 1) Atlanta, GA | 11) Minneapolis, MN |
| 2) Baltimore, MD | 12) Newark, NJ |
| 3) Boston, MA | 13) New York, NY |
| 4) Chicago, IL | 14) Philadelphia, PA |
| 5) Cleveland, OH | 15) Pittsburgh, PA |
| 6) Dallas, Tx | 16) St. Louis, MO |
| 7) Detroit, MI | 17) St. Paul, MN |
| 8) Houston, TX | 18) San Francisco, CA |
| 9) Los Angeles, CA | 19) Seattle, WA |
| 10) Milwaukee, WI | 20) Washington, D. C. |

APPENDIX B

Cities with Population of 250,000 or Greater in 1970

- | | |
|----------------------|----------------------------|
| 1) Atlanta, Ga | 28) Nashville-Davidson, TN |
| 2) Austin, TX | 29) New Orleans, LA |
| 3) Baltimore, MD | 30) New York, NY |
| 4) Birmingham, AL | (New York County) |
| 5) Brooklyn, NY | 31) Newark, NJ |
| (Kings County) | 32) Norfolk, VA |
| 6) Boston, MA | 33) Oakland, CA |
| 7) Buffalo, NY | 34) Oklahoma City, OK |
| 8) Chicago, IL | 35) Omaha, NE |
| 9) Cincinnati, OH | 36) Philadelphia, PA |
| 10) Cleveland, OH | 37) Phoenix, AZ |
| 11) Columbus, OH | 38) Pittsburgh, PA |
| 12) Dallas, TX | 39) Portland, OR |
| 13) Denver, CO | 40) Sacramento, CA |
| 14) Detroit, MI | 41) St. Louis, MO |
| 15) El Paso, TX | 42) St. Paul, MN |
| 16) Fort Worth, TX | 43) San Antonio, TX |
| 17) Houston, TX | 44) San Diego, CA |
| 18) Indianapolis, IN | 45) San Francisco, CA |
| 19) Jacksonville, FL | 46) San Jose, CA |
| 20) Kansas City, MO | 47) Seattle, WA |
| 21) Long Beach, CA | 48) Tampa, FL |
| 22) Los Angeles, CA | 49) Toledo, OH |
| 23) Louisville, KY | 50) Tucson, AZ |
| 24) Memphis, TN | 51) Tulsa, OK |
| 25) Miami, FL | 52) Washington, D. C. |
| 26) Milwaukee, WI | 53) Wichita, KS |
| 27) Minneapolis, MN | |

APPENDIX C

SOCIO-ECONOMIC TRENDS IN THE CITIES COMPRISING THIS STUDY

<u>Total Central City Population</u>			
REGION and CITY	1970 TOTAL CENT. CITY POPULATION	1980 TOTAL CENT. CITY POPULATION	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	905,759	785,775	-13.1
Boston, MA	641,071	562,994	-12.2
Kings County (Brooklyn), NY	2,602,012	2,230,936	-14.3
New York County (Manhattan), NY	1,539,233	1,428,285	- 7.2
Newark, NJ	382,417	329,248	-13.9
Norfolk, VA	307,951	266,979	-13.3
Philadelphia, PA	1,948,609	1,688,210	-13.4
Washington, D. C.	756,510	638,333	-15.6
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	462,768	357,870	-22.7
III <u>Lower Great Lakes Region</u>			
Chicago, IL	3,366,957	3,005,072	-10.7
Cleveland, OH	750,903	573,822	-23.6
Milwaukee, WI	717,099	636,212	-11.3
Pittsburgh, PA	520,117	423,938	-18.5
Toledo, OH	383,818	354,635	- 7.6
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	434,400	370,951	-14.6
St. Paul, MN	309,980	270,230	-12.8
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	507,087	448,159	-11.6
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	361,472	298,451	-17.4
Nashville- Davidson, TN	448,003	445,651	1.7
St. Louis, MO	622,236	453,085	-27.2
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	496,973	425,022	-14.5

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	528,865	540,920	2.3
	Miami, FL	334,859	346,865	3.6
	New Orleans, LA	593,471	557,515	- 6.1
XII	<u>Pacific Northwest Region</u>			
	Seattle, WA	530,831	493,846	- 7.0
XIII	<u>Pacific Southwest Region</u>			
	Long Beach, CA	358,633	361,334	0.8
	Los Angeles, CA	2,816,061	2,966,850	5.4
	Oakland, CA	361,561	339,337	- 6.1
	Phoenix, AZ	581,562	789,704	35.8
	San Diego, CA	696,769	875,538	25.7
	San Francisco, CA	715,674	678,974	- 5.1

Total Central City White Population

REGION and CITY	1970 TOTAL CENT. CITY WHITE POP.	1980 TOTAL CENT. CITY WHITE POP.	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	479,837	345,113	-28.1
Boston, MA	524,709	393,937	-24.9
Kings County (Brooklyn), NY	1,905,788	1,249,486	-34.4
New York County (Manhattan), NY	1,089,302	841,204	-22.8
Newark, NJ	168,382	101,417	-39.8
Norfolk, VA	215,069	162,300	-24.5
Philadelphia, PA	1,278,717	983,084	-23.1
Washington, D. C.	209,272	171,768	-17.9
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	364,367	252,365	-30.7
III <u>Lower Great Lakes Region</u>			
Chicago, IL	2,207,767	1,490,216	-32.5
Cleveland, OH	458,084	307,264	-32.9
Milwaukee, WI	605,372	466,620	-22.9
Pittsburgh, PA	412,280	316,694	23.2
Toledo, OH	329,068	283,920	-13.7
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	406,414	323,831	-20.3
St. Paul, MN	295,741	243,226	-17.8
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	391,496	312,836	-20.1
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	274,511	212,102	-22.7
Nashville- Davidson, TN	358,780	344,886	-3.9
St. Louis, MO	364,992	242,576	-33.5
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	240,503	137,879	-42.7
Memphis, TN	379,224	333,789	-12.0

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	470,695	394,756	- 3.2
	Miami, FL	256,377	231,008	- 9.9
XII	New Orleans, LA	323,420	236,987	-26.7
	<u>Pacific Northwest Region</u>			
	Seattle, WA	463,870	392,766	-15.3
XIII	<u>Pacific Southwest Region</u>			
	Long Beach, CA	329,084	269,953	-18.0
	Los Angeles, CA	2,173,600	1,816,761	-16.4
	Oakland, CA	213,512	129,692	-39.3
	Phoenix, AZ	542,510	665,898	22.2
	San Diego, CA	619,498	666,863	7.6
	San Francisco, CA	511,186	395,081	-22.7

Total Central City Black Population

REGION and CITY	1970 TOTAL CENT. CITY BLACK POP.	1980 TOTAL CENT. CITY BLACK POP.	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	420,210	431,151	2.6
Boston, MA	104,707	126,229	20.6
Kings County (Brooklyn), NY	656,194	772,812	10.2
New York County (Manhattan), NY	380,442	309,854	-18.6
Newark, NJ	207,458	191,745	- 7.6
Norfolk, VA	87,261	93,987	7.7
Philadelphia, PA	653,791	638,878	- 2.3
Washington, D. C.	537,712	448,906	-16.5
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	94,329	95,116	0.8
III <u>Lower Great Lakes Region</u>			
Chicago, IL	1,102,620	1,197,000	8.6
Cleveland, OH	287,841	251,347	-12.7
Milwaukee, WI	105,088	146,940	39.8
Pittsburgh, PA	104,904	101,813	- 2.9
Toledo, OH	52,915	61,750	16.7
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	19,005	28,433	49.6
St. Paul, MN	10,930	13,305	21.7
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	112,005	122,699	9.5
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	86,040	84,080	- 2.3
Nashville- Davidson, TN	87,851	105,942	20.6
St. Louis, MO	254,191	206,386	-18.8
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	255,051	282,911	10.9
Memphis, TN	242,513	307,702	26.9

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	118,158	137,324	16.2
	Miami, FL	76,156	87,110	14.4
XII	New Orleans, LA	267,308	308,149	15.3
	<u>Pacific Northwest Region</u>			
	Seattle, WA	37,868	46,755	23.5
XIII	<u>Pacific Southwest Region</u>			
	Long Beach, CA	18,991	40,738	114.5
	Los Angeles, CA	503,606	505,210	0.3
	Oakland, CA	124,710	159,281	27.7
	Phoenix, AZ	27,896	37,804	35.5
	San Diego, CA	52,961	77,700	46.7
	San Francisco, CA	96,078	86,414	-10.1

Percent of Total Central City Population Which Was Black

REGION and CITY	1970 % TOT. CENT. CITY POPULATION BLACK	1980 % TOT. CENT. CITY POPULATION BLACK	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	46.4	54.8	8.4
Boston, MA	16.3	22.4	6.1
Kings County (Brooklyn), NY	25.2	32.4	7.2
New York County (Manhattan), NY	24.7	21.7	- 3.0
Newark, NJ	54.2	58.2	4.0
Norfolk, VA	28.3	35.2	6.9
Philadelphia, PA	33.6	37.8	4.2
Washington, D. C.	71.1	70.3	- 0.8
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	20.4	26.6	6.2
III <u>Lower Great Lakes Region</u>			
Chicago, IL	32.7	39.8	7.1
Cleveland, OH	38.3	43.8	5.5
Milwaukee, WI	14.7	23.1	8.4
Pittsburgh, PA	20.2	24.0	3.8
Toledo, OH	13.8	17.4	3.6
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	4.4	7.7	3.3
St. Paul, MN	3.5	4.9	1.4
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	22.1	27.4	5.3
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	23.8	28.2	4.4
Nashville- Davidson, TN	19.6	23.3	3.7
St. Louis, MO	40.9	45.6	4.7
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	51.3	66.6	15.3
Memphis, TN	38.9	47.6	8.7

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	22.3	25.4	3.1
	Miami, FL	22.7	25.1	2.4
	New Orleans, LA	45.0	55.3	10.3
XII	<u>Pacific Northwest Region</u>			
	Seattle, WA	7.1	9.5	2.4
XIII	<u>Pacific Southwest Region</u>			
	Long Beach, CA	5.3	11.3	6.0
	Los Angeles, CA	17.9	17.0	- 0.9
	Oakland, CA	34.5	46.9	12.4
	Phoenix, AZ	4.8	4.8	0.0
	San Diego, CA	7.6	8.9	1.3
	San Francisco, CA	13.4	12.7	- 0.7

Total Central City Non-White Population

REGION and CITY	1970 TOTAL CENT. CITY NON-WHITE POPULATION	1980 TOTAL CENT. CITY NON-WHITE POPULATION	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	425,922	441,662	3.7
Boston, MA	116,362	169,007	45.2
Kings County (Brooklyn), NY	696,244	981,450	41.0
New York County (Manhattan), NY	449,931	587,081	30.5
Newark, NJ	214,035	227,831	6.4
Norfolk, VA	92,882	104,679	12.7
Philadelphia, PA	669,892	705,126	5.3
Washington, D. C.	547,238	466,565	-14.7
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	98,401	105,505	7.2
III <u>Lower Great Lakes Region</u>			
Chicago, IL	1,159,190	1,514,856	30.7
Cleveland, OH	292,819	266,558	- 9.0
Milwaukee, WI	111,727	169,592	51.8
Pittsburgh, PA	107,837	107,244	- 0.5
Toledo, OH	54,750	70,715	29.2
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	27,986	47,120	68.4
St. Paul, MN	14,239	27,004	89.6
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	115,591	135,323	17.1
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	86,961	86,349	- 0.7
Nashville- Davidson, TN	89,223	110,765	24.1
St. Louis, MO	257,244	210,509	-18.2
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	256,470	287,143	12.0
Memphis, TN	244,306	312,567	27.9

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	121,170	146,164	20.6
	Miami, FL	78,482	115,857	47.6
	New Orleans, LA	270,051	320,528	18.7
XII	<u>Pacific Northwest Region</u>			
	Seattle, WA	66,961	101,080	51.0
XIII	<u>Pacific Southwest Region</u>			
	Long Beach, CA	29,549	91,381	209.3
	Los Angeles, CA	642,461	1,150,089	79.0
	Oakland, CA	148,049	209,645	41.6
	Phoenix, AZ	39,052	123,806	217.0
	San Diego, CA	77,271	208,675	170.1
	San Francisco, CA	204,488	283,893	38.8

Percent of Total Central City Population Which Was Non-White

REGION and CITY	1970 % TOT. CENT. CITY POPULATION NON-WHITE	1980 % TOT. CENT. CITY POPULATION NON-WHITE	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	47.0	56.1	9.1
Boston, MA	18.2	30.1	11.8
Kings County (Brooklyn), NY	26.8	44.0	17.2
New York County (Manhattan), NY	29.2	41.1	11.9
Newark, NJ	56.0	69.2	13.2
Norfolk, VA	30.2	39.2	9.0
Philadelphia, PA	34.4	41.8	7.4
Washington, D. C.	72.3	73.1	0.8
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	21.3	29.5	8.2
III <u>Lower Great Lakes Region</u>			
Chicago, IL	34.4	50.4	16.0
Cleveland, OH	39.0	46.5	7.5
Milwaukee, WI	15.6	26.7	11.1
Pittsburgh, PA	20.7	25.3	4.6
Toledo, OH	14.3	19.9	5.6
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	6.4	12.7	6.3
St. Paul, MN	4.6	10.0	5.4
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	22.8	30.2	7.4
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	24.1	28.9	4.8
Nashville- Davidson, TN	19.9	24.3	4.4
St. Louis, MO	41.3	46.5	5.2
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	51.6	67.6	16.0
Memphis, TN	39.2	48.4	9.2

IX	<u>Gulf Coast and Atlantic</u>		
	<u>Flatwoods Region</u>		
	Jacksonville, FL	22.9	27.0
	Miami, FL	23.4	33.4
XII	New Orleans, LA	45.5	57.5
	<u>Pacific Northwest Region</u>		
	Seattle, WA	12.6	20.6
	<u>Pacific Southwest Region</u>		
XIII	Long Beach, CA	8.2	25.3
	Los Angeles, CA	22.8	38.8
	Oakland, CA	40.9	61.8
	Phoenix, AZ	6.7	15.7
	San Diego, CA	11.1	23.8
	San Francisco, CA	28.6	41.8

4.1

10.0

12.0

7.9

17.1

16.0

20.9

9.0

12.7

13.2

Percent of Total Central City Work Force White Collar

REGION and CITY	1970 % TOT. CENT. CITY WK. FORCE WHITE-COL.	1980 % TOT. CENT. CITY WK. FORCE WHITE-COL.	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	44.4	49.4	5.0
Boston, MA	64.7	60.3	- 4.4
Kings County (Brooklyn), NY	54.4	58.0	3.6
New York County (Manhattan), NY	64.4	61.6	- 2.8
Newark, NJ	34.3	39.0	4.7
Norfolk, VA	51.1	52.2	1.1
Philadelphia, PA	47.5	54.4	6.9
Washington, D. C.	57.9	67.4	9.5
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	42.4	47.6	5.2
III <u>Lower Great Lakes Region</u>			
Chicago, IL	47.6	52.7	5.1
Cleveland, OH	36.6	41.7	5.1
Milwaukee, WI	45.0	48.5	3.5
Pittsburgh, PA	50.1	56.1	6.0
Toledo, OH	47.0	52.2	5.2
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	54.5	61.1	6.6
St. Paul, MN	53.7	58.4	4.7
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	52.4	56.7	4.3
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	4.9	51.5	6.6
Nashville- Davidson, TN	54.4	60.4	6.0
St. Louis, MO	42.1	48.9	6.8
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	9.7	54.9	5.2
Memphis, TN	36.9	55.6	18.7

IX	<u>Gulf Coast and Atlantic</u>			
	<u>Flatwoods Region</u>			
	Jacksonville, FL	53.6	57.7	4.1
	Miami, FL	40.9	47.4	6.5
XII	New Orleans, LA	51.2	55.3	4.1
	<u>Pacific Northwest Region</u>			
	Seattle, WA	58.8	63.0	4.2
	<u>Pacific Southwest Region</u>			
XIII	Long Beach, CA	56.1	58.0	1.9
	Los Angeles, CA	57.4	58.7	1.3
	Oakland, CA	53.4	60.3	6.9
	Phoenix, AZ	53.6	57.6	4.0
	San Diego, CA	58.5	62.0	3.5
	San Francisco, CA	61.6	66.7	5.1

Percent of Total Central City Work Force Blue Collar

REGION and CITY	1970 % TOT. CENT. CITY WK. FORCE BLUE-COL.	1980 % TOT. CENT. CITY WK. FORCE BLUE-COL.	% CHANGE 1970-80
I <u>Atlantic Metropolitan Belt Region</u>			
Baltimore, MD	38.1	31.3	- 6.8
Boston, MA	28.1	20.9	- 7.2
Kings County (Brooklyn), NY	33.2	26.7	- 6.5
New York County (Manhattan), NY	19.6	24.4	4.8
Newark, NJ	50.0	44.0	- 6.0
Norfolk, VA	31.7	30.1	- 1.6
Philadelphia, PA	37.4	29.6	- 7.8
Washington, D. C.	20.8	14.6	- 6.2
II <u>Eastern Great Lakes and Northeastern Uplands Region</u>			
Buffalo, NY	41.3	34.3	- 7.0
III <u>Lower Great Lakes Region</u>			
Chicago, IL	39.1	32.6	- 6.5
Cleveland, OH	46.8	40.7	- 6.1
Milwaukee, WI	40.2	35.0	- 5.2
Pittsburgh, PA	31.8	24.8	- 7.0
Toledo, OH	39.0	32.2	- 6.8
IV <u>Upper Great Lakes Region</u>			
Minneapolis, MN	29.9	22.7	- 7.2
St. Paul, MN	31.1	24.8	- 6.3
V <u>North Center (Corn Belt) Region</u>			
Kansas City, MO	32.9	27.3	- 5.6
VII <u>Central and Eastern Upland Region</u>			
Louisville, KY	39.4	30.4	- 9.0
Nashville- Davidson, TN	31.4	25.7	- 5.7
St. Louis, MO	37.7	29.9	- 7.8
VIII <u>Southeast Coastal Plain and Piedmont Region</u>			
Atlanta, GA	31.7	25.3	- 6.4
Memphis, TN	33.8	29.6	- 4.2

IX	<u>Gulf Coast and Atlantic</u>					
	<u>Flatwoods Region</u>					
	Jacksonville, FL	31.8	28.0	-	3.8	
	Miami, FL	38.7	33.1	-	5.6	
	New Orleans, LA	30.6	26.1	-	4.5	
XII	<u>Pacific Northwest Region</u>					
	Seattle, WA	27.0	22.4	-	4.6	
XIII	<u>Pacific Southwest Region</u>					
	Long Beach, CA	30.5	27.7	-	2.8	
	Los Angeles, CA	29.8	27.4	-	2.4	
	Oakland, CA	30.7	23.6	-	7.1	
	Phoenix, AZ	32.8	28.5	-	4.3	
	San Diego, CA	26.1	21.5	-	4.6	
	San Francisco, CA	22.3	16.8	-	5.5	

APPENDIX D

Example of Sorting Program Output

JACKSONVILLE, FL - 1980

CENSUS TRACT	VAR 1	RANK	VAR 2	RANK	VAR 3	RANK	VAR 4	RANK	VAR 5	RANK	TOT RANK
1.00	81.40	48	4.30	66	48.48	47	12247.00	60	22200.00	56	277
1.99	81.25	51	.00	83	.00	81	.00	81	.00	81	377
2.00	10.45	71	1.16	81	22.68	77	8480.00	72	13700.00	75	376
2.99	86.84	40	36.21	2	.00	81	.00	81	.00	81	285
3.00	66.27	57	3.58	69	29.68	73	11948.00	62	15000.00	71	332
4.00	4.59	74	2.70	73	27.07	74	6842.00	76	11900.00	79	376
5.00	26.29	65	3.68	68	24.17	75	11062.00	63	10700.00	80	351
6.00	78.41	54	10.03	35	62.79	23	17206.00	34	26900.00	41	187
7.00	87.20	39	28.82	8	76.75	5	22500.00	9	48600.00	8	69
8.00	94.63	17	15.78	20	69.85	14	13867.00	53	32500.00	27	131
9.00	59.82	59	26.65	12	40.17	58	4861.00	79	23800.00	51	259
10.00	60.44	58	9.23	40	33.27	67	6607.00	78	13400.00	77	320
10.99	.00	84	.00	83	.00	81	.00	81	.00	81	410
11.00	45.89	64	3.37	70	30.83	70	6927.00	75	14900.00	73	352
12.00	52.97	61	2.51	76	37.92	61	8511.00	71	16600.00	67	336
13.00	26.06	66	4.79	63	36.48	63	7731.00	73	18600.00	64	329
14.00	54.46	60	4.45	64	47.85	50	12057.00	61	21800.00	59	294
15.00	.39	81	8.39	47	35.13	66	8777.00	70	16600.00	67	331
16.00	.13	83	5.59	59	21.30	78	6612.00	77	15000.00	71	368
17.00	2.78	75	2.20	78	16.70	79	4368.00	80	12900.00	78	390
18.00	1.90	77	1.87	79	15.66	80	7647.00	74	15300.00	70	380
19.00	47.16	63	11.83	31	44.59	53	12760.00	59	13600.00	76	282
20.00	85.17	43	14.15	28	56.43	35	14798.00	50	28500.00	36	190
21.00	95.32	15	31.17	5	75.34	8	21114.00	14	37600.00	11	53
22.00	99.03	4	22.64	15	71.39	12	21022.00	15	33600.00	23	69
23.00	98.63	6	20.54	16	76.11	7	19730.00	21	32100.00	28	78
24.00	99.78	1	34.62	3	79.58	4	25568.00	6	51500.00	7	21
25.00	88.42	36	7.75	48	56.07	36	15962.00	46	24300.00	49	215
26.00	24.09	67	2.54	75	24.17	76	9244.00	67	14600.00	74	359
27.00	66.76	56	2.62	74	40.75	56	13169.00	56	20400.00	60	302
28.00	.55	79	5.83	58	36.34	64	10205.00	64	17400.00	65	330
29.00	.18	82	7.01	51	30.45	72	9452.00	68	16900.00	66	337
101.00	97.30	9	6.26	54	41.61	55	20414.00	17	35300.00	17	152
103.00	77.98	55	8.93	45	48.36	48	19487.00	23	32800.00	26	197
104.00	93.02	20	7.02	50	55.96	37	18627.00	27	25800.00	47	181
105.00	98.31	7	4.41	65	39.39	59	20053.00	19	30900.00	31	181
106.00	90.84	29	2.33	77	38.47	60	15769.00	47	24100.00	50	263
107.00	11.22	70	14.26	25	51.79	42	16411.00	44	26400.00	44	225
108.00	5.83	73	6.55	53	40.61	57	16628.00	42	23700.00	53	278
109.00	23.44	68	9.08	42	49.29	46	18507.00	29	26500.00	43	228
110.00	83.70	46	5.95	56	47.82	51	16637.00	41	22100.00	57	251
111.00	86.47	41	2.98	72	53.67	39	16706.00	39	25900.00	46	237
112.00	15.21	69	15.20	23	55.09	38	18540.00	28	28700.00	34	192
113.00	2.61	76	10.73	33	48.18	49	14154.00	52	26900.00	41	251
114.00	.46	80	9.78	37	45.42	52	16185.00	45	22000.00	58	272
115.00	7.84	72	5.13	62	30.66	71	9113.00	68	16300.00	69	342
116.00	.74	78	9.24	39	49.29	45	12898.00	58	19900.00	61	281
117.00	91.03	27	.63	82	36.30	65	14398.00	51	22400.00	55	280
118.00	96.60	10	1.30	80	32.95	68	13588.00	54	19800.00	62	274
120.00	87.22	38	5.45	60	57.61	31	21187.00	12	33700.00	22	163
121.00	90.19	31	3.19	71	37.66	62	13036.00	57	19500.00	63	284
122.00	95.75	13	5.90	57	50.27	44	17056.00	35	27600.00	39	188
123.00	96.30	11	6.67	52	56.65	33	17453.00	33	26300.00	45	174
124.00	98.66	5	9.03	44	59.85	27	18455.00	30	27100.00	40	146
125.00	89.62	35	12.44	30	60.01	26	19196.00	25	35400.00	15	131
127.00	83.58	47	5.33	61	52.73	41	16711.00	38	31900.00	29	216
128.00	85.18	42	9.07	43	61.10	25	19889.00	20	32900.00	25	155
129.00	96.00	12	12.75	29	65.85	19	22872.00	8	35000.00	19	87
130.00	99.62	2	47.89	1	89.24	1	38294.00	1	78700.00	1	6
131.00	99.98	34	29.41	6	75.21	9	20313.00	18	45400.00	9	76
132.00	81.36	49	17.45	17	65.13	20	15782.00	48	37500.00	12	146
133.00	91.19	26	9.27	38	56.84	32	17614.00	32	35800.00	14	142
136.00	80.44	52	10.04	34	31.47	69	9840.00	65	23800.00	51	271
138.00	79.93	53	9.08	41	51.72	43	8915.00	69	25700.00	48	254
138.99	81.26	50	15.59	21	.00	81	.00	81	.00	81	314
144.00	90.98	28	16.62	18	58.76	29	19642.00	22	33500.00	24	121
145.00	99.10	3	7.59	49	52.90	40	21654.00	10	28700.00	34	136
146.00	95.37	14	23.20	13	71.19	13	25625.00	5	52700.00	6	51
147.00	91.27	25	28.06	11	76.17	6	26441.00	3	60900.00	3	48
148.00	84.38	44	22.86	14	67.34	16	15281.00	49	34100.00	21	144
151.00	91.93	23	8.76	46	59.67	28	17650.00	31	28900.00	33	161
152.00	89.99	33	9.98	36	65.98	18	16786.00	37	31600.00	30	154
153.00	91.59	24	15.32	22	67.11	17	19453.00	24	34500.00	20	107
154.00	88.27	37	13.49	27	61.97	24	20422.00	16	29900.00	32	136
155.00	92.10	22	11.25	32	58.28	30	16424.00	43	27800.00	37	164
156.00	92.78	21	29.24	7	79.90	3	24783.00	7	53600.00	5	43
157.00	83.74	45	16.31	19	64.54	21	16677.00	40	35300.00	17	142
160.00	94.30	19	14.49	24	69.48	15	21155.00	13	36300.00	13	84
161.00	90.06	32	13.13	28	64.50	22	18829.00	26	35400.00	15	123
162.00	94.34	18	6.09	55	56.50	34	16961.00	36	27800.00	37	180
163.00	47.76	62	4.23	67	42.86	54	13242.00	55	22600.00	54	292
164.00	90.58	30	28.72	10	75.11	10	21579.00	11	41100.00	10	71
165.00	97.85	8	32.21	4	81.29	2	32178.00	2	61000.00	2	18
168.00	94.96	16	28.72	9	72.32	11	26370.00	4	58700.00	4	44

APPENDEX E

1970-1980 Census Tract Comparability Table

Atlanta, GA

<u>1970</u>	<u>1980</u>
6 9 10	6 10.95
42 43 59	42.95 43
45 46	46.95pt
47 49	49.95pt

Baltimore, MD

<u>1970</u>	<u>1980</u>
1003 1004pt	1003pt 1004

Tract 2002 is located within the urban core but was eliminated from the study due to the fact that in 1980 it consisted of part of tract 1606 which is not in the urban core.

Boston, MA19701980

305pt ————— 305
 305.99

404 ————— 404pt
 405pt ————— 405

503 ————— 503pt
 504pt ————— 504

606pt ————— 606
 606.99

Buffalo, NY19701980

71.02 ————— 71.02pt
 72.01pt ————— 72.02

Chicago, IL

None

Cleveland, OH

None

Jacksonville, FL

None

Kansas City, MO

None

Los Angeles, CA

None

180

Long Beach, CA

None

Louisville, KY

1970

1980

30	{	30
31		49
49		50
50		61
61		

Memphis, TN

None

Miami, FL

1970

1980

53pt	{	53.01
		53.02

Milwaukee, WI

None

Minneapolis, MN

1970

1980

21	—	21pt
22pt	{	22

23	—	23pt
29pt	{	29

41	—	41pt
42pt	{	42

44pt	{	44
52		52pt

Minneapolis, MN (continued)

<u>1970</u>		<u>1980</u>
62pt		62
63		63pt

St. Paul, MN

<u>1970</u>		<u>1980</u>
306pt		306.01
		306.02
346pt		346.01
		346.02
374pt		374.01
		374.02

Nashville-Davidson, TN

None

New Orleans, LA

<u>1970</u>		<u>1980</u>
39		39pt
42		42pt
43pt		
44pt		44.01
		44.02
81pt		81.01
		81.02
93pt		93.01
		93.02

Kings County (Brooklyn), NY

None

Tract 491 is in the urban core but was eliminated from the study due to the fact that in 1980 it consisted of part of tract 493 which is not in the urban core.

New York County (Manhattan), NY19701980

44pt — 44.01
 — 44.02

317pt — 317.01
 — 317.02

Newark, NJ

None

Norfolk, VA

None

Philadelphia, PA

None

Phoenix, AZ

None

Pittsburgh, PA19701980

301 ————— 305pt
 303 ————— 305pt

501pt ————— 501
 503 ————— 503pt

1601 ————— 1601pt
 1603pt ————— 1603

1605pt ————— 1606
 ————— 1607

2006 ————— 2006pt

2009 ————— 2015pt

2011pt ————— 2016

2811pt

2802pt ————— 2809
 2803 ————— 2810pt

2804pt ————— 2812

2806 —————

2104 ————— 2106pt
 2105 ————— 2106pt

2504 ————— 2506pt
 2505 ————— 2506pt

St. Louis, MO19701980

1251 ————— 1255

1252 ————— 1257

1253 ————— 1256pt
 1254 ————— 1256pt

1261 ————— 1266pt
 1262 ————— 1266pt
 1263 ————— 1266pt

St. Louis, MO (continued)

Tract 1244 in 1970 was in the urban core but was eliminated from the study because in 1980 it consisted of part of tract 1246 which was not in the urban core.

San Diego, CA

None

Oakland, CA

None

San Francisco, CA

<u>1970</u>		<u>1980</u>
176pt	—	176.01
	—	176.02
179pt	—	179.01
	—	179.02

Seattle, WA

<u>1970</u>		<u>1980</u>
58pt	—	58.01
		58.02

Toledo, OH

<u>1970</u>		<u>1980</u>
12pt	—	12.01pt
	—	12.02
20pt	—	20pt
30pt	—	30pt

Toledo, OH (continued)

Tract 12, in 1970, was in the urban core but was eliminated from the study because in 1980 it consisted of part of tract 12.01. Part of tract 12.01, in 1980, was also part of tract 55.03 in 1970. Tract 55.03 was not in the urban core.

Washington, D. C.

<u>1970</u>	<u>1980</u>
5pt	5.01 5.02
7pt	7.01 7.02
13pt	13.01 13.02
55pt	55.01 55.02
62pt	62.01 62.02
84pt	84.01 84.02
87pt	87.01 87.02
88.01pt	88.03 88.04
92pt	92.01 92.02
93pt	93.01 93.02

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Northwestern University
S P S S - Statistical Package for the Social Sciences
Version 9.0 . MSU . DEC 11 . 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

• • • • •

ACCORDING TO YOUR INPUT FORMAT. VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
1. NAME	10	1	1-10
2. ADDRESS	20	2	11-30
3. CITY	10	3	1-10
4. STATE	10	4	1-10
5. ZIP	10	5	1-10
6. PHONE	10	6	1-10
7. OCCUPATION	20	7	11-30
8. INCOME	10	8	1-10
9. EDUCATION	10	9	1-10
10. MARRIAGE	10	10	1-10
11. CHILDREN	10	11	1-10
12. PETS	10	12	1-10
13. HOBBIES	20	13	11-30
14. COMMENTS	50	14	1-50

[illegible]

THE INPUT FORMAT PROVIDES FOR 30 VARIABLES. 30 WILL BE READ.
IT PROVIDES FOR 4 RECORDS ("CARDS") PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.

VAR LABELS	PERNC	1980	TOT	CNT	CTY	WK	FORCE	MC/CHANWC	CHNG	TOT	CNT	CTY	WK
FORCE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	FORCE	BC/					8
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					9
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					10
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					11
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					12
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					13
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					14
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					15
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					16
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					17
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					18
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					19
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					20
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					21
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					22
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					23
VALUE	1970-80/EMRG	1980	TOT	CNT	CTY	WK	VALUE	BC/					24

SE VALUE 1970-80/HOUSMAS, 1980 MEDIAN SMSA HOUSE VALUE/CHHUSMA.CH

FACTOR ANALYSIS - 29 CITIES - 30 VAR.

05/17/86 SPSS V9.0 .16.52.52. PAGE 2

NG MEDIAN SMSA HOUSE VALUE 1970-80/A1939, TOT HSE URB COR BLT ON
OR BEFORE 1939/PERCHILD, 1980 TOT FAM CHILD 18 YRS/CHCHILD.CHNG
TOT FAM CHILD 18 YRS 1970-80/
THE FOLLOWING ABBREVIATIONS ARE USED: BC-BLUE COLLAR BLT-BUILT
CHNG-CHANGE, CNT CNT-CENTRAL CITY, FAM-FAMILY HSE-HOUSE, POP-POP
ULATION, TOT-TOTAL, URB COR-URBAN CORE, WC-WHITE COLLAR, WK FORCE
WORK FORCE.
29
N OF CASES

CPU TIME REQUIRED.. .253 SECONDS

FACTOR VARIABLES=PERWC TO CHCHILD/
TYPE=PA2/
NFACTORS=6/
ROTATE=VARIMAX/
ACSCORE/
11.9.22
OPTIONS
STATISTICS
READ INPUT DATA
2.4.5.6

00063400 CM NEEDED FOR FACTOR

OPTION -1
IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)

OPTION -11
WRITE SEQUENCE INFORMATION WITH FACSCORES

OPTION -13
LIST FACSCORES ON OUTPUT

FACTOR ANALYSIS - 29 CITIES - 30 VAR.

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FILE FACTORS (CREATION DATE = 05/17/86)

CORRELATION COEFFICIENTS...

PERWC	CHANWC	PERBC	CHANBC	VALADD	CAEXP	LONGDIS	SHORTDIS	AVERDIS	TOTPOP
1.00000	-.06306	-.95861	-.20519	-.02086	-.07924	-.07746	-.23131	-.04963	-.10322
-.06306	1.00000	-.95861	-.20519	-.02086	-.07924	-.07746	-.23131	-.04963	-.10322
-.95861	-.95861	1.00000	-.07500	-.15854	-.23350	-.07524	-.15392	-.09315	-.02243
-.20519	-.38211	-.07800	1.00000	-.35760	-.26302	-.03217	-.47585	-.32758	-.17406
-.03086	-.25056	-.15854	-.07500	1.00000	-.97597	-.00750	-.44780	-.39019	-.84131
-.07934	-.18431	-.21350	-.26302	-.97597	1.00000	-.01437	-.35771	-.33656	-.86314
-.27746	-.07579	-.07524	-.03217	-.00750	-.01437	1.00000	-.09270	-.10439	-.05493
-.23131	-.40234	-.15392	-.47585	-.44780	-.35771	-.09270	1.00000	1.00000	-.50653
-.04963	-.35361	-.09915	-.32758	-.39019	-.33656	-.10439	-.47499	1.00000	-.43238
-.10322	-.15989	-.02243	-.27506	-.54359	-.83104	-.05493	-.50653	-.43238	1.00000
1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
-.15989	-.30840	-.11896	-.50188	-.50077	-.31125	-.02422	-.66951	-.45196	-.46958
-.30840	-.27339	-.16520	-.41703	-.29559	-.21909	-.20594	-.23069	-.06295	-.45312
-.08533	-.08533	-.25352	-.09394	-.39224	-.31204	-.17072	-.12809	-.10759	-.40344
-.30608	-.46119	-.05121	-.28890	-.40278	-.32047	-.10752	-.45643	-.29692	-.30344
-.03804	-.06331	-.05121	-.10594	-.80985	-.82827	-.08500	-.42393	-.35778	-.95935
-.13409	-.24136	-.00332	-.73219	-.75949	-.75949	-.00276	-.54863	-.43497	-.89367
-.00738	-.02793	-.02509	-.15896	-.33405	-.31197	-.14273	-.55648	-.33373	-.55347

PNWCCPOP	35837	65197	- .08846	- .01539	- .07653	17974	.08350	- .05650	12535	- .09009
CHNWPOP	1.00000	.09424	- .69035	- .41343	- .32897	- .53868	- .47907	- .17174	18639	- .51060
PNWUCPOP	.09424	1.00000	- .08878	- .26039	- .18182	- .16907	- .15944	- .18521	42774	- .00232
CHNWUCPOP	.69035	- .08878	1.00000	- .48668	- .44818	- .48041	- .48605	- .31125	31938	- .76339
HOUSEVAL	41343	- .26039	- .48668	1.00000	1.00000	1.00000	1.00000	1.00000	27935	- .53914
CHHOUSEVAL	32897	- .18182	- .44818	1.00000	1.00000	1.00000	1.00000	1.00000	18941	- .60339
HOUSEMAS	35869	- .16907	- .48041	1.00000	1.00000	1.00000	1.00000	1.00000	18206	- .53234
CHHOUSEMAS	32897	- .18182	- .44818	1.00000	1.00000	1.00000	1.00000	1.00000	17289	- .56467
CH1939	17174	- .16907	- .48041	1.00000	1.00000	1.00000	1.00000	1.00000	17289	- .56467
PERCHILDD	18639	- .42774	- .31125	- .32897	- .18941	- .08206	- .11209	- .17380	1.00000	- .35850
CHCHILD	51060	.00232	- .76339	- .53914	60339	53234	56467	- .21815	35850	1.00000

FACTOR ANALYSIS - 29 CITIES - 30 VAR.
 MATRIX TO BE DECOMPOSED IS NON-POSITIVE DEFINITE
 DUE TO 30-TH PIVOT ELEMENT

DETERMINANT = 0 (0)

*** WARNING *** THE CORRELATION MATRIX IS SINGULAR.

CHECK THE EIGENVALUES OF THE INITIAL FACTOR EXTRACTION
 FACTOR EXTRACTION RESULTS MAY NOT BE RELIABLE.

ORIGINAL CORRELATION MATRIX IS NOT INVERTIBLE.
 FACTOR SCORE COEFFICIENTS CANNOT BE COMPUTED.

SQUARED MULTIPLE CORRELATIONS CANNOT BE FOUND. INITIAL ESTIMATE OF
 COMMUNALITIES IS MAXIMUM OFF-DIAGONAL ELEMENT OF CORRELATION MATRIX.

FACTOR ANALYSIS - 29 CITIES - 30 VAR.
 FILE FACTORS (CREATION DATE = 05/17/86)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
PERWC	.95861	1	8.8722	29.6	29.6
CHANC	.49312	2	5.3632	17.9	47.5
PERBC	.95861	3	5.0328	16.7	64.2
CHANC	.97597	4	2.7630	9.7	73.9
CHANC	.97597	5	1.7815	5.9	79.8
CHANC	.35569	6	1.1377	3.8	83.6
LONGD1S	.66951	7	.96612	3.2	86.8
SHORTD1S	.57197	8	.88204	2.9	89.8
AVERTD1S	.95335	9	.69853	2.3	92.1
TOTPOP	.63687	10	.52695	1.8	93.9
CHTOTPOP	.76597	11	.49886	1.6	95.5
POPUC	.45372	12	.25890	.9	96.4
CHPOPUC	.54118	13	.22032	.7	97.1
CHCCPOP	.95335	14	.13340	.4	97.5
CHCCPOP	.89367	15	.10080	.3	97.9
CHCCPOP	.78607	16	.09279	.3	98.2
CHMUPOP	.76003	17	.04038	.1	98.3
CHMUPOP	.65197	18	.03328	.1	98.4
CHMUPOP	.65197	19	.02697	.0	98.5
CHMUPOP	.76339	20	.00658	.0	98.5
CHMUPOP	.94465	21	.00284	.0	98.5
HOUSEVAL	.94465	22	.00165	.0	98.5
CHHOUSEVAL	.97874	23	.00055	.0	98.5
CHHOUSEVAL	.97874	24	.00015	.0	98.5
CHHOUSEMAS	.49481	25	.00005	.0	98.5
CHHOUSEMAS	.65319	26	.00000	.0	98.5
CHHOUSEMAS	.65319	27	.00000	.0	98.5
CHHOUSEMAS	.65319	28	.00000	.0	98.5
CHHOUSEMAS	.65319	29	.00000	.0	98.5
CHHOUSEMAS	.65319	30	.00000	.0	98.5

NNUCPOP .84952
 CHNWUPOP .94776
 PNWCCPOP .58052
 CHNWPOP .51083
 PNWUCPOP .76092
 CHNWVAL .95144
 CHOUVAL .89464
 HOUVAL .95421
 CHUSMAS .93259
 CHOUSMA .50416
 A1939 .67212
 PERCHILD .67325
 CHCHILD

FACTOR ANALYSIS - 29 CITIES - 30 VAR.
 FILE FACTORS (CREATION DATE = 05/17/86)

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VARIMAX ROTATED FACTOR MATRIX
 AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERNC	.22084	.06183	.06019	.88556	.12050	-.04725
CHANC	-.22685	-.03232	.43667	-.00169	-.02618	.45531
PERNC	-.16081	.05844	-.09973	-.02015	-.02513	.06011
CHANC	.07657	.10883	.63970	.13383	.46448	-.00881
VALADD	.84058	.83676	.34766	-.07071	-.03532	.10694
CAPEXP	.04555	.88503	.21560	.13536	-.01408	-.06474
LONGDTS	.10201	-.05795	.02882	-.01580	.09051	.34280
SHORTDTS	.12036	.32185	.71545	.09948	.08435	-.02073
VERDGR	.35769	.33335	.44738	-.06167	.07110	.07149
AVERTOP	.34722	.30972	.08958	.10349	.18710	.06592
CHTOTPOP	.17077	.30297	.08958	.10349	.18710	.06592
POPUC	.05658	.32443	.87287	.14761	.29245	.18949
CHPOPUC	.33317	.15402	.05681	.13653	.65457	.35570
CCCPUC	.16237	-.62675	.47357	-.10309	-.28875	-.03358
CHPCCPUC	.29132	.20655	.45941	.22526	.18944	.43416
NNCCPOP	.16743	.87828	.20394	-.00064	.25852	.28130
CHNCPOP	.40931	.83183	.20298	.06556	.16036	.01864
NNUCPOP	.14080	.27632	.56759	.03346	-.38038	.53371
CHNCPOP	.15724	.27632	.56759	.03346	-.38038	.53371
PNWUCPOP	.15724	.27632	.56759	.03346	-.38038	.53371
CHNWUPOP	.62214	.02732	.12304	.06523	.26808	.61391
PNWUCPOP	-.03984	.09550	-.05488	.22446	.06716	.10368
CHNWUPOP	.66314	.38508	.18930	-.26341	.04110	.91975
HOUSEVAL	.69314	.11751	.32265	.51082	.38589	-.08502
CHOUVAL	.73500	.09701	.10614	.52092	.24499	.11011
HOUSEVAL	.92149	-.00877	.11260	.28946	.23781	.07637
CHUSMAS	.90631	-.02533	.01130	.32459	.03618	.06131
CHUSMA	.10156	.02763	.09103	.71182	.08520	.18946
A1939	-.10156	.02763	.09103	.71182	.08520	.18946
PERCHILD	.69509	.15241	.07062	-.16308	.96218	-.08079
CHCHILD						

TRANSFORMATION MATRIX

FACTOR	1	2	3	4	5	6
FACTOR 1	.64183	.54039	.47158	.17406	.18307	-.09912
FACTOR 2	-.32228	.58324	.18069	-.48688	-.40487	.34977
FACTOR 3	.19480	.16821	-.48930	-.59588	.00497	.59868
FACTOR 4	.49366	-.30469	.95589	-.60723	.11075	.00497
FACTOR 5	.41728	-.10390	.46026	.63718	.28418	.28418
FACTOR 6						.40028

FACTOR SCORE COEFFICIENTS ARE INDETERMINATE

```

- - - - -
FACTOR ANALYSIS - 29 CITIES - 30 VAR.
CPU TIME REQUIRED.. 1.802 SECONDS
*
TOTAL CPU TIME USED.. 2.063 SECONDS
FINISH
RUN COMPLETED
NUMBER OF CONTROL CARDS READ 42
NUMBER OF ERRORS DETECTED 0
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```

Table F.2

29 Cities - 30 Variables

Vogelback Computing Center
Northwestern University
S P S - Statistical Package for the Social Sciences
Version 9.0, MSU, Dec 11, 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

```

RUN NAME
FILE NAME
VARIABLE LIST
PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.
FACTORS
PERMC,CHANGC,PERBC,CHANGC,VALADD,CAPEXP,LONGDIS,SHORTDIS,
AVERDIS,TOTPOP,CHTPOP,POBUC,CHPOBUC,PCCPOP,CHCPCUP,NMCCPOP,
CHNCCPOP,NMCCPOP,CHNUPPOP,PNMCCPOP,CHNUPPOP,PCNMUPP,
HOUSEVAL,CHQOVAL,CHCQOVAL,CHQOVSMA,A1939,PERCHILD,CHCHILD,
FIXED(316X,9FB,0Y)7,8X,3FB,0)
INPUT FORMAT

```

ACCORDING TO YOUR INPUT FORMAT. VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
PERMC	F 8.0	1	16
PERNC	F 8.0	1	9
PERCC	F 8.0	1	17
CHANG	F 8.0	1	23
CHANG	F 8.0	1	33
VALADD	F 8.0	1	40
CAPEXP	F 8.0	1	41
LONGDIS	F 8.0	1	56
SHORTDIS	F 8.0	1	64
AVERDIS	F 8.0	1	72
TOTPOD	F 8.0	1	80
TOTPOD	F 8.0	1	73
CHOTPOD	F 8.0	1	9
POPUC	F 8.0	2	16
POPUC	F 8.0	2	24
GNPCUC	F 8.0	2	32
GNPCUC	F 8.0	2	33
GNPCUC	F 8.0	2	40
GNPCUC	F 8.0	2	49
MNCCPOP	F 8.0	2	56
MNCCPOP	F 8.0	2	64
MNCCPOP	F 8.0	2	72
MNCCPOP	F 8.0	2	73
MNCCPOP	F 8.0	2	80
MNCCPOP	F 8.0	2	9
MNCCPOP	F 8.0	2	16
MNCCPOP	F 8.0	2	24
MNCCPOP	F 8.0	2	32
MNCCPOP	F 8.0	2	33
MNCCPOP	F 8.0	2	40
MNCCPOP	F 8.0	2	41
PCNNUP	F 8.0	2	48
HOUSEVAL	F 8.0	2	59
CHROVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72
COLNVAL	F 8.0	2	73
COLNVAL	F 8.0	2	80
COLNVAL	F 8.0	2	9
COLNVAL	F 8.0	2	16
COLNVAL	F 8.0	2	24
COLNVAL	F 8.0	2	32
COLNVAL	F 8.0	2	33
COLNVAL	F 8.0	2	40
COLNVAL	F 8.0	2	41
COLNVAL	F 8.0	2	48
COLNVAL	F 8.0	2	59
COLNVAL	F 8.0	2	64
COLNVAL	F 8.0	2	72

THE INPUT FORMAT PROVIDES FOR 30 VARIABLES. 30 WILL BE READ.
IT PROVIDES FOR 4 RECORDS ("CARDS") PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.

PERMC. 1980 TOT CNT CTV WK FORCE WC/CHAMWC.CHNG TOT CNT CTV WK
UNSAFE. 1970-80/PERBC. 1980 TOT CNT CTV WK FORCE BC/
CHANG. CHNG TOTDET C. MANUFORCE BC 1970-80/
CAPDET NEW CAPITAL EXPENDITURES BY MANUFACTURERS/LONGEST
DISTANCE CBD TO URBAN FRINGE/SHORTS DISTANCE
BAN FRINGE/AVERDIS AVERAGE DISTANCE CBD TO URBAN FRINGE
TOTPOP. 1980 TOT CNT CTV POP/CHTPTOP.CHNG TOT CNT CTV POP 1970-80/
/POPUS. 1980 TOT URB COR POP/CHPOP.CHNG TOT URB COR POP 1970-80/
PCCPUS. 1980 TOT CNT CTV POP IN URB COR/CHPCPCP.CHNG TOT POP
CLIN URB COR 1970-80/NNCCPOP. 1980 TOT URB COR POP NON-WHITE/
CLIN URB COR POP NON-WHITE/CHNNPCPOP.CHNG TOT URB COR POP NON-WHITE
O-80/PNNCCPOP. 1980 TOT CNT CTV POP NON-WHITE/CHNNPCPOP.CHNG TOT
-1980/PCCHANNUP.CHNG TOT URB COR POP NON-WHITE 1970-80/HOUSEVAL
-WHITE/MEDIAN CNT CTV HOUSE VALUE/CHHOUSEVAL.CHNG MEDIAN CNT CTV HOU

SE VALUE 1970-80/HOUSMAS, 1980 MEDIAN SMSA HOUSE VALUE/CH-HOUSMA, CH

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR. 05/17/86 SPSS V9.0 .16.51.24. PAGE 2

NG MEDIAN SMSA HOUSE VALUE 1970-80/A1939, TOT MSE URB COR BLT ON
OR BEFORE 1939/PERCHILD 1980 TOT FAM CHILD 18 YRS/CHCHILD.CHNG
TOT FAM CHILD 18 YRS 1970-80/
THE FOLLOWING ABBREVIATIONS ARE USED: BC-BLUE COLLAR, BLT-BUILT
CHNG-CHANGE, CNT CNT-CENTRAL CITY, FAM-FAMILY, MSE-HOUSE, POP-POP
ULATION, TOT-TOTAL, URB COR-URBAN CORE, WC-WHITE COLLAR, WK FORCE
-WORK FORCE.
29
N OF CASES

CPU TIME REQUIRED.. .210 SECONDS

FACTOR VARIABLES=PERWC TO CHCHILD/
TYPE=PA1/
NFACTORS=6/
ROTATE=VARIMAX/
FACSCORE/
11.1.22
OPTIONS 2.4.5.6
STATISTICS
READ INPUT DATA

OO063400 CM NEEDED FOR FACTOR

OPTION -1
{IGNORE MISSING VALUE INDICATORS
{NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED}

OPTION -11

WRITE SEQUENCE INFORMATION WITH FACSCORES

OPTION -19

LIST FACSCORES ON OUTPUT

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.

FILE FACTORS (CREATION DATE = 05/17/86)

CORRELATION COEFFICIENTS..

PERWC	CHAMWC	PERBC	CHAMBC	VALADO	CAPEXP	LONGDIS	SHORTDIS	AVERDIS	TOTPOP
1.00000	-.06936	-.95861	-.20519	-.03086	-.07934	-.07746	-.23131	-.04963	-.10332
-.06936	1.00000	-.06681	-.38211	-.25056	-.18431	-.07579	-.40234	-.35361	-.15989
-.95861	-.06681	1.00000	-.07800	-.15854	-.21350	-.07524	-.15392	-.09915	-.02243
-.06936	-.20519	-.07800	1.00000	-.35760	-.26302	-.03217	-.47585	-.32758	-.17406
-.03086	-.25056	-.15854	-.35760	1.00000	1.07597	-.00750	-.44780	-.39019	-.84131
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000	1.04377	-.35771	-.33656	-.86314
-.03086	-.25056	-.15854	-.35760	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.07934	-.18431	-.21350	-.26302	1.07597	1.00000	1.04377	-.35771	-.33656	-.86314
-.20519	-.38211	-.07800	-.07800	-.35760	1.00000				

PINCCPOP	.35837	.65197	-.08846	-.01539	-.07653	.17974	.08350	-.05650	.12535	-.08009
CHNWCP	1.00000	.03424	-.65075	-.24333	-.28922	-.32809	-.45907	-.16174	.18639	.51060
CHNWUP	.68045	.08779	-.48666	-.48666	.44118	-.48041	-.48605	.31123	.31638	.76335
CHNWG	.41343	-.26039	.48666	1.00000	.94465	.83683	.83427	-.23358	.27835	.53914
HOUSEVAL	.32897	.18182	.48118	.94465	1.00000	.83918	.87722	.19601	.16941	.60339
CHOUVAL	.53868	-.16907	.48041	.83683	.83918	1.00000	.97874	-.08071	-.08206	.53234
HOUSMAS	.47907	-.15944	.48605	.83427	.87722	.97874	1.00000	.14263	.11209	.56467
CHOUSMA	-.17174	-.18521	-.31125	.23358	-.19601	-.08071	.00000	1.00000	.17380	.28115
PERCHILD	.18639	.44274	.31938	-.23358	.83427	.87722	.97874	.14263	.11209	.56467
CHCHILD	.51060	.00232	.76339	.53914	.60339	.53234	.36467	-.21815	.10000	1.00000

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FILE FACTORS (CREATION DATE = 05/17/86)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
PERMC	1.00000	1	8.87242	29.6	29.6
CHAMC	1.00000	2	5.35221	17.9	47.5
PERBC	1.00000	3	5.35221	17.9	65.4
CHAMC	1.00000	4	2.74118	9.1	74.5
VALAD	1.00000	5	2.74118	9.1	83.6
CAPEXP	1.00000	6	1.78125	5.9	89.5
LONGOIS	1.00000	7	1.13778	3.8	93.3
SHORTOIS	1.00000	8	.96612	3.2	96.5
AVEROIS	1.00000	9	.86204	2.9	99.3
TOIPOP	1.00000	10	.69853	2.3	101.6
PRULPOP	1.00000	11	.52692	1.8	103.4
CUOPUC	1.00000	12	.41198	1.4	104.8
PCCPUC	1.00000	13	.25880	.9	105.7
CHCCPUC	1.00000	14	.25880	.9	106.6
MCPCPOP	1.00000	15	.20322	.7	107.3
CHAMCPOP	1.00000	16	.13340	.4	107.7
NAUCPOP	1.00000	17	.10080	.3	108.0
CHAMCPOP	1.00000	18	.08279	.3	108.3
CHAMCPOP	1.00000	19	.04038	.1	108.4
CHAMCPOP	1.00000	20	.03669	.1	108.5
CHAMCPOP	1.00000	21	.01027	.0	108.5
CHAMCPOP	1.00000	22	.00868	.0	108.5
CHAMCPOP	1.00000	23	.00564	.0	108.5
HOUSEVAL	1.00000	24	.00284	.0	108.5
CHOUVAL	1.00000	25	.00185	.0	108.5
HOUSMAS	1.00000	26	.00093	.0	108.5
CHOUSMA	1.00000	27	.00046	.0	108.5
PERCHILD	1.00000	28	.00023	.0	108.5
CHCHILD	1.00000	29	.00000	.0	108.5

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR. 05/17/86 SPSS V9.0 .16.51.24. PAGE 6

FILE FACTORS (CREATION DATE = 05/17/86)

FACTOR MATRIX USING PRINCIPAL FACTOR, NO ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERMC	.39305	-.53318	-.40864	.11161	-.50799	.00170
CHAMC	-.42656	.07710	.22205	.45001	-.33712	.06271
PERBC	-.24435	.56200	.50019	-.14320	.48970	-.04372
VALAD	.32115	-.11025	-.06039	.31977	.10441	-.68725
CAPEXP	.86104	.88481	.10823	-.37736	-.25115	.04427
LONGOIS	.68919	-.15998	-.08870	-.26495	.26327	.34108
SHORTOIS	.64310	.20014	-.30517	-.11877	.13751	-.36781
AVEROIS	.59497	.17673	.00817	-.02280	.35008	-.06228

TOTPOP	.69137	.60663	.01700	-.07583	-.33384	.11554
CHTOTPOP	-.12738	-.59049	-.46005	-.00503	-.01280	-.34355
POPUC	.52851	-.36260	-.80743	-.07862	-.20730	-.26876
CHPOPUC	.51622	-.48636	-.36005	-.31087	-.08418	-.17158
PCCPCUC	-.07695	-.17723	-.42579	-.28593	-.73651	-.09387
CHPCCPCUC	.58318	-.07757	-.46560	-.27134	-.18071	-.12581
CHNCCPCUC	.83339	.56330	.05140	-.04397	-.21498	.12923
CHNCCPOP	.97829	.58400	.35677	-.48866	-.10668	-.08623
CHNCCPOP	.87512	-.11808	-.13568	-.74340	-.18458	-.13998
CHNCCPOP	.04652	.38513	-.10965	-.24305	-.08768	-.15777
CHNCCPOP	.60578	.06139	-.26493	.30976	-.11949	.14546
CHNCCPOP	-.12446	.47642	.26534	.65764	-.16050	.14546
CHNCCPOP	.71459	-.07056	.49241	.03835	-.25726	.03206
CHNCCPOP	.70211	.47612	-.04108	.21862	.14375	.14375
CHNCCPOP	.68039	-.10628	-.06415	.38259	.18661	.35572
CHNCCPOP	.46039	.49048	.01830	.38336	.04167	.34654
CHNCCPOP	.15401	.31978	-.43561	-.18487	.23520	.52773
CHNCCPOP	.06274	.44920	-.84608	-.10515	.35520	.23673
CHNCCPOP	.62377	-.21787	.48211	.13990	.20141	.10883

VARIABLE COMMUNALITY

PERWC	.87627
CHANNWC	.55730
PERBC	.88796
CHANNBC	.77280
CAPEUP	.88579
CHCAPEUP	.88579
LONGEDIS	.30696
SHORTDIS	.71491
AVERDIS	.51224
TOTPOP	.97669
CHTOTPOP	.82286
POPUC	.90158
CHPOPUC	.80831
PCCPCUC	.68453
CHPCCPCUC	.95588
NHCCPCUC	.93115
CHNCCPCUC	.85614
CHNCCPOP	.91697
CHNCCPOP	.73042
CHNCCPOP	.80766
CHNCCPOP	.82130
CHNCCPOP	.95018
HOUSEVAL	.90708
CHHOUSEVAL	.92669
HOUSEMA	.92002
CHHOUSEMA	.98083
PERCHILD	.88120
CHPERCHILD	.74118

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.

FILE FACTORS (CREATION DATE = 05/17/86)

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VARIMAX ROTATED FACTOR MATRIX AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERWC	-.22289	-.06496	-.04562	.89734	.11261	-.04896
CHANNWC	-.11480	-.09854	-.53032	-.00719	-.03209	.50208
PERBC	-.06500	.05756	.00199	-.92799	-.01122	.04508
CHANNBC	.06510	.10405	.68587	-.13743	.51758	.02350
CAPEUP	.05025	.80572	.34451	-.03317	-.08934	-.08971
CHCAPEUP	.05025	.80271	.21225	-.13001	-.01409	-.08971

LONGDOL	15405	07966	02303	04882	19782	-48460
SHORTDOL	11326	32951	75847	10766	08144	00007
AVERTOL	39282	20001	50847	19488	01212	06044
TOTPOP	9327	9823	29426	01015	12866	12866
POP	6137	21784	8471	15700	18802	15719
CHPOP	25630	215674	06644	15230	58810	37462
CHPCUP	16220	67142	51075	09743	30507	00863
CHPCCPUC	18593	20704	49879	36601	20552	43268
CHMCPOP	15928	87125	19504	00214	20665	28378
CHMCPOP	12595	82201	19369	05272	13176	01429
CHMCPOP	32239	38905	53899	03306	39198	55733
CHMCPOP	52249	37119	52822	00860	37933	29436
CHMCPOP	89208	15669	16403	02828	22956	14377
CHMCPOP	03437	01563	09072	33731	03748	87370
CHMCPUP	11136	10613	18268	35921	35770	08556
HOUSEVAL	68786	11807	31177	53879	37726	09161
CHOUVAL	73370	09684	09356	55103	20334	07521
HOUSEVAL	89091	01273	11714	33299	08269	03717
CHOUSMA	88465	03996	01307	36604	01370	04652
A1939	11837	03933	04267	11024	75299	29036
PERCHILD	25700	25269	11962	17363	13667	15594
PERCHILD	75731	14804	04811	16049	33592	08951

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
FACTOR 1	64950	53103	47591	18891	16282	-08648
FACTOR 2	30620	58023	17148	-49872	40231	35998
FACTOR 3	36587	14994	-48733	-57650	57709	06288
FACTOR 4	42495	-28839	-09170	11168	-17683	82710
FACTOR 5	26602	58957	48854	-60881	17867	-21843
FACTOR 6	40293	12661	-52789	-01909	-64452	-38662

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.

FILE FACTORS (CREATION DATE = 05/17/86)

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16.51.24.

CASE	SUBFILE	FACTOR SCORES	2	3	4	5	6
1	FACTOR1	3256	5245	0748	3331	3208	16615
2	FACTOR2	8504	0433	0231	2531	9050	2323
3	FACTOR3	6931	0637	0034	1153	4943	17783
4	FACTOR4	8480	3388	4872	9722	5665	4887
5	FACTOR5	0696	3397	11372	9739	7369	1366
6	FACTOR6	3251	0381	6531	13337	6878	2289
7	FACTOR1	3495	0972	0950	0782	14330	2917
8	FACTOR2	24203	18121	1392	3708	5335	7325
9	FACTOR3	8004	0456	5463	4640	0557	7112
10	FACTOR4	7094	3100	12997	0756	12441	19340
11	FACTOR5	6800	7076	2699	10597	10584	2348
12	FACTOR6	3902	0623	4886	13504	1953	684
13	FACTOR1	0598	4433	1076	1196	2818	11917
14	FACTOR2	2674	6385	2539	1774	8280	24233
15	FACTOR3	8599	0515	5154	5234	10427	2243
16	FACTOR4	5891	1203	7702	3975	1896	1995
17	FACTOR5	5789	1203	1702	3975	1896	1995
18	FACTOR6	7633	4931	1744	9334	5802	465
19	FACTOR1	9869	15514	3119	3377	5514	9332
20	FACTOR2	9434	5151	3143	2580	9595	432
21	FACTOR3	0925	7837	2962	1166	8646	8000
22	FACTOR4	3339	0735	3401	1166	21595	1905
23	FACTOR5	1004	4060	1194	1473	803	797
24	FACTOR6	2717	0788	1269	1473	374	734
25	FACTOR1	1529	0866	0822	1854	9115	1786
26	FACTOR2	5729	158	2469	1550	2260	7412
27	FACTOR3	1165	158	2469	1550	2260	7412
28	FACTOR4	1165	158	2469	1550	2260	7412

29 FACTORS -.1537 -.6584 -.1625 2.4190 -1.0511 1.6957

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.

FILE FACTORS (CREATION DATE = 05/17/86) 05/17/86 SPSS V9.0 .16.51.24. PAGE 9

6 FACTOR SCORES WERE WRITTEN ON FILE FACTS FOR 29 UNWEIGHTED CASES.

1 RECORDS OUTPUT PER CASE

OUTPUT FORMAT IS (F8.0,F2.0,1X,A8.1X,6F10.6). RECORD NUMBER APPEARS LEFT-ZERO-FILLED.

MISSING FACTOR SCORES ARE OUTPUT AS 999.0

NON-MISSING BUT EXTREME FACTOR SCORES ARE TRUNCATED TO +99.0 OR -99.0

FACTORS FROM VARIABLE LIST	FACTOR NUMBER	OUTPUT RECORD NUMBER PER CASE	RECORD COLUMNS	UNWEIGHTED NUMBER OF MISSING CASES
1	1	1	1-8	
2	2	1	9-10	
3	3	1	11-15	
4	4	1	16-20	
5	5	1	21-30	
6	6	1	31-40	
		1	41-50	
		1	51-60	
		1	61-70	
		1	71-80	

PRINCIPLE COMPONENT - 29 CITIES - 30 VAR.

CPU TIME REQUIRED... .541 SECONDS

FINISH

TOTAL CPU TIME USED... .755 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 42

NUMBER OF ERRORS DETECTED 0

APPENDIX F, Table F.3

Regression Analysis - Dependent Variable I with Factor
Scores from Principle Factoring Without Iterations (PA1)
29 Cities - 30 Variables

```

1
2
3
4
5
6
7
8
9
10
11
12
13

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VOGELBACK COMPUTING CENTER
NORTHWESTERN UNIVERSITY
SPSS - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES
VERSION 9.0 . MSU . DEC 11 , 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

* RUN NAME PRIN. COMP.-STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80
* VARIABLE LIST PERCHANG,FACTOR1,FACTOR2,FACTOR3,FACTOR4,FACTOR5,FACTOR6
* INPUT FORMAT FIXED(10X,7F10.6)

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE FORMAT RECORD COLUMNS
PERCHANG F10.6 1 11- 20
FACTOR1 F10.6 1 21- 40
FACTOR2 F10.6 1 41- 60
FACTOR3 F10.6 1 61- 80
FACTOR4 F10.6 1 81- 100
FACTOR5 F10.6 1 101- 120
FACTOR6 F10.6 1 121- 140

THE INPUT FORMAT PROVIDES FOR 7 VARIABLES. 7 WILL BE READ.
IT PROVIDES FOR 80 RECORDS ("CARDS") PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.
* N OF CASES 29
CPU TIME REQUIRED.. .046 SECONDS

* REGRESSION METHOD=STEPWISE/
* VARIABLES=PERCHANG,FACTOR1,FACTOR2,FACTOR3,FACTOR4,
* FACTOR5,FACTOR6
* FACTORS=FACTOR1,FACTOR2,FACTOR3,FACTOR4,FACTOR5,FACTOR6
* REGRESS=PERCHANG WITH FACTOR1(1),FACTOR2(1),
* RESIDUALS=FACTOR4(1),FACTOR5(1),FACTOR6(1))
* OPTION 11-22
* STATISTICS 11-22
* READ INPUT DATA 11-22,4
00057100 CM NEEDED FOR REGRESSION

OPTION -1
IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)
OPTION -11
WRITE RESIDUALS ON BCDOUT
OPTION -22
INHIBIT PRINTING NEW REGRESSION MESSAGE

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PRIN. COMP.-STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80
FILE NONAME (CREATION DATE = 06/19/86 )
* * * * * MULTIPLE REGRESSION * * * * *

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A VALUE OF 99.0000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

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PRIN. COMP. -STEPWISE-29 CITY-CHG. IN # H.S.C.T. - 1970-80
FILE NONAME (CREATION DATE = 06/19/86 )
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06/19/86

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DEPENDENT VARIABLE..	PERCHANG
MEAN RESPONSE	33.21034
STD. DEV.	39.74719
VARIABLE(S) ENTERED ON STEP NUMBER 1..	FACTORS5

MULTIPLE R	51850	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.26890	REGRESSION	1	11892.18639	11892.18639	9.92753	.004
ADJUSTED R SQUARE	.24176	RESIDUAL	27	32343.30031	1197.90002		
R SQUARE	.61069	COEFF OF VARIABILITY	104.2	PCT			
STD DEVIATION	34						

VARIABLES IN THE EQUATION			VARIABLES NOT IN THE EQUATION		
VARIABLE	B	STD ERROR B	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE
FACTOR5	-20.608759	6.5408060	FACTOR1	-.36906	1.00000
(CONSTANT)	33.210346	6.4270442	FACTOR2	.27534	1.00000
			FACTOR3	-.03552	1.00000
			FACTOR4	.02773	1.00000
			FACTOR6	-.09674	1.00000

[illegible][illegible]

FACTORS	-20.608761	6.1948616	11.067271	-.5184961	FACTOR2	.29625	1.00000	2.4052552
FACTOR1	-12.543277	6.1948620	4.0997631	-.00000	FACTOR3	-.03822	1.00000	.3656401E-01
(CONSTANT)	33.210345	6.0871167	29.766207	.00000	FACTOR4	.02984	1.00000	.22273875E-01
			.000		FACTOR6	-.10408	1.00000	.27379757
								.605

PRIN. COMP. STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80
 FILE NONAME (CREATION DATE = 06/19/86)

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***** MULTIPLE REGRESSION *****
 DEPENDENT VARIABLE... PERCHANG
 VARIABLE(S) ENTERED ON STEP NUMBER 3.. FACTOR2

MULTIPLE R	.65104	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.42396	REGRESSION	3.	18749.84053	6249.8484	6.13068	.003
ADJUSTED R SQUARE	.39262	RESIDUAL	24.	19052.19959	793.8733		
STD DEVIATION	31.92664	COEFF OF VARIABILITY	96.1 PCT	25485.94636	1019.43785		

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	
FACTORS	-20.608761	6.0339452	11.665438	FACTOR3	-.04001	1.00000	.38484023E-01
FACTOR1	-12.543276	6.0339455	4.3213476	FACTOR4	.03124	1.00000	.23442106E-01
FACTOR2	9.3579768	6.0339455	2.4052552	FACTOR6	-.10897	1.00000	.28843801
(CONSTANT)	33.210345	5.9289990	31.375020				.596
			.000				

***** FACTOR5 *****
 VARIABLE(S) ENTERED ON STEP NUMBER 4.. FACTOR5

MULTIPLE R	.65628	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.43070	REGRESSION	4.	19052.19959	4763.04990	4.53925	.007
ADJUSTED R SQUARE	.39582	RESIDUAL	24.	25183.28731	1049.30364		
STD DEVIATION	32.39296	COEFF OF VARIABILITY	97.5 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	
FACTORS	-20.608761	6.1216933	11.333410	FACTOR3	-.04025	1.00000	.37324504E-01
FACTOR1	-12.543277	6.1216937	4.1983515	FACTOR4	.03142	1.00000	.22735631E-01
FACTOR2	9.3579768	6.1216937	2.3367957				.881
FACTOR6	-3.2877424	6.1216929	.28843801				
(CONSTANT)	33.210345	6.0152210	30.482008				
			.000				

PRIN. COMP.-STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80
 FILE NONAME (CREATION DATE = 06/19/86)
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE.. PERCHANG
 VARIABLE(S) ENTERED ON STEP NUMBER 5... FACTOR3
 MULTIPLE R .65698
 R SQUARE .43162
 ADJUSTED R SQUARE .30806
 STD DEVIATION 33.06284

PAGE 5

ANALYSIS OF VARIANCE
 REGRESSION 5.
 RESIDUAL 23.
 TOTAL 28.
 COEFF OF VARIABILITY 99.6 PCT
 MEAN SQUARE 3818.60019
 F 3.49320
 SIGNIFICANCE .017

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	VARIABLE	PARTIAL TOLERANCE	F	SIGNIFICANCE
FACTOR5	-20.608761	6.2482899	10.878811	FACTOR4	.03145	1.00000	.21782451E-01
FACTOR1	-12.543276	6.2482903	4.0299193				.884
FACTOR2	9.3579768	6.2482903	2.2430633				
FACTOR6	-3.2877426	6.2482894	.27686836				
FACTOR3	-1.2071416	6.2482902	.37324504E-01				
(CONSTANT)	33.210345	6.1396157	29.259331				

FACTOR4
 MULTIPLE R .65741
 R SQUARE .43218
 ADJUSTED R SQUARE .30833
 STD DEVIATION 33.78920

MEAN SQUARE 3186.31169
 F 2.79082
 SIGNIFICANCE .036

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	VARIABLE	PARTIAL TOLERANCE	F	SIGNIFICANCE
FACTOR5	-20.608761	6.3855580	10.416122				
FACTOR1	-12.543276	6.3855584	3.8585507				
FACTOR2	9.3579766	6.3855584	2.1476631				
FACTOR6	-3.2877427	6.3855575	.26509284				
FACTOR3	-1.2071416	6.3855583	.35737017E-01				
FACTOR4	.94243677	6.3855580	.21782451E-01				
(CONSTANT)	33.210345	6.2744964	28.014896				

ALL VARIABLES ARE IN THE EQUATION.

PRIN. COMP.-STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80
 PAGE 6

FILE NONAME (CREATION DATE = 06/19/86)
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE... PERCHANG

SUMMARY TABLE

STEP	VARIABLE ENTERED	REMOVED	F TO REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE CHANGE	SIMPLE R	OVERALL F	SIGNIFICANCE
1	FACTORS		9.92753	.004	.51850	.26884	-.51850	9.92753	.004
2	FACTOR1		2.09326	.033	.65698	.43586	-.3258	6.19026	.003
3	FACTOR2		2.28444	.596	.65698	.43070	-.0272	4.53925	.007
4	FACTOR3		.03732	.849	.65698	.43162	-.03037	3.49320	.017
5	FACTOR4		.02178	.884	.65741	.43218	-.02371	2.79082	.036

PRIN. COMP. -STEPWISE-29 CITY-CHG. IN # H.S.C.T. -1970-80
 FILE NONAME (CREATION DATE = 06/19/86)

..... MULTIPLE REGRESSION
 OBSERVATION

	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	0.0	+2SD
1.	20.00000	20.18227	-.1822695			
2.	100.0000	62.46248	37.53752			
3.	112.5000	59.20323	53.29677			
4.	20.00000	53.60486	-33.60486			
5.	50.00000	80.88406	-30.88406			
6.	50.00000	51.82095	-1.820954			
7.	33.30000	19.08292	-14.21708			
8.	15.70000	3.45318	-18.24682			
9.	33.30000	46.88233	-13.58233			
10.	0	14.80340	-14.80340			
11.	0	13.45482	-13.45482			
12.	-16.70000	34.58808	-51.28808			
13.	50.00000	37.94531	12.05469			
14.	50.00000	49.04593	95.06866			
15.	20.00000	17.38741	2.61259			
16.	125.0000	69.85536	55.14464			
17.	3.00000	32.84329	-29.84329			
18.	11.80000	17.01785	-5.217845			
19.	0	18.39062	-18.39062			
20.	111.1000	89.79605	21.30395			
21.	0	-14.47244	14.47244			
22.	14.30000	5.27525	-5.27525			
23.	0	4.890860	-4.890860			
24.	0	28.66218	-14.36218			
25.	22.20000	32.99726	-10.79726			
26.	15.00000	47.53964	-32.53964			

NOTE - (S) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
 R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED 29.
 NUMBER OF 2 S.D. OUTLIERS 1. OR 3.45 PERCENT OF THE TOTAL
 VON NEUMANN RATIO 1.92463 DURBIN-WATSON TEST 1.85626
 NUMBER OF POSITIVE RESIDUALS 11.
 NUMBER OF NEGATIVE RESIDUALS 18.
 NUMBER OF RUNS OF SIGNS
 EXPECTED NUMBER OF RUNS OF SIGNS 15.
 S.D. OF RUN DISTRIBUTION 2.48430
 UNIT NORMAL DEVIATE
 PROBABILITY OF OBTAINING .GE. ABS(Z) -1.27005
 .10203

RESIDUALS -	29 CASES WRITTEN ON FILE BCDOUT				

PRIN. COMP.-STEPWISE-29 CITY-CHG. IN # H.S.C.T.-1970-80		06/19/86	SPSS V9.0	.17.22.17.	PAGE 8
CPU TIME REQUIRED..	.203 SECONDS				
•	FINISH				14
TOTAL CPU TIME USED..	.261 SECONDS				
RUN COMPLETED					
NUMBER OF CONTROL CARDS READ	14				
NUMBER OF ERRORS DETECTED	0				

Principle Factoring With Iterations (PA2)
32 Cities - 30 Variables

89
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PNWCCPOP	.35636	.65627	-.09792	-.00700	-.06706	.19076	.10020	-.09235	.08768	-.13064
CHNWPOP	1.00000	.08768	-.68098	.44711	.06192	.57730	.50059	-.18924	.41074	-.01323
PNHWCPOP	.68098	1.00000	-.09653	-.26700	-.18654	-.16591	-.15050	-.18924	.41074	-.01323
CHNWUP	.68098	1.00000	-.09653	-.26700	-.18654	-.16591	-.15050	-.18924	.41074	-.01323
HOUSEVAL	.44711	-.09653	1.00000	.48399	.44882	.84566	.84315	.30350	.29774	.74603
CHHOVAL	.36142	-.18654	.48399	.48399	.94718	.84566	.84315	.30350	.29774	.74603
HOUSEMAS	.56730	-.16591	.46882	.94718	1.00000	1.00000	.88130	.22856	.22762	.54704
CHHOUSEMA	.51053	-.15650	.46882	.84566	.84566	1.00000	.88130	.22856	.22762	.54704
PERCHLD	-.21547	-.18924	-.30350	.84315	.88130	.88130	1.00000	.19529	.16985	.48480
PERCHLD	-.18924	-.30350	.84315	.88130	.88130	.88130	1.00000	.19529	.16985	.48480
CHCHILD	.44923	-.01323	.74603	.47752	.54704	.44799	.48480	.22728	.37405	1.00000

FACTOR ANALYSIS - 32 CITIES - 30 VAR. 06/19/86 SPSS V9.0 .16.45.22. PAGE 5

DETERMINANT = .0000000 (.27832899E-30)

*** WARNING *** THE CORRELATION MATRIX IS NEARLY SINGULAR.
AN ATTEMPT WILL STILL BE MADE TO OBTAIN SQUARED MULTIPLE CORRELATIONS
AS COMMUNALITY ESTIMATES.

FACTOR ANALYSIS - 32 CITIES - 30 VAR. 06/19/86 SPSS V9.0 .16.45.22. PAGE 6

FILE FACTORS (CREATION DATE = 06/19/86)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
PERWC	.99728	1	9.05391	30.2	30.2
CHANC	.94406	2	5.24307	17.5	47.7
PERBC	.99695	3	3.03574	10.1	57.8
CHANC	.98287	4	2.58666	8.6	66.4
VALADD	.99704	5	2.20168	7.3	73.7
CAPEAP	.99163	6	1.70957	5.7	79.4
LONGHLS	.86090	7	1.09507	3.7	83.1
AVERTDS	.98407	8	.92775	3.2	86.3
TOTPOP	.99912	9	.67899	2.3	88.6
CHTOTPOP	.99651	10	.51326	1.7	90.3
POPUC	.99921	11	.49634	1.7	92.0
CHPOPUC	.99780	12	.42314	1.4	93.5
PCCPUC	.97492	13	.29425	1.0	94.5
CHPCCPUC	.99437	14	.21683	.7	95.2
PNWCCPOP	.99593	15	1.5709	.5	95.7
CHPCCPOP	.99831	16	.08987	.3	96.0
PNWCCPOP	.99801	17	.04968	.2	96.2
CHPCCPOP	.99640	18	.03244	.1	96.3
PNWCCPOP	.99671	19	.02907	.1	96.4
CHPCCPOP	.99640	20	.01802	.1	96.5
PNWCCPOP	.99628	21	.01069	.0	96.5
CHPCCPOP	.99837	22	.00849	.0	96.5
HOUSEVAL	.99901	23	.00767	.0	96.5
CHHOUSEVAL	.99887	24	.00364	.0	96.5
HOUSEMAS	.99952	25	.00322	.0	96.5
CHHOUSEMAS	.99934	26	.00051	.0	96.5
A1939	.94038	27	.00018	.0	96.5
PERCHLD	.98306	28	.00012	.0	96.5
CHCHILD	.99000	29	.00012	.0	96.5
CHCHILD	.99000	30	.00012	.0	96.5

FACTOR ANALYSIS - 32 CITIES - 30 VAR. 06/19/86 SPSS V9.0 .16.45.22. PAGE 7

FILE FACTORS (CREATION DATE = 06/19/86)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERMC	.43495	.51674	.39398	.03758	.48425	.05572
PERMC	.40857	.07007	.04185	.41616	.28213	.00355
PERBC	.28332	.54406	.49699	.02574	.48707	.00711
CHANC	.54385	.10423	.04136	.13589	.14557	.55988
VALAD	.60040	.57928	.08319	.22796	.15971	.00593
CAEXP	.53947	.61974	.21291	.27993	.15723	.04865
SHORTIS	.93959	.13870	.02966	.19591	.15723	.20807
SHORTIS	.93959	.13870	.02966	.19591	.15723	.20807
AVERTD1S	.57054	.18426	.00277	.00702	.26582	.31172
TOTPOP	.69385	.65934	.43160	.08293	.32084	.08676
CHTOTPOP	.14952	.11094	.02131	.02131	.35884	.08676
POPUC	.55777	.59371	.59371	.10352	.22414	.22414
CHPOPUC	.50848	.44644	.43345	.19431	.17102	.17102
PCPCUC	.01738	.19769	.43467	.12587	.00444	.00444
CHPCPCUC	.59769	.07544	.30999	.33168	.69407	.69407
NWCCPOP	.58171	.70762	.09623	.07317	.31939	.10828
CHNWCCPOP	.81817	.36999	.26118	.14440	.19448	.04193
CHNUCPOP	.87495	.55225	.34308	.27308	.25922	.12633
PNWCCPOP	.05338	.39822	.29960	.40612	.02132	.08449
CHNWPOP	.59684	.07654	.14364	.32256	.15328	.11962
PNWUCPOP	.13591	.41130	.03920	.71842	.16428	.34987
CHNWUP	.68484	.04925	.48961	.16270	.21695	.03245
HOUSEVAL	.82808	.45039	.15162	.11478	.05989	.00617
CHHOUSEVAL	.73973	.50576	.07008	.20375	.16345	.11398
HOUSEMAS	.71273	.38464	.15155	.36712	.09083	.36916
CHHOUSEMAS	.63141	.45170	.07191	.37504	.01084	.34728
PERCHILDO	.02832	.21882	.48750	.32468	.27073	.18922
CHCHILD	.52868	.17624	.47750	.20293	.15337	.08428

CONVERGENCE REQUIRED 11 ITERATIONS.

FACTOR ANALYSIS - 32 CITIES - 30 VAR.

FILE FACTORS (CREATION DATE = 06/19/86)

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VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
PERMC	.85043	1	8.86989	39.5	39.5
PERMC	.84639	2	2.80438	12.7	52.2
PERBC	.86147	3	2.30925	10.3	62.5
CHANC	.85333	4	1.96175	8.7	71.2
VALAD	.85557	5	1.41375	6.3	77.5
CAEXP	.13331	6			83.7
LONGD1S	.65523				90.0
SHORTD1S	.42246				96.3
AVERTD1S	.88820				100.0
TOTPOP	.80080				
CHTOTPOP	.97157				
POPUC	.72893				
CHPOPUC	.62135				
PCPCUC	.98752				
NWCCPOP	.91430				
CHNWCCPOP	.83446				
CHNUCPOP	.95207				
CHNWUP	.59805				
PNWCCPOP	.52364				
CHNWCCPOP	.70676				
CHNUCPOP	.9832				
HOUSEVAL	.88978				
CHHOUSEVAL	.95820				
HOUSEMAS	.95449				
CHHOUSEMAS	.9439				
A1939	.46708				
PERCHILDO	.67714				

FACTOR ANALYSIS - 32 CITIES - 30 VAR.
FILE FACTORS (CREATION DATE = 06/19/86)

VARIMAX ROTATED FACTOR MATRIX
AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERMC	06487	24639	05370	86922	15103	-05548
CHANWC	13150	-17230	-40573	-09105	-47322	-07322
PERBC	05055	-17581	-00925	-90779	-03150	-05150
CHANBC	12864	05543	59955	15881	50542	02375
VALADD	84828	02596	30750	-07527	-01120	11887
CAPEXP	89617	01895	15974	-14569	-01195	-07314
LONGDLS	-05147	11712	04575	08004	-07994	32824
SORTDLS	34281	11533	69900	10954	14434	-05456
AVROIS	27354	32968	44552	13399	06562	-06378
AVROIS	33275	20691	12805	02814	18873	07374
CLOTPOP	24195	30193	88213	15001	-22778	05214
POPUC	15983	20415	00207	14207	68395	33908
CCPPUC	58562	18795	52442	-09131	24304	07431
CHPCPPUC	22560	30377	25208	25208	11836	-04168
NMCCPOP	87634	18953	22914	01900	-23859	27173
CHNCCPOP	81372	41169	20245	04628	19859	01060
NNUCCPOP	28900	17436	62173	03544	33485	47034
CINNUCCPOP	38271	46731	48370	03190	-48872	37354
PNMCCPOP	01636	16823	20970	04855	27235	67009
CHNPPPOP	23337	62341	20606	12818	10568	10235
PNMPPPOP	09556	-04140	-02264	21040	-01546	92372
CHPPOP	25018	83697	15217	24652	33480	02177
CHPPVAL	10129	78041	30482	50579	37074	-09177
CHOUSMAL	00386	91786	15774	50979	06375	05042
CHOUSMA	00328	90393	05188	29296	-02479	06335
CHOUSMA	03331	13720	02333	32600	06838	05908
PERCHLD	23663	14682	-11905	16143	58566	28313
PERCHLD	15396	61101	-00735	74395	-08039	15974
PERCHLD				20881	40321	-09597

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
FACTOR 1	1.0000					
FACTOR 2	-.5245	1.0000				
FACTOR 3	-.2042	-.5806	1.0000			
FACTOR 4	-.2409	-.1956	-.4796	1.0000		
FACTOR 5	-.1230	-.5120	-.1412	-.5093	1.0000	
FACTOR 6	-.4732	-.1826	-.5453	-.6137	-.0794	1.0000
FACTOR 1	-.0858	-.4625	-.4486	-.0977	-.6471	-.3848
FACTOR 2	-.3450	-.3950	-.2929	-.3430	-.3950	-.1217
FACTOR 3	-.1343	-.5977	-.5093	-.5977	-.1343	-.8052
FACTOR 4	-.8052	-.0385	-.0385	-.8052	-.0385	-.2487
FACTOR 5	-.2487	-.6718	-.6718	-.2487	-.6718	-.3848

FACTOR ANALYSIS - 32 CITIES - 30 VAR.
FILE FACTORS (CREATION DATE - 06/19/86)

CASE SEQNUM	SUBFILE	FACTOR SCORES					
		1	2	3	4	5	6
1	FACTORS	-.6680	-.5732	.9085	.3718	-2.8094	.9743
2	FACTORS	-.8110	-.0222	.5372	-.5846	-1.8850	.4985
3	FACTORS	-.7584	-.5909	.2341	.7358	-.3817	-1.9476

4 FACTORS 1996 8279 2 3252 -1 9093 -3 8107 1 3826
5 FACTORS 3 7298 -2553 -1 6181 -1 1999 -2673 1 2392
6 FACTORS -1353 1991 -1 5423 -1 8351 -1 6762
7 FACTORS -1 8371 1 4778 -1 8366 -1 2800 -1 0465
8 FACTORS 2 1516 -1 1234 -1 1767 -1 0133 9027 0102
9 FACTORS 2 9849 1 7763 1 5717 -1 2556 5176 -1 1426
10 FACTORS 1 7978 -1 9550 -1 0199 -1 6998 -1 5851
11 FACTORS 4 600 -1 845 -1 924 2 952 1 2248
12 FACTORS -5347 -1 612 -1 088 1 3246 1 2767
13 FACTORS 5 441 1 1084 -1 9608 -1 4047 -1 691
14 FACTORS -8400 3737 -1 4845 -1 1450 -1 0839
15 FACTORS -4752 -1 0169 -1 0773 2337 -1 5499 -1 5626
16 FACTORS 5991 3460 -1 0919 2 1997 1 8150
17 FACTORS -5931 -1 2351 -1 0423 4 0975 1 3416
18 FACTORS 1 1410 -1 8312 -1 4533 -1 3234 7710
19 FACTORS 2 4865 -1 1605 4 1605 1 0842 8166
20 FACTORS -2 236 -1 2146 -1 3942 2 003 3866
21 FACTORS 1 4309 -1 9480 -1 915 1 3289 -1 6097 1 1258
22 FACTORS 6220 -1 8544 1289 -1 1444 1 640
23 FACTORS -1 3069 -1 3937 -1 2205 -1 5270 -1 8995
24 FACTORS -2361 -1 9334 -1 7679 4498 -1 7358
25 FACTORS 2 4030 1 4926 -1 8358 6749 2 4562 -1 3972
26 FACTORS -4079 1 543 3319 -1 3780 9647
27 FACTORS -2197 1 0349 1 9242 -1 8928 1 1916
28 FACTORS -1 500 1 688 2 049 1 1916 3 0283
29 FACTORS 3 657 -1 8572 -1 616 1 1202
30 FACTORS 3 957 -1 2926 3 0491 -3 0737 2 0206
31 FACTORS
32 FACTORS

FACTOR ANALYSIS - 32 CITIES - 30 VAR. 06/19/86 SPSS V9.0 .16.45.22. PAGE 11
FILE FACTORS (CREATION DATE = 06/19/86)

6 FACTOR SCORES WERE WRITTEN ON FILE FACTS FOR 32 UNWEIGHTED CASES.

OUTPUT FORMAT IS
(FB.O.F2.O.1X.A8.1X.6F10.6). RECORD NUMBER APPEARS LEFT-ZERO-FILLED.
MISSING FACTOR SCORES ARE OUTPUT AS 999.0
NON-MISSING BUT EXTREME FACTOR SCORES ARE TRUNCATED TO +99.0 OR -99.0

FACTORS FROM VARIABLE LIST	FACTOR NUMBER	OUTPUT RECORD NUMBER PER CASE	RECORD COLUMNS	UNWEIGHTED NUMBER OF MISSING CASES
RECORD NUMBER SUBFILE				
1	1		1-8	
2	2		9-16	
3	3		17-24	
4	4		25-32	
5	5		33-40	
6	6		41-48	
			49-56	
			57-64	
			65-72	
			73-80	

FACTOR ANALYSIS - 32 CITIES - 30 VAR. 06/19/86 SPSS V9.0 .16.45.22. PAGE 12
CPU TIME REQUIRED.. 1.947 SECONDS

* FINISH
TOTAL CPU TIME USED.. 2.158 SECONDS 42

RUN COMPLETED
NUMBER OF CONTROL CARUS READ 42
NUMBER OF ERRORS DETECTED 0

APPENDIX F, Table F.5

Regression Analysis - Dependent Variable II With Factor Scores from Principle Factoring With Iterations (PA2) 32 Cities - 30 Variables

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06/19/86      SPSS V9.0      .17.11.52.      PAGE      1
VOGELBACK COMPUTING CENTER
NORTHWESTERN UNIVERSITY
S P S - - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES
VERSION 9.0 . MSU . DEC 11 . 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

:      RUN NAME      F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80
:      VARIABLE LIST  PERCHANG.FACTOR1.FACTOR2.FACTOR3.FACTOR4.FACTOR5.FACTOR6
:      INPUT FORMAT  FIXED(10X,7F10.6)

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE  FORMAT  RECORD  COLUMNS
PERCHANG  F10.6    1      11- 20
FACTOR1   F10.6    1      21- 30
FACTOR2   F10.6    1      31- 40
FACTOR3   F10.6    1      41- 50
FACTOR4   F10.6    1      51- 60
FACTOR5   F10.6    1      61- 70
FACTOR6   F10.6    1      71- 80

THE INPUT FORMAT PROVIDES FOR 7 VARIABLES. 7 WILL BE READ.
IT PROVIDES FOR 80 RECORDS. 1 RECORDS PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.

.      N OF CASES      32
CPU TIME REQUIRED...    .034 SECONDS

.      REGRESSION      METHOD=STEPWISE/
.                      VARIABLE=PERCHANG.FACTOR1.FACTOR2.FACTOR3.FACTOR4.
.                      FACTOR5.FACTOR6
.                      REGRESSION=PERCHANG WITH FACTOR1(1).FACTOR2(1).
.                      FACTOR3(1).FACTOR4(1).FACTOR5(1).FACTOR6(1)}
.                      RESIDUALS/
.                      11,22
.                      OPTION
.                      STATISTICS
.                      READ INPUT DATA 1,3,5,4
.                      00057100 CM NEEDED FOR REGRESSION

OPTION - 1
IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)
OPTION -11
WRITE RESIDUALS ON BCDOUT
OPTION -22
INHIBIT PRINTING NEW REGRESSION MESSAGE

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80
FILE  NONAME      (CREATION DATE = 06/19/86 )
..... MULTIPLE REGRESSION .....

```

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

FACTOR1	-.00217	-.25035			
FACTOR2	-.07466	-.02138	13749		
FACTOR3	-.03140	-.31924	-.09405		
FACTOR4	-.09262	-.30731	-.43386	-.03205	
FACTOR5	-.15830	-.02689	-.12378	-.16930	-.03095
FACTOR6	-.14254	-.26802	-.16547	-.16930	
PERCHANG	FACTOR1	FACTOR2	FACTOR3	FACTOR4	FACTOR5

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80 06/19/86 SPSS V9.0 17.11.52. PAGE 3

FILE NONAME (CREATION DATE = 06/19/86)

..... MULTIPLE REGRESSION

DEPENDENT VARIABLE... PERCHANG

MEAN RESPONSE 3.03750 STD. DEV. 3.83883

VARIABLE(S) ENTERED ON STEP NUMBER 1... FACTORS

MULTIPLE R	.15830	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.02506	REGRESSION	1	11.44850	11.44850	.77114	.387
ADJUSTED R SQUARE	.0	RESIDUAL	30	445.38650	14.84622		
STD DEVIATION	3.85308	COEFF OF VARIABILITY	126.9 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	
FACTORS	-.35053985	.39918207	.77113913	FACTOR1	-.00651	.99928	.12305090E-02
(CONSTANT)	3.0375000	.68113455	19.886885	FACTOR2	-.12988	.98468	.4975688E-01
			.000	FACTOR3	-.04191	.81176	.51032004E-01
				FACTOR4	.08871	.99897	.23001979
				FACTOR6	-.14939	.99904	.66201814
							.422

VARIABLE(S) ENTERED ON STEP NUMBER 2... FACTOR6

MULTIPLE R	.21638	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.04662	REGRESSION	2	21.38825	10.69413	.71223	.499
ADJUSTED R SQUARE	.0	RESIDUAL	28	435.44605	15.55168		
STD DEVIATION	3.87497	COEFF OF VARIABILITY	127.6 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	

FACTORS	-.36065278	.40164222	.80630594	-.1628720	FACTORS	.03509	.92782	.34527312E-01
FACTORS	-.44156669	.54270193	.66201814	-.1475814	FACTORS	-.15948	.95599	.73075474
(CONSTANT)	3.0375000	.68500413	19.662838	.00000	FACTORS	-.01753	.78935	.86023154E-02
			.000		FACTORS	.11684	.97062	.38754265
								.539

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80 06/19/86 SPSS V9.0 .17.11.52. PAGE 4

FILE NONAME (CREATION DATE = 06/19/86)

***** MULTIPLE REGRESSION *****

DEPENDENT VARIABLE... PERCHANG

VARIABLE(S) ENTERED ON STEP NUMBER 3... FACTOR2

MULTIPLE R	R SQUARE	ADJUSTED R SQUARE	STD DEVIATION	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
.2658	.07106	.07106		REGRESSION	3	32.46434	10.82145	.71400	.552
				RESIDUAL	28	424.37086	15.15609		
				COEFF OF VARIABILITY	128.2	PCT			

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	
FACTORS	-.40614855	.40701440	.95574987	-.1834181			
FACTORS	-.52231139	.55336006	.89092956	-.1745680			
FACTORS	-.49743913	.58190773	.73075474	-.1592477			
(CONSTANT)	3.0375000	.68820634	19.480282	-.00000			
			.000				

VARIABLES ENTERED ON STEP NUMBER 4... FACTOR4				VARIABLES NOT IN THE EQUATION					
MULTIPLE R	R SQUARE	ADJUSTED R SQUARE	STD DEVIATION	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
.27556	.07593	.07593		REGRESSION	4	34.68318	8.67229	.55467	.697
				RESIDUAL	27	422.14582	15.63503		
				COEFF OF VARIABILITY	130.2	PCT			

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	
FACTORS	-.39517528	.41441746	.90929217	-.1784625			
FACTORS	-.54818621	.56620538	.93736394	-.1832160			
FACTORS	-.42579984	.62079259	.47045342	-.1353585			
FACTORS	.22840666	.60549324	.14229805	.0744015			
(CONSTANT)	3.0375000	.69899550	18.883558	-.00000			
			.000				

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION.

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80
 FILE NONAME (CREATION DATE = 06/19/86)
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE.. PERCHANG

SUMMARY TABLE

STEP	VARIABLE ENTERED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE CHANGE	R SQUARE SIMPLE	OVERALL F	SIGNIFICANCE
1	FACTORS	.77114	.387	.15830	.02506	.15830	.77114	.387
2	FACTOR6	.66202	.422	.21638	.04682	.14223	.71223	.499
3	FACTOR2	.73075	.400	.26558	.07106	.10766	.71400	.552
4	FACTOR4	.14230	.709	.27556	.07593	.09467	.55467	.697

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80
 FILE NONAME (CREATION DATE = 06/19/86)
 MULTIPLE REGRESSION

OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	0.0	+2SD
1.	2.700000	3.942591	-1.242591			
2.	4.100000	3.385043	.7149566			
3.	19.60000	4.673360	14.92664			
4.	7.400000	2.855697	-4.555697			
5.	2.800000	3.855889	1.055889			
6.	1.200000	4.021853	2.821853			
7.	4.000000	3.100712	-.8952882			
8.	2.700000	3.150469	-.4504686			
9.	0	2.126150	-2.126150			
10.	2.300000	2.858648	-.5586480			
11.	2.200000	2.748905	-.5489052			
12.	0	1.944343	-1.944343			
13.	0	3.262809	-3.262809			
14.	-1.100000	3.596238	4.696238			
15.	4.100000	3.593776	-.493776			
16.	2.200000	4.157575	1.957575			
17.	5.600000	2.114924	-.3450758			
18.	3.200000	3.218390	2.878161			
19.	6.100000	2.663611	3.436389			
20.	1.100000	3.542190	2.442190			
21.	2.300000	1.707133	-1.392867			
22.	0	2.072866	-2.072866			
23.	8.700000	1.073316	-.6266839			
24.	0	1.802493	-1.802493			
25.	1.100000	4.993928	3.893928			
26.	3.000000	2.647692	-.3523079			
27.	0	1.803215	-1.803215			
28.	0	1.710633	-1.710633			
29.	3.400000	3.065287	3.347135			
30.	4.800000	3.623067	1.768933			
31.	0	4.732569	-4.732569			
32.	3.700000	3.716327	-.01632747E-01			

NOTE - (-) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
 R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED 32. OR 3.13 PERCENT OF THE TOTAL
 NUMBER OF 2 S.D. OUTLIERS 1. OR 3.13 PERCENT OF THE TOTAL
 VON NEUMANN RATIO 2.14380 DURBIN-WATSON TEST 2.07681
 NUMBER OF POSITIVE RESIDUALS 13.
 NUMBER OF NEGATIVE RESIDUALS 19.
 NUMBER OF RUNS OF SIGNS 19.
 EXPECTED NUMBER OF RUNS OF SIGNS 16.

EXPECTED S.D. OF RUN DISTRIBUTION 2.68135
 UNIT NORMAL DEViate
 Z*(OBSERVED-EXPECTED+0.5)/(S.D. 1.14215
 PROBABILITY OF OBTAINING .GE. ABS(Z) .12670

RESTOUALS - 32 CASES WRITTEN ON FILE BCDOUT

F.A.-STEPWISE-32 CITY-CHG. U.C.T. THAT ARE H.S. 1970-80

CPU TIME REQUIRED.. .188 SECONDS

• FINISH

TOTAL CPU TIME USED.. .236 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 14
 NUMBER OF ERRORS DETECTED 0

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CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

FACTOR1	-.11811				
FACTOR2	-.08373	-.25035			
FACTOR3	-.08863	-.02138	.13749		
FACTOR4	.28251	.30731	-.31924	-.09405	
FACTOR5	-.01855	-.02689	-.12378	-.43386	-.03205
FACTOR6	.20868	.26802	-.16307	-.16930	-.03095
PERCHANG					
FACTOR1					
FACTOR2					
FACTOR3					
FACTOR4					
FACTOR5					

F.A.-STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80

SPSS V9.0

PAGE 3

FILE NONAME (CREATION DATE = 06/24/86)

***** MULTIPLE REGRESSION *****

DEPENDENT VARIABLE.. PERCHANG

MEAN RESPONSE 17.02500 STD. DEV. 8.42217

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FACTOR4

MULTIPLE R	.28251	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.07981	REGRESSION	1.	175.49756	175.49756	2.60199	.117
ADJUSTED R SQUARE	.04914	RESIDUAL	30.	2023.42244	67.44741		
STD DEVIATION	8.21264	COEFF OF VARIABILITY	48.2 PCT				

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
FACTOR4	1.9027551	1.1795871	2.6019909	.117	.2825081	-.00000	FACTOR1	-.22449	.90556	1.5390402	.225
(CONSTANT)	17.025000	1.4518029	137.51780	.000			FACTOR2	.00710	.89809	.14640168E-02	.141
							FACTOR3	-.04405	.99115	.56369071E-01	.814
							FACTOR5	-.00991	.99897	.28461505E-02	.958
							FACTOR6	.17014	.97134	.86445767	.360

----- VARIABLES NOT IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
MULTIPLE R	.35522										
R SQUARE	.12618										
ADJUSTED R SQUARE	.08592										
STD DEVIATION	8.13983										

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE

FACTOR4	2.3711484	1.2285829	3.7248414	.3520516	FACTOR2	-.03206	.87249	.28807196E+01
FACTOR1	-1.5270299	1.2308994	1.5390402	-.2262963	FACTOR3	-.04337	.99109	.52766167E+01
(CONSTANT)	17.025000	1.4389331	139.98872	-.00000	FACTOR5	-.01430	.99865	.57236445E+02
			.000		FACTOR6	.23393	.91982	1.621055E+01

F.A. STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80 06/24/86 SPSS V9.0 .23.54.36. PAGE 4

FILE NONAME (CREATION DATE = 06/24/86)

DEPENDENT VARIABLE... PERCHANG MULTIPLE REGRESSION

VARIABLE(S) ENTERED ON STEP NUMBER 3.. FACTOR6

MULTIPLE R	.41714	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.17400	REGRESSION	3.	382.92436	127.64145	1.96616	.142
ADJUSTED R SQUARE	.08350	RESIDUAL	27.	1816.29804	67.26979		
STD DEVIATION	8.05405	COEFF OF VARIABILITY	47.3 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE
FACTOR4	2.2237182	1.2211381	3.3161180	.3301625	FACTOR2	-.01285	.86638
FACTOR1	-1.8940162	1.2515712	2.2901096	-.2806813	FACTOR3	-.09084	.95696
FACTOR6	1.4967307	1.1755706	1.6210257	.00000	FACTOR5	-.00932	.99815
(CONSTANT)	17.025000	1.4237691	142.98654	.00000			.23455227E+02

VARIABLE(S) ENTERED ON STEP NUMBER 4.. FACTOR3

MULTIPLE R	.42523	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.18082	REGRESSION	4.	397.60895	99.40249	1.48995	.233
ADJUSTED R SQUARE	.08946	RESIDUAL	27.	1801.31005	66.71519		
STD DEVIATION	8.16794	COEFF OF VARIABILITY	48.0 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE
FACTOR4	2.1582923	1.2460738	3.000811	.3204485	FACTOR2	-.00056	.85050
FACTOR1	-1.9154505	1.2700734	2.2744909	-.2838578	FACTOR5	-.05546	.80259
FACTOR6	1.6034552	1.2132700	1.7466143	.00000			.80228994E+01
FACTOR3	-.5156067	1.0878242	.22465630	-.0843958			.779
(CONSTANT)	17.025000	1.4439008	139.02712	.00000			

F.A.-STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80
 FILE NONAME (CREATION DATE = 06/24/86) SPSS V9.0 .23.54.36. PAGE 5
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE.. PERCHANG
 VARIABLE(S) ENTERED ON STEP NUMBER 5.. FACTORS
 MULTIPLE R .42818 ANALYSIS OF VARIANCE DF SUM OF SQUARES MEAN SQUARE F SIGNIFICANCE
 R SQUARE .18534 REGRESSION 5. 403.15121 80.63024 1.16740 .352
 ADJUSTED R SQUARE .03629 RESIDUAL 26. 1795.78879 69.06803
 STD DEVIATION 8.31072 COEFF OF VARIABILITY 48.8 PCT

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	BETA ELASTICITY	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE
FACTOR4	2.1295877	1.2718998	2.8034014	.3161866	FACTOR2	-.00617	.84193 .95155078E-03
FACTOR1	-1.9268965	1.2929069	2.2211724	-.2855540			.976
FACTOR6	1.6259082	1.2372525	1.7290348	.00000			
FACTOR3	-.67036154	1.2343445	.29494797	-.1097266			
FACTOR5	-.27222033	.96106968	.80228994E-01	-.0560341			
(CONSTANT)	17.025000	1.4691412	134.29108	-.00000			

F-LEVEL OR TOLERANCE-LEVEL INSUFFICIENT FOR FURTHER COMPUTATION.

F.A.-STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80
 FILE NONAME (CREATION DATE = 06/24/86) SPSS V9.0 .23.54.36. PAGE 6
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE.. PERCHANG

SUMMARY TABLE									
STEP	VARIABLE ENTERED	REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE	SIMPLE R	OVERALL F SIGNIFICANCE
1	FACTOR4		2.60199	.117	.28251	.07981	.07981	.28251	2.60199 .117
2	FACTOR1		1.53904	.225	.35522	.12618	.04637	-.11811	2.09389 .141
3	FACTOR6		1.62103	.213	.41714	.17400	.04782	.20868	1.96616 .142
4	FACTOR3		.22466	.639	.42523	.18082	.00682	-.06863	1.48995 .233
5	FACTOR5		.08023	.779	.42818	.18334	.00252	-.01855	1.16740 .352

F.A.-STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80									
FILE	NONAME	(CREATION DATE = 06/24/86)	SPSS V9.0	.23.54.36.	PAGE	7			
..... MULTIPLE REGRESSION +2SD									
OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	0.0	1.1	1.1	1.1	1.1
1.	11.00000	20.84482	-9.844823						
2.	28.60000	18.30684	10.29316						
3.	28.30000	16.81044	11.48956						
4.	12.00000	14.30243	-2.302425						
5.	17.20000	10.95908	6.240917						

6.	12.80000	13.26723	-1.4672255
7.	4.00000	14.03666	-10.03666
8.	10.80000	17.26428	-6.464282
9.	0	9.302526	-9.302526
10.	18.20000	16.99065	1.209346
11.	15.60000	17.99856	-2.001720
12.	3.80000	17.77870	-13.17870
13.	8.00000	12.73253	-13.47823
14.	6.70000	12.73253	-6.032527
15.	20.30000	16.35684	3.943164
16.	15.60000	16.09772	-1.977235
17.	22.20000	20.31780	-1.882196
18.	17.20000	17.84337	-6.433666
19.	25.50000	14.91834	10.58166
20.	17.50000	13.11922	4.188077
21.	21.90000	23.29958	10.70329
22.	23.50000	18.31233	-6.07367
23.	11.10000	17.17347	-4.287675
24.	15.20000	15.72412	-5.241227
25.	30.30000	15.12472	15.17528
26.	20.00000	18.83303	1.166971
27.	16.90000	20.29367	-3.393672
28.	27.60000	23.50452	4.095481
29.	16.70000	16.67422	-3.578329E-01
30.	6.80000	16.80263	-9.802630
31.	25.80000	26.84708	-1.047080
32.			

NOTE - (*) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED	32	O OR	O PERCENT OF THE TOTAL
NUMBER OF 2 S.D. OUTLIERS			
VON NEUMANN RATIO	1.43219	DURBIN-WATSON TEST	1.38743
NUMBER OF POSITIVE RESIDUALS	16.		
NUMBER OF NEGATIVE RESIDUALS	16.		
NUMBER OF RUNS OF SIGNS	17.		
EXPECTED NUMBER OF RUNS OF SIGNS			
EXPECTED S.D. OF RUN DISTRIBUTION	2.78243		
UNIT NORMAL DEViate			
Z-(OBSERVED-EXPECTED*0.5)/S.D.	.42869		
PROBABILITY OF OBTAINING .GE. ABS(Z)			

RESIDUALS - 32 CASES WRITTEN ON FILE BCDOUT

F.A.-STEPWISE-30 CITY-DIFF. SORT ALL 5 VAR. 1970-80

CPU TIME REQUIRED.. .186 SECONDS

* FINISH

TOTAL CPU TIME USED.. .220 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 14
NUMBER OF ERRORS DETECTED 0

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Northwestern University
S P S - Statistical Package for the Social Sciences
Version 9.0, MSU, Dec 11, 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

```

RUN NAME
VARIABLE LIST
  FACTOR ANALYSIS - 29 CITIES - 15 VAR.
  FACTOR ANALYSIS - 29 CITIES - 15 VAR.
  CHANNC CHANBC VALADD CAPEXP.LONGDIS.
  CHTDPO CHTDPOC CHPCPCPC
  CHNCPOP CHNNUPOP CHNPPOP
  CHNQUVAL CHNQUVALA 1959.CHCHILD
  FIXED(16X,F8.0,8X,4F8.0,16X/16X,4(F8.0,
  16X,2(8X,F8.0)/8X,F8.0,F8.0)
INPUT FORMAT

```

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

	VARIABLE	FORMAT	RECORD	COLUMNS
1	DATE	DDMMYY	1-3	1-3
2	TIME	HHMMSS	4-6	4-6
3	LOCATION	TEXT	7-10	7-10
4	WEATHER	TEXT	11-15	11-15
5	WIND	TEXT	16-18	16-18
6	TEMP	TEXT	19-21	19-21
7	HUMIDITY	TEXT	22-24	22-24
8	PRECIP	TEXT	25-27	25-27
9	WINDDIR	TEXT	28-30	28-30
10	WINDSPEED	TEXT	31-33	31-33
11	WINDGUST	TEXT	34-36	34-36
12	WINDTYPE	TEXT	37-39	37-39
13	WINDPOT	TEXT	40-42	40-42
14	WINDDIR2	TEXT	43-45	43-45
15	WINDSPEED2	TEXT	46-48	46-48
16	WINDGUST2	TEXT	49-51	49-51
17	WINDTYPE2	TEXT	52-54	52-54
18	WINDPOT2	TEXT	55-57	55-57
19	WINDDIR3	TEXT	58-60	58-60
20	WINDSPEED3	TEXT	61-63	61-63
21	WINDGUST3	TEXT	64-66	64-66
22	WINDTYPE3	TEXT	67-69	67-69
23	WINDPOT3	TEXT	70-72	70-72
24	WINDDIR4	TEXT	73-75	73-75
25	WINDSPEED4	TEXT	76-78	76-78
26	WINDGUST4	TEXT	79-81	79-81
27	WINDTYPE4	TEXT	82-84	82-84
28	WINDPOT4	TEXT	85-87	85-87
29	WINDDIR5	TEXT	88-90	88-90
30	WINDSPEED5	TEXT	91-93	91-93
31	WINDGUST5	TEXT	94-96	94-96
32	WINDTYPE5	TEXT	97-99	97-99
33	WINDPOT5	TEXT	100-102	100-102
34	WINDDIR6	TEXT	103-105	103-105
35	WINDSPEED6	TEXT	106-108	106-108
36	WINDGUST6	TEXT	109-111	109-111
37	WINDTYPE6	TEXT	112-114	112-114
38	WINDPOT6	TEXT	115-117	115-117
39	WINDDIR7	TEXT	118-120	118-120
40	WINDSPEED7	TEXT	121-123	121-123
41	WINDGUST7	TEXT	124-126	124-126
42	WINDTYPE7	TEXT	127-129	127-129
43	WINDPOT7	TEXT	130-132	130-132
44	WINDDIR8	TEXT	133-135	133-135
45	WINDSPEED8	TEXT	136-138	136-138
46	WINDGUST8	TEXT	139-141	139-141
47	WINDTYPE8	TEXT	142-144	142-144
48	WINDPOT8	TEXT	145-147	145-147
49	WINDDIR9	TEXT	148-150	148-150
50	WINDSPEED9	TEXT	151-153	151-153
51	WINDGUST9	TEXT	154-156	154-156
52	WINDTYPE9	TEXT	157-159	157-159
53	WINDPOT9	TEXT	160-162	160-162
54	WINDDIR10	TEXT	163-165	163-165
55	WINDSPEED10	TEXT	166-168	166-168
56	WINDGUST10	TEXT	169-171	169-171
57	WINDTYPE10	TEXT	172-174	172-174
58	WINDPOT10	TEXT	175-177	175-177
59	WINDDIR11	TEXT	178-180	178-180
60	WINDSPEED11	TEXT	181-183	181-183
61	WINDGUST11	TEXT	184-186	184-186
62	WINDTYPE11	TEXT	187-189	187-189
63	WINDPOT11	TEXT	190-192	190-192
64	WINDDIR12	TEXT	193-195	193-195
65	WINDSPEED12	TEXT	196-198	196-198
66	WINDGUST12	TEXT	199-201	199-201
67	WINDTYPE12	TEXT	202-204	202-204
68	WINDPOT12	TEXT	205-207	205-207
69	WINDDIR13	TEXT	208-210	208-210
70	WINDSPEED13	TEXT	211-213	211-213
71	WINDGUST13	TEXT	214-216	214-216
72	WINDTYPE13	TEXT	2	

[illegible]

THE INPUT FORMAT PROVIDES FOR 15 VARIABLES. 15 WILL BE READ.
IT PROVIDES FOR 4 RECORDS ("CARDS") PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.

[illegible]

CPU TIME REQUIRED.. .115 SECONDS

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. . .
```

FACTOR	VARIABLES=CHANWC TO CHCHILD/ TYPE=PIZ NFACTORS=4/ ROTATE=VARIMAX/ FACSCORE/ 11.13.22 2.4.5.6
OPTIONS STATISTICS	

FACTOR ANALYSIS

DETERMINAN

FACTOR ANALYSIS

FILE FAC

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
CHANWC	.46287	1	5.40530	36.0	36.0
CHANBC	.73580	2	2.75077	18.0	54.0
VALADD	.98093	3	1.52355	10.2	64.5
CAPEXP	.98423	3	1.51555	10.2	73.3
CHOTDTS	.09861	5	.99177	6.6	79.9
LNGTOTPO	.88418	6	.75790	5.1	85.0
CHTOPUC	.85224	7	.64565	4.3	89.3
CHPCPPUC	.80966	8	.53207	3.5	92.8
CHNCPOP	.89350	9	.42838	2.9	95.7
CHNCPOP	.71161	10	.29301	1.9	97.7
CHNCPOP	.71161	11	.29301	1.9	99.6
CHNCVAL	.90375	12	.08623	.6	100.0
CHNCUSMA	.89110	13	.04111	.3	100.0
A1939	.59688	14	.00870	.1	100.0
CHNCCHILD	.70324	15			

FACTOR ANA

FILE FAC

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

[illegible]

CONVERGENCE REQUIRED 16 ITERATIONS.

VARIABLE	COMMUNITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
CHANC	.43083	1	5.13886	52.5	52.5
CHANC	.41130	2	2.56286	26.2	78.6
VALAD	.90739	3	1.18754	12.1	90.7
CAPEXP	.90731	4	.90802	9.3	100.0

11	FACTORS	.0332	-.9263	.9319	-2.1734
12	FACTORS	-.5987	.0698	.6565	-.0002
13	FACTORS	.3690	-.2223	-.3102	-.1958
14	FACTORS	-.5257	-.0781	.0000	.7936
15	FACTORS	-.1668	-.4895	.7320	-.5778
16	FACTORS	-.2553	-.3259	.3385	-.2489
17	FACTORS	.8039	-.7795	-.21513	.1061
18	FACTORS	1.8294	-1.0968	1.4215	2.4056
19	FACTORS	-.6753	-.7239	-.6218	-.1154
20	FACTORS	-.7996	-.3832	.0085	-.0859
21	FACTORS	.6827	-1.1851	1.3726	-.6285
22	FACTORS	.0333	-.0209	1.9498	-.12856
23	FACTORS	-.5778	1.1862	.0837	-.9883
24	FACTORS	-.6932	2.2806	-.8068	-.9085
25	FACTORS	-.7508	1.5690	-.3283	.7373
26	FACTORS	-.4258	1.2398	.1809	-.5062
27	FACTORS	-.11733	-.5866	-.10333	-.1888

FACTOR ANALYSIS - 29 CITIES - 15 VAR.

FILE FACTORS (CREATION DATE = 05/18/86)

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4 FACTOR SCORES WERE WRITTEN ON FILE FACTS FOR 29 UNWEIGHTED CASES.
1 RECORDS OUTPUT PER CASE

OUTPUT FORMAT IS (F8.0,F2.0,1X,A8.1X,6F10.6). RECORD NUMBER APPEARS LEFT-ZERO-FILLED.

MISSING FACTOR SCORES ARE OUTPUT AS 999.0
NON-MISSING BUT EXTREME FACTOR SCORES ARE TRUNCATED TO +99.0 OR -99.0

FACTORS FROM VARIABLE LIST	FACTOR NUMBER	OUTPUT RECORD NUMBER PER CASE	RECORD COLUMNS	UNWEIGHTED NUMBER OF MISSING CASES
1	1		1-8	
2	2		9-10	
3	3		12-15	
			21-30	
			31-40	0000
			41-50	
			51-60	

FACTOR ANALYSIS - 29 CITIES - 15 VAR.

CPU TIME REQUIRED.. .592 SECONDS

05/18/86 SPSS V9.0 .15.48.34. PAGE 10

* FINISH

TOTAL CPU TIME USED.. .717 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 37
NUMBER OF ERRORS DETECTED 0

229

CORRELATION COEFFICIENTS.

A VALUE OF .999999 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

FACTOR1 .10874 .03110
FACTOR2 -.25177 .01870
FACTOR3 .52092 .02841
FACTOR4 .09121 .05805 .03886
PERCHANG FACTOR1 FACTOR2 FACTOR3

F. A.-STEPWISE-29 CITY-15 VAR.CHNG.IN # H.S.C.T. 1970-80
FILE NONAME (CREATION DATE = 06/25/86)

SPSS V9.0 .01.46.17. PAGE 3

***** MULTIPLE REGRESSION *****

DEPENDENT VARIABLE... PERCHANG

MEAN RESPONSE 33.21034 STD. DEV. 39.74719

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FACTOR3

MULTIPLE R	.52092	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.27136	REGRESSION	1.	12003.81891	12003.81891	10.05542	.004
ADJUSTED R SQUARE	.24436	RESIDUAL	26.	32231.66799	1193.76548		
STD DEVIATION	34.55091	COEFF OF VARIABILITY	104.0 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	
FACTOR3	-21.149276	6.6695309	10.055425	.004	-.5209239	-.00000	
(CONSTANT)	33.210345	6.4159432	26.793272	.000			

***** FACTOR2 *****

MULTIPLE R	.59411	ANALYSIS OF VARIANCE	DF	SUM OF SQUARES	MEAN SQUARE	F	SIGNIFICANCE
R SQUARE	.35297	REGRESSION	2.	15613.83193	7806.91596	7.09183	.003
ADJUSTED R SQUARE	.30320	RESIDUAL	26.	28621.65497	1100.83288		
STD DEVIATION	33.17880	COEFF OF VARIABILITY	99.9 PCT				

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	
FACTOR3	-21.892546	6.4178040	11.638427	.002	-.5392313	-.00000	
FACTOR2	-10.895446	6.0166026	3.2792480	.082	-.2862389	-.00000	
(CONSTANT)	33.210346	6.1611488	29.055168	.000			

F. A.-STEPWISE-29 CITY-15 VAR.CHNG.IN # H.S.C.T. 1970-80
 FILE NONAME (CREATION DATE = 06/25/86)
 O6/25/86 SPSS V9.0 .01.46.17. PAGE 4
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE... PERCHANG
 VARIABLE(S) ENTERED ON STEP NUMBER 3... FACTOR4

MULTIPLE R .60620 ANALYSIS OF VARIANCE DF SUM OF SQUARES MEAN SQUARE F SIGNIFICANCE
 R SQUARE .36748 REGRESSION 3. 16255.64306 5418.54769 4.84147 .009
 ADJUSTED R SQUARE .29158 RESIDUAL 25. 652.00000 26.08000
 STD DEVIATION 33.45435 COEFF OF VARIABILITY 100.7 PCT 27979.84384 1119.19375

----- VARIABLES IN THE EQUATION -----
 VARIABLE B STD ERROR B F SIGNIFICANCE BETA ELASTICITY
 FACTOR3 -22.092556 6.4764920 11.636239 .541577
 FACTOR2 -11.037863 6.0694851 3.3072443 .000000
 FACTOR4 5.3259269 7.0330584 .57345846 .1206021
 (CONSTANT) 33.210345 6.2123174 28.578505 .000000
 ----- VARIABLES NOT IN THE EQUATION -----
 VARIABLE PARTIAL TOLERANCE F SIGNIFICANCE
 FACTOR1 .12969 .99535 .41054286 .528

.....
 VARIABLE(S) ENTERED ON STEP NUMBER 4... FACTOR1
 MULTIPLE R .61491 ANALYSIS OF VARIANCE DF SUM OF SQUARES MEAN SQUARE F SIGNIFICANCE
 R SQUARE .37812 REGRESSION 4. 16726.21535 4181.55384 3.64813 .019
 ADJUSTED R SQUARE .27447 RESIDUAL 24. 698.00000 29.08333
 STD DEVIATION 33.85587 COEFF OF VARIABILITY 101.9 PCT 27509.27155 1146.21965

----- VARIABLES IN THE EQUATION -----
 VARIABLE B STD ERROR B F SIGNIFICANCE BETA ELASTICITY
 FACTOR3 -22.152969 6.5548997 11.421727 .5456457
 FACTOR2 -10.912592 6.1454406 3.1531872 .000000
 FACTOR4 5.0593209 7.1296199 .50356055 .1145650
 FACTOR1 4.1946998 6.5466876 .41054286 .1033808
 (CONSTANT) 33.210346 6.2868764 27.904573 .000000
 ----- VARIABLES NOT IN THE EQUATION -----
 VARIABLE PARTIAL TOLERANCE F SIGNIFICANCE

ALL VARIABLES ARE IN THE EQUATION.

F. A.-STEPWISE-29 CITY-15 VAR.CHNG.IN # H.S.C.T. 1970-80
 FILE NONAME (CREATION DATE = 06/25/86)
 O6/25/86 SPSS V9.0 .01.46.17. PAGE 5
 MULTIPLE REGRESSION
 DEPENDENT VARIABLE... PERCHANG

SUMMARY TABLE

STEP	VARIABLE ENTERED	VARIABLE REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE	SIMPLE R	OVERALL F	SIGNIFICANCE
1	FACTOR3		10.05542	.004	.5092	.27136	.27136	.5092	10.05542	.004
2	FACTOR4		3.27332	.082	.5092	.27136	.27136	.5092	10.05542	.004
3	FACTOR4		5.7346	.456	.5092	.27136	.27136	.5092	10.05542	.004
4	FACTOR1		4.1054	.528	.5092	.27136	.27136	.5092	10.05542	.004

F. A. -STEPWISE-29 CITY-15 VAR. CHNG. IN # H.S.C.T. 1970-80
 FILE NAME (CREATION DATE = 06/25/86)

OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	REGRESSION	-2SD	+2SD
1.	20.00000	29.61138	-9.611377				
2.	100.00000	51.30277	-41.30277				
3.	12.00000	55.05288	-43.05288				
4.	20.00000	72.27463	-52.27463				
5.	50.00000	63.42744	-13.42744				
6.	50.00000	22.60162	10.69838				
7.	33.30000	-13.70142	13.70142				
8.	16.70000	5.538815	11.16118				
9.	33.30000	48.38854	-15.08854				
10.	0	11.81850	-11.81850				
11.	0	15.39327	-15.39327				
12.	-16.70000	38.17574	-54.87574				
13.	50.00000	37.17574	12.82426				
14.	50.00000	37.17574	12.82426				
15.	100.00000	18.91319	81.08681				
16.	27.30000	26.93716	10.36284				
17.	125.00000	76.27054	-48.72946				
18.	3.000000	33.53388	-30.53388				
19.	11.80000	35.67009	-23.87009				
20.	0	33.41560	-33.41560				
21.	111.1000	76.14992	-34.95008				
22.	0	-46.23119	46.23119				
23.	14.30000	-7.67728	21.67728				
24.	0	14.84246	-14.84246				
25.	14.30000	23.94184	-9.64184				
26.	22.20000	27.36483	-5.16483				
27.	15.00000	43.82267	-28.82267				
28.							
29.							

NOTE - (-) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
 R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED 29. OR 3.45 PERCENT OF THE TOTAL
 NUMBER OF 2 S.D. OUTLIERS
 VON NEUMANN RATIO 1.90836 DURBIN-WATSON TEST 1.84256
 NUMBER OF POSITIVE RESIDUALS 13.
 NUMBER OF NEGATIVE RESIDUALS 16.
 NUMBER OF RUNS OF SIGNS
 EXPECTED NUMBER OF RUNS OF SIGNS 15.
 EXPECTED S.D. OF RUN DISTRIBUTION 2.61472
 UNIT NORMAL DEVIATE
 Z-OBSERVED-EXPECTED+0.5/S.D. -1.47045
 PROBABILITY OF OBTAINING .GE. ABS(Z) .07072

RESIDUALS - 29 CASES WRITTEN ON FILE BCDOUT

F. A. -STEPWISE-29 CITY-15 VAR. CHNG. IN # H.S.C.T. 1970-80

06/25/86 SPSS V9.0 .01.46.17. PAGE 7

CPU TIME REQUIRED... .156 SECONDS
• FINISH
TOTAL CPU TIME USED... .206 SECONDS
RUN COMPLETED
NUMBER OF CONTROL CARDS READ 13
NUMBER OF ERRORS DETECTED 0

Principle Factoring With Iterations (PA2)
32 Cities - 14 Variables

Vogelback Computing Center
Northwestern University
S P S - Statistical Package for the Social Sciences
Version 9.0 . MSU . Dec 11 . 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

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RUN NAME
FILE NAME
VARIABLE LIST
FACTOR ANALYSIS - 32 CITIES - 14 VAR.
FACTORS
CHANC CHANBC VALADD CAPEXP LONGDIS.
CHTDPD CHPOAUC CHPCCPUC
CHNCPDP CHNUPOP CHNNPD.
CHQUVAL A1939.CHCHILD
FIXED(16X.F8.O.8X.AF8.O.16X/16X.4(F8.O.8X.F8.O).
2X.F8.O.16X.XX.F8.O.8X.F8.O)
INPUT FORMAT

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ACCORDING TO YOUR INPUT FORMAT. VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
CHANNIC	F 8.	1	17-
CHANGC	F 8.	1	24
CHANGD	F 8.	1	30
CHALAD	F 8.	1	40
CAPEXP	F 8.	1	48
LONGTSS	F 8.	1	56
LONGTSP	F 8.	1	64
CHPCDUC	F 8.	1	72
CHPCDPC	F 8.	1	80
CHNCPCD	F 8.	1	88
CHNCPCD	F 8.	1	96
CHNCPCD	F 8.	1	104
CHNCPCD	F 8.	1	112
CHNCPCD	F 8.	1	120
CHNCPCD	F 8.	1	128
CHNCPCD	F 8.	1	136
CHNCPCD	F 8.	1	144
CHNCPCD	F 8.	1	152
CHNCPCD	F 8.	1	160
CHNCPCD	F 8.	1	168
CHNCPCD	F 8.	1	176
CHNCPCD	F 8.	1	184
CHNCPCD	F 8.	1	192
CHNCPCD	F 8.	1	200
CHNCPCD	F 8.	1	208
CHNCPCD	F 8.	1	216
CHNCPCD	F 8.	1	224
CHNCPCD	F 8.	1	232
CHNCPCD	F 8.	1	240
CHNCPCD	F 8.	1	248
CHNCPCD	F 8.	1	256
CHNCPCD	F 8.	1	264
CHNCPCD	F 8.	1	272
CHNCPCD	F 8.	1	280
CHNCPCD	F 8.	1	288
CHNCPCD	F 8.	1	296
CHNCPCD	F 8.	1	304
CHNCPCD	F 8.	1	312
CHNCPCD	F 8.	1	320
CHNCPCD	F 8.	1	328
CHNCPCD	F 8.	1	336
CHNCPCD	F 8.	1	344
CHNCPCD	F 8.	1	352
CHNCPCD	F 8.	1	360
CHNCPCD	F 8.	1	368
CHNCPCD	F 8.	1	376
CHNCPCD	F 8.	1	384
CHNCPCD	F 8.	1	392
CHNCPCD	F 8.	1	400
CHNCPCD	F 8.	1	408
CHNCPCD	F 8.	1	416
CHNCPCD	F 8.	1	424
CHNCPCD	F 8.	1	432
CHNCPCD	F 8.	1	440
CHNCPCD	F 8.	1	448
CHNCPCD	F 8.	1	456
CHNCPCD	F 8.	1	464
CHNCPCD	F 8.	1	472
CHNCPCD	F 8.	1	480
CHNCPCD	F 8.	1	488
CHNCPCD	F 8.	1	496
CHNCPCD	F 8.	1	504
CHNCPCD	F 8.	1	512
CHNCPCD	F 8.	1	520
CHNCPCD	F 8.	1	528
CHNCPCD	F 8.	1	536
CHNCPCD	F 8.	1	544
CHNCPCD	F 8.	1	552
CHNCPCD	F 8.	1	560
CHNCPCD	F 8.	1	568
CHNCPCD	F 8.	1	576
CHNCPCD	F 8.	1	584
CHNCPCD	F 8.	1	592
CHNCPCD	F 8.	1	600
CHNCPCD	F 8.	1	608
CHNCPCD	F 8.	1	616
CHNCPCD	F 8.	1	624
CHNCPCD	F 8.	1	632
CHNCPCD	F 8.	1	640
CHNCPCD	F 8.	1	648
CHNCPCD	F 8.	1	656
CHNCPCD	F 8.	1	664
CHNCPCD	F 8.	1	672
CHNCPCD	F 8.	1	680
CHNCPCD	F 8.	1	688
CHNCPCD	F 8.	1	696
CHNCPCD	F 8.	1	704
CHNCPCD	F 8.	1	712
CHNCPCD	F 8.	1	720
CHNCPCD	F 8.	1	728
CHNCPCD	F 8.	1	736
CHNCPCD	F 8.	1	744
CHNCPCD	F 8.	1	752
CHNCPCD	F 8.	1	760
CHNCPCD	F 8.	1	768
CHNCPCD	F 8.	1	776
CHNCPCD	F 8.	1	784
CHNCPCD	F 8.	1	792
CHNCPCD	F 8.	1	800

THE INPUT FORMAT PROVIDES FOR 14 VARIABLES. 14 WILL BE READ.
IT PROVIDES FOR 4 RECORDS ("CARDS") PER CASE.
A MAXIMUM OF 80 "COLUMNS" ARE USED ON A RECORD.

[illegible]

CPU TIME REQUIRED.. .160 SECONDS

```

VARIABLES=CHANWC TO CHCHILD/
WRITE FAC
NETFORC=4/
ROTATE
FACMAX/
FACSCORE=
11 3 22
OPTIONS
STATISTICS
READ INPUT DATA
2 4 5 6

```

00057300 CM NEEDED FOR FACTOR

FACTOR ANALYSIS - 32 CITIES - 14 VAR.

SPSS V9.0 .00.39.20.

PAGE 2

OPTION - 1
{IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)
OPTION - 11
WRITE SEQUENCE INFORMATION WITH FACSCORES
OPTION - 13
LIST FACSCORES ON OUTPUT

FACTOR ANALYSIS - 32 CITIES - 14 VAR.

SPSS V9.0 .00.39.20.

PAGE 3

FILE FACTORS (CREATION DATE = 06/25/86)

CORRELATION COEFFICIENTS...

CHANWC	CHANBC	VALADD	CAPEXP	LONGDIS	CHTOTPOP	CHPOPUC	CHPCCPUC	CHNNCPOP	CHNNUPOP
1.00000	.39086	.24384	.17984	-.08046	-.02248	-.28407	-.46232	-.25198	-.50016
-.39086	1.00000	.34610	.24836	-.01092	-.28850	.42785	.32717	.29229	.58655
-.17384	.34610	1.00000	.28072	-.01815	-.39228	.21102	.28708	.23861	.49639
-.08046	-.01092	.01172	.10919	1.00000	.00535	.07995	.19415	.01892	.11215
-.02248	.28850	.31229	.29698	.00535	1.00000	.64472	-.18050	-.02639	.33408
-.28407	.42785	.21502	.21108	.07995	.64472	1.00000	.40618	.38748	.68240
-.46232	.29229	.38768	.28700	.19415	-.18050	.40618	1.00000	.36888	.55081
-.25198	.58655	.71381	.72855	.01885	-.02639	.38748	.36888	1.00000	.72861
-.50016	.49639	.49639	.23508	.11615	.33408	.68240	.55081	.72861	1.00000
-.26357	.23042	.24084	.22619	-.03096	-.00314	.28946	.28946	.59013	.53801
-.17850	.38838	.31102	.07988	.11155	.43832	.39147	.39147	.41334	.56628
-.13432	.20489	.07166	.25928	.05404	-.43832	.40659	.15212	.12762	.74330
-.13432	.24487	.17160	.22129	-.03503	.39950	.47857	.15812	.40732	.58855

CHANWC	CHOUVAL	A1939	CHCHILD
-.26357	-.17650	-.18702	-.13438
-.23042	.39838	-.20882	-.24887
-.22619	.07968	.06945	.22159
-.03096	.11155	.04794	-.03503
-.00314	.42832	-.47398	.39950
.24190	.50511	-.40640	.47657
.28946	.39147	.15716	.19612
.39147	.41334	-.12762	.40732
.53801	.56628	-.17430	.59895
1.00000	.36142	-.21547	.44923
.56628	.58855	.22856	.58855
.53801	.54704	1.00000	.54704
.44923	.44923	.15418	.15418

FACTOR ANALYSIS - 32 CITIES - 14 VAR.

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PAGE 4

DETERMINANT = .0000049 (.49368214E-05)

FACTOR ANALYSIS - 32 CITIES - 14 VAR. 06/25/86 SPSS V9.0 .00.39.20. PAGE 5

FILE FACTORS (CREATION DATE = 06/25/86)

VARIABLE	EST COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
CHANWC	.46644	1	5.07539	36.3	36.3
CHANEC	.64771	2	2.56948	18.4	54.6
VALADD	.97355	3	1.40778	10.1	64.7
CAPEXP	.97620	4	1.05789	7.6	72.2
LONGDIS	.10326	5	.97413	7.0	79.2
CHTOTPOP	.85647	6	.85601	6.1	85.3
CHPCCPUC	.75385	7	.52350	3.7	89.0
CHNCPOP	.84334	8	.38421	2.7	91.7
CHNWUPOP	.91284	9	.25322	1.8	93.5
CHNUVAL	.59338	10	.17980	1.3	94.8
A1939	.64250	11	.07401	.5	95.4
CHNUVAL	.57511	12	.06604	.5	95.9
CHCHILD	.69287	13	.01175	.1	96.0
		14			100.0

FACTOR ANALYSIS - 32 CITIES - 14 VAR.

FILE FACTORS (CREATION DATE = 06/25/86)

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
CHANWC	-.43762	.07400	.42358	-.11579
CHANEC	.56423	.6543	-.02642	.20201
VALADD	.67040	-.65061	.36425	.16756
CAPEXP	.07059	.00728	-.20066	.08679
LONGDIS	.26098	.89783	.21871	.21047
CHTOTPOP	.68803	.43790	.01302	.24859
CHPCCPUC	.57419	-.18700	-.56330	.09930
CHNCPOP	.80508	-.27651	.20531	-.23444
CHNWUPOP	.97778	.02239	-.04154	-.06156
CHNUVAL	.56645	.37785	-.09238	.00231
A1939	-.21799	-.44892	-.35621	-.01123
CHCHILD	.57489	.26992	.07319	-.22287

CONVERGENCE REQUIRED 24 ITERATIONS.

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	PCT OF VAR	CUM PCT
CHANWC	.38897	1	4.80187	34.1	34.1
CHANEC	.38723	2	2.39335	17.0	51.1
VALADD	.95505	3	.86523	6.1	57.2
LONGDIS	.05283				
CHTOTPOP	.94848				
CHPCCPUC	.72710				
CHNCPOP	.69183				
CHNWUPOP	.82172				
CHNUVAL	.91458				

CHNPOP .64332
 CHOUVAL .49685
 A1939 .31839
 CHCHILD .45839

FACTOR ANALYSIS - 32 CITIES - 14 VAR. PAGE 7
 FILE FACTORS (CREATION DATE = 06/25/86) SPSS V9.0 .00.39.20.

VARIMAX ROTATED FACTOR MATRIX
 AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
CHANPC	-.14251	-.06305	-.15727	-.58305
CHANBC	-.25193	.45326	-.14426	-.31226
VALADD	.97390	-.02546	.11367	.18165
CAPEXP	.97314	-.02786	.13840	.04536
LONGDIS	-.02705	.00711	-.02356	.22693
CHTOTPOP	-.17928	.93688	-.00062	-.06572
CHPCPOP	.22670	.45819	.24619	.76944
CHPCPCPC	.64841	.05239	.60391	.10538
CHNUPOP	.37871	.15863	.52847	.50074
CHNUPOP	.14123	.49261	.78114	.08287
CHOUVAL	.03317	.07958	.43115	.27711
A1939	.02194	.48278	-.13139	.24315
CHCHILD	.11099	.42551	.50885	.09007

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
FACTOR 1	-.55522	.47692	.53797	.41818
FACTOR 2	-.65164	.75395	.05360	-.06363
FACTOR 3	.43029	.30419	-.05447	-.84815
FACTOR 4	.28627	.33402	-.83950	.31895

FACTOR ANALYSIS - 32 CITIES - 14 VAR. PAGE 8
 FILE FACTORS (CREATION DATE = 06/25/86) SPSS V9.0 .00.39.20.

CASE SENUM	SUBFILE	FACTOR SCORES	2	3	4
1	FACTORS	-.1431	-.1741	.3153	-1.4294
2	FACTORS	-.2698	-.4932	-1.3559	-1.2220
3	FACTORS	-.5257	-.2207	-.2986	1.5609
4	FACTORS	-.3712	-.6409	-.3632	-2.2849
5	FACTORS	3.4707	-1.4856	.6047	-.5648
6	FACTORS	.5186	-.0408	-.7377	-.2165
7	FACTORS	-.5263	.3508	-.5864	-.3951
8	FACTORS	-.3504	.4111	-.4111	-.6203
9	FACTORS	2.3391	2.3197	1.7471	1.8890
10	FACTORS	-.1857	-.5370	-.1.4441	1.4387
11	FACTORS	-.0936	-.1793	-.1.0501	-2.1660
12	FACTORS	-.0798	.9193	-.1202	-.2043
13	FACTORS	-.6338	.7121	-.4418	-.3045
14	FACTORS	.2241	-.1161	-.6037	-.9406
15	FACTORS	-.5127	-.0886	-.6037	-.8406
16	FACTORS	-.1132	.5320	-.5046	-.8812
17	FACTORS	-.7520	-.0742	-.7981	-.3433

CINWPOP
CHOUVAL
A1939
CHCHILD

FACTOR ANALYSIS - 32 CITIES - 14 VAR.
FILE FACTORS (CREATION DATE = 06/25/86) PAGE 7

VARIMAX ROTATED FACTOR MATRIX
AFTER ROTATION WITH KAISER NORMALIZATION

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
CHANC	.14251	-.06305	-.15727	-.58305
CHANC	.27193	-.05226	-.11267	-.11255
CAREXP	.97314	-.02786	-.13840	-.04536
LONGDIS	-.02705	.00711	-.02356	-.22693
CHTOTPOP	-.27928	.93088	-.00062	-.06572
CHPOPCUC	.17342	.74528	.18421	.32810
CHPOPCUC	.22670	-.00533	.24619	.76144
CHWCPDP	.64841	.15963	.50917	-.05376
CHWCPDP	.64841	.15963	.50917	-.05376
CHWCPDP	.14123	.07558	.75114	.08287
CHWCPDP	.03317	.48378	-.43115	.27111
CHOUVAL	.02194	-.54761	-.13139	.24315
A1939	.11099	.42551	.50685	.09007
CHCHILD				

TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
FACTOR 1	.55522	.47692	.53797	.41818
FACTOR 2	-.65164	.75395	-.05360	-.06363
FACTOR 3	.43029	.30419	-.05447	-.84815
FACTOR 4	.28627	.33402	-.83950	.31895

FACTOR ANALYSIS - 32 CITIES - 14 VAR.
FILE FACTORS (CREATION DATE = 06/25/86) PAGE 8

CASE SENUM	SUBFILE	FACTOR SCORES	1	2	3	4
1	FACTORS	-.1431	-.1741	-.3153	-.14294	
2	FACTORS	-.2699	-.4932	-.13569	-.2220	
3	FACTORS	-.3257	-.2007	-.2989	1.5609	
4	FACTORS	3.4707	-.2007	-.6077	-.5648	
5	FACTORS	-.1431	-.1741	-.3153	-.14294	
6	FACTORS	-.2699	-.4932	-.13569	-.2220	
7	FACTORS	-.3257	-.2007	-.2989	1.5609	
8	FACTORS	3.4707	-.2007	-.6077	-.5648	
9	FACTORS	-.1431	-.1741	-.3153	-.14294	
10	FACTORS	-.2699	-.4932	-.13569	-.2220	
11	FACTORS	-.3257	-.2007	-.2989	1.5609	
12	FACTORS	3.4707	-.2007	-.6077	-.5648	
13	FACTORS	-.1431	-.1741	-.3153	-.14294	
14	FACTORS	-.2699	-.4932	-.13569	-.2220	
15	FACTORS	-.3257	-.2007	-.2989	1.5609	
16	FACTORS	3.4707	-.2007	-.6077	-.5648	
17	FACTORS	-.1431	-.1741	-.3153	-.14294	
18	FACTORS	-.2699	-.4932	-.13569	-.2220	

```

19 FACTORS      -3211      -2.7154      2.6052      .1203
20 FACTORS      2.5639      .7370      .0098      2.4079
21 FACTORS      -9705      .0000      .0000      .0000
22 FACTORS      9433      .9530      .2219      .0093
23 FACTORS      -1.3068      .8334      .2219      .8534
24 FACTORS      .2882      2.1923      .3466      -1.2359
25 FACTORS      -4766      .3013      .6113      .5174
26 FACTORS      .4587      .9452      .9117      .4570
27 FACTORS      .2619      1.6227      .3553      -1.0040
28 FACTORS      -8060      .3023      1.5398      .1499
29 FACTORS      -8126      .0769      .6794      .6794
30 FACTORS      .3085      2.7702      .2410      .6341
31 FACTORS      -1104      .1461      .1461      .1461
32 FACTORS      -6750      .5070      -1.2212      .0449

```

FACTOR ANALYSIS - 32 CITIES - 14 VAR. PAGE 9

FILE FACTORS (CREATION DATE = 06/25/86) SPSS V9.0 .00.39.20.

4 FACTOR SCORES WERE WRITTEN ON FILE FACS FOR 32 UNWEIGHTED CASES.

OUTPUT FORMAT IS (F8.O,F2.O,1X,A8,1X,6F10.0). RECORD NUMBER APPEARS LEFT-ZERO-FILLED.

MISSING FACTOR SCORES ARE OUTPUT AS 999.0

NON-MISSING BUT EXTREME FACTOR SCORES ARE TRUNCATED TO +99.0 OR -99.0

FACTORS FROM VARIABLE LIST	FACTOR NUMBER	OUTPUT RECORD NUMBER PER CASE	RECORD COLUMNS	UNWEIGHTED NUMBER OF MISSING CASES
SECONUM			1-8	
RECORD NUMBER			9-10	
SUBFIL			12-15	
1	1		21-30	0
2	2		31-40	0
3	3		41-50	0
4	4		51-60	0

FACTOR ANALYSIS - 32 CITIES - 14 VAR. PAGE 10

CPU TIME REQUIRED.. .668 SECONDS

* FINISH

TOTAL CPU TIME USED.. .835 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 36

NUMBER OF ERRORS DETECTED 0

APPENDIX F, Table F.10

Regression Analysis - Dependent Variable II With Factor Scores from Principle Factoring With Iterations (PA2) 32 Cities - 14 Variables

```

1
2
3
4
5
6
7
8
9
10
11
12

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VOGELBACK COMPUTING CENTER
NORTHWESTERN UNIVERSITY
S P S - - STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES
VERSION 9.0 . MSU . DEC 11 . 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

RUN NAME      F.A.-STEP-32 CTY-14 VAR.CHG. IN  U.C.T.THAT H.S.1970-80
VARIABLE LIST PERCHANG,FACTOR1,FACTOR2,FACTOR3,FACTOR4
INPUT FORMAT  FIXED(10X,5F10.6)

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE FORMAT RECORD COLUMNS
PERCHANG F10.6 1 11- 20
FACTOR1 F10.6 1 21- 30
FACTOR2 F10.6 1 31- 40
FACTOR3 F10.6 1 41- 50
FACTOR4 F10.6 1 51- 60

THE INPUT FORMAT PROVIDES FOR 5 VARIABLES 5 WILL BE READ.
IT PROVIDES FOR 1 RECORDS ("CARDS") PER CASE
A MAXIMUM OF 60 "COLUMNS" ARE USED ON A RECORD.

CPU TIME REQUIRED.. .029 SECONDS

METHOD=STEPWISE/
VARIABLES=PERCHANG,FACTOR1,FACTOR2,FACTOR3,FACTOR4
REGRESSION=PERCHANG WITH FACTOR1(1),FACTOR2(1),
FACTOR3(1),FACTOR4(1)/
RESIDUALS/
OPTION 11,22
STATISTICS 1,3,5,4
READ INPUT DATA

00057000 CM NEEDED FOR REGRESSION

OPTION - 1
IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)
OPTION -11
WRITE RESIDUALS ON BCDOUT
OPTION -22
INHIBIT PRINTING NEW REGRESSION MESSAGE

F.A.-STEP-32 CTY-14 VAR.CHG. IN  U.C.T.THAT H.S.1970-80
FILE NAME (CREATION DATE = 06/19/86 )
MULTIPLE REGRESSION

```

Regression Analysis - Dependent Variable II With Factor Scores from Principle Factoring With Iterations (PA2)
32 Cities - 14 Variables

PAGE 1

. 16.52.02.

SPSS v9.0

06/19/86

Vogelback Computing Center
Northwestern University
S P S - Statistical Package for the Social Sciences
Version 9.0, MSU, Dec 11, 1984

100000 CM MAXIMUM FIELD LENGTH REQUEST

RUN NAME
 VARIABLE LIST
 INPUT FORMAT
 F.A.-STEP-32 CTY-14 VAR.CHG. IN U.C.T.THAT H.S.1970-80
 PERCHANG FACTOR1 FACTOR2, FACTOR3, FACTOR4
 FIXED(10X,5F10.6)

ACCORDING TO YOUR INPUT FORMAT, VARIABLES ARE TO BE READ AS FOLLOWS

VARIABLE	FORMAT	RECORD	COLUMNS
PERCHANG	F10.6	1	11-20
FACTOR1	F10.6	1	21-30
FACTOR2	F10.6	1	31-40
FACTOR3	F10.6	1	41-50
FACTOR4	F10.6	1	51-60

THE INPUT FORMAT PROVIDES FOR 5 VARIABLES. 5 WILL BE READ. IT PROVIDES FOR 1 RECORD ("CARDS") PER CASE. A MAXIMUM OF 60 "COLUMNS" ARE USED ON A RECORD.

```

      *      N OF CASES      32
      CPU TIME REQUIRED..      .029 SECONDS

```

```
REGRESSION
METHOD=STEPWISE/
VARIABLES=PERCHANG,FACTOR1,FACTOR2,FACTOR3,FACTOR4
REGRESSION=PERCHANG WITH FACTOR1(1),FACTOR2(1),
FACTOR3(1),FACTOR4(1)/
```

00057000 CM NEEDED FOR REGRESSION

**OPTION - 1
IGNORE MISSING VALUE INDICATORS
(NO MISSING VALUES DEFINED...OPTION 1 MAY HAVE BEEN FORCED)**

OPTION - 11
WRITE RESIDUALS ON BCDOUT

OPTION -22
INHIBIT PRINTING NEW REGRESSION MESSAGE

PAGE 2

.16.52.02.

SPSS v9.0

06/19/86

F. A. -STEP-32 CTY-14 VAR. CHG. IN U.C.T. THAT H.S. 1970-80

FILE NONAME (CREATION DATE = 06/19/86)

..... MULTIPLE REGRESSION

CORRELATION COEFFICIENTS.

A VALUE OF .99 .00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

FACTOR1 .06003
FACTOR2 -.40055
FACTOR3 -.07939
FACTOR4 .22460
PERCHANG FACTOR1 FACTOR2 FACTOR3
PERCHANG FACTOR4

F.A.-STEP-32 CTY-14 VAR.CHG. IN U.C.T.THAT H.S.1970-80

FILE NONAME (CREATION DATE = 06/19/86)

..... MULTIPLE REGRESSION

DEPENDENT VARIABLE... PERCHANG

MEAN RESPONSE 3.03750 STD. DEV. 3.83883

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FACTOR2

MULTIPLE R .40055
R SQUARE .16044
ADJUSTED R SQUARE .15945
STD DEVIATION 3.57557
ANALYSIS OF VARIANCE
REGRESSION
RESIDUAL
COEFF OF VARIABILITY
DF 30
SUM OF SQUARES 73.5330
117.7 PCT 383.54190
MEAN SQUARE 2.41777
12.78473
F 5.73286
SIGNIFICANCE .023

----- VARIABLES IN THE EQUATION -----
VARIABLE B STD ERROR B F SIGNIFICANCE
FACTOR2 -1.5574274 .65046216 5.7328627 .023
(CONSTANT) 3.0375002 .63207817 23.053559 .000
----- VARIABLES NOT IN THE EQUATION -----
VARIABLE PARTIAL TOLERANCE F SIGNIFICANCE
FACTOR1 .06549 1.00000 12490369 .226
FACTOR3 -.07809 .99982 17791740 .676
FACTOR4 .25183 .99977 1.9037189 .172

..... FACTOR4

MULTIPLE R .46226
R SQUARE .21368
ADJUSTED R SQUARE .15945
STD DEVIATION 3.51949
ANALYSIS OF VARIANCE
REGRESSION
RESIDUAL
COEFF OF VARIABILITY
DF 29
SUM OF SQUARES 97.61733
115.9 PCT 359.21767
MEAN SQUARE 48.80866
12.38682
F 3.94037
SIGNIFICANCE .031

----- VARIABLES IN THE EQUATION -----
VARIABLE B STD ERROR B F SIGNIFICANCE
FACTOR2 -1.5711459 .64033445 6.0203161 .020
FACTOR4 .97894588 .69858462 1.9637159 .172
(CONSTANT) 3.0375001 .62216397 23.835425 .000
----- VARIABLES NOT IN THE EQUATION -----
VARIABLE PARTIAL TOLERANCE F SIGNIFICANCE
FACTOR1 .05822 .99867 .95240922E-01 .760
FACTOR3 -.10531 .99100 .31399061 .580

..... MULTIPLE REGRESSION
 DEPENDENT VARIABLE... PERCHANG
 VARIABLE(S) ENTERED ON STEP NUMBER 3.. FACTOR3
 MULTIPLE R .47159
 R SQUARE .22240
 ADJUSTED R SQUARE .13909
 STD DEVIATION 3.56187

ANALYSIS OF VARIANCE
 REGRESSION 3.
 RESIDUAL 28.
 COEFF OF VARIABILITY 117.3 PCT

MEAN SQUARE
 33.86697
 12.88693

F 2.66944
 SIGNIFICANCE .067

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	
FACTOR2	-.15645076	.64815351	5.8263907 023 00000	FACTOR1	.05922	.99863	.95036280E-01 .760
FACTOR4	1.0158933	.71006491	2.0489165 164 00000				
FACTOR3	-.39682034	.70816685	.31399061 580 00000				
(CONSTANT)	3.0375001	.62965596	23.271586 .000				

.....
 VARIABLE(S) ENTERED ON STEP NUMBER 4.. FACTOR1

MULTIPLE R .47448
 R SQUARE .22513
 ADJUSTED R SQUARE .14033
 STD DEVIATION 3.62087

ANALYSIS OF VARIANCE
 REGRESSION 4.
 RESIDUAL 27.
 COEFF OF VARIABILITY 119.2 PCT

MEAN SQUARE
 35.74175
 13.11067

F 1.96113
 SIGNIFICANCE .129

VARIABLES IN THE EQUATION				VARIABLES NOT IN THE EQUATION			
VARIABLE	B	STD ERROR B	F SIGNIFICANCE	VARIABLE	PARTIAL TOLERANCE	F SIGNIFICANCE	
FACTOR2	-.15643568	.65888883	5.6369908 025 00000				
FACTOR4	1.0079447	.72228581	1.9474005 174 00000				
FACTOR3	-.39823379	.71991056	.30599837 585 00000				
FACTOR1	.20101343	.65204920	.95036780E-01 2607 00000				
(CONSTANT)	3.0375001	.64008473	22.519445 .000				

ALL VARIABLES ARE IN THE EQUATION.

..... MULTIPLE REGRESSION
 DEPENDENT VARIABLE... PERCHANG

S U M M A R Y T A B L E

STEP	VARIABLE ENTERED OR REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE CHANGE	R SQUARE	SIMPLE R	OVERALL F	SIGNIFICANCE
1	FACTOR2	5.73286	.023	.40055	.16044	.16044	.40055	5.73286	.023
2	FACTOR4	1.96372	.512	.49726	.21368	.05325	.27490	3.84037	.031
3	FACTOR3	.14639	.813	.50000	.21368	.05325	.27490	3.84037	.031
4	FACTOR1	.09504	.760	.47438	.22513	.00373	.06003	1.86113	.129

F.A.-STEP-32 CTY-14 VAR.CHG. IN U.C.I. THAT H.S.1970-80

PAGE 6

06/19/86 SPSS V9.0 .16.52.02.

FILE NONAME

(CREATION DATE = 06/19/86)

OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD	0.0	+2SD
1.	2.700000	1.714826	.9851742			
2.	4.100000	4.779921	-.6799205			
3.	2.800000	3.852680	-.0526800			
4.	2.800000	3.852680	-.0526800			
5.	7.800000	5.243261	2.556739			
6.	1.200000	4.845389	-3.645389			
7.	1.200000	2.150056	1.049944			
8.	2.700000	2.642767	.0572323			
9.	0	1.303847E-01	-.1303847			
10.	2.300000	2.588533	-.2885334			
11.	1.200000	4.925155	-3.725155			
12.	2.200000	5.625155	-3.425155			
13.	0	2.049880	-.049880			
14.	0	2.781411	-.781411			
15.	1.100000	3.984111	-2.884111			
16.	2.200000	4.006635	-.806635			
17.	5.600000	1.848243	3.751757			
18.	2.300000	2.339380	-.039380			
19.	6.100000	6.304619	-.204619			
20.	2.300000	5.752432	-3.452432			
21.	2.300000	3.752432	-.452432			
22.	0	3.130499	-.130499			
23.	8.700000	4.741113	3.958887			
24.	0	-1.441772	1.441772			
25.	1.100000	4.178033	-.078033			
26.	3.000000	4.510774	-.510774			
27.	0	-1.7070879	1.7070879			
28.	0	1.340592	-.340592			
29.	3.400000	3.89705	-.49705			
30.	4.800000	3.274292	1.525708			
31.	0	3.194809	-.194809			
32.	3.700000	4.226423	-.5264228			

NOTE - (*) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED	32.	OR	3.13 PERCENT OF THE TOTAL
NUMBER OF 2 S.D. OUTLIERS	1.		
VON NEUMANN RATIO	2.33930	DURBIN-WATSON TEST	2.26620
NUMBER OF POSITIVE RESIDUALS	14.		
NUMBER OF NEGATIVE RESIDUALS	18.		
NUMBER OF RUNS OF SIGNS	20.		
EXPECTED NUMBER OF RUNS OF SIGNS	17.		
EXPECTED S.D. OF RUN DISTRIBUTION	2.73751		
UNIT NORMAL DEVIATE			
Z=(OBSERVED-EXPECTED+0.5)/(S.D.)	1.36986		
PROBABILITY OF OBTAINING .GE. ABS(Z)	.08537		

RESIDUALS - 32 CASES WRITTEN ON FILE BCDOUT

F.A.-STEP-32 CTY-14 VAR.CHG. IN U.C.T.THAT H.S.1970-80

06/19/86 SPSS V9.0 .16.52.02.

PAGE 7

CPU TIME REQUIRED.. .156 SECONDS

* FINISH

TOTAL CPU TIME USED.. .187 SECONDS

RUN COMPLETED

NUMBER OF CONTROL CARDS READ 13

NUMBER OF ERRORS DETECTED 0

13

CORRELATION COEFFICIENTS.

A VALUE OF 99.00000 IS PRINTED
IF A COEFFICIENT CANNOT BE COMPUTED.

FACTOR1 -.20250
FACTOR2 -.45224
FACTOR3 -.14415
FACTOR4 .20805
PERCHANG FACTOR1 FACTOR2 FACTOR3

F.A.-STEPWISE-32 CITY-14 VAR.-DIFF.SORT ALL 5 VAR 1970-80

05/20/86 SPSS V9.0 .21.42.50. PAGE 3

FILE NONAME (CREATION DATE = 05/20/86)

***** MULTIPLE REGRESSION *****

DEPENDENT VARIABLE.. PERCHANG

MEAN RESPONSE 17.02500 STD. DEV. 8.42217

VARIABLE(S) ENTERED ON STEP NUMBER 1.. FACTOR2

MULTIPLE R .45224 ANALYSIS OF VARIANCE DF SUM OF SQUARES MEAN SQUARE F SIGNIFICANCE
R SQUARE .20452 REGRESSION 1. 449.71785 449.71785 7.71297 .009
ADJUSTED R SQUARE .17800 RESIDUAL 30. 1749.20215 58.30674
STD DEVIATION 7.63588 COEFF OF VARIABILITY 44.9 PCT

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
FACTOR2	-3.8578587	1.3891068	7.7129854	-.4522362			FACTOR1	-.22708	1.00000	1.5766665	
(CONSTANT)	17.0250000	1.3498465	159.07037	-.00000			FACTOR3	-.15171	.99962	.6831643	
			.000				FACTOR4	.23880	.99977	1.7538017	
										.196	

----- VARIABLES IN THE EQUATION -----

VARIABLE(S) ENTERED ON STEP NUMBER 2.. FACTOR4

MULTIPLE R .49988 ANALYSIS OF VARIANCE DF SUM OF SQUARES MEAN SQUARE F SIGNIFICANCE
R SQUARE .24988 REGRESSION 2. 549.46987 274.73493 4.83028 .015
ADJUSTED R SQUARE .19815 RESIDUAL 29. 1649.45013 56.87759
STD DEVIATION 7.54172 COEFF OF VARIABILITY 44.3 PCT

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
FACTOR2	-3.8858397	1.3721374	8.0191778	-.4554928			FACTOR1	-.24297	.99867	1.7566243	
FACTOR4	1.9824398	1.4969585	1.7538017	.00000			FACTOR3	-.17984	.99100	.93586294	
(CONSTANT)	17.0250000	1.3332009	163.07337	.00000						.342	

F.A.-STEPWISE-32 CITY-14 VAR.-DIFF.SORT ALL 5 VAR 1970-80 05/20/86 SPSS V9.0 .21.42.50. PAGE 4

FILE NNAME (CREATION DATE = 05/20/86)

..... MULTIPLE REGRESSION

DEPENDENT VARIABLE... PERCHANG

VARIABLE(S) ENTERED ON STEP NUMBER 3.. FACTOR1

MULTIPLE R .54237
R SQUARE .29406
ADJUSTED R SQUARE .21854
STD DEVIATION 7.44522

ANALYSIS OF VARIANCE
REGRESSION 3.
RESIDUAL 28.
TOTAL 31.
COEFF OF VARIABILITY 43.7 PCT

SUM OF SQUARES
648.84194
1552.07806

MEAN SQUARE
215.61398
55.43138

F 3.88975
SIGNIFICANCE .019

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
FACTOR2	-3.8867641	1.3545806	8.2331615	.008	-.4556246		FACTOR3	-.18380	.99096	.94406877	.340
FACTOR4	2.0538686	1.4787867	1.9290088	.176	.2206884						
FACTOR1	-1.7769545	1.3407162	1.7566243	.196	-.2103722						
(CONSTANT)	17.025000	1.3161421	167.32800	.000							

----- VARIABLES NOT IN THE EQUATION -----

.....

VARIABLE(S) ENTERED ON STEP NUMBER 4.. FACTOR3

MULTIPLE R .56392
R SQUARE .31801
ADJUSTED R SQUARE .21897
STD DEVIATION 7.45267

ANALYSIS OF VARIANCE
REGRESSION 4.
RESIDUAL 27.
TOTAL 31.
COEFF OF VARIABILITY 43.8 PCT

SUM OF SQUARES
699.27759
1499.64241

MEAN SQUARE
174.81940
55.54231

F 3.14750
SIGNIFICANCE .030

----- VARIABLES IN THE EQUATION -----

VARIABLE	B	STD ERROR B	F	SIGNIFICANCE	BETA	ELASTICITY	VARIABLE	PARTIAL	TOLERANCE	F	SIGNIFICANCE
FACTOR2	-3.8626742	1.3561623	8.1124647	.008	-.4528007						
FACTOR4	2.1875857	1.4866496	2.1652744	.154	.2350563						
FACTOR1	-1.7686496	1.3420848	1.7366950	.199	-.2095881						
FACTOR3	-1.4397246	1.4817607	.94406877	.340	-.1551249						
(CONSTANT)	17.025000	1.3174586	168.99378	.000							

----- VARIABLES NOT IN THE EQUATION -----

ALL VARIABLES ARE IN THE EQUATION.

F.A.-STEPWISE-32 CITY-14 VAR.-DIFF.SORT ALL 5 VAR 1970-80 05/20/86 SPSS V9.0 .21.42.50. PAGE 5

FILE NNAME (CREATION DATE = 05/20/86)

..... MULTIPLE REGRESSION

DEPENDENT VARIABLE... PERCHANG

SUMMARY TABLE

STEP	VARIABLE ENTERED	REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE	SIMPLE R	OVERALL F	SIGNIFICANCE
1	FACTOR2		7.71297	.009	.45224	.20452	.20452	-.45224	7.71297	.009
2	FACTOR1		1.75320	.196	.43688	.20988	.04532	.20665	4.83028	.015
3	FACTOR3		1.75662	.196	.53237	.29416	.04428	.20250	3.88975	.019
4	FACTOR3		.94407	.340	.56392	.31801	.02385	-.14415	3.14750	.030

F.A.-STEPWISE-32 CITY-14 VAR.-DIFF.SORT ALL 5 VAR 1970-80 05/20/86 SPSS V9.0 .21.42.50. PAGE 6

FILE NONAME (CREATION DATE = 05/20/86)

..... MULTIPLE REGRESSION O.O +2SD

OBSERVATION	Y VALUE	Y ESTIMATE	RESIDUAL	-2SD
1.	11.00000	14.36990	-3.36990	
2.	28.60000	17.52087	11.07913	
3.	19.20000	20.03456	-0.83456	
4.	15.20000	14.51926	0.68074	
5.	12.80000	20.71639	-7.91639	
6.	4.00000	16.42721	-12.42721	
7.	10.80000	16.57628	-5.77628	
8.	0	3.202263	-3.202263	
9.	18.20000	17.31693	0.88307	
10.	9.60000	10.98727	-1.38727	
11.	2.80000	16.01534	-13.21534	
12.	5.00000	15.77528	-10.77528	
13.	6.70000	20.28753	-13.58753	
14.	20.30000	20.39639	-0.09639	
15.	15.60000	14.78008	0.81992	
16.	22.20000	16.74445	5.45555	
17.	17.20000	24.59422	-7.39422	
18.	25.50000	17.42950	8.07050	
19.	21.20000	19.56590	1.63410	
20.	23.30000	19.72737	3.57263	
21.	22.60000	5.842637	16.75737	
22.	11.10000	21.04382	-9.94382	
23.	15.20000	20.17767	-4.97767	
24.	30.30000	8.512356	21.78764	
25.	20.00000	15.39396	4.60604	
26.	16.90000	18.72324	-1.82324	
27.	24.70000	17.68518	7.01482	
28.	6.60000	22.03330	-15.43330	
29.	25.60000		3.56669	

NOTE - (*) INDICATES ESTIMATE CALCULATED WITH MEANS SUBSTITUTED
R INDICATES POINT OUT OF RANGE OF PLOT

NUMBER OF CASES PLOTTED	32	O OR	O PERCENT OF THE TOTAL
NUMBER OF 2 S.D. OUTLIERS	0		
VON NEUMANN RATIO	1.53014	DURBIN-WATSON TEST	1.48232
NUMBER OF POSITIVE RESIDUALS	18.		
NUMBER OF NEGATIVE RESIDUALS	14.		
NUMBER OF RUNS OF SIGNS	14.		
EXPECTED NUMBER OF RUNS OF SIGNS	17		
EXPECTED S.D. OF RUN DISTRIBUTION	2.73751		
UNIT NORMAL DEVIATE			
Z-(OBSERVED-EXPECTED+O.5)/S.D.	-.82192		
PROBABILITY OF OBTAINING .GE. ABS(Z)	.20556		

RESIDUALS - 32 CASES WRITTEN ON FILE BCDOUT

F.A.-STEPWISE-32 CITY-14 VAR.-DIFF.SORT ALL 5 VAR 1970-80		05/20/86	SPSS V9.0	.21.42.50.	PAGE	7
CPU TIME REQUIRED..						
.						
FINISH						
TOTAL CPU TIME USED..						13
.202 SECONDS						
RUN COMPLETED						
NUMBER OF CONTROL CARDS READ						13
NUMBER OF ERRORS DETECTED						0

APPENDIX G

Survey Questionnaire

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF GEOGRAPHY
315 NATURAL SCIENCE

EAST LANSING • MICHIGAN • 48824-1115

March 5, 1986

The Honorable Jake M. Godbold
Mayor of Jacksonville, Florida
220 East Bay Street
Jacksonville, FL 32202

Dear Mayor Godbold;

I am a Ph. D. candidate in the Department of Geography at Michigan State University. For my dissertation I am doing a study on the extent of urban revitalization that has occurred in the inner-cities of major U. S. metropolitan area between 1970-80. One of the cities selected was Jacksonville, FL.

Would you please indicate if the following census tracts in your city have undergone revitalization during the 1970s by putting an 'X' in the space to the left of the tract number.

<u>If revitalized put 'X' in space below.</u>	<u>Census Tract Number</u>
_____	7
_____	8
_____	19
_____	21
_____	156

In addition, would you please list below the number(s) of any other census tracts which, in your opinion, have also undergone revitalization but are not listed above.

Census Tract
Number

A prompt reply would be greatly appreciated.

Sincerely yours,

Martin A. Stepper

MSU is an Affirmative Action/Equal Opportunity Institution

APPENDIX H

Coefficient of Areal Correspondence

The results listed below are arranged in descending
decending order of the value of areal correspondence.

Newark, NJ

$$A \cap B = 36; A \cup B = 36$$

$$C_A = 1.00$$

Jacksonville, FL

$$A \cap B = 5; A \cup B = 9$$

$$C_A = 0.56$$

Atlanta, GA

$$A \cap B = 11; A \cup B = 21$$

$$C_A = 0.52$$

Norfolk, VA

$$A \cap B = 9; A \cup B = 20$$

$$C_A = 0.45$$

Nashville, TN

$$A \cap B = 5; A \cup B = 13$$

$$C_A = 0.38$$

New Orleans, LA

$$A \cap B = 15; A \cup B = 49$$

$$C_A = 0.31$$

San Francisco, CA

$$A \cap B = 15; A \cup B = 51$$

$$C_A = 0.29$$

Louisville, KY

$$A \cap B = 4; A \cup B = 16$$

$$C_A = 0.25$$

Milwaukee, WI

$$A \cap B = 4; A \cup B = 16$$

$$C_A = 0.25$$

Baltimore, MD

$$A \cap B = 23; A \cup B = 94$$

$$C_A = 0.24$$

Washington, D. C.

$$A \cap B = 14; A \cup B = 62$$

$$C_A = 0.23$$

Memphis, TN

$$A \cap B = 1; A \cup B = 5$$

$$C_A = 0.20$$

Buffalo, NY

$$A \cap B = 2; A \cup B = 14$$

$$C_A = 0.14$$

Minneapolis, MN

$$A \cap B = 3; A \cup B = 28$$

$$C_A = 0.11$$

Kansas City, MO

$$A \cap B = 2; A \cup B = 26$$

$$C_A = 0.08$$

Toledo, OH

$$A \cap B = 1; A \cup B = 12$$

$$C_A = 0.08$$

Long Beach, CA

$$A \cap B = 0; A \cup B = 18$$

$$C_A = 0.00$$

Phoenix, AZ

$$A \cap B = 0; A \cup B = 16$$

$$C_A = 0.00$$

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Two additional attempts were made using the two revised definitions of the dependent variable (see page ?? and page \$\$). As discussed earlier, it was now possible to use 32 rather than 29 cities in this part of the analysis. Using the same 16 variables a factor analysis was executed. Due to estimated communalities exceeding 1.000000, two of these variables had to be eliminated before the program was able to converge (Appendix F, Table F.9). These variables were PCHNWUP and CHHOUSMA.

Four factors with eigenvalues greater than 1.000000 were obtained. These, with their variables that have high loadings, are given in Table 5.8.

The stepwise regression (Appendix F, Table F.10) done with the factor scores from the above factor analysis and Dependent Variable II had only one statistically significant factor. This factor, Factor 2 - Total Population Growth, entered into the equation on step one. The adjusted R square for the equation was 0.13245.

Using the same set of factor scores, as independent variables, and Dependent Variable III a final regression analysis was executed (Appendix F, Table F.11). The results were substantially the same as the previous regression analysis. That is, Factor 2 - Total Population Growth entered into the equation on the first step and was statistically significant at $\alpha = 0.05$. The equation as a whole was also statistically significant on step one. Factors entered into the equation on subsequent steps were not significant. The adjusted R square was slightly higher than in the

CHHOUVAL
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In doing the factor analysis for the data for the original 29 cities one variable, PCHNWUP, had to be eliminated because its estimated communality exceeded 1.000000 and the program stopped before convergence. After this variable was taken out of the data set, the program ran to convergence (see Appendix F, Table F.7). Four factors with eigenvalues greater than 1.000000 were extracted. These four factors, which contained 73.3% of the variance of the original 15 variables, with those variables that had high loadings are given in Table 5.7. Using the above four factors a regression analysis was attempted (Appendix F, Table F.8) using the originally defined dependent variable (Dependent Variable I).

Only one factor that was entered into the regression equation was statistically significant. This was factor 3, with an alpha = 0.004, which was entered into the equation on step 1. On step 1 the whole equation is also statistically

Initially the dependent variable, used in the regression analysis, was defined as the percentage change in the number of high status census tracts found in the urban core between 1970 and 1980. Of the original 32 cities in the study three, namely Kansas City, MO, St. Louis, MO, and Toledo, OH, had to be eliminated at this stage of the analysis. The reason for this was that these cities had no high status census tracts in their urban cores in 1970. In division, when the value of the denominator is zero the quotient is mathematically undefined. In the calculation of the dependent variable the number of 1970 high status tracts, in the city of interest, is divided into the difference in the number of high status census tracts between 1970-80 in the urban core. Table 5.3 gives a listing of the 29 cities and their dependent variable.

Stepwise regression analysis was done on the remaining 29 cities in the study. In a stepwise regression analysis the factors, from best to worst in explanatory value, are entered into the regression equation one at a time, provided that certain established statistical criteria are met. The variable, or in this case factor, that explains the greatest amount of variance in the dependent variable is entered first. At the next step in the process, the factor not yet in the equation that explains the greatest amount of the remaining variance, in conjunction with the factor already in the equation, is entered into the formula. This process is repeated until the statistical criteria for inclusion are not met. At each step in the construction of the final equation