EXAMINING PATTERNS OF NEIGHBORHOOD CHANGE IN THE CITY OF MILWAUKEE, 1980-1990: AN ECOLOGICAL APPROACH

by

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ABSTRACT

In this study, classic and current ecological perspectives of neighborhood change were examined and tested in explaining neighborhood change in the City of Milwaukee during the period 1980-1990. In addition, the changing spatial distribution of neighborhood characteristics stressed by urban ecological theory in explanations of neighborhood change were described and mapped.

Neighborhood change was measured by calculating changes in the neighborhoods' share of poverty between 1980 and 1990. A total of five ecological models were tested. Current ecological perspectives (Wilson 1987, 1993; Massey and Denton 1993) included Economic Transformation, Racial Segregation, and Demographic Composition models. Classic ecological perspectives (Chicago School; Hoover and Vernon 1959) included Invasion-Succession/Life Cycle and Arbitrage models.

Findings from the present study suggest that an interdisciplinary and integrative approach should guide the study of neighborhood change. Consideration of economic transformations, racial/ethnic segregation, and the changing demographic composition of neighborhoods stressed by current ecological models were crucial in predicting neighborhood change in the City of Milwaukee during the period 1980-1990. Consideration of housing and spatial variables stressed by classic ecological models constituted value-added predictors. The present study also shows that consideration of pre-existing as well as changing socioeconomic, demographic, and housing conditions of neighborhoods are necessary to better predict neighborhood change.

The visual display of neighborhood change at the city level allows us to observe the overall transformations experienced by the city's spatial structure and to identify existing and new spatial patterns of neighborhood change. The mapping of changing neighborhood characteristics facilitated observation of the direction of change across the urban spectrum and the identification of neighborhoods and clusters of neighborhoods that because of their location and changing characteristics are more susceptible to change. Furthermore, modeling of changing neighborhood characteristics revealed the existence of an opportunity structure reflected spatially that limit the life chances of populations living in neighborhoods located in areas with increasing concentrations of minority populations and the poor. These findings inform place-based policies and planning efforts aimed at preventing the decline of neighborhoods and at improving the life chances of its inhabitants.

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CHAPTER I: Introduction

During the post-World War II period, particularly since the 1960s, an accelerated process of paradoxical change took place across urban areas of The United States (U.S.). During this period some cities, particularly, newer, post-industrial cities in the South and West experienced economic growth and prosperity, while other cities, particularly; older industrial cities in the Midwest experienced considerable decline. This decline has been characterized by a progressive loss of population, jobs, and investment, and by the accelerated growth of poverty and social distress. This process of adverse change, however, did not take place evenly across the cities' neighborhoods. Some neighborhoods absorbed greater impacts of such transformations, creating new or reinforcing existing patterns of neighborhood change.

In this study, classic and current ecological perspectives of neighborhood change are examined and tested in explaining neighborhood change in the City of Milwaukee during the period 1980-1990. In addition, the changing spatial distribution of neighborhood characteristics stressed by urban ecological theory in explanations of neighborhood change is described and mapped. The visual display of neighborhood change at the city level allows one to observe the overall transformations experienced by the city's spatial structure. This step also enhances understanding of the spatial aggregation of change and the identification of existing and new patterns of neighborhood change taking place across the city's neighborhoods.

Neighborhood change is measured by calculating changes in the neighborhoods' share of poverty between 1980 and 1990. A total of five ecological models are tested. Current ecological perspectives (Wilson 1987, 1993; Massey and Denton 1993) include

Economic Transformation, Racial Segregation, and Demographic Composition models. Classic ecological perspectives (Chicago School; Hoover and Vernon 1959) include Invasion-Succession/Life Cycle and Arbitrage models.

From current ecological perspectives of neighborhood change, various hypotheses can be identified. Hypotheses derived from the Economic Transformation model emphasize changes in the economy from manufacturing to services, changing levels of unemployment, and social class changes in blue-collar workers. Racial Segregation hypotheses emphasize the changing distribution of population characteristics based on neighborhoods' racial/ethnic composition. Hypotheses derived from the Demographic Composition model emphasize composition variables of changing age and family structure.

Classic ecological perspectives include various hypotheses. Invasion-Succession/Life Cycle hypotheses emphasize distance from the urban core and sector of location as well as variables associated to housing and demographic dynamics. The Arbitrage model emphasizes geographic proximity and competition between households--with different socioeconomic status and racial and ethnic backgrounds--for housing in adjacent areas of the city.

The present study argues that current ecological explanations of neighborhood change will benefit by incorporating housing and spatial related variables stressed by classic ecological perspectives of neighborhood change. It is also argued that examination of the evolution of the city's spatial structure, including spatial modeling of changing neighborhood characteristics are necessary in order to understand the spatial patterns that result from the aggregation and direction of change.

Census tracts are used as proxies to represent neighborhoods and they constitute the unit of analysis for the present study. Statistical testing of ecological models and the mapping of changing neighborhood characteristics will be conducted using census tracts. In some instances, the descriptive analysis of change will use aggregation of census tracts representing homogenous city/sub-areas. This facilitates quantification and interpretation of spatial patterns that result from the aggregation and direction of change portrayed through the mapping procedure.

A major contribution of the present study is the description and documentation of existing patterns of neighborhood change taken place in a locality. It provides an explanatory framework that helps account for such patterns and it tests hypotheses regarding neighborhood change from the perspectives mentioned above. Place-based policies aimed at improving the quality of life of neighborhoods will be informed in two ways. First, through an evaluation of the relative importance of factors associated with the neighborhood change phenomena. Secondly, through the identification of existing and new patterns of change taking place across the City's neighborhoods. Literature is not available extensively examining these processes in the City of Milwaukee for the period covered in this study. Thus, the present study will be of great benefit in understanding the spatial patterns of neighborhood change experienced by the City of Milwaukee and in identifying relevant factors related to that process during the most recent decade.

The study poses some methodological and theoretical limitations that constrain its contribution to urban policy. The outcomes resulting from measures that describe the statistical aggregation of people and households in a neighborhood inform on place-based

policies that may exclude poor residents living in non-poor neighborhoods or benefit non-poor residents living in poor neighborhoods. In addition, the unavailability of longitudinal data at the neighborhood level, for the period under study, regarding political-economy and social movements variables excludes from the analysis plausible emerging hypotheses derived from such perspectives. Thus, results from the present study constitute an important but yet partial contribution in understanding and addressing neighborhood change in general, and neighborhood decline in particular.

The study is presented in six chapters. In chapter I, the complexities involved in the study of neighborhood change are discussed as well as the implications of the study for urban planning and policy. Chapter II offers a review of urban ecological theory and examination of classic and current ecological perspectives of neighborhood change. Chapter III includes description of the various methods and sources of data used in the study as well as the presentation of the specific models, hypotheses, and variables tested.

In chapter IV, a description and spatial modeling of demographic, socioeconomic, and housing changes taking place across neighborhoods in Milwaukee's metropolitan area is offered first. Then, an examination of the evolution of Milwaukee's spatial structure is offered by describing and modeling historic as well as contemporary spatial patterns of change across the city's neighborhoods. Special attention will be directed toward identification of patterns of change taking place at the city level regarding neighborhoods' demographic, socioeconomic, and housing characteristics. Chapter V contains results from statistical testing of the five ecological models of neighborhood change examined. Finally, chapter VI discusses the research findings and the theoretical

and methodological lessons resulting from the study. The chapter also offers a series of recommendations for urban planning and policy.

A. The Complexities Involved in the Study of Neighborhood Change

The study of neighborhood change is complex and controversial. One critical dimension of its complexity is the design of criteria and methodology that unveil and identify the point at which it can be said that a change in the neighborhood has taken place. The emphasis in this endeavor has been in identifying a "tipping point" at which or from which a process of neighborhood transformation occurs. The criteria for the "tipping point" has been based on a single but revealing indicator such as the neighborhood's share of poverty or indexes constructed out of the combination of various key indicators such as the neighborhood's incidence of crime, board-up housing units, housing values, etc.

Another critical dimension of its complexity, which is also related to the former, relies on determining if the emphasis to identify change should be placed on change of the people who live in the neighborhood or on other neighborhood characteristics such as the physical (e.g. housing, infrastructure, etc.) and economic (e.g. commercial activity, local investments, etc.) structures of the neighborhood. What has been acknowledged, however, is that a change in the social status of a neighborhood as well as a change in other neighborhood characteristics are two distinctive processes that can be identified and analyzed and that such changes may even operate independently of each other (Schwirian 1983, Schwab and Ringel 1991). In addition, while they may operate independently of each other, an interdependent relationship tends to exist between them to which other

factors such as the safety of the neighborhood have become increasingly relevant in the process of change.

The complexity of the study of neighborhood change is further complicated by the controversy developed around the identification of the primary causes of change and the interdependent relationship between the physical and economic vitality of a neighborhood and the well-being of its inhabitants. Wilson's (1987) contribution to the study of neighborhood poverty in the City of Chicago called for a better understanding of the relationship between the circumstances of inner-city neighborhoods' physical and economic deterioration, the geographic concentration of poverty in such neighborhoods, and the life chances of those living in such areas. Determining causality between these factors, however, is highly problematic and remains controversial.

Causes of change may be originated in the physical, social, and economic environment as well as in the inhabitants themselves. These relationships are further complicated by the fact that inner-city neighborhoods constitute the shelter of highly mobile populations (Sawicki and Flynn 1996, p. 178). Explaining causality would require understanding why people moved to the places where they live and why they experience changes in their socioeconomic status. This task, however, is limited by the scarcity of longitudinal data regarding individuals' changes in socioeconomic status overtime (Jargowsky 1997 p. 51). In addition, people are limited to choose a place to reside under a constrained selection process that further sorts inhabitants who share some similar characteristics into the same neighborhoods (Sawicki and Flynn 1996, p. 178). Thus, establishing causal relationships between people and place is problematic.

A clear distinction between cause and effect at the neighborhood level is also difficult to achieve. The socioeconomic status of a neighborhood may be the result of factors that are outside the neighborhood itself. For instance, racial and ethnic discrimination in society may have an effect on the sorting of neighborhoods in terms of their racial and ethnic composition. In addition, factors acting within the neighborhood such as vacant housing, crime rates, and concentration of poverty can be simultaneously cause and effect. In short, the factors that cause improvements or declines in the well-being of neighborhoods as physical entities may be different from those that cause improvements or decline in the well-being of neighborhoods residents themselves (Sawicki and Flynn 1996, p. 177-178).

The complexity and controversial character of the study of neighborhood change has made it difficult to develop causal models of neighborhood change. In addition, some approaches have shown that more subtle factors related to society's culture, logic of capital investments and markets, and different forms of social organization are influential in the process of neighborhood change. For instance, a socio-cultural/organizational approach finds a source of change in the attitudes and values of people and the neighborhood's forms of social relations. A political-economic approach emphasizes the role of economic and political institutions and the business and housing markets in processes of change experienced by neighborhoods. A social-movements approach stresses the role of citizen participation and neighborhood organizations in the transformations experienced by neighborhoods (Schwirian 1983; Schwab and Ringel 1991).

B. Implications of Research for Urban Planning and Policy

Urban scientists are asked to help understand processes and manifestations emerged from urban life as well as to propose strategies that can lead to improve its quality. By modeling and testing the predictive power of variables related to the neighborhood change phenomena, this study seeks to aid urban planners and policy makers in developing more effective strategies to promote the stability and improvement of urban neighborhoods.

Our emphasis in modeling spatial patterns of neighborhood change is inspired by the human tradition of appreciation of space and the graphic representation of spatial processes of change that have become facilitated by new information technologies. Some of the oldest and most popular methods of data presentations are graphical in nature. Among these methods mapping has played an important role. Brinton (1919) noted that "Maps marked, colored, or shaded in different ways, or used in conjunction with pins or other signals, form one of the most convenient means of conveying information." (p. 208). More recently, Aberley (1993) argued that mapping can play an important role in social change since the interplay between the physical environment and the social realities of urban life (e.g., division of classes and the distribution of poverty based on race, sex, or age) emerge more clearly when shown in graphic relationships and charted across our urban neighborhoods (pp. 4-5).

New information technologies such as Geographic Information Systems (GIS) constitute some of the most recent response to the needs of modeling societal processes that can be related to space and time. GIS enables spatial relationships to be modeled (Doig 1993, p 42) and large quantities of societal information to be related to space, time,

and location and presented in graphic forms facilitating the modeling, understanding, and communication of such processes. This study takes advantage of such technological innovations and introduces an approach to planning and policy that stresses graphic representation and the dissemination of information about processes of change across urban neighborhoods.

The dissemination of information has been an important component in the agenda of the people and organizations promoting a better understanding of our communities. Throughout history people have learned that access to information results not only in a greater number of choices in terms of goods, services, and opportunities, but also in a greater awareness of the societal conditions that regulate their lives. As suggested by Chakravorty (1996), people's perception of societal developments such as inequality may be better understood from observations made in the neighborhood and the region where one lives in, rather than from more abstract and more difficult-to-comprehend inequality measures (p. 1672). Similarly, as proposed by Walker and Young (1997) sophisticated spatial modeling and mapping can better inform policy makers, helping them to think locally, spatially, and temporally.

Thus, making information available and easy to interpret constitutes an important step toward facilitating the decision making process for urban planning and policy as well as for empowering populations and enabling them to transform their lives through greater participation in both the planning and the policy making process. In this study, the theoretical and methodological inspiring principles of Wright Mill's "sociological imagination" and David Harvey's "geographical imagination" are combined in order to study urban neighborhoods and to plan for their future. The need for involving people

and neighborhood organizations in the planning and policy making process of their communities have become increasing evident among urban scholars, planners, and city officials as well as neighborhood agencies and organizations. Urban scholars and institutions dealing with the broad spectrum of urban issues have concluded that although exogenous forces condition the destiny of urban neighborhoods endogenous forces can effectively mediate the effects of changes and influence the direction of these changes in their communities. If the development of place-specific policies help preserve a sense of community in a specific geographical setting it represents valuable capital (Bolton 1991) for the improvement of the people who live there.

Limitations of the present study in the context of urban planning and policy can be also identified. The "place prosperity versus people prosperity" conundrum recalled by Sawicki and Flynn (1996) and revisited by Bolton (1991) is introduced here and it serves as a good way to discuss such limitations. By using measures that describe the statistical aggregations of people and households located in a certain area (e.g. percent of population in poverty in a census tracts) and data that measure the characteristics of the area itself (e.g. sector of location, distance to the Central Business District (CBD)) without measures that describe the characteristics of the individual residents we inform on place-based policies that "can often lead to the miss-specification of the individuals they target" (Sawicki and Flynn 1996, p. 175). More affluent people living in targeted poorer areas "can benefit from programs aimed at poor areas, while people living in poverty outside the same targeted area do not benefit at all" (Ibid.)[1].

Well documented is the fact that urban renewal initiatives-- that were established and justified as an effort to improve, among others, the housing conditions of low-income

urban neighborhoods--have become a public subsidy for private business development via downtown commercial real estate (Feagin and Parker, 1990; Squires 1994, p. 100). Clear distinctions therefore should be made between policies directed at improving the well being of neighborhoods and policies directed at improving the well being of neighborhood residents. The contribution of the present study, however, focuses on informing place-specific policies which is emphasized should be complemented with research informing on people-specific policies. Taking advantage of new information technologies in general and GIS in particular this author agrees with Sawicki and Flynn (1996) emphasis while describing the Urban Institute's National Neighborhood Indicators Project. They suggest that new participatory approaches to neighborhood revitalization must be based on information about places as well as its inhabitants and that the neighborhood should be seen not only as an unit of analysis but also as a tool to change people's lives (p. 166).

[1] This assertion accords findings on spatial patterns of poverty and deprivation in Great Britain (Lee 1994)

CHAPTER II: Theoretical Background

In this chapter, a review of contemporary trends in urban ecological theory is offered. The chapter also offers an examination of classic and current ecological perspectives of neighborhood change as well as identification of their theoretical roots from urban ecological theory.

A. Urban Ecological Theory

The urban ecology perspective is founded on theories of Human Ecology which premises advance that the resulting social and spatial organization of urban society is the result of a natural process of change steaming from growth (Hawley 1986). In such an approach, it is assumed that societies have a tendency toward collective adaptation and that technological change, production, population dynamics, and market exchanges take place through a functional process (Hawley 1984, p.905).

In explaining the changing spatial orientation of metropolitan residents, for instance, Hawley (1986) states that the distribution of population and other urban components (e.g. industries and businesses) is the result of a process of reorganization resulting from the expansion of the community (p. 187). This reorganization, Hawley argues, is a continuous process "as long as improvements in transportation and communication are added to existing technology" (Ibid.). Thus, in Hawley's (1984, 1986) account, the social and spatial organization and reorganization of cities is primarily the outcome of an expansion in the community that is facilitated by technological improvements in transportation and communication.

Although Hawley (1984) does not ignore the existence of power relations since such a paradigm identifies hierarchic patterns of relationship (e.g. the submission of

workers by the owners of the means of production or the relation of dominance among systems of cities), the concept of class is interpreted as one of several species of categorical grouping (p.910). In addition, the increasing centralization of economic power, by corporate entities such as insurance companies, banks, brokerage houses, mutual stock funds etc., is acknowledged (Ibid.). However, such power relations are considered part of a hierarchy structure that serves as facilitators to optimize the use of scarce resources and as a mechanism for distributing the fruits of those resources over active population (p. 915)

Berry and Kasarda (1977), following such basic theoretical principles, sustain that the central problem of ecological inquiry is understanding how population organizes in its adaptation to a constantly changing and restricting environment (p. 12). To do so, explain Berry and Kasarda, "ecologists rely principally" on four functionally interdependent variables: population, organization, environment and technology" (p. 14). Population refers to an internally structured human collectivity that functions as a coherent entity. Organization refers to a system structure that--through collective action--facilitates population's capability to survive in a given environment. An environment or ecological complex is defined as all external events affecting population. Technologies are the tools employed by a population to subsist and to organize productive activities in its environment (p.p. 14-15). Thus, population organizes--in its adaptation to the environment--in social systems that tend to move toward a state of equilibrium (p.13). These variables, it is argued, are important explanations of patterns and processes of social and spatial organization.

Berry and Kasarda (1977) sustain that, in contemporary urban society, some constraints can be identified in the process of population adaptation to the changing and restricting environment. In terms of residential location, for instance, it is argued that population confronts a decision process that is mediated by price, type, and location of housing (p. 126). Income is considered the most important determinant in the decision process and two sets of variables are further incorporated as determinant of housing choice. One set refers to the individual's characteristics such as income, stage-in-life cycle, lifestyle preferences, and attitudes toward the journey to work. The other is related to housing characteristics such as price, type of home, neighbors-type of community institutions and location with respect to jobs (Ibid.). In addition, processes of exclusion and restriction are also identified in the creation of constrains related to such decisions. It is argued that organized individuals residing in determined social areas or neighborhoods exclude people with dissimilar characteristics from their neighborhoods (e.g. suburbs) or restrict certain minority groups to particular areas (e.g. the ghetto) (p. 130).

These contemporary trends in urban science and their theoretical roots are manifested in the study of the neighborhood change phenomena. The application of urban ecological theory in the study of neighborhood change is reflected in current and classic perspectives of neighborhood change including Economic Transformation, Racial Segregation, Demographic Composition, Invasion-Succession/Life Cycle, and Arbitrage models of neighborhood change.

B. Major Ecological Perspectives of Neighborhood Change

As observed in previous chapters, the study of neighborhood change is complex and controversial. Some perspectives have focused on the changing socioeconomic

composition of the neighborhood while others place more attention on the transformations of neighborhood's physical (e.g. housing, infrastructure, etc.) and economic (e.g. commercial activity, local investments, etc.) structures. What has been acknowledged, however, is that neighborhoods are physical as well as social entities (Keller 1968 in Schwirian 1983, p. 84) and that change in the social status of a neighborhood as well as a change in its housing and neighborhood characteristics are two distinctive processes that can be identified and analyzed. Although such changes may operate independently of each other (Schwirian 1983, Schwab and Ringel 1991), they can be also related to each other (Wilson 1987, 1993).

1. Classic Ecological Perspectives of Neighborhood Change

a. Invasion-Succession/Life Cycle Model

The neighborhood Life Cycle and Invasion-Succession models can be conceived as two complementary models where neighborhood movement through the life cycle is described by researchers as a series of invasion-succession cycles (Schwrian 1982, p. 91). Although each model emphasizes certain unique factors and their relationship with the neighborhood change phenomena, both of them attempt to unveil the intricacies of the same process of transformation experienced by urban neighborhoods (Schwab 1987).

The invasion-succession process has been commonly defined as a course of neighborhood population alteration that results from racial and social-status transitions where the successful settlement of newcomers in a neighborhood is followed by the departure of established populations. Invasion-succession has been also used to refer to change in land use or dominant activities in a neighborhood (Schwirian 1983). For instance, changes in the relative income position of a neighborhood may be related to

changes in the demographic and socioeconomic composition of neighborhoods as well as in the location of neighborhoods and its housing and structural conditions.

Recent studies have found in the Invasion-Succession model a good theoretical foundation for contemporary patterns of neighborhood change as measured by its changing racial and ethnic composition. Alba, Denton, Leung, and Logan (1995), for instance, found that specific patterns of persistence and change in neighborhood regarding their racial and ethnic composition followed the invasion-succession process. The authors noticed that the transition of a neighborhood from a mixed racial and ethnic composition to an all-minority composition generally occurs on the borders of heavily minority areas, when whites depart from neighborhoods where they are outnumbered by minorities. (p. 652).

The Life Cycle model of Hoover and Vernon (1959) focuses on the relationship between changes in the socioeconomic characteristics of neighborhoods and the aging of housing. The model identifies several stages in the neighborhood's development that involves occupancy by a succession of demographic groups falling in income levels and varying in housing and population densities as the neighborhood ages. In the life-cycle model of neighborhood change it is argued that many areas of a city experience a process of change that involves five stages: development, transition, downgrading, thinning out, and renewal. Hoover and Vernon (1959) denoted that not all neighborhoods passed through such subsequent transformations, but the passing of neighborhood from one stage to the other result in changes in the status and the racial and age composition of the

population; the intensity of land and dwelling use; population density; and the quality and condition of housing.[2]

b. Arbitrage Model

The Arbritage model is concerned with the dynamic price equilibrium introduced by the competition of racial and socioeconomic groups for housing in adjacent neighborhoods. In the Arbritage model--which derives from a more general process known as filtering (See Hartshorn 1992, p. 261) and embedded in the same theoretical roots as the life-cycle model--changes in neighborhood, as measured by its housing values, are determined by the geographic proximity and competition between households, with different socioeconomic status and racial and ethnic backgrounds, for housing in adjacent areas of the city.

Factors associated with the decision making of households regarding place of residence are the focus of the Arbitrage model. The Arbitrage model stresses the relationship between household change and neighborhood succession. Household utility, it is argued, depends positively on neighborhood income and negatively on the proportion of non-white population. The preferences of households to live in a racially and economically homogenous neighborhoods depends greatly on the level of housing prices and occupancy changes of neighborhoods (Schwab 1987, p. 298). Different from the Life Cycle model, in the Arbitrage model as well as in the filtering concept households rather than housing are the unit of analysis and changes in households preferences are examined rather than housing values or structures.

[2] For a more detailed interpretation of classic ecological models See Schwrian (1983).

2. Current Ecological Perspectives of Neighborhood Change

The literature on neighborhood poverty change lead by Wilson (1987, 1993, 1996); Massey and Denton (1993); Massey, Gross and Shibuya (1994); Jargowsky and Bane (1990); and Jargowsky (1997) focuses on the geographic concentration of the poor and uses a 40 percent criterion (percentage of persons or families below the poverty level) including in some instances other demographic variables to measure neighborhood poverty change and to define high-poverty, distressed, ghetto, or underclass neighborhoods. These approaches echo classic ecological models' explanations of neighborhood change by stressing neighborhood racial and social-status transitions, migration, the changing accessibility of the neighborhood to the city's or metropolitan area's employment opportunities, residential distance between and within racial, ethnic, and socioeconomic groups, and social interaction.

a. Economic Transformation

During the post-World War II period, particularly since the 1960s, the relationship between changes in the U.S. economy--from a manufacturing to service-based economy--, technological innovation in transportation and communications, and rapid suburbanization embraces distinct interrelated societal urban processes that can be associated to neighborhood change. During this period cities lost jobs, population, and relative importance in the national economy, while suburbs grew rapidly, experiencing economic growth and significant job gains (Wilson 1987). In addition, the suburbs house much greater proportions of whites than African-Americans while central cities have become, in relation to the suburbs, the shelter of poor racial and ethnic groups, particularly African-Americans and Hispanics (Ibid.).

Wilson (1987) demonstrated that such changes were accompanied by two related processes. First, economic and technological shifts of the post-World War II period precipitated the movement toward decentralization and rapid residential development in the suburbs. Second, central cities became the recipients of increases in the rates of joblessness, accelerated flows of immigrants, rapid population changes, and a sudden transformation in their class composition. Once these processes were under way, Wilson (1987) argues, "they became part of a vicious cycle of metropolitan change and relocation" (p. 135-136). Thus, central city neighborhoods have become primarily the shelter of lower-income minorities and the jobless, whose chances of long-term residence, in high concentrations of poverty, have been increased by their social isolation from society and the mainstream economy (p. 62).

b. Demographic Composition

This social isolation, it is argued, has been further magnified by two interrelated processes. First, decentralization has reduced the employment opportunities of central city poor residents as a result of the growing mismatch between the location of employment and residence in the inner-city (Wilson 1993, p. 15) and between distribution of labor qualification vis-à-vis qualifications required for available jobs (Kasarda 1988, p. 77). Second, poor neighborhoods' economic development and their cultural resources--such as role models--have been threatened by the exodus of middle-class professionals and stable working-class families from areas of concentrated poverty to higher income neighborhoods in other parts of the city and to the suburbs (Wilson 1987, p. 143; Wilson 1993, p. 18-20). These processes of change in the socioeconomic

status of neighborhoods have left neighborhoods of concentrated poverty to the poor, including female-headed households and large families.

c. Racial/Ethnic Segregation

Massey and Denton (1993) and Massey, Gross, and Shibuya (1994) stress the role of racial discrimination in society and the levels of racial segregation as the key predictors of neighborhood poverty change in general, and concentration of poverty in particular. Massey used two measures of segregation. Indices of African-American-white dissimilarity[3] which measures the percentage of all African-Americans who would have to move to achieve an even, or integrated, residential racial configuration. That is one where each census neighborhood (census tract) replicates the racial composition of the metropolitan area as a whole (Massey and Denton 1993, p. 66). Indices of spatial isolation[4] which indicate the percentage of African-Americans living in the tract of the average African-American and measures the extent to which African-Americans live only among other African-Americans and gauge the potential for interracial contact within neighborhoods (Ibid.).

Although the impact of high levels of class segregation on the concentration of poverty is acknowledged by these researchers, they argue that the effect of class segregation is to heighten and reinforce the poverty-concentration effects of racial segregation which does not change their basic conclusion "racial segregation concentrates poverty, and it does so without anyone having to move anywhere" (Massey and Denton 1993, p. 130). Thus, it is argued that "the effect of rising poverty on poverty concentration depends crucially on the level of racial segregation at which the increase in

[3] It can be also interpreted as an abstract measure of physical separation between racial or ethnic groups
[4] It can be also interpreted as a degree of spatial isolation among one racial or ethnic group

poverty occurs (Ibid.). These processes of racial segregation and its resulting concentration of poverty concluded the researchers "interact to deliver an exogenous shock to African-American neighborhoods that pushes them beyond the point where physical decay and disinvestment become self-perpetuating" (p. 132).

3. Housing and Space: Integrating Classic and Current Perspectives

A departure from classic models can be identified, particularly in the work posterior to Wilson (1987). It is considering the absence of some spatial variables such as distance from the CBD and sector of location. Wilson's (1987) study of neighborhood poverty change was focused on the City of Chicago where, as in most cities, a sectorial bias exist following neighborhoods' socioeconomic and racial composition as well as other neighborhood characteristics such as proximity to industrial locations and areas of environmental distress.

After Wilson's work, attempts have taken place to test and extent his various hypotheses through cross-sectional studies encompassing metropolitan areas across the U.S. (Massey and Denton 1993; Massey, Gross and Shibuya 1994; Wilson and Donnelly 1995; Jargowsky 1997). Such studies have focused on explaining a single yet critical dimension of the neighborhood change phenomena: the concentration of poverty. Their contribution to the study of neighborhood change in general, and neighborhood poverty change in particular, has developed around the analysis of the relationship between the concentration of the poor and the levels of racial and economic segregation in metropolitan areas.

The scope of these studies, however, limited their consideration of variables traditionally considered by urban ecological theory in general, and classic ecological

models of neighborhood change in particular including land uses, sector of location, the city's history and geography, and housing. Although housing has been relatively absent from sociological research in general (Myers 1990, p. 7; Squires 1994, p. 40) and understated in explanations of specific urban developments such as spatial patterns of urban poverty and deprivation (Lee 1994, p. 1,198), a growing number researchers have stressed the theoretical and methodological significance of housing in the study of contemporary urban developments.

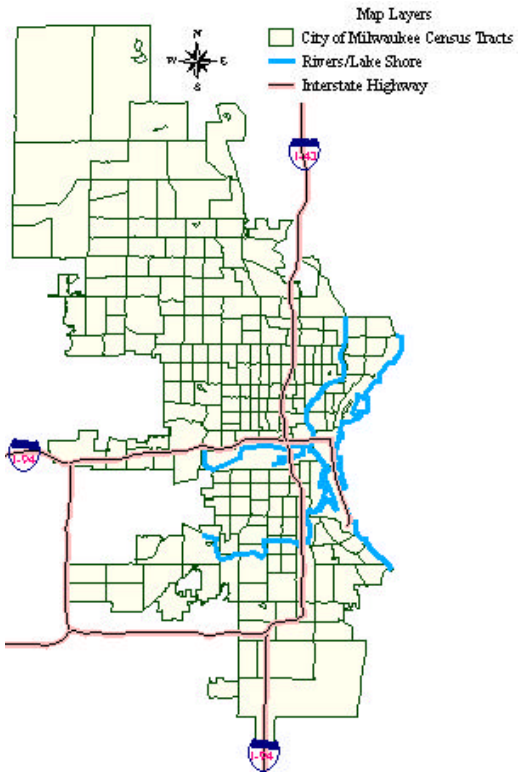
White (1989), for instance, after a comprehensive analysis of residential segregation in US metropolitan areas and evaluation of the primacy of each of the various factors associated with such phenomena, concluded that "separation of neighborhoods by housing characteristics and race were most prominent, followed by socioeconomic status, and life cycle characteristics" (p. 269). Massey and Denton (1993) and Massey, Gross, and Shibuya (1994) fostered the argument by suggesting the relevance of housing segregation as a magnifier of the harmful economic conditions of what has been defined as an urban underclass. Lee (1994) after analyzing spatial patterns of deprivation in England, concluded that the academic literature on poverty and the underclass should give greater attention to housing and space as independent contributory forces in the creation of new poverty forms.

Thus, it has been argued that contemporary urban analysis should be more sensitive to the role that housing and space play in contemporary urban developments and to the usefulness of studying such relationships at the local level. The present study echoes such understanding by incorporating in the analysis of neighborhood change

housing and spatial variables stressed by classic ecological perspectives of neighborhood change.

CHAPTER III: Methods and Sources of Data

The City of Milwaukee is the focus of this research and census tracts[5] constitute the unit of analysis in the examination of neighborhood change. Census tracts will be used as proxies to represent neighborhoods since they are generally accepted by urban specialists as "reasonably accurate approximations of the concept of a "neighborhood" (Massey and Denton 1993, p. 62; See also White 1987 pp. 18-20). In addition, census tracts are the smallest practical geographic unit of analysis for which data on income and poverty is provided by the U.S. Census of Population and Housing. Thus, statistical testing of ecological models as well as mapping of changing neighborhood characteristics will be conducted using census tracts. In some instances, the descriptive analysis of



[5] Census tracts are small, relatively permanent areas into which metropolitan and certain other areas are divided for the purpose of gathering demographic information for the decennial census. When census tracts are established, they are designed to be homogeneous with respect to population characteristics, economic status, and living conditions. Tracts generally have between 2,500 and 8,000 residents.

change will use aggregation of census tracts representing homogenous city/sub-areas. This facilitates quantification and interpretation of patterns that result from the aggregation and direction of change portrayed through the mapping procedure.

A. Dependent Variable and the Problem

Neighborhood change is represented by changes in the neighborhood's share of persons living in households with incomes below the poverty level between 1980 and 1990 [6]. The City of Milwaukee experienced an important increase in its number of persons below the poverty level, rising from 80,377 in 1970, to 85,328 in 1980 to 135,559 in 1990. The proportion of persons living in poverty within the City of Milwaukee also increased during that period. While in 1970 14 % of the city's residents lived in poverty, by 1990 the city's level of poverty had grown to 22 %. During the period between 1980 and 1990, most neighborhoods in Milwaukee experienced increases in their share of poverty. Those experiencing the largest increases, however, cluster together reinforcing existing and creating new patterns of neighborhood change. How the various neighborhood characteristics associated with the neighborhood change phenomena have changed in their distribution across the city's neighborhoods during the 1980s? How can we better explain changes in neighborhoods' share of poverty during that period in Milwaukee?

In order to answer these questions, the present study was developed in three steps. First, a description and spatial modeling of the economic, demographic, and housing

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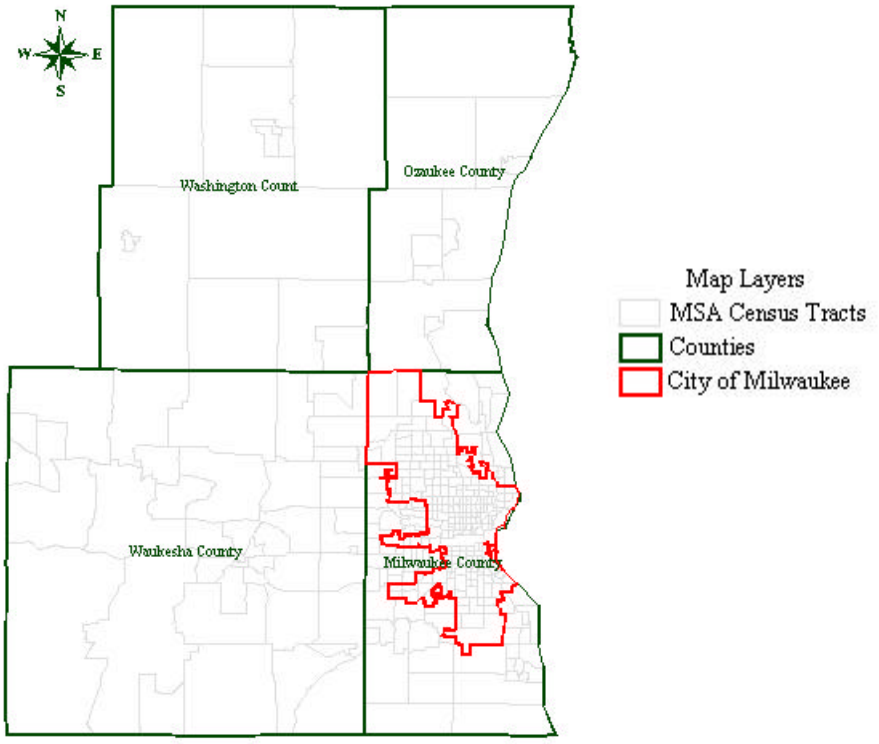
[6] ***Persons Below Poverty***: The sum of the number of persons in families with incomes below the poverty level and the number of unrelated individuals with incomes below the poverty level constitute the number of persons below poverty as defined by the U.S. Census Bureau. The poverty thresholds are revised annually to allow for changes in the cost of living as reflected in the Consumer Price Index. The average poverty threshold for a family of four persons was $12,674 in 1989 (1990 CP-2-1 1990 Census of Population, Social and Economic Characteristics, U.S.).

changes taking place at the metropolitan level are offered. This first step provides readers with a snapshot of the larger ecological context in which the city functions and the changes that such context has experienced during the most recent decades.



Secondly, an examination of the evolution of the City of Milwaukee's spatial structure is offered as well as a description and spatial modeling of economic, demographic, and housing changes taking places across the city's neighborhoods. Descriptive and univariate statistics and demographic and mapping techniques via geographic information systems (GIS) were employed to conduct the previous analyses. In some instances, the descriptive analysis of change used aggregation of census tracts representing homogenous city/sub-areas. Various distinctive sub-areas defined based on

their location, demographic composition, and socioeconomic status[7] were used to provide readers with a background of changes in Milwaukee's social structure from 1950 to 1970. In addition, using as a reference 1970 sub-areas and neighborhood strategic plan areas as defined by the Community Development Block Grant Initiative (CDBG), another set of sub-areas were created to describe patterns of change from 1970 to 1990. The grouping of census tracts in sub-areas facilitates quantification and interpretation of citywide patterns that result from the aggregation and direction of change portrayed through the mapping procedure.

[7] In the early 1970s an effort was made in Milwaukee to organize census data using as references geographic sub-areas within the city "…especially when it appears likely that there are differences between them that should be noted" (Palay 1973, p. 5).

Finally, the explanatory power of five ecological models of neighborhood change were examined using correlation and multiple regression analysis. These include Economic Transformation, Racial Segregation, Demographic Composition, Invasion-Succession/Life Cycle, and Arbitrage models. Correlation analysis was conducted to explore the strength and direction of the relationship between each of the independent variables and neighborhood poverty change. Correlation coefficients were also used to determine levels of correlation between independent variables. Regression models were run independently for each model in order to identify significant predictors of neighborhood change and the relative importance of each predictor within models. This statistical procedure, using multiple regression analysis, also helped evaluate the predictive power of each of the ecological models in explaining neighborhood change.

B. Models, Hypotheses, and Independent Variables

1. Current Ecological Models

Model 1: Economic Transformation

The Economic Transformation model (Wilson 1970, 1993) emphasizes changes in the economy from manufacturing to services, changing levels of unemployment, and social class changes in blue-collar workers, in explanations of neighborhood change. Consideration of pre-existing as well as changing conditions of labor force participation and social class are examined. Hypothesis derived from the Economic Transformation model suggests that

H1: Decreases in manufacturing jobs and blue collar occupations and increases in unemployment are predicted to be related to increases in neighborhoods' share of poverty.

Pre-existing conditions of economic variables are represented by the variables PUNEMP8 (neighborhoods' share of unemployment in 1980), PMANUF8 (neighborhoods' share of labor force employed in the manufacturing sector in 1980), PBLUEC8 (neighborhoods' share of blue collar occupations in 1980), and PSERV8 (neighborhoods' share of labor force employed in the service sector in 1980). Changing conditions of economic variables in neighborhoods are represented by the variables PDUNEM89 (changes in neighborhoods' share of unemployment between 1980 and 1990), PDMANU89 (changes in the neighborhood's share of labor force employed in the manufacturing sector during the period 1980-1990), PDBLUE89 (changes in the neighborhood's share of blue collar workers between 1980 and 1990), and PDSERV89 (changes in the neighborhood's share of labor force employed in the service sector during the period 1980-1990).

Model 2: Racial/Ethnic Segregation

The Racial Segregation model (Massey and Denton 1993) emphasizes the changing distribution of neighborhoods' racial/ethnic composition. The hypothesis tested emphasizes the pre-existing and changing racial/ethnic composition of neighborhoods

H2: Neighborhoods with greater pre-existing and increasing shares of minority population are predicted to experience increases in their share of poverty

Pre-existing conditions of racial segregation variables in neighborhoods are represented by the variables PMIN8 (neighborhood's share of minorities in 1980), SEGREG8 (ghetto neighborhood[8] in 1980), and HSEGREG8 (ghetto core neighborhood[9]

[8] Neighborhood status is defined using Rose (1971)'s descriptive labels specifying social areas based on the racial status of neighborhoods.
[9] Ibid

in 1980). Hypothesis derived from the Racial Segregation model also suggests that neighborhoods with greater pre-existing shares of minority populations and poverty are predicted to experience increases in their share of poverty. Thus, the variable PPOV8 (neighborhoods' share of poverty in 1980) will be introduced in the regression model. Changing conditions of racial segregation variables are represented by the variable PDMIN89 (changes in neighborhoods' share of minority populations between 1980 and 1990).

Model 3: Demographic Composition

The demographic model (Wilson 1987; Wilson and Donnelly 1995) emphasizes composition variables of changing age and family structure in explanations of neighborhood change. Hypothesis derived from the demographic model suggests that

> H3: The growth of female-headed households, young persons under 15 years of age, and older persons 65 or more years of age are predicted to be related to increases in neighborhoods' share of poverty.

Pre-existing conditions of demographic variables in neighborhoods are represented by the variables PAGE0148 (neighborhoods' share of children 0 to 14 years of age in 1980), PAGE658 (neighborhoods' share of population 65 or more years of age in 1980), and PFEMH8 (neighborhoods' share of female-headed households in 1980). Changing conditions of demographic variables in neighborhoods are represented by the variables PD01489 (changes in neighborhoods' share of children ages 0 through 14), PD6589 (changes in neighborhoods' share of population with 65 or more years of age), and PDFEMH89 (changes in neighborhoods' share of female-headed families).

2. Classic Ecological Models

Model 4: Life Cycle/Invasion-Succession

The Invasion-Succession/Life Cycle model (Chicago School; Hoover and Vernon 1959) emphasizes distance from the urban core and sector of location as well as variables associated to housing and demographic dynamics in explanations of neighborhood change.

Hypotheses derived from the Invasion-Succession/Life Cycle model suggests that

H4: Neighborhoods located in closer proximity to the CBD and outside the most attractive areas of the city are more likely to experience increases in neighborhoods' share of poverty

H5: Neighborhoods with greater shares of old housing stock and two family residential units, increasing shares of rental housing, and lower home appreciation rates are more likely to experience increases in neighborhoods' share of poverty

H6: Neighborhoods with greater shares of minority populations and recent movers and decreasing population are more likely to experience increases in neighborhoods' share of poverty

The variable DISTANCE represents the location of neighborhoods in respect to the Central Business District (CBD) and it is measured in miles with a straight-line distance from the CBD to the center of the tract. The variable SECTOR is a dummy variable with tracts roughly located between the lake and the Milwaukee and Kinnickinnic Rivers = 1. These tracts are roughly located in the most valuable areas of the city. The variable PH0039 represents the neighborhood's share of housing built before 1940. The variable PH2FLY9 represents the neighborhoods' share of two family residential units. The variable PDRENT89 represents changes in the neighborhoods' share of rental housing between 1980 and 1990. The variable HVALUE89 represents

changes in neighborhoods' median home assessment values between 1980 and 1990. The variable PMIN8 represents neighborhoods' share of minority population in 1980. The variable POPCH89 represents changes in the neighborhoods' total population between 1980 and 1990. Finally, the variable PMOVERS9 represents the neighborhoods' share of heads of households who moved into their housing units between 1989 and March of 1990.

Model 5: Arbitrage

The Arbitrage model emphasizes geographic proximity and competition between households--with different socioeconomic status and racial and ethnic backgrounds--for housing in adjacent areas of the city in explanations of neighborhood change.

Hypotheses derived from the Invasion-Succession/Life Cycle model suggests that

> H7: Neighborhoods adjacent to minority neighborhoods with increasing rental housing and minority populations, and decreasing income levels are predicted to experience increases in their share of poverty.

The variable INCOME89 represents changes in neighborhoods' average family income between 1980 and 1990. The variable PDMIN89 represents changes in neighborhoods' share of minority populations between 1980 and 1990. The variable PDRENT89 represents changes in neighborhoods' share of rental housing units between 1980 and 1990. Finally, the variable ADJACENT is a dummy variable with predominantly white tracts adjacent to tracts with more than 10 percent minority population = 1.

C. Sources of Data

Various sources of data will be used in the present study. One source of information is the U.S. 1970, 1980, and 1990 Censuses of Population and Housing. The

1990 Summary Tape Files 3 (STF3) (U.S. Census Bureau 1990) will be used for extracting 1990 census tract data. A common problem that emerges, when dealing with longitudinal analysis, is the lack of matching variables from older censuses, in this case 1980, and particularly 1970 data. Adams (1992ab) and Tobin (1993) have prepared extraction of comparable data from 1970 and 1980 that can be matched with data extracted from the 1990 Census. Also, Topographically Integrated Geographic Encoding and Referencing system (TIGER) Line/files (U.S. Census Bureau 1995) will be used to create an electronic map of Milwaukee MSA's census tracts, streets, and highways as well as to create a longitudinal and topologically structured spatial database for spatial analysis at the census tract level.

Another source of information for this analysis is the Urban Research Center-1977-1996 ES202 (URC-ES202) longitudinal database. URC-ES202 was created in order to investigate trends in employment and earnings for specific geographic areas, particularly the Milwaukee Metropolitan Area. This unique database contains longitudinal information on sources of employment for the State of Wisconsin and it will be used to complement census data for the analysis of labor force and employment changes in Milwaukee's MSA. URC-ES202 contains an annual employment observation, annual payroll, location, SIC, ownership, and transfer data (White, Zipp, McMahon, Reynolds, Osterman, and Binkley 1990).

The Milwaukee Property File (MPROP) (City of Milwaukee-Department of City Development 1995) will be incorporated for the analysis of housing and land uses. Milwaukee is one of the first and few cities in the U.S. with a longitudinal electronic geo-database containing detailed information on individual properties and land use. MPROP is an electronic database originated and updated by the Office of the Tax Commissioner at

the City of Milwaukee containing 40 items describing land and building data for each of the approximately 160,000 properties in the city (Huxhold and Anderson 1994). For the purpose of the present study, data from MPROP have been aggregated at the census tract level for the years 1980 and 1990.

CHAPTER IV: Modeling the Changing Urban Environment

In this chapter, the changing spatial distribution of neighborhood characteristics stressed by urban ecological theory in explanations of neighborhood change is described and mapped at the metropolitan and city levels. Analysis of the metropolitan area helps us understand the larger ecological context in which the city functions and the city's relationship with its surrounding environments. The visual display of neighborhood change at the city level allows one to observe the overall transformations experienced by the city's spatial structure. In addition, this step enhances understanding of the spatial aggregation of change and the identification of existing and new patterns of neighborhood change taking place across the city's neighborhoods.

A. A Look at the Metropolitan Context: Spatial Modeling of Demographic, Housing, and Economic Changes[10]

Although cities develop following their own dynamics and under very particular historical circumstances, the development of the region where they are located also conditions their evolvement. Studies on neighborhood change and metropolitan transformation (Wilson 1987, 1993; Kasarda 1988, 1993; Massey and Denton 1993; Jargowsky 1997) stress various processes at the metropolitan level that can be analyzed and related to the city's experiences of neighborhood change. These include distribution and redistribution of population, rapid suburbanization, and economic shifts from manufacturing to service employment, decentralization of employment, neighborhoods' racial and social-status transitions, and spatial distance between racial, ethnic, and socioeconomic groups.

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[10] *Tables for this section are contained in Appendix A (p.101). Maps are contained in Appendix B (p.113)

Wilson (1987) stresses deindustrialization, industry deconcentration, and neighborhood sorting (middle and working class flight from poor neighborhoods) to explain the worsening and expansion of the ghetto while Massey and Denton (1993) and Massey, Gross, and Shibuya (1994) stress the role of racial discrimination in society and the levels of racial segregation in urban U.S. as the important predictors of neighborhood poverty change.

It has generally been argued that during the most recent decades cities lost jobs, population, and relative importance in the national economy, while suburbs grew rapidly, experiencing economic and population growth and significant job gains. In addition, suburbs house much greater proportions of whites than African-Americans while central cities' neighborhoods have become disproportionately the shelter of poor racial and ethnic groups, particularly African-Americans and Hispanics.

This section involves the description and spatial modeling of the demographic, housing, and economic changes across neighborhoods at the metropolitan level to better understand the regional contexts in which neighborhood change is embedded and the changes that such contexts have experienced during the most recent decades. Descriptive and univariate statistics and demographic and mapping techniques via geographic information systems (GIS) will be employed.

1. General Population and Housing Changes

During the last several decades, a continuous process of population distribution and redistribution took place across Milwaukee's Metropolitan Statistical Area (MSA). This process was characterized by a continuous growth of the suburban counties and a progressive decline in Milwaukee County's share of the MSA's population. This decline,

however, has been unevenly distributed. The City of Milwaukee--The urban core of Milwaukee's MSA--absorbed most of the county's population decline. Data displayed in Table 1 shows that by 1990 Milwaukee County continued to be the most populated county of the MSA. However Table 1 also shows that Milwaukee County's share of the MSA total population had declined from 86 percent in 1950 to 67 percent in 1990. Lead by Waukesha County, the rest of the counties experienced continuous population growth during the same period. Note in Table 1 that during the most recent decades (1970-1990), Milwaukee County experienced a decrease of 94,974 persons in its total population with the City of Milwaukee absorbing 94 percent of this decline.

Even though Milwaukee's MSA suburbs gained population while the city experienced continuous decreases, natural growth and net migration analysis for the city and suburban Milwaukee reveal new patterns of migration within Milwaukee's MSA. Milwaukee's Department of City Development (DCD) (1990) reported that during the 1980s--different from previous decades when about half of the persons who left the city settled in the remainder of the metropolitan area--more of the persons leaving the City of Milwaukee moved somewhere outside the metropolitan area. During the 1980s, net in-migration to the three suburban counties was only fifteen percent of the 1970-1980 net in-migration (pp. 4-5).

Population gains and losses across the MSA's neighborhoods are portrayed in Maps 1a, 1b, 1c, and 1d. Map 1a shows population losses for the period 1970-1980 while Map 1b displays population losses for the period 1980-1990. A high concentration of population losses within the city boundaries can be observed in Maps 1a and 1b. It also

can be noticed from data displayed in Maps 1a and 1b that suburban neighborhoods losing the most population were those located in closer proximity to city boundaries.

Map 1c shows population gains for the period 1970-1980 while Map 1d shows population gains for the period 1980-1990. It can be noticed in Maps 1c and 1d that most of the population gains in the metropolitan area took place outside city boundaries. Note also that although the spatial distribution of population gains across the MSA's neighborhoods was nearly evenly distributed, the highest concentrations of population gains took place in areas near major highway/road intersections across the metropolitan area. Population gains within the city took place in very well defined areas.

Thus, during the 1970s and 1980s the City of Milwaukee lost population while the suburbs increased their share of population in the MSA. The most important loss of population in the city, however, took place during the 1970s while the city's population losses provided limited contributions to the MSA suburb's population gains during the 1980s.

Table 2 contains information on residential development in Milwaukee's MSA. Similar to patterns of population distribution during the period 1950-1990, Milwaukee County's share of the MSA's housing units declined from 85 percent in 1950 to 70 percent in 1990. Lead by Waukesha County the rest of the counties experienced steady increase in their share of the MSA's housing units. Note also in Table 2 that while during the period 1950-1970 Milwaukee County had by far the largest increase in the number of residential units, during the following period 1970-1990 Waukesha County became the county with the largest increase in residential units.

During the 1950s and 1960s, highway construction had important impacts on the spatial patterns of residential development and population distribution and re-distribution in the U.S.. In Milwaukee's MSA, recent patterns of residential development and population growth in suburban counties, however, find their roots in a residential structure in place before 1940. Maps 2a through 2f portray residential development in Milwaukee's MSA before 1940 and for each of the following decades from 1940 to 1990. Map 2a shows an existing residential structure with higher housing concentrations prior to 1940 in or near the areas that became poles of residential development and population growth during the 1970s and 1980s (See also Maps 1c and 1d "population gains"). Thus, in Milwaukee highway construction accelerated but did not determine more recent spatial patterns of residential and population growth[11].

2. Poverty

Even though Milwaukee's MSA experienced a dynamic process in the geographic distribution of its population, the spatial distribution and redistribution of population living in households with incomes below the poverty level took place largely within the City of Milwaukee's boundaries. Information contained in Table 3 shows that the City of Milwaukee absorbed almost all the increases in the population below poverty for the period 1980-1990. The City of Milwaukee's poor population was 85,328 in 1980 and 135,559 in 1990, an increase of 50,231 persons. The rest of Milwaukee County, however, increased its population below poverty by only 1,742 persons, followed by

[11] Analysis of residential growth for the City of Milwaukee will be developed in subsequent sections of this chapter using a more accurate data on housing. Census data on housing age are useful for the analysis of overall spatial patterns of housing distribution across large areas. When analyzing smaller areas, the actual records of property collected by city officials are more appropriate. For instance, census information on the age of housing is provided to the census by the public who may not have a precise knowledge of the year in which their housing units were built.

Waukesha County with an increase of only 765 persons. Ozaukee and Washington counties experienced decreases in their population below poverty with reductions of 647 and 813 persons, respectively. Thus, by 1990, 84 percent of the MSA's poor population was living in the City of Milwaukee.

3. African-American and Latino Populations

The distribution of minority populations across the MSA's neighborhoods during the 1970s and 1980s is not much different from that of poverty. African-American and Latino populations--the largest minority groups in Milwaukee's MSA--continued historical distributional patterns in Milwaukee's MSA. Although population and residential growth developed toward suburban counties and the central city continued to experience population decline, minority populations remained concentrated in the central city. Tables 4 and 5 contain information on African-American and Latino populations within Milwaukee's MSA and the changes experienced by such population groups during the periods 1970-1980 and 1980-1990. Data in Table 4 show that in 1990, respectively, 97 percent and 77 percent of the MSA's African-American and Latino populations were living within the City of Milwaukee.

Information portrayed in Table 5 shows that increases in the African-American and Latino populations during the 1970s and 1980s were disproportional absorbed by Milwaukee County, particularly by the City of Milwaukee's neighborhoods. During the 1970s and 1980s, respectively, 94 percent and 96 percent of the MSA's increases in African-American population were absorbed by the City of Milwaukee. The Latino population presents a somewhat different pattern, however. While during the 1970s all the increases in Latino population was absorbed by the City of Milwaukee, during the

1980s the City of Milwaukee absorbed 79 percent of Latino increases, followed by Waukesha County with 8 percent.

Thus, by 1990 the African-American and Latino populations continued to be spatially concentrated within the City of Milwaukee boundaries with the Latino population presenting some indications of dispersal across the MSA's counties. One question that is derived from such finding is whether or not such changes are related to the economic capacity of these minority groups to access the housing market of Milwaukee MSA's suburbs.

Table 6 through Table 9 portray the distribution of income groups within the African-American and Latino populations in Milwaukee's MSA. Table 6 depicts the proportion that each county houses various African-American incomes groups. Information contained in Table 6 shows that nearly all income groups within the African-American population live in Milwaukee County. In addition, within Milwaukee County, the City of Milwaukee houses 99 percent of African-American poverty income households, 96 percent of African-American moderate income households, and 94 percent of African-American middle and upper class households.

Table 7 depicts the total number of African-American households income groups in each county and the proportion of income groups within these counties. Information contained in Table 7 indicates that almost half (48 percent) of all African-American households living in Milwaukee's MSA are poor. Data in Table 7 also shows that suburban areas are more likely to house higher income African-American households than the city. For instance, 49 percent of the City of Milwaukee's African-American

households are poor, while only 16 percent of African-American households living in Milwaukee County's suburbs are poor.

Maps 3a through 3c portray the spatial distribution of African-American income groups across the MSA's neighborhoods. Data shows that although suburban neighborhoods are more likely to house African-American households with higher incomes, most African-American households of all income groups live within the city's boundaries.

Table 8 depicts the proportion that each county houses various Latino income groups. Information contained in Table 8 shows that most income groups within the Latino population live in Milwaukee County. In addition, within Milwaukee County, the City of Milwaukee houses 90 percent of the Latino poverty income households, 78 percent of Latino moderate income households, and 62 percent of Latino middle and upper class households.

Table 9 depicts the total number of Latino households income groups in each county and the proportion of income groups within the county. Information contained in Table 9 indicates that 35 percent of all Latino households living in Milwaukee's MSA are poor. Data in Table 9 also show that suburban areas are more likely to house higher income Latino households than the city. For instance, 41 percent of the City of Milwaukee's Latino households are poor, while only 12 percent of Latino households living in Milwaukee County's suburbs fall within the same income group.

Maps 4a through 4c portray the spatial distribution of Latino income groups across the MSA's neighborhoods. Data shows that although suburban neighborhoods are

more likely to house Latino households with higher incomes, most Latino households of all income groups live within the city boundaries.

4. Economic Restructuring and Decentralization of Employment

The distribution of labor force (LF) by major sectors of the economy in Milwaukee's MSA is presented in Tables 10 and 11. Information contained in Table 10 shows that Milwaukee's MSA decreased its labor force employed in the manufacturing sector from 209,183 in 1980 to 168,746 in 1990 (a decrease of 40,437). The services and trade sectors, however, experienced increases in their total labor force, from 207, 104 in 1980 to 226,107 in 1990 and from 136,382 in 1980 to 150,153 in 1990, respectively. These changes in the generation of employment by economic sector took place unevenly across the MSA.

Data contained in Table 11 depicts the proportion that each county share of the MSA's labor force by economic sector. While Milwaukee County and the City of Milwaukee experienced a steady decline in their share of the MSA's labor force employed in most sectors, Waukesha County increased its share of the MSA's labor force in all economic sectors.

For instance, Milwaukee County's share of labor force in the manufacturing sector declined from 75 percent in 1970 to 58 percent in 1990. Waukesha County, on the other hand, increased from 15 percent of the manufacturing labor force in 1970 to 25 percent in 1990. Waukesha County also increased its share of the MSA's labor force employed in the service sector from 15 percent in 1970 to 22 percent in 1990.

Milwaukee County, and the City of Milwaukee within it, absorbed most of the MSA's losses of labor force employed in the manufacturing sector. Note also that the

gains experienced by the other counties are relatively small when compared to the losses experienced by the MSA. The analysis presented above, however, is founded on data regarding labor force by economic sector by the residence of employees during each census year. Tables 12 and 13 contain additional information on employment by economic sector that is based on the geographic location of employers. This additional set of tables will help identify geographic pattern of change in the location of the sources of employment across the MSA.

Information contained in Table 12 shows that during the 1980s Milwaukee's MSA increased its capacity to generate jobs with 100,377 additional jobs. Except for the manufacturing sector--which experienced a reduction of 32,309 jobs--all other sectors experienced increases. Note in Table 12 that the services increases of 61,391 and trade increases of 36,572 contributed to most of the increase.

Information contained in Table 12 also shows that Milwaukee County and the City of Milwaukee experienced a reduction in their capacity to house sources of employment in the manufacturing sector. During the 1980s, Milwaukee County lost 45,176 manufacturing jobs physically located within its territories with the City of Milwaukee absorbing 24,609 of those losses. Note, however, that Milwaukee County generated 43,980 additional jobs in the service sector during that period with the City of Milwaukee contributing 27,491 of those additional service jobs. Thus, data in Table 12 show that in terms of job generation Milwaukee County and the City of Milwaukee within it continued to experience an economic shift from manufacturing to service. On the other hand, lead by Waukesha County the other counties increased their capacity to

generate new jobs in almost all economic sectors with manufacturing being the leading economic sector in job generation.

Data contained in Tables 13 and 14 depict the proportion that each area share of the MSA job generation for the years 1980 and 1990 and the changes that took place during that period. Lead by Waukesha County, suburban counties experienced increased or stable shares of the MSA's job generation. Milwaukee County, however, experienced decreases in its share of the MSA's job generation in most sectors while the City of Milwaukee, within Milwaukee County, experienced decreases in all sectors.

The geographic distribution of sources of employment presented in Tabless 12, 13, and 14 shows that a process of decentralization of employment took place across Milwaukee's MSA during the 1980s. Milwaukee County and the City of Milwaukee within it lost their capacity to house additional sources of employment while suburban counties, leaded by Waukesha County increased their share of the MSA's job generation in almost all economic sectors. Thus, during the 1980s Milwaukee County and the City of Milwaukee not only reduced their capacity to house labor force employed in the manufacturing sector but also their capacity to generate new jobs in all sectors of the economy.

B. The Changing Internal Structure of the City[12]

The City of Milwaukee has gone through several stages in its formation. From a commercial center for the exchange and processing of goods in the middle 1800s--with a population of 1,712 in 1840—Milwaukee became a leading manufacturing center ranking among the largest urban centers in the country. By 1910, Milwaukee was the country's

[12] Figures for this section are contained in Appendix C (p.120). Tables are contained in Appendix D (p.123). Maps are contained in Appendix E (p.131).

twelfth largest city and its labor force was heavily committed to manufacturing. It ranked eleventh in value added by manufacture, tenth in value of manufactured product, seventh in value added per capita, and second in the percentage of its male work force engaged in all manufacturing and mechanical pursuits. The interactions of these developments (economy) with the geography of the city shaped the land use pattern of the city and its spatial structure (Simons 1978, p. 10-11).

1. Geographic Features, Early Settlements, Land Uses, and Urban Form

The fact that the mouth of the Milwaukee River offers the best naturally protected harbor on the west side of Lake Michigan between Chicago and Green Bay was influential in Milwaukee's early growth. It became a vital commercial and processing center serving a fertile and growing hinterland. Although the Milwaukee River itself does not provide access to the interior, it does join two smaller tributaries, the Menomonee River and Kinnickinnic River. Following these geographic features Milwaukee's early growth developed in three separate and competing settlements around the mouth of the Milwaukee River: the east-side peninsula two miles north of the river's mouth and two areas north and south of the Menomonee Valley[13] (See Figure 1).

Although Milwaukee's early settlements system was divided in three distinctive segments, the design of the city was based on a rational plan following the checkerboard grid-iron plan used in the design of most nineteenth-century Western towns (See Figure 2). The rationality of the plan was based on two principles. The gridiron was the easiest

[13] It has been reported that exuberant land speculation by each section's promoters and town-side speculation maintained considerable autonomy among each section even after their merge as the new Town of Milwaukee. Furthermore, separate improvement funds for each section (wards) continued as a permanent feature of Milwaukee's development (Simon 1978).

plat to survey, providing a large number of uniform lots with simple legal descriptions. It also facilitated non-resident speculators and visitors through ease of navigation[14].

The geographic features of the City's topography also influenced Milwaukee's spatial structure and its land uses. By contrasting Figures 3 and 4 it can be noticed that while the CBD was located in the intersection of the Milwaukee and Menomonee Rivers, near the mouth of the Milwaukee River, the location of industrial activity was assigned to areas corresponding to low lands on both sides of the Milwaukee and Menomonee Rivers. As it can be observed in Figure 4, the development of principal commercial streets also derived from such locations.

2. Residential Development and Demographic Transformations

Driven in large by private interests of speculators and promoters (Simons 1978, Orum 1995), the strategies previously discussed determined Milwaukee's design and form and became successful in terms of growth. During its early growth the city's population grew from 1,712 in 1846 to 285,315 in 1900 with percentage increases between decades that run from 39.5 percent change to over 1,000 percent change during that period. The City of Milwaukee's territories were also expanded through a sequence of annexations that brought the city's size from less than twelve square miles in 1846 to almost twenty-four square miles in 1910 (Ibid.).

During the 20th century, various contrasting transformations can be observed in the city's demographic, residential, and territorial developments. In Table 1,

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[14] The fact that three competing villages became Milwaukee created some difficulties in terms of duplication and continuity of street names. Baehr (1995) notes that by the 1900s there were many duplications, and even triplication of names and no system of house numbering or directional prefixes. "Crossing a bridge could bring a name change. Sixth Street became First Avenue when traversing the Menomonee River Valley, and Wisconsin and Grand were names for the same street on either side of the Milwaukee River" (p. ix). Baehr (1995) also notes that after several calls and attempts for a uniform

Milwaukee's total population is presented from 1840 to 1990 as well as the absolute and relative rate of population change between decades. Maps 1a, 1b, 1c, and 1d portray an historical account of the evolution of Milwaukee's residential structure and identify spatial patterns of housing development across the city's neighborhoods. Map 2 depicts the growth of the city's territories from 1900 to the present.

It can be observed in Table 1 and Maps 1a, 1b, 1c, 1d and 2, that up to 1960 the City of Milwaukee experienced a steady increase in its total population, residential development, and territories. Its total population grew from 285,315 in 1900 to 741,324 in 1960[15]. Residential development was as vibrant as in its early growth and its territories expanded throughout the years.[16] However, in Table 1 it can be also observed that since the 1960s a continuous process of population decline took place with the largest decline in the absolute and relative rate of population change during the 1970s. From a total population of 741,324 in 1960 the city's size decreased to 636,295 in 1980 and then to 628,088 in 1990. Thus the city lost a total of 23,952 people during the 1960s, 81,077 during the 1970s, and 8,207 during the 1980s with percent changes during those years of -3.2, -11.3, and -1.2 respectively.

These processes of transformations, however, were not felt evenly across the city's neighborhoods. Neighborhoods located in the areas with the oldest housing stock, located in close proximity to industrial concentrations, with the highest rates of

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naming system that started as early as 1868, by 1930 Milwaukee had been eliminated most duplicates, sound-alike names reduced, and street names carried through from one side of town to the other. (p. xi)

[15] Note in table 1, however, that a substantial decrease took place in Milwaukee's absolute and relative rate of change since the 1930s

[16] Two major expansions in area took place during the century. One between 1924 and 1930 when a total of 16.7 square miles of land to the north and west of the city were added. The other and larger expansion between 1948 and 1957. These last additions were in all sides of the city and totaled 28.6 square miles (Beverstock and Stuckert 1972 p.44). These two annexations can help explain Milwaukee's two largest increases in total population that took place during the 1920s and 1950s.

unemployment[17], and inhabited by increasing numbers of minority populations experienced the most important transformations. A good example of the changes experienced by these areas is their rapidly changing demographic composition. As it will be demonstrated below demographic transformations in these areas started to develop even before 1960, which constitute a point in time in which the city as a whole initiated its decline in total population.

In 1970, various distinctive sub-areas were defined based on their location, demographic composition, and socioeconomic status in that year (See map in page 27)[18]. The processes of demographic change experienced by these sub-areas from 1950 to 1970 is then represented in Tables 2, 3, and 4. In Table 2, information regarding total population residing in each sub-area in 1950, 1960, and 1970 is presented as well as the proportion (percentage) that each sub-area houses of Milwaukee's total population. Absolute and relative rates of change of each sub-area's total population are also presented in Table 2[19]. Table 3 depicts information on the racial and ethnic make up of each sub-area, including the city as a whole, while Table 4 portrays the proportion that each sub-area houses of the city's total number of persons pertaining to each racial and ethnic group.

Data contained in Table 2 show that between 1950 and 1970 the Center of City as well as Inner-Cities North and South experienced important declines in their total

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[17] In 1960 areas located toward the center of the city had male unemployment rates of more than nine percent while areas located on the periphery had male unemployment rates of less than three percent (For detailed data including male and female rates of unemployment for selected areas of the city for years 1950, 1960 and 1970 See Palay (1973 p. 95)

[18] In the early 1970s an effort was made in Milwaukee to organize census data using as references geographic sub-areas within the city "…especially when it appears likely that there are differences between them that should be noted" (Palay 1973, p. 5). See map with sub-areas in page 27.

[19] Change is calculated by dividing the absolute population change (population in 1970 – population 1950) by the population at the earlier date (in this case population in 1950).

population reducing their population to near half of their 1950 figures. It can be also observed in Table 2 that by 1970 the Center of City sub-area experienced a decline in its total population from 86,523 in 1950 to 51,495 in 1970 a decrease of 35,028 persons. Similarly, Inner-City North experienced a decline in population from 105,647 in 1950 to 67,500 in 1970 (-38,147 persons). The less populated Inner-City South also experienced a decrease in its total population from 37,776 in 1950 to 22,635 in 1970 (-15,141 persons). The Transitional North and South sub-areas also experienced decreases in their total population. During the period from 1950 to 1970, they lost a total of 11,591 and 13,493 persons respectively. In contrast, the Balance of City sub-area experienced increasing population gains from 226,361 in 1950 to 419,714 in 1970 (193,353 persons). Thus by 1960 the Balance of City sub-area already housed more than half of the city's total population and by 1970 nearly doubled its total population[20].

The changes in total population experienced by these sub-areas were also accompanied by important transformations in their racial and ethnic composition. As data contained in Table 3 shows, the sub-areas that were experiencing the most dramatic transformations in their racial and ethnic composition were Inner-City North and its neighboring sub-area Transitional North followed by Inner-City South.

Totals for the city in Table 3 indicate that the African-American population increased from 21,772 in 1950 to 105,088 in 1970 representing respectively, 3.4 and 14.6 percent of the city's total population. In contrast, the City's white population decreased from 614,116 in 1950 to 589,783 in 1970. The Spanish-Speaking population increased from 532 in 1950 to 15,589 in 1970 and the American-Indian population increased from

[20] Note in maps 1a, 1b, 1c, and 1d that the areas on the periphery of the city also experienced its major residential development during the 1940s and 1950s which, although at lower rates, continued to be the

1,779 in 1950 to 3,300 in 1970. By looking at the changing racial and ethnic make up of each of the city's sub-areas, important and progressive transformations can be observed during the period between 1950 and 1970. Inner-City North's and Transitional North's share of African-American population increased, respectively, from 18.9 percent in 1950 to 86.7 percent in 1970 and from 0 percent in 1950 to 39.2 percent in 1970. In contrast Inner-City North's and Transitional North's share of white population decreased respectively from 80.9 percent in 1950 to 11.2 percent in 1970 and from 99.9 percent in 1950 to 56.9 percent in 1970. Inner-City South's share of Spanish-Speaking population increased 0.5 percent in 1950 to 19.2 percent in 1970.

Changes in the spatial distribution of minority populations in Milwaukee can be observed in Table 4 by looking at the proportion of the city's total number of persons pertaining to each racial and ethnic group that each sub-area houses. As it can be observed in Table 4, in 1950 and 1960 more than 91 percent of all African-Americans living in Milwaukee were concentrated in Inner-City North. Although their spatial distribution expanded during the 1960s to the Transitional North sub-area, by 1970 they remained distributed among Inner-City North (55.7 percent) and Transitional North (38.5 percent) with no presence in the south sub-areas and only a small one (3.5 percent) in the Balance of City sub-area.

In contrast, whites living in Milwaukee decreased their already limited presence in Inner-City and Transitional North, respectively, from 13.9 percent in 1950 to 1.3 percent in 1970 and from 18.7 percent in 1950 to 9.9 percent in 1970. The Balance of City sub-area's share of the city's total white population increased from 36.7 percent in 1950 to 69.4 percent in 1970. Thus, the important decreasing presence of whites in

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city's areas of residential development during subsequent years.

absolute and relative numbers in the sub-areas inhabited by an increasing number of African-Americans created new patterns of spatial separation between these two population groups that otherwise would not have developed considering the important expansion of the geographic area inhabited by African-Americans that took place during the 1960s.

3. Spatial Arrangement of Neighborhood Characteristics: Modeling the Aggregation and Direction of Change

During the 1970s and 1980s, the 1970 inner-city Milwaukee expanded to the Transitional city sub-areas and part of the Balance of City sub-area became transitional sub-areas[21] (See sub-areas in page 27). A northwest direction of growth took place in the Inner-City North sub-area and a southwest direction of growth in the Inner-City South sub-area. These overall patterns of change in Milwaukee's spatial structure should be considered when identifying recent changes in the spatial arrangement of demographic, socioeconomic, housing, and other neighborhood characteristics associated with the neighborhood change phenomena and when relating those changes to the history and geography of the city.

a. Demographic Changes

Tables 5 and 6 contain information on population and population density for the City of Milwaukee and its various sub-areas for the period between 1970 and 1990. During the 1970-1990 period, the City of Milwaukee experienced a loss in its total population that dropped from 717,124 in 1970 to 632,619 in 1990. The largest decline took place during the 1970s when the city lost 81,077 persons. During the 1980s, the city

[21] The expansion of inner-city Milwaukee is displayed in the map using as a reference areas defined by the Department of City Development's (DCD) Community Development Block Grant's neighborhood strategic

lost 8,207 persons. Data displayed in Table 5 also show that most of the city's population losses took place in Inner-City North (-38,551) and the Balance of City South (-32,028). Population losses for the other sub-areas are relatively small when compared to these two sub-areas. Data in Table 6 shows that the city as well as all of the city's sub-areas experienced declined in population density with Inner-City North experiencing the largest decline in population density

The spatial distribution of population losses and gains during these periods are presented in Maps 3a through 3d. Population losses during the period 1970-1980 are portrayed in Map 3a while Map 3c shows the spatial distribution of population gains during the same period. Map 3a shows that most neighborhoods in Milwaukee lost population during that period. Note the higher concentrations in Inner-City North. By comparing data portrayed in Map 3a with data showed in Map 3c it can be seen that most of the neighborhoods that did not experience population losses experienced population gains during the period.

Although the city's population losses slowed during the following decade (1980-1990), Map 3b shows that, except for Inner-City South, the overall spatial pattern of population losses remained similar to those during the previous period. Population gains portrayed in Map 3d, however, show that a different pattern of population gains took place during the 1980s. These population gains took place in areas within the inner-city that did not experience important population gains during the previous decade, particularly, in the Transitional North, Center of City, and Inner-City South sub-areas. Thus, spatial patterns of population losses continued during a period of 20 years, with an

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planning areas. These areas are chosen by the City of Milwaukee's DCD based on their lower socioeconomic characteristics and their need for governmental assistance.

important reduction in its absolute incidence, while population gains presented new patterns during the 1980s.

In terms of its racial and ethnic composition, the City of Milwaukee continued to experience important transformations during the most recent decades. In order to simplify the analysis and since in Milwaukee the two largest racial/ethnic groups are African-Americans and Latinos, the following examination will focus on these two racial/ethnic groups[22]. Information presented in Table 7 shows that while the African-American and Latino populations increased, respectively, from 101,654 in 1970 to 190,470 in 1990 and from 22,095 in 1970 to 37,432 in 1990, the white population decreased from 585,374 in 1970 to 387,230 in 1990. Information presented in Table 7 also shows that during the period between 1970 and 1990 all sub-areas of the city lost white population, particularly, Inner-City North and Transitional North. These were also the sub-areas experiencing gains of African-American population during that period. It can be also noticed in Table 7 that an important increase of Latino population residing in the Inner-City South developed.

Information contained in Table 8 depicts the proportion of the city's African-American and Latino populations that each sub-area houses for the period between 1970 and 1990. Data in Table 8 shows that the Balance of City North and South housed most of the city's white population during the 20 years period. Inner-City North reduced its share of the city's African American and Latino populations, respectively from 94 percent in 1970 to 57 percent in 1990 and from 35 percent in 1970 to 13 percent in 1990. The Transitional North and Balance of City North, however, increased their share of the

[22] In 1990, the City of Milwaukee housed a total of 11,429 Asian-Pacific Islander population, 5,213 American-Indians, and 915 persons of other races.

city's African-American population, respectively, from 1 percent in 1970 to 21 percent in 1990 and from 2 percent in 1970 to 13 percent in 1990. Similarly, Inner-City South increased its share of the city's Latino population from 29 percent in 1970 to 56 percent in 1990.

In order to gain a deeper understanding of these processes of spatial change an additional set of Maps is presented next. Maps 4a through 4j portray the spatial distribution of population gains and losses for white, African-American, and Latino populations in the City of Milwaukee during the periods 1970-1980 and 1980-1990.

Data portrayed in Map 4a show that during the 1970s white losses took place in most neighborhoods of the city. The spatial patterns of white losses also show higher concentrations in neighborhoods located on the edge of Inner-City North and in Inner-City South. White losses during the period 1980-1990 are portrayed in Map 4b. Map 4b shows that although a decrease in the intensity of white losses took place across Milwaukee neighborhoods during the 1980s, their spatial patterns continued similar to those of the 1970s, with higher concentration on the Transitional North and Inner-City South sub-areas. White gains during the 1970s and 1980s are presented in Maps 4c and 4d. Map 4c shows that white gains took place in very few neighborhoods located on the edges of the city. Map 4d shows that the intensity of white gains diminished during the 1980s with fewer neighborhoods gaining white population.

Maps 4e through 4h show the spatial distribution of African-American population gains and losses during the periods 1970-1980 and 1980-1990. Map 4g shows that during the 1970s African-American losses took place in neighborhoods located in Inner-City North. This sub-area has continuously experienced population losses and racial

succession since the 1950s. By looking at data presented in Maps 4a through 4h, it can be seen that during the 1970s and 1980s not only did whites leave these areas in great numbers, but African-Americans began leaving as well. Note in Map 4h that during the 1980s neighborhoods located within Inner-City North continued to lose African-American population as well as adjacent neighborhoods joined these spatial patterns of African-American population losses following a north-west directional pattern.

The spatial distribution of African-American gains during the periods 1970-1980 and 1980-1990 is presented in Maps 4e and 4f. Maps 4e and 4f show that most African-American gains during the two periods took place in well-defined areas of the city, particularly, the west edge of Inner-City North and in Transitional North. Note that these are roughly the same areas where high concentration of white losses took place during the same periods, particularly, neighborhoods located along the west edge of Inner-City North (see Maps 4a and 4b).

Maps 4g through 4j show the spatial distribution of Latino population losses and gains during the periods 1970-1980 and 1980-1990. Maps 4g and 4h show that during the 1970s and 1980s no distinctive spatial patterns of Latino losses took place across the city's neighborhoods. Maps 4i and 4j, however, show that Latino increases during the 1970s and 1980s were highly concentrated in Inner-City South following a southwestern pattern of growth. When comparing Maps 4a and 4b with Maps 4i and 4j it can be observed that these are the same areas with the highest concentrations of white losses in the south section of the city during the 1970s and 1980s.

The analysis of population and neighborhood racial change that took place during the 1950s and 1960s in the 1970’s Inner-cities north and South sub-areas as well as

Transitional North sub-areas was indicative of a process of invasion-succession from white to minority neighborhoods. The important decreasing presence of whites in absolute and relative numbers in the areas inhabited by an increasing number of minorities, particularly African-Americans, created new patterns of spatial separation between these two population groups that otherwise would not have developed considering the important expansion of the geographic area inhabited by African-Americans that took place during the 1960s. Findings in this section reveal that the invasion-succession process continued during the following decades with an increasing concentration of Latinos in the Inner-City South sub-area and an increasing presence of African-Americans in the Transitional North and Balance of City North sub-areas. Maps in this section also show that while the African-American population left the 1970 inner-city sub-areas, particularly during the 1970s, the Latino population reinforced their presence in the 1970 Inner-City South sub-area during the 1970s and 1980s.

b. Neighborhood Poverty

The City of Milwaukee experienced an important increase in its number of persons below the poverty level, rising from 80,377 in 1970, to 85,328 in 1980 to 135,559 in 1990. The proportion of persons living in poverty within the City of Milwaukee also increased during that period. While in 1970 14 % of the city's residents lived in poverty, by 1990 the city's level of poverty had grown to 22 %. Data portrayed in Tables 9 and 10, however, show that the increases in poverty experienced by the City of Milwaukee during recent decades present an uneven distribution across the city's sub-areas. Table 9 shows that Inner-City North houses near half of the city's poor population during the period from 1970 to 1990. Inner-City South represents the second largest

share of the city's poverty increasing from 11 percent in 1970 to 15 percent in 1990. Note also in Table 9 Transitional North more than doubled its share of the city's poverty from 6 percent in 1970 to 13 percent in 1990.

The number and proportion of persons living below poverty within each sub-area are presented in Table 10. Data portrayed in Table 10 show that most city sub-areas experienced increases in their absolute and relative rates of poverty during the period 1970-1990. Note, however, that by 1990 near half of the population living in Inner-City North lived in a household with incomes below the poverty level, followed respectively by Inner-City South and the Center of City sub-areas with 30 and 26 percent. Note also in Table 10 that the Transitional North sub-area experienced the second largest increase in the number of persons below poverty during the 1980s.

Maps 5a, 5b, and 5c portray the distribution of poverty across the city's neighborhoods during the period from 1970 to 1990. Information displayed in maps show patterns of concentration of poverty in the Inner-City North and South sub-areas as well as patterns of dispersion taking place over time, particularly toward the Transitional North and Balance of City North sub-areas. In order to gain a deeper understanding of these processes of spatial change a set of maps is presented next. Maps 6a through 6d portray the spatial distribution of poverty lose and gain across the city's neighborhoods during the periods 1970-1980 and 1980-1990. Map 6a shows that few tracts in the Inner-City North and South sub-areas experienced poverty losses during the 1970s, while Map 6b shows no evidence of distinctive spatial patterns of poverty losses during the 1980s.

Maps 6c and 6d show the spatial patterns of poverty gains during the periods 1970-1980 and 1980-1990. Map 6c shows that the highest concentration of poverty gains

during the 1970s took place in neighborhoods located on the periphery of Inner-City North. Map 6d, however, reflect the large increase in poverty that took place in Milwaukee during the 1980s. As Map 6d shows, poverty increases were concentrated in Inner-City North and South sub-areas and in the Transitional North sub-area. By looking at previous maps showing the spatial distribution of increases in demographic and other socioeconomic characteristics across neighborhoods it can be noticed that increases of poverty and minority populations tended to occur in areas losing population, especially, white population. Maps also show that while the African-American population left the 1970 inner-city sub-areas, particularly during the 1970s, the Latino population reinforced their presence in the 1970 Inner-City South sub-area during the 1970s and 1980s.

c. Economic Changes

During the 1980s, the distribution of labor force (LF) by major sectors of the economy continued to reflect a decrease in Milwaukee's once leading manufacturing sector. In 1980, 32 percent of Milwaukee's labor force was employed in the service sector, 30 percent in the manufacturing sector, and 19 percent in the trade sector[23]. By 1990, LF employed in the service and trade sectors had increased to 34 and 22 percent respectively. The manufacturing sector, however, experienced a reduction in its capacity to absorb Milwaukee's labor force, declining from 30 percent of the LF in 1980 to 22 percent in 1990.

Table 11 contains information on employment by industry across selected city sub-areas. During the period 1980-1990, a reduction of the labor force in the manufacturing sector took place not only in inner-city areas but also in areas located on the periphery of the city. For instance, Inner-City North and Inner-City South

experienced a reduction of ten percentage points. These were followed by the Transitional North and Balance of City South sub-areas with reductions of labor force in the manufacturing sector of nine percentage points. Table 11 also shows that increases in LF employed in the service sector were relatively small while increases in trade employment shows relatively higher rates of change in most sub-areas. Finally, data in Table 11 shows that except for the East Side and the Center of City sub-areas, the decreases in manufacturing jobs were by far greater than the increases in labor force absorbed by the other economic sectors.

Levels of unemployment in Milwaukee increased from four percent in 1970 to seven percent in 1980 to nine percent in 1990. Table 12, however, shows that an uneven distribution of these changes took place across the city's sub-areas. Increasing levels of unemployment were particularly felt in inner-city areas and their peripheral communities. Inner-City North, which housed by far the largest number of unemployed persons in 1990 (9,296), also had the largest increase in unemployment rates, from 14 percent in 1980 to 19 percent in 1990. The Transitional North sub-area, which is adjacent to Inner-City North, had the second largest increase in unemployment with increase of four percentage points between 1980 and 1990. It was followed by Inner-City South with increases of three percentage points during the same period. Thus, unemployment levels and its relative rate of change were not only higher for inner-city areas but also for their immediate peripheral communities.

Analysis from Tables 11 and 12 indicates that the reduction in the manufacturing sector's capacity to absorb Milwaukee's labor force had an important impact on unemployment levels in Milwaukee during the 1980s. The small increases in

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[23] The other sectors employed the remaining 19 percent of Milwaukee's labor force.

employment generated by the other sectors furthered this development with greater negative impacts on inner-city areas and their adjacent peripheral communities.

d. Housing

Table 13 contains information on the age of Milwaukee's housing stock by selected city sub-areas. Data contained in Table 13 reveals that Inner-Cities North and South house the greatest shares of the city's older housing stock while areas on the periphery have a newer residential structure. Most of the city's residential development took place during the period between 1900 and 1959. Out of the city's total housing units in 1990 (127,780) 78 percent were built during that period. Maps 1a through 1d portray such patterns showing a centrifugal process of residential development with the inner-city areas housing the oldest housing and the periphery housing the newer residential structure.

This residential structure developed with a well-defined distribution of housing types. As information contained in Table 14 and Maps 7a through 7c shows, neighborhoods with the largest shares of single-family housing are located on the periphery of the city. Neighborhoods with the largest shares of two-family housing are located within the inner-city area. For instance, 83 percent of the Balance of City North's and 70 percent of the Balance of City South's housing stock is composed of single-family units while less than half of the housing units in both inner-city sub-areas are so. Multi-family housing is located near Milwaukee's CBD.

Table 15 depicts information on housing tenure by selected city sub-areas. The total number of owner-occupied housing units in the city decreased from 121,851 in 1980 to 108,989 in 1990 while the total number of renter-occupied housing units increased

from 121,747 in 1980 to 134,055 in 1990. Table 15 also shows that all sub-areas of the city experienced increases in their share of rental housing. Note also in Table 15 that the areas with the largest shares of rental housing are those located near the CBD, the closer to the CBD, the greater the share of rental housing. Data displayed in Maps 8a and 8b show that neighborhoods located within the inner-city areas were more likely to increase their share of rental housing during the period between 1980 and 1990.

The spatial distribution of changes in median home assessment values during the period between 1980 and 1990 is portrayed in Map 9. Map 9 shows that most neighborhoods located within Inner-City and Transitional sub-areas experienced changes below the city's change in median assessment values. Note also that those neighborhoods located in the Balance of City North sub-area but adjacent to the Transitional North sub-area also experienced change in assessment values below the city's median change value. It can also be observed that all neighborhoods on the Balance of City South experienced changes in median assessment values above the city median change value while neighborhoods in the East Side experienced the largest increases. Finally, note that neighborhoods located within Inner-City North but adjacent to the East Side and the east section of the Center of City sub-area experienced changes above the cities change in median assessment values.

CHAPTER V: Testing the Predictive Power of Classic and Current Ecological Models of Neighborhood Change[24]

In the present study, classic and current ecological perspectives of neighborhood change are examined and tested in explaining neighborhood change in the City of Milwaukee during the period 1980-1990. Neighborhood change is measured by calculating changes in the neighborhoods' share of poverty between 1980 and 1990. A total of five ecological models are tested. Current ecological perspectives (Wilson 1987, 1993; Massey and Denton 1993) include Economic Transformation, Racial Segregation, and Demographic Composition models. Classic ecological perspectives (Chicago School; Hoover and Vernon 1959) include Invasion-Succession/Life Cycle and Arbitrage models.

From current ecological perspectives of neighborhood change, various hypotheses are tested. Hypotheses derived from the Economic Transformation model emphasize changes in the economy from manufacturing to services, changing levels of unemployment, and social class changes in blue-collar workers. Racial Segregation hypotheses emphasize the changing distribution of population characteristics based on neighborhoods' racial/ethnic composition. Hypotheses derived from the demographic model emphasize composition variables of changing age and family structure.

Classic ecological perspectives include various hypotheses. Invasion-Succession/Life Cycle hypotheses emphasize distance from the urban core and sector of location as well as variables associated to housing and demographic dynamics. The Arbitrage model emphasizes geographic proximity and competition between households--with different socioeconomic status and racial and ethnic backgrounds--for housing in

[24] Tables for this chapter are contained in Appendix F (p. 151).

adjacent areas of the city.

Model 1: Economic Transformation and Neighborhood Change

The Economic Transformation model emphasizes changes in the economy from manufacturing to services, changing levels of unemployment, and social class changes in blue-collar workers in explanations of neighborhood change. Hypothesis derived from the Economic Transformation model suggests that decreases in manufacturing jobs and blue collar occupations and increases in unemployment are predicted to be related to increases in neighborhoods' share of poverty. Pre-existing conditions of economic variables are represented by the variables PUNEMP8 (neighborhoods' share of unemployment in 1980), PMANUF8 (neighborhoods' share of labor force employed in the manufacturing sector in 1980), PBLUEC8 (neighborhoods' share of blue collar occupations in 1980), and PSERV8 (neighborhoods' share of labor force employed in the service sector in 1980). Changing conditions of economic variables in neighborhoods are represented by the variables PDUNEM89 (changes in neighborhoods' share of unemployment between 1980 and 1990), PDMANU89 (changes in the neighborhood's share of labor force employed in the manufacturing sector during the period 1980-1990), PDBLUE89 (changes in the neighborhood's share of blue collar workers between 1980 and 1990), and PDSERV89 (changes in the neighborhood's share of labor force employed in the service sector during the period 1980-1990).

Results from the correlation analysis in Table 1a revealed that the independent variables that had the highest correlation with neighborhood poverty change were PDUNEM89 (.550), PBLUEC8 (.378), and PMANUF8 (.313). These results suggest that neighborhood poverty change is strongly related to changes in unemployment levels and

to pre-existing levels of manufacturing and blue collar occupations. Correlation coefficients also indicated that some predictors were strongly related to each other. For instance, the correlation between PMANUF8 and PBLUEC8 = .888.

Results from the full regression model in Table 1b suggest that the only significant predictors of neighborhood change are the change in neighborhood's share of unemployment (PDUNEM89= .541) and pre-existing share of blue-collar occupations (PBLUEC8= .407). The higher the change in the neighborhood's share of unemployment the more impoverished the neighborhood became in 1990. The larger the size of the neighborhood's share of blue-collar occupations in 1980, the higher the share of poverty in the neighborhood by 1990. These results support the Economic Transformation hypothesis which suggest that decreases in manufacturing jobs and blue collar occupations and increases in unemployment are predicted to be related to increases in neighborhoods' share of poverty.

Model 2: Racial Segregation and Neighborhood Change

The Racial Segregation model emphasizes the changing distribution of population characteristics based on neighborhoods' racial/ethnic composition in explanations of neighborhood change. Hypothesis derived from the Racial Segregation model suggest that neighborhoods with greater pre-existing and increasing shares of minority populations are predicted to experience increases in their share of poverty. Pre-existing conditions of racial segregation variables in neighborhoods are represented by the variables PMIN8 (neighborhood's share of minorities in 1980), SEGREG8 (ghetto neighborhood in 1980), and HSEGREG8 (ghetto core neighborhood in 1980). Hypothesis derived from the Racial Segregation model also suggest that neighborhoods with greater

pre-existing shares of minority populations and poverty are predicted to experience increases in their share of poverty. Thus, the variable PPOV8 (neighborhoods' share of poverty in 1980) will be introduced in the regression model. Changing conditions of racial segregation variables are represented by the variable PDMIN89 (changes in neighborhoods' share of minority populations between 1980 and 1990).

Results from the correlation analysis in Table 2a revealed that all independent variables are related to neighborhood poverty change: PMIN8 (.430), PDMIN89 (.342), SEGREG8 (.327), HSEGREG8 (.308), and PPOV8 (.226). These results suggest that neighborhood poverty change is strongly related to changes in the neighborhood's share of minority populations and to pre-existing shares of neighborhood's minority and poor populations. Correlation coefficients also indicated that some predictors were strongly related to each other. For instance, the correlation between PMIN8 and SEGREG8 = .930, PMIN8 and HSEGREG8 = .887.

Results from the full regression model in Table 2b suggest that the only significant predictors of neighborhood change are change in neighborhood's share of minority population (PDMIN89= .519) and pre-existing ghetto core classification (HSEGREG8= .524). The higher the change in the neighborhood's share of minority populations the more impoverished the neighborhood became in 1990. Neighborhoods classified as ghetto core neighborhoods in 1980 were more likely to experience higher shares of poverty in the neighborhood by 1990. These results support the Racial Segregation model which suggest that neighborhoods with greater pre-existing and increasing shares of minority populations are predicted to experience increases in their share of poverty.

Note, however, that the measurement used in the present study does not directly address the measures of uneveness, contact, and density captured by Massey and Denton. The use of minority neighborhoods being ghetto or ghetto core classification is a proxy. Because of high multiculinerity between the independent variables measured and disagregated minority variables of African-American and Latino populations the latest were not included in the full model. However, correlation analysis was run between the later and poverty changes. Findings revealed that pre-existing and changing shares of African-American population in neighborhoods were significantly related to changes in poverty. Findings also indicated that while greater preexisting shares of Latino population predicted increases in the neighborhood's share of poverty, changing shares of Latino population did not significantly predict neighborhood poverty change.

Model 3: Demographic Composition and Neighborhood Change

The demographic model emphasizes composition variables of changing age and family structure in explanations of neighborhood change. Hypothesis derived from the demographic model suggests that the growth of female-headed households, young persons under 15 years of age, and persons 65 or more years of age are predicted to be related to increases in neighborhoods' share of poverty. Pre-existing conditions of demographic variables in neighborhoods are represented by the variables PAGE0148 (neighborhoods' share of children 0 to 14 years of age in 1980), PAGE658 (neighborhoods' share of population 65 or more years of age in 1980), and PFEMH8 (neighborhoods' share of female-headed households in 1980). Changing conditions of demographic variables in neighborhoods are represented by the variables PD01489 (changes in neighborhoods' share of children ages 0 through 14), PD6589 (changes in

neighborhoods' share of population with 65 or more years of age), and PDFEMH89 (changes in neighborhoods' share of female-headed families).

Results from correlation analysis in Table 3a revealed that the independent variables that had the highest correlation with neighborhood poverty change were PAGE0148 (.528), PD01489 (.487), PFEMH8 (.439), and PDFEM89 (.319). These results suggest that neighborhood poverty change is strongly related to pre-existing and changing shares of young children and female-headed households in neighborhoods.

Results from the full regression model in Table 3b suggest that pre-existing and changing shares of neighborhoods' young children and female-headed families are significant predictors of neighborhood change. The higher the change in the neighborhood's share of young children and female-headed families the more impoverished the neighborhood became in 1990. Neighborhoods with higher shares of young children and female-headed families in 1980 were more likely to experience higher shares of poverty in the neighborhood by 1990. These results support the Demographic Composition hypotheses suggesting that the growth of female-headed households and young persons under 15 years of age are predicted to be related to increases in neighborhoods' share of poverty.

Model 4: Invasion-Succession/Life Cycle and Neighborhood Change

The Invasion-Succession/Life Cycle model emphasizes distance from the urban core and sector of location as well as variables associated to housing and demographic dynamics in explanations of neighborhood change. Hypotheses derived from the Invasion-Succession/Life Cycle model suggests that neighborhoods located in closer proximity to the CBD and outside the most attractive areas of the city, with greater shares

of old housing stock and two family residential units, increasing shares of rental housing, and lower home appreciation rates as well as greater shares of minority populations, recent movers and decreasing population are more likely to experience increases in neighborhoods' share of poverty.

The variable DISTANCE represents the location of neighborhoods in respect to the Central Business District (CBD) and is measured in miles with a straight-line distance from the CBD to the center of the tract. The variable SECTOR is a dummy variable with tracts roughly located between Lake Michigan and the Milwaukee and Kinnickinnic Rivers = 1. These tracts are roughly located in the most valuable areas of the city. The variable PH0039 represents the neighborhoods' share of housing built before 1940. The variable PH2FLY9 represents the neighborhoods' share of two-family residential units. The variable PDRENT89 represents changes in the neighborhoods' share of rental housing between 1980 and 1990. The variable HVALUE89 represents changes in neighborhoods' median home assessment values between 1980 and 1990. The variable PMIN8 represents neighborhoods' share of minority population in 1980. The variable POPCH89 represents changes in the neighborhoods' total population between 1980 and 1990. Finally, the variable PMOVERS9 represents the neighborhood's share of heads of households who moved into their housing units between 1989 and March of 1990.

Results from correlation analysis in Table 4a revealed that all variables in the model are related to neighborhood change. The independent variables that had the highest correlation with neighborhood poverty change were PH2FLY9 (.467), PMIN8 (.430), HVALUE89 (-.370), and PH0039 (.362). These results suggest that neighborhood poverty change is strongly related to neighborhoods' share of two family housing, pre-

existing conditions of neighborhoods' share of minority populations, decreases in home assessment values, and neighborhoods' share of older housing structures. The other variables in the model were also related to neighborhood poverty change. Correlation coefficients also indicated that some predictors were strongly related to each other. For instance, the correlation between DISTANCE and PH0039 = -.812 and between PH2FLY9 and PH0039 = .814.

Results from the full regression model in Table 4b suggest that the only significant predictors of neighborhood change are the neighborhoods' distance from the CBD (DISTANCE .213), changes in median assessment values (HVALUE89 = -.212), neighborhoods' share of minority populations in 1980 (PMIN8 = .244), and changes in neighborhoods' total population (POPCH89 = .177). The farther the neighborhood from the CBD the greater the increases in the neighborhoods' share of poverty. The greater the increases in median home assessment values in a neighborhood, the less likely the neighborhood became poorer in 1990. The larger the size of the neighborhoods' share of minority populations in 1980, the higher the share of poverty in the neighborhood by 1990. The greater the increases in population in a neighborhood the higher the share of poverty in the neighborhood in 1990. These results support some of the hypotheses of the model and contradict others. As predicted by the model's hypotheses, neighborhoods experiencing lower home appreciation values and greater pre-existing shares of minority populations are more likely to experience greater shares of poverty by 1990. Contrary to predictions proposed in the model, neighborhoods located farther from the CBD and experiencing increases in total population were more likely to experience increases in their share of poverty by 1990.

Model 5: Arbitrage and Neighborhood Change

The Arbitrage model emphasizes geographic proximity and competition between households--those with different socioeconomic status and racial and ethnic backgrounds--for housing in adjacent areas of the city in explanations of neighborhood change. Hypotheses derived from the Arbitrage model suggests that neighborhoods adjacent to minority neighborhoods with increasing rental housing and minority populations, and decreasing income levels are predicted to experience increases in their share of poverty.

The variable INCOME89 represents changes in neighborhoods' average family income between 1980 and 1990. The variable PDMIN89 represents changes in neighborhoods' share of minority populations between 1980 and 1990. The variable PDRENT89 represents changes in neighborhoods' share of rental housing between 1980 and 1990. Finally the variable ADJACENT is a dummy variable with predominantly white tracts adjacent to tracts with more than 10 percent minority population = 1.

Results from correlation analysis in Table 5a revealed that the independent variables that had the highest correlation with neighborhood poverty change were INCOME89 (-.418), PDMIN89 (.342), and PDRENT89 (.216). These results suggest that neighborhood poverty change is strongly related to decreasing family income levels, increasing minority populations, and increasing rental housing.

Results from the full regression model in Table 5b suggest that the only significant predictors of neighborhood change are changes in neighborhoods' family average income (INCOME89 = -.354) and changes in neighborhood's share of minority population (PDMIN89 = .239). The lower the increase in average family income the

higher the share of poverty in the neighborhood by 1990. The higher the increase in neighborhoods' share of rental housing, the more impoverished the neighborhood became in 1990. These results partially support the Arbitrage hypothesis of neighborhood change which suggest that neighborhoods neighboring minority neighborhoods with increasing rental housing and minority populations, and decreasing income levels are predicted to experience increases in their share of poverty. Adjacency of predominantly white neighborhoods to neighborhoods with shares of more than10 percent minority population did not predict neighborhood change.

CHAPTER VI: Discussion and Conclusion

In this study, classic and current ecological perspectives of neighborhood change were examined and tested in explaining neighborhood change in the City of Milwaukee during the period 1980-1990. In addition, the changing spatial distribution of neighborhood characteristics stressed by urban ecological theory in explanations of neighborhood change were described and mapped. The visual display of neighborhood change at the city level allowed us to observe the overall transformations experienced by the City's spatial structure. This step also enhanced understanding of the spatial aggregation of change and the identification of existing and new patterns of neighborhood change taking place across the City's neighborhoods.

Neighborhood change was measured by calculating changes in the neighborhoods' share of poverty between 1980 and 1990. A total of five ecological models were tested. Current ecological perspectives (Wilson 1987, 1993; Massey and Denton 1993) included Economic Transformation, Racial Segregation, and Demographic Composition models. Classic ecological perspectives (Chicago School; Hoover and Vernon 1959) included Invasion-Succession/Life Cycle and Arbitrage models.

Findings from the present study show that current ecological explanations of neighborhood change can benefit by incorporating housing and spatial related variables stressed by classic ecological perspectives of neighborhood change. Findings also show that examination of the evolution of the City's spatial structure, including spatial modeling of changing neighborhood characteristics are necessary in order to understand the spatial patterns that result from the aggregation and direction of change.

Spatial modeling of the metropolitan context was useful in order to understand the

process of change experienced by the City in relation to its surrounding environments. It also showed how neighborhood characteristics associated to neighborhood poverty change such as race behaved over time across metropolitan neighborhoods. The discussion of findings is presented in three sections. First, findings from the analysis of the metropolitan context are discussed. Secondly, discussion of findings regarding the examination of the evolution of the City's spatial structure is offered. Finally, discussion of the models and hypotheses tested is presented. The chapter's last section discusses the implications of the study for urban planning and policy.

Uneven Development and the Geographic Concentration of Distress: The Metropolitan Context.

During the 1980s the City of Milwaukee, continued to experience changes in its economy with a declining manufacturing sector and increased generation of jobs in the services and trade sectors. These losses of jobs in the City, however, are much greater than the job gains experienced by the suburban counties. Similarly, the City continued to decline in its total population. However, most of the City's losses did not contribute to the increases in population experienced by suburban counties during the 1980s. Residential development continued at the metropolitan level with the City experiencing little of this development. The City continued to house most of the MSA's minority populations of all incomes and it absorbed most of the increases in the number of person below the poverty level during the 1980s. Thus, in the Milwaukee MSA neighborhood poverty is for the most part a central city phenomenon.

Population

During the last several decades, a continuous process of population distribution and redistribution took place across Milwaukee's Metropolitan Statistical Area (MSA).

The continuous growth of suburban counties and a progressive decline in Milwaukee County's share of the MSA's population characterized this process. This decline, however, has been unevenly distributed. The City of Milwaukee--the urban core of Milwaukee's MSA--absorbed most of the county's population decline. By 1990, Milwaukee County continued to be the most populated county of the MSA. However, Milwaukee County's share of the MSA total population has declined during the last several decades. Lead by Waukesha County the rest of the counties experienced continuous population growth. During the most recent decades (1970-1990), the City of Milwaukee absorbed almost all of Milwaukee County's population decline. In addition, the suburban neighborhoods losing the most population were those located in closer proximity to the City's boundaries.

The highest concentration of population gains took place in areas near major highway/road intersections across the metropolitan area. The most important loss of population in the City, however, took place during the 1970s while the City's population losses provided limited contributions to the MSA suburb's population gains during the 1980s.

Residential Development

Patterns of residential development were found to be similar to those of population growth. Milwaukee County's share of the MSA's housing units declined while, lead by Waukesha County, the rest of the counties experienced steady increases in their share of the MSA's housing units. During the most recent decades, Waukesha County was the county with the largest increase in residential units.

Highway construction during the 1950s and 1960s had important impacts in the spatial patterns of residential development and population distribution and re-distribution in the Milwaukee MSA. Recent patterns of residential development and population growth in suburban counties, however, find their roots in a residential structure in place before 1940. Existing residential structure with higher housing concentrations before 1940 in or near the areas became poles of residential development and population growth during the 1970s and 1980s. Thus, in Milwaukee highway construction accelerated but did not determine more recent spatial patterns of residential and population growth.

Poverty

Even though Milwaukee's MSA experienced a dynamic process in the geographic distribution of its population, the spatial distribution and redistribution of population living in households with incomes below the poverty level took place largely within the City of Milwaukee's boundaries. The City of Milwaukee absorbed almost all the increases in the population below poverty for the period 1980-1990. Thus, by 1990, 84 percent of the MSA's poor population was living in the City of Milwaukee.

African-American and Latino Populations

The distribution of minority populations across the MSA's neighborhoods during the 1970s and 1980s were found to be coterminous with the distribution of people in poverty. African-American and Latino populations--the largest minority groups in Milwaukee's MSA--continued their historical distributional patterns in Milwaukee's MSA. Although population and residential growth developed toward suburban counties and the central city continued to experience population decline, minority populations remained concentrated in the central city.

Nearly all income groups within the African-American population live in Milwaukee County. In addition, within Milwaukee County, the City of Milwaukee houses 99 percent of African-American poverty income households, 96 percent of African-American moderate income households, and 94 percent of African-American middle and upper class households. Although suburban neighborhoods are more likely to house African-American households with higher incomes, most African-American households of all income groups live within the City's boundaries.

Most income groups within the Latino population live in Milwaukee County. In addition, within Milwaukee County, the City of Milwaukee houses 90 percent of the Latino poverty income households, 78 percent of Latino moderate income households, and 62 percent of Latino middle and upper class households. Although suburban neighborhoods are more likely to house Latino households with higher incomes, most Latino households of all income groups live within the City's boundaries.

Economy

Analysis of the distribution of labor force (LF) by major sectors of the economy in Milwaukee's MSA showed that Milwaukee's MSA decreased its labor force employed in the manufacturing sector. The services and trade sectors, however, experienced increases in their total labor force. In addition, these changes in the generation of employment by economic sector took place unevenly across the MSA. While Milwaukee County and the City of Milwaukee experienced a steady decline in their share of the MSA's labor force employed in most sectors, Waukesha County increased its share of the MSA's labor force in all economic sectors. Milwaukee County and the City of Milwaukee within it absorbed most of the MSA's losses of labor force employed in the

manufacturing sector. Note also that the gains experienced by the other counties are relatively small when compared to the losses experienced by the MSA. Additional information on employment by economic sector that is based on the geographic location of employers indicated that during the 1980s Milwaukee's MSA increased its capacity to generate jobs. Except for the manufacturing sector-which experienced a reduction of jobs-all other sectors experienced increases with services and trade sectors contributing to most of that increase.

Milwaukee County and the City of Milwaukee experienced a reduction in their capacity to house sources of employment in the manufacturing sector. In terms of job generation, Milwaukee County and the City of Milwaukee within it continued to experience an economic shift away from manufacturing and towards service. On the other hand, lead by Waukesha County the other counties increased their capacity to generate new jobs in almost all economic sectors with manufacturing being the leading economic sector in job generation.

Suburban counties experienced increased or stable shares of the MSA's job generation. Milwaukee County, however, experienced decreases in its share of the MSA's job generation in most sectors while the City of Milwaukee, within Milwaukee County, experienced decreases in all sectors.

The geographic distribution of sources of employment show that a process of decentralization of employment took place across Milwaukee's MSA during the 1980s. Milwaukee County and the City of Milwaukee within it lost their capacity to house additional sources of employment while suburban counties, lead by Waukesha County increased their share of the MSA's job generation in almost all economic sectors. Thus,

during the 1980s Milwaukee County and the City of Milwaukee not only reduced their capacity to house labor force employed in the manufacturing sector but also their capacity to generate new jobs in all sectors of the economy.

The City's Changing Spatial Structure and the Social Geography of Distress

Analysis of the evolution of the City's spatial structure shows that, during the last several decades, neighborhoods located in the areas with the oldest housing stock, located in close proximity to industrial concentrations, with the highest rates of unemployment, and inhabited by increasing numbers of minority populations experienced the most important transformations.

Population

During the 1970-1990 period, the City of Milwaukee continued a process of population decline. The largest decline, however, took place during the 1970s. Although population losses were significant during the following decade (1980-1990), except for Inner-City South, the overall spatial pattern of population losses remained similar to those during the previous period. Population gains, however, showed that a different pattern of population gains took place during the 1980s. Population gains took place in areas within inner-city that did not experience important population gains during the previous decade, particularly, in the Transitional North, Center of City, and Inner-City South sub-areas. Thus, spatial patterns of population losses continued during a period of 20 years, with an important reduction in its absolute incidence, while population gains presented new patterns during the 1980s.

African-American and Latino Population Change

The analysis of population and neighborhood racial change that took place during the 1950s and 1960s in the 1970's Inner-cities north and South sub-areas as well as Transitional North sub-areas is indicative of a process of invasion-succession from white to minority neighborhoods. The important decreasing presence of whites in absolute and relative numbers in the areas inhabited by an increasing number of African-Americans created new patterns of spatial separation between these two population groups that otherwise would not have developed considering the important expansion of the geographic area inhabited by African-Americans that took place during the 1960s. Findings reveal that the invasion-succession process continued during the following decades.

In terms of its racial and ethnic composition, the City of Milwaukee continued to experience important transformations during the most recent decades. While the African-American and Hispanic populations increased, the white population decreased during the 1970s and 1980s. During the period between 1970 and 1990, all sub-areas of the City lost white population, particularly, Inner-City North and Transitional North. These were also the areas experiencing gains of African-American population during that period. In addition, an important increase of Latino population residing in the Inner-City South sub-area was also observed.

The Balances of City North and South housed most of the City's white population during the 20 years period. Inner-City North reduced its share of the City's African American and Latino populations while the Transitional North and Balance of City North

increased their share of the City's African-American population. Similarly, Inner-City South increased its share of the City's Latino population

During the 1970s white population losses took place in most neighborhoods of the City. The spatial patterns of these losses also show higher concentrations in neighborhoods located on the edge of Inner-City North and in Inner-City South. Although during the 1980s white population losses slowed down, their distribution continued to be similar to that of the 1970s. White population was more likely to leave the Transitional North and Inner-City South sub-areas. White population gains during the 1970s and 1980s took place in very few neighborhoods located on the edges of the City.

During the 1970s African-American losses took place in neighborhoods located in Inner-City North. This area has continuously experienced population losses and racial succession since the 1950s. During the 1970s and 1980s not only whites left these areas, but also an increasing number of the African-American population with no gains in other populations. During the 1980s neighborhoods located within and adjacent to Inner-City North continued to lose African-American population following a northwest directional pattern.

Spatial modeling of distribution of African-American gains during the periods 1970-1980 and 1980-1990 show that most African-American gains during the two periods took place in well-defined areas of the City, particularly, the west edge of Inner-City North and in Transitional North. These are roughly the same areas where high concentration of white losses took place during the same periods, particularly, neighborhoods located along the west edge of Inner-City North.

Spatial modeling of the distribution of Latino population losses and gains during the periods 1970-1980 and 1980-1990 show that during the 1970s and 1980s no distinctive spatial patterns of Latino losses took place across the City's neighborhoods. Spatial modeling, however, shows that Latino increases during the 1970s and 1980s were highly concentrated in Inner-City South following a southwest pattern of growth. It can also be observed that these are the same areas with the highest concentrations of white population losses in the south section of the City during the 1970s and 1980s.

While the African-American population left the 1970 inner-city sub-areas, particularly during the 1970s, the Latino population reinforced their presence in the 1970 Inner-City South sub-area during the 1970s and 1980s. Population mobility indicators by residence of persons in 1985 for neighborhoods located in Milwaukee's near-south side shows that only four percent of the population residing in this area were living abroad in 1985. Research also shows that 40 percent were living in the same county while 48 percent were residing in the same house in that year. The remaining eight percent of the population were living in a different county within the state of Wisconsin or in a different state (Varela 1995, p. 33). Thus, during the 1980s most of the migratory movements of the population living in the areas housing most of the Hispanic population took place within Milwaukee County.

Poverty

The increases in poverty experienced by the City of Milwaukee during recent decades developed in an uneven manner across the City's neighborhoods. Most City sub-areas experienced increases in their absolute and relative rates of poverty during the period 1970-1990. By 1990, however, nearly half of the population living in Inner-City

North lived in a household with incomes below the poverty level, followed by Inner-City South and the Center of City sub-areas. The Transitional North sub-area experienced the second largest increase in the number of persons below poverty during the 1980s.

Spatial modeling shows a higher incidence of poverty in the Inner-City North and South sub-areas as well as patterns of dispersion taking place overtime, particularly toward the Transitional North and Balance of City North sub-areas. The highest incidence of poverty gains during the 1970s took place in neighborhoods located on the periphery of Inner-City North. During the 1980s, poverty increases were concentrated in the Inner-City North and South sub-areas and in the Transitional North sub-area.

Economy

During the 1980s, the distribution of labor force (LF) by major sectors of the economy continued to reflect a decrease in Milwaukee's once leading manufacturing sector. By 1990, LF employed in the service and trade sectors had increased while the manufacturing sector experienced a decrease. During the period 1980-1990, a reduction of the labor force in the manufacturing sector took place not only in inner-city sub-areas but also in areas located on the periphery of the City. Increases in LF employed in the service sector were relatively small while increases in trade employment shows relatively higher rates of change in most areas. Finally, except for the East Side and the Center of City sub-areas, the decreases in manufacturing were by far greater than the increases in labor force absorbed by the other economic sectors.

Levels of unemployment in Milwaukee increased unevenly across the City's sub-areas. Increasing levels of unemployment were particularly felt in inner-city sub-areas and their peripheral communities. The Transitional North sub-area, which is adjacent to

Inner-City North, had the second largest increase in unemployment. It was followed by Inner-City South. Thus, unemployment levels and its relative rate of change were not only higher for inner-city sub-areas but also for their immediate peripheral communities.

Housing

Milwaukee's residential structure developed through a centrifugal process of residential development with the inner-city sub-areas housing the oldest housing with the periphery housing the newer residential structures. Inner-Cities North and South house the greatest shares of the City's oldest housing stock. Most of the City's residential development took place during the period between 1900 and 1959. Out of the City's total housing units in 1990, 78 percent were built during that period. Such residential structure developed with a well-defined distribution of housing types with the largest shares of single-family housing located on the periphery of the City. Neighborhoods with the largest shares of two-family housing are located within inner-city sub-areas. Multi-family housing is located near Milwaukee's CBD. Patterns of housing tenure were also found. Owner-occupied housing units decreased while renter-occupied housing units increased from 1980 to 1990. Although all sub-areas of the City experienced increases in their share of rental housing, the sub-areas with the largest increases in their shares of rental housing were those located near the CBD. The closer to the CBD the greater the share of rental housing. In addition, neighborhoods located within inner-city areas were more likely to increase their share of rental housing during the 1980s.

The analysis of changes in median home assessment values during the period between 1980 and 1990 showed that most neighborhoods located within Inner-City and Transitional sub-areas experienced changes below the City's change in median

assessment values. In addition, neighborhoods located in the Balance of City North sub-area but adjacent to the Transitional North sub-area also experienced change in assessment values below the City's median change value. All neighborhoods on the Balance of City South experienced changes in median assessment values above the City's median change value while neighborhoods in the East Side experienced the largest increases. Finally, neighborhoods located within Inner-City North but adjacent to the East Side and the east section of the Center of City sub-area experienced changes greater than the City's change in median assessment values.

Integrating Current and Classic Ecological Models in the Study of Neighborhood Change

A total of five ecological models were tested. Current ecological perspectives (Wilson 1987, 1993; Massey and Denton 1993) include Economic Transformation, Racial Segregation, and Demographic Composition models. Classic ecological perspectives (Chicago School; Hoover and Vernon 1959) include Invasion-Succession/Life Cycle and Arbitrage models. From current ecological perspectives of neighborhood change, various hypotheses can be identified. Hypotheses derived from the Economic Transformation model emphasize changes in the economy from manufacturing to services, changing levels of unemployment, and social class changes in blue-collar workers. Racial Segregation hypotheses emphasize the changing distribution of population characteristics based on neighborhoods' racial/ethnic composition. Hypotheses derived from the demographic model emphasize composition variables of changing age and family structure.

Classic ecological perspectives include various hypotheses. Invasion-Succession/Life Cycle hypotheses emphasize distance from the urban core and sector of

location as well as variables associated to housing and demographic dynamics. The Arbitrage model emphasizes geographic proximity and competition between households--with different socioeconomic status and racial and ethnic backgrounds--for housing in adjacent areas of the City.

Results from the full regression analyses validated most hypotheses derived from current ecological models of neighborhood change. Housing and space related predictors stressed by classic ecological models of neighborhood change constitute value-added variables reflecting the important role of the built environment and the spatial structure in the changing status of neighborhoods.

Economic Transformation

Two dimensions of the Economic Transformation hypotheses were tested. One dimension is related to changing economic conditions were higher levels of unemployment best predicted neighborhood poverty change. The other dimension is related to pre-existing conditions underlying structural processes where neighborhoods with higher shares of blue-collar workers were more likely to experience increases in their share of poverty. Thus, in Milwaukee, the pre-existing class composition of neighborhoods and increasing levels of unemployment were significant factors in the impoverishing of neighborhoods during the 1980s. The insignificance of pre-existing and changing labor force in manufacturing suggest that the class composition of neighborhoods rather than the economic sector of employment of its employed labor force better predicted neighborhood poverty change. The descriptive analysis showed that during the period 1980-1990, a reduction of the labor force in the manufacturing sector

took place not only in inner-city areas but also in areas located on the periphery of the City.

Racial Segregation

The hypothesis from the Racial Segregation model was validated in the present study. Two dimensions of the Racial Segregation model were tested. One dimension is related to the changing racial composition of neighborhoods while the other dimension stresses the pre-existing racial composition of neighborhoods as measured by its ghetto status. Results indicate that neighborhoods experiencing increasing share of minority population and classified as ghetto core in 1980 were more likely to experience increases in their share of poverty in 1990. Pre-existing ghetto core classification is indicative of minority segregation and it confirms the Racial Segregation hypothesis of neighborhood change. Note, however, that the measurement used in the present study does not directly address the measures of unevenness, contact, and density captured by Massey and Denton.

The use of minority neighborhoods being ghetto or ghetto core classification is a proxy. Because of high multicuolinearity between the independent variables measured and desegregated minority variables of African-American and Latino populations the latest were not included in the full regression model. However, correlation analysis was run between the later and poverty changes. Findings indicated that pre-existing and changing shares of African-American population in neighborhoods were significantly related to changes in poverty. Findings also indicated that while greater preexisting shares of Latino population were correlated, changing shares of Latino population did not significantly predict neighborhood poverty change.

Demographic Composition

Two dimensions of the Demographic Composition model were tested. One dimension is related to the changing demographic composition of neighborhoods while the other dimension stresses the pre-existing demographic composition of neighborhoods. The demographic model emphasizes composition variables of changing age and family structure in explanations of neighborhood change. Pre-existing and changing shares of neighborhoods' young children and female-headed families were found to be significant predictors of neighborhood change. These results support hypothesis from the Demographic Composition model, which suggests that, the growth of female-headed households and young persons under 15 years of age are predicted to be related to increases in neighborhoods' share of poverty. Thus, in Milwaukee neighborhoods with higher changing shares of poverty are more likely to house single parent, female-headed households with children, making it difficult for these households to get out of poverty.

Invasion-Succession/Life Cycle

As predicted by the model's hypotheses, neighborhoods experiencing lower home appreciation values and greater pre-existing shares of minority populations were more likely to experience greater shares of poverty by 1990. Different from predictions proposed in the model, neighborhoods located in closer proximity to the CBD and experiencing decreases in total population were less likely to experience increases in their share of poverty by 1990. These findings corroborate results from the modeling of these variables analyzed in the descriptive analysis. Such findings suggest the existence of a pattern of dispersal and relocation of the poor from inner-city rather than their growth, concentration, and social isolation in inner-city neighborhoods. Note, however, in the

descriptive analysis that such patterns apply more to the African-American population. Latinos in Milwaukee have reinforced their presence in the near south side of the City during the last two decades forming a growing and compact mosaic of barrios.

In addition, the descriptive analysis showed that the neighborhood racial change that took place during the 1950s and 1960s in the 1970's Inner-Cities North and South as well as Transitional North sub-areas is indicative of a process of invasion-succession from white to minorities neighborhoods. The findings from the descriptive analysis also revealed that the invasion-succession process continued during the following decades.

Arbitrage

As expected, neighborhoods with lower income levels were significantly related to those experiencing increases in shares of poverty. Increases in neighborhood's share of minority populations were also related to increases in share of poverty. Considering the high levels of segregation in Milwaukee, it was not surprising that when included in the model increases in the neighborhood's share of rental housing were found insignificant. The correlation analysis, however, showed a significant relationship.

The modeling of changes in rental housing and poverty offered in the descriptive analysis depicts such relationship. Considering results from the Racial Segregation model it is also not surprising that adjacency to neighborhoods with more than ten percent of the population being minority was not a significant predictor of increases in neighborhoods' share of poverty. The more than ten percent criteria used in the present study seems to be inadequate to Milwaukee where hyper-segregation (75 percent or more minority) significantly predict increases in neighborhoods' share of poverty. Thus, the validity of the Arbitrage model in Milwaukee will need to be further examined since the

statistical analysis does not measure spatial dynamics that are emphasized by the model [25].

Recommendations for Urban Planning and Policy

The validity of current as well as classic ecological models suggests that an interdisciplinary and integrative approach should guide the study of neighborhood change. Consideration of economic transformations, racial/ethnic segregation, and the changing demographic composition of neighborhoods stressed by current ecological models was crucial in predicting neighborhood change in the City of Milwaukee during the period 1980-1990. Consideration of housing and spatial variables stressed by classic ecological models constituted value-added predictors. The present study also shows that consideration of pre-existing as well as changing socioeconomic, demographic, and housing conditions of neighborhoods are necessary to better predict neighborhood change. Thus, this study shows that the integration of variables stressed by current as well as classic models of neighborhood change and consideration of pre-existing and changing characteristics of neighborhood may improve our understanding of the neighborhood change phenomena.

Results from the present study also suggests that examining the underlying processes of change taking place across the urban spectrum may improve our understanding of the larger processes of change taking place in a locality. There was an uneven distribution of neighborhood characteristics associated with neighborhood change and distress (race/ethnicity, poverty, unemployment, etc.) across the metropolitan area with the central city absorbing most of those neighborhood characteristics. Furthermore,

[25] Refer to Anthony Downs (1981) p. 87.

it was found that an uneven distribution of those characteristics across the City's neighborhoods has developed throughout the years.

The visual display of these processes at the city level can help urban planners and policy makers in Milwaukee observe the overall transformations experienced by the city's spatial structure. This step enhances understanding of the spatial aggregation of change and the identification of existing and new patterns of neighborhood change taking place across the city's neighborhoods. For instance, this procedure facilitated identification of two different dynamics in the changing spatial distribution of neighborhood characteristics in the south and north sides of the City. Findings from the present study also help identify neighborhoods and clusters of neighborhoods that because of their changing characteristics and their location are at risk of decline.

Spatial modeling of those spatial processes of change allowed us to observe the overall transformations experienced by the City's spatial structure and its relationship with an opportunity structure reflected in space. In Milwaukee, increases in poverty and minority populations tended to occur in areas losing population, particularly, white population. It was also shown that the invasion-succession from white to minority neighborhoods that took place during the 1950s and 1960s continued during the following decades. This process was accompanied by an increasing concentration of Latinos in the Inner-City South sub-area and an increasing presence of African-Americans in the Transitional North and Balance of City North sub-areas.

The spatial modeling of changes in median home assessment values during the period between 1980 and 1990 portrays some of those spatial processes of deprivation experienced by a large proportion of Milwaukee's population. Findings from the present

study showed that the neighborhoods where minorities have historically resided and the areas where they are recently moving into experienced changes below the City's change in median assessment values during that period. Most neighborhoods located within the Inner-City and Transitional sub-areas experienced changes below the City's change in median assessment values. In addition, neighborhoods located in the Balance of City North area but adjacent to the Transitional North area also experienced change in assessment values below the City's median change value.

In contrast, all neighborhoods on the Balance of City South experienced changes in median assessment values above the City's median change value while neighborhoods in the East Side experienced the largest increases. Finally, neighborhoods located within Inner-City North adjacent to the East Side and the east section of the Center of City area experienced changes above the city's change in median assessment values. Thus, findings from the present study help identify neighborhoods and clusters of neighborhoods that because of their changing characteristics and their location are at risk of decline.

These spatial processes of change reveal the existence of an opportunity structure reflected in space that limits the life chances of populations living in minority neighborhoods. Recent studies on food access in Milwaukee, for instance, have shown that people living in areas where minorities and the poor have historically resided and the areas where they are recently moving into experience deprivation accessing quality and affordable food (Johnson, Percy and Wagner, 1996; Varela 1996; Varela, Johnson and Percy, 1998; Varela, Haider-Markel and Percy, 1998). Thus, the location of neighborhoods in the urban spectrum and its relation with the City's history and

geography should be considered when designing policies and planning to improve the status of of neighborhoods as well as the life chances of its inhabitants.

Results from the present study suggest the existence of an opportunity structure reflected spatially that need to be further examined. Findings also invite a close examination of the ghetto/barrio formation process and how it can be related to such opportunity structure. The development and incorporation of spatial statistics in the study of neighborhood change is also advised.

The graphic representation of processes and dynamics that can be related to time and space portray complex processes of change in a way that simplifies their understanding. Making information available and easy to interpret constitutes an important step toward facilitating the decision making process for urban planning and policy professionals as well as for empowering populations and enabling them to transform their lives through greater participation in both the planning and policy making process. The need for involving people and neighborhood organizations in the planning and policy making process of their communities has become increasing evident among urban scholars, planners, city officials, and urban neighborhood agencies and organizations. Urban scholars as well as governmental and non-governmental institutions have concluded that although exogenous forces condition the destiny of urban neighborhoods, endogenous forces can effectively mediate the effects of changes and influence the direction of change in their communities.

As part of the present study, a comprehensive longitudinal data set containing three observations (1970, 1980, and 1990) was created for the study of neighborhood change in Milwaukee. Several demographic and housing indicators from various sources

are available in electronic format and in a geographic information system for the analysis and mapping of neighborhood change in Milwaukee (Varela 1999).

The study poses some methodological and theoretical limitations that constraint its contribution to urban policy. The outcomes resulting from measures that describe the statistical aggregation of people and households in a neighborhood inform place-based policies that may exclude poor residents living in non-poor neighborhoods or benefit non-poor residents living in poor neighborhoods. In addition, the lack of availability of longitudinal data at the neighborhood level, for the period under study, regarding political-economy and social movements variables excludes from the analysis plausible hypotheses derived from such perspectives. Thus, results from the present study constitute an important but yet partial contribution in understanding and addressing neighborhood change in general, and neighborhood poverty change in particular.

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APPENDIX A: TABLES: CHAPTER IV-SECTION A

Table 1. Milwaukee's MSA Total Population and Population Change, 1950-1990

Population

	1950		1960		1970		1980		1990		Change 1950-70		Change 1970-90	
County	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Milwaukee	871,047	86%	1,036,041	81%	1,054,249	75%	964,988	69%	959,275	67%	183,202	-11%	-94,974	-8%
City of Milwaukee	637,392	63%	741,324	58%	717,372	51%	636,295	46%	628,088	44%	79,980	-12%	-89,284	-7%
Suburbs	233,655	23%	294,717	23%	336,877	24%	328,693	24%	331,187	23%	103,222	1%	-5,690	-1%
Ozaukee	23,361	2%	38,441	3%	54,461	4%	66,981	5%	72,831	5%	31,100	2%	18,370	1%
Washington	33,902	3%	46,119	4%	63,839	5%	84,848	6%	95,328	7%	29,937	1%	31,489	2%
Waukesha	85,901	8%	158,249	12%	231,335	16%	280,203	20%	304,715	21%	145,434	8%	73,380	5%
Total	1,014,211		1,278,850		1,403,884		1,397,020		1,432,149		389,673		28,265	

Source: 1950,1960,1970,1980,1990 US Census (1950-1970 Milwaukee Urban Observatory; 1980 IUCPSR; 1990 STF-3)

Table 2. Milwaukee's MSA Housing Units, 1950-1990

Housing Units

	1950		1960		1970		1980		1990		Change 1950-70		Change 1970-90	
County	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Milwaukee	253,384	85%	327,736	82%	349,762	78%	378,000	72%	390,715	70%	96,378	-7%	40,953	-8%
City of Milwaukee	188,926	63%	241,593	60%	246,092	55%	253,489	49%	254,204	45%	57,166	-8%	8,112	-10%
Suburbs	64,458	22%	86,143	21%	103,670	23%	124,511	24%	136,511	24%	39,212	2%	32,841	1%
Ozaukee	7,046	2%	11,128	3%	15,351	3%	22,520	4%	26,482	5%	8,305	1%	11,131	1%
Washington	10,915	4%	14,519	4%	18,692	4%	28,363	5%	34,382	6%	7,777	1%	15,690	2%
Waukesha	27,490	9%	47,301	12%	65,239	15%	92,622	18%	110,452	20%	37,749	5%	45,213	5%
Total	298,835		400,684		449,044		521,505		562,031		150,209		112,987	

Source: 1950,1960,1970,1980,1990 US Census (1950-1970 Milwaukee Urban Observatory; 1980 IUCPSR; 1990 STF-3)

Table 3. Persons Below Poverty by Geographic Area, 1970-1990

Area	Population			Persons Below Poverty						Change in Poverty					
	1970	1980	1990	1970		1980		1990		1970-80		1980-90		1970-90	
County	#	#	#	#	%	#	%	#	%	#	%	#	%	#	%
Milwaukee	1,054,249	964,988	959,275	93,976	86%	96,211	87%	148,184	91%	2,235	0%	51,973	5%	54,208	5%
Suburbs	336,877	328,693	331,187	13,599	12%	10,883	10%	12,625	8%	(2,716)	-3%	1,742	-2%	(974)	-5%
City	717,372	636,295	628,088	80,377	74%	85,328	77%	135,559	84%	4,951	3%	50,231	7%	55,182	10%
Ozaukee	54,461	66,981	72,831	2,432	2%	2,208	2%	1,561	1%	(224)	0%	(647)	-1%	(871)	-1%
Washington	63,839	84,848	95,328	3,360	3%	3,861	3%	3,048	2%	501	0%	(813)	-2%	(312)	-1%
Waukesha	231,335	280,203	304,715	9,137	8%	8,592	8%	9,357	6%	(545)	-1%	765	-2%	220	-3%
Milwaukee MSA	1,403,884	1,397,020	1,432,149	108,905		110,872		162,150		1,967		51,278		53,245	

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 4. African-American and Latino Populations by Geographic Area, 1970-1990

Area	Population			African-American						Latino					
	1970	1980	1990	1970		1980		1990		1970		1980		1990	
County	#	#	#	#	%	#	%	#	%	#	%	#	%	#	%
Milwaukee	1,054,249	964,988	959,275	102,471	100%	148,174	99%	194,422	99%	24,949	81%	29,752	85%	41,893	86%
Suburbs	336,877	328,693	331,187	817	1%	2,324	2%	3,952	2%	2,836	9%	3,265	9%	4,473	9%
City	717,372	636,295	628,088	101,654	99%	145,850	97%	190,470	97%	22,113	72%	26,487	76%	37,420	77%
Ozaukee	54,461	66,981	72,831	112	0%	237	0%	366	0%	469	2%	368	1%	855	2%
Washington	63,839	84,848	95,328	111	0%	284	0%	329	0%	1,106	4%	464	1%	495	1%
Waukesha	231,335	280,203	304,715	122	0%	922	1%	874	0%	4,147	14%	4,409	13%	5,502	11%
Milwaukee MSA	1,403,884	1,397,020	1,432,149	102,816		149,617		195,991		30,671		34,993		48,745	

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 5. Change in African-American and Latino Populations, 1970-80-90

Area	African-American						Latino					
	1970-80		1980-90		1970-90		1970-80		1980-90		1970-90	
County	#	%	#	%	#	%	#	%	#	%	#	%
Milwaukee	45,703	-1%	46,248	0%	91,951	0%	4,803	4%	12,141	1%	16,944	5%
Suburbs	1,507	1%	1,628	0%	3,135	1%	429	0%	1,208	0%	1,637	0%
City	44,196	-1%	44,620	0%	88,816	-2%	4,374	4%	10,933	1%	15,307	5%
Ozaukee	125	0%	129	0%	254	0%	(101)	0%	487	1%	386	0%
Washington	173	0%	45	0%	218	0%	(642)	-2%	31	0%	(611)	-3%
Waukesha	800	0%	(48)	0%	752	0%	262	-1%	1,093	-1%	1,355	-2%
Milwaukee MSA	46,801	0%	46,374	0%	93,175	0%	4,322	0%	13,752	0%	18,074	0%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 6. Geographic Areas' Share of African-American Household Income, 1990

	Geographic Area					
		Milwaukee		Ozaukee	Washington	Waukesha
	County	Suburbs	City			
Income	%	%	%	%	%	%
		Poverty Income				
$0-14999	100%	1%	99%	0%	0%	0%
		Moderate (Above Poverty) Income				
$15000-24999	100%	1%	99%	0%	0%	0%
$25000-34999	100%	2%	97%	0%	0%	0%
Total Moderate Income	100%	1%	98%	0%	0%	0%
		Middle and Upper Class Income				
$35000-49999	99%	2%	97%	0%	0%	0%
$50000-74999	97%	5%	92%	1%	0%	1%
$75000 or more	94%	14%	80%	5%	0%	1%
Total Middle and Upper	98%	4%	94%	1%	0%	1%

Source: 1990 US Census STF-3

Table 7. African-American Household Income by County and Milwaukee County Subareas, 1990

	Geographic Area													
	MSA		Milwaukee						Ozaukee		Washington		Waukesha	
			County		Suburbs		City							
Income	#	%	#	%	#	%	#	%	#	%	#	%	#	%
						Poverty Income								
$0-14999	29,601	48%	29,543	48%	161	16%	29,382	49%	5	4%	20	77%	33	16%
						Moderate (Above Poverty) Income								
$15000-24999	11,477	19%	11,472	19%	96	10%	11,376	19%	-	0%	-	0%	5	2%
$25000-34999	7,742	13%	7,707	13%	183	18%	7,524	12%	2	2%	6	23%	27	13%
Total Moderate	19,219	31%	19,179	31%	279	28%	18,900	31%	2	2%	6	23%	32	15%
						Middle and Upper Class Income								
$35000-49999	6,993	11%	6,933	11%	119	12%	6,814	11%	7	5%	-	0%	53	26%
$50000-74999	4,822	8%	4,692	8%	258	26%	4,434	7%	59	45%	-	0%	71	34%
$75000 or more	1,233	2%	1,156	2%	173	17%	983	2%	59	45%	-	0%	18	9%
Total Middle and Upper	13,048	21%	12,781	21%	550	56%	12,231	20%	125	95%	-	0%	142	69%
Total Households	61,868		61,503		990		60,513		132		26		207	

Source: 1990 US Census STF-3

Table 8. Geographic Areas' Share of Latino Household Incomes, 1990

	Geographic Area					
	Milwaukee			Ozaukee	Washington	Waukesha
	County	Suburbs	City			
Income	%	%	%	%	%	%
			Poverty Income			
$0-14999	93%	3%	90%	0%	1%	6%
			Moderate (Above Poverty) Income			
$15000-24999	91%	11%	80%	1%	1%	7%
$25000-34999	86%	10%	76%	1%	0%	12%
Total Moderate Income	89%	10%	78%	1%	0%	10%
			Middle and Upper Class Income			
$35000-49999	81%	11%	70%	2%	1%	16%
$50000-74999	72%	21%	51%	3%	3%	22%
$75000 or more	70%	20%	50%	0%	2%	28%
Total Middle and Upper	77%	15%	62%	2%	2%	19%

Source: 1990 US Census STF-3

Table 9. Latino Household Income by County and Milwaukee County Subareas, 1990

	Geographic Area													
	MSA		Milwaukee						Ozaukee		Washington		Waukesha	
			County		Suburbs		City							
Income	#		#	%	#	%	#	%	#	%	#	%	#	%
					Poverty Income									
$0-14999	4,486	35%	4161	38%	140	12%	4021	41%	8	5%	39	31%	278	20%
					Moderate (Above Poverty) Income									
$15000-24999	2,328	18%	2107	19%	245	21%	1862	19%	26	17%	21	17%	174	12%
$25000-34999	2,001	16%	1726	16%	199	17%	1527	16%	30	20%	0	0%	245	17%
Total Moderate	4,329	34%	3833	35%	444	38%	3389	34%	56	37%	21	17%	419	29%
					Middle and Upper Class Income									
$35000-49999	2,316	18%	1880	17%	255	22%	1625	17%	53	35%	23	18%	360	25%
$50000-74999	1,233	10%	890	8%	257	22%	633	6%	33	22%	38	30%	272	19%
$75000 or more	328	3%	230	2%	65	6%	165	2%	1	1%	5	4%	92	6%
Total Middle and Upper	3,877	31%	3000	27%	577	50%	2423	25%	87	58%	66	52%	724	51%
Total Households	12,692		10994		1161		9833		151		126		1421	

Source: 1990 US Census STF-3

Table 10. Employment by Industry and Residence of Employee, 1980-1990

	Geographic Area											
	County								MSA		City of Milwaukee	
Year	Milwaukee		Ozaukee		Washington		Waukesha					
1980	#	%	#	%	#	%	#	%	#	%	#	%
Ag & Mining	1,887	0%	942	3%	1,347	3%	1,849	1%	6,025	1%	1,088	0%
Construction	12,885	3%	1,269	4%	2,146	5%	7,220	5%	23,520	3%	7,679	3%
Manufacturing	140,534	30%	11,703	35%	15,245	38%	41,701	30%	209,183	31%	90,307	30%
Transportation/Util.	29,946	6%	1,721	5%	2,019	5%	8,340	6%	42,026	6%	19,047	6%
Trade	90,961	19%	6,553	20%	7,945	20%	30,923	22%	136,382	20%	56,211	19%
FIRE	28,637	6%	2,004	6%	1,631	4%	7,876	6%	40,148	6%	16,879	6%
Services	149,684	32%	8,502	26%	9,552	24%	39,366	28%	207,104	30%	96,272	32%
Government	16,480	3%	550	2%	725	2%	3,240	2%	20,995	3%	11,676	4%
Total	471,014	100%	33,244	100%	40,610	100%	140,515	100%	685,383	100%	299,159	100%
1990												
Ag & Mining	2,437	1%	826	2%	1,639	3%	2,358	1%	7,260	1%	1,550	1%
Construction	16,832	4%	1,736	4%	3,416	7%	9,673	6%	31,657	5%	10,131	4%
Manufacturing	98,715	22%	11,204	29%	16,923	34%	41,904	25%	168,746	24%	61,020	22%
Transportation/Util.	29,856	7%	1,665	4%	2,522	5%	9,610	6%	43,653	6%	18,724	7%
Trade	95,452	21%	8,456	22%	10,362	21%	35,883	22%	150,153	21%	59,061	22%
FIRE	35,226	8%	2,773	7%	3,014	6%	11,919	7%	52,932	8%	19,825	7%
Services	152,809	34%	11,781	30%	11,717	23%	49,800	30%	226,107	32%	93,515	34%
Government	15,303	3%	659	2%	905	2%	3,362	2%	20,229	3%	10,424	4%
Total	446,630	100%	39,100	100%	50,498	100%	164,509	100%	700,737	100%	274,250	100%
Change 1980-1990												
Ag & Mining	550	0%	(116)	-1%	292	0%	509	0%	1,235	0%	462	0%
Construction	3,947	1%	467	1%	1,270	1%	2,453	1%	8,137	1%	2,452	1%
Manufacturing	(41,819)	-8%	(499)	-7%	1,678	-4%	203	-4%	(40,437)	-6%	(29,287)	-8%
Transportation/Util.	(90)	0%	(56)	-1%	503	0%	1,270	0%	1,627	0%	(323)	0%
Trade	4,491	2%	1,903	2%	2,417	1%	4,960	0%	13,771	2%	2,850	3%
FIRE	6,589	2%	769	1%	1,383	2%	4,043	2%	12,784	2%	2,946	2%
Services	3,125	2%	3,279	5%	2,165	0%	10,434	2%	19,003	2%	(2,757)	2%
Government	(1,177)	0%	109	0%	180	0%	122	0%	(766)	0%	(1,252)	0%

Sources: 1980 and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table11. Geographic Area's Share of MSA Employment by Industry, by Residence of Employee 1970-1990

	Geographic Area														
	County												City of Milwaukee		
	Milwaukee			Ozaukee			Washington			Waukesha					
	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990
Ag & Mining	35%	31%	34%	14%	16%	11%	25%	22%	23%	27%	31%	32%	22%	18%	21%
Construction	66%	55%	53%	5%	5%	5%	6%	9%	11%	23%	31%	31%	44%	33%	32%
Manufacturing	75%	67%	58%	4%	6%	7%	5%	7%	10%	15%	20%	25%	52%	43%	36%
Transportation/Util.	81%	71%	68%	3%	4%	4%	4%	5%	6%	13%	20%	22%	58%	45%	43%
Trade	76%	67%	64%	3%	5%	6%	4%	6%	7%	17%	23%	24%	52%	41%	39%
FIRE	81%	71%	67%	3%	5%	5%	3%	4%	6%	13%	20%	23%	54%	42%	37%
Services	78%	72%	68%	3%	4%	5%	3%	5%	5%	15%	19%	22%	53%	46%	41%
Government	84%	78%	76%	2%	3%	3%	2%	3%	4%	12%	15%	17%	63%	56%	52%
Total	77%	69%	64%	4%	5%	6%	4%	6%	7%	16%	21%	23%	52%	44%	39%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 12. Employment by Industry and Location of Employer, 1980-1990

	Geographic Area											
	County								MSA		City of Milwaukee	
Year	Milwaukee		Ozaukee		Washington		Waukesha					
1980	#	%	#	%	#	%	#	%	#	%	#	%
Ag & Mining	843	0%	217	1%	193	1%	896	1%	2,149	0%	523	0%
Construction	11,964	2%	777	4%	1,127	4%	5,936	6%	19,804	3%	7,790	2%
Manufacturing	153,737	32%	8,890	44%	10,469	37%	32,942	32%	206,038	33%	92,693	27%
Transportation/Util.	20,937	4%	252	1%	769	3%	4,825	5%	26,783	4%	24,239	7%
Trade	103,552	21%	4,227	21%	4,928	17%	24,213	24%	136,920	22%	70,081	20%
FIRE	33,374	7%	578	3%	1,003	3%	3,970	4%	38,925	6%	27,627	8%
Services	106,852	22%	2,611	13%	3,310	12%	17,462	17%	130,235	21%	99,303	29%
Government	51,450	11%	2,648	13%	6,883	24%	11,791	12%	72,772	11%	21,636	6%
Total	482,709	100%	20,200	100%	28,682	100%	102,035	100%	633,626	100%	343,892	100%
1990												
Ag & Mining	1,373	0%	334	1%	359	1%	1,522	1%	3,588	0%	709	0%
Construction	14,433	3%	977	4%	1,953	6%	9,594	6%	26,957	4%	8,837	2%
Manufacturing	108,561	21%	9,371	36%	12,550	36%	43,247	28%	173,729	24%	68,084	19%
Transportation/Util.	27,500	5%	679	3%	1,272	4%	7,174	5%	36,625	5%	29,284	8%
Trade	118,998	23%	6,476	25%	7,630	22%	40,388	26%	173,492	24%	66,007	19%
FIRE	41,098	8%	953	4%	1,496	4%	7,217	5%	50,764	7%	34,134	10%
Services	150,832	29%	4,589	17%	5,319	15%	30,886	20%	191,626	26%	126,794	36%
Government	56,764	11%	2,944	11%	4,422	13%	13,092	9%	77,222	11%	20,509	6%
Total	519,559	100%	26,323	100%	35,001	100%	153,120	100%	734,003	100%	354,358	100%
Change 1980-1990												
Ag & Mining	530	0%	117	0%	166	0%	626	0%	1,439	0%	186	0%
Construction	2,469	0%	200	0%	826	2%	3,658	0%	7,153	1%	1,047	0%
Manufacturing	(45,176)	-11%	481	-8%	2,081	-1%	10,305	-4%	(32,309)	-9%	(24,609)	-8%
Transportation/Util.	6,563	1%	427	1%	503	1%	2,349	0%	9,842	1%	5,045	1%
Trade	15,446	1%	2,249	4%	2,702	5%	16,175	3%	36,572	2%	(4,074)	-2%
FIRE	7,724	1%	375	1%	493	1%	3,247	1%	11,839	1%	6,507	2%
Services	43,980	7%	1,978	5%	2,009	4%	13,424	3%	61,391	6%	27,491	7%
Government	5,314	0%	296	-2%	(2,461)	-11%	1,301	-3%	4,450	-1%	(1,127)	-1%
Total	36,850		6,123		6,319		51,085		100,377		10,466	

Source: UWM-CUIR ES202 Longitudinal Database

Table 13. Geographic Area's Share of MSA Employment by Industry, 1980-1990

	Geographic Area									
	County								City of Milwaukee	
	Milwaukee		Ozaukee		Washington		Waukesha			
	1980	1990	1980	1990	1980	1990	1980	1990	1980	1990
Ag & Mining	39%	38%	10%	9%	9%	10%	42%	42%	24%	20%
Construction	60%	54%	4%	4%	6%	7%	30%	36%	39%	33%
Manufacturing	75%	62%	4%	5%	5%	7%	16%	25%	45%	39%
Transportation/Util.	78%	75%	1%	2%	3%	3%	18%	20%	91%	80%
Trade	76%	69%	3%	4%	4%	4%	18%	23%	51%	38%
FIRE	86%	81%	1%	2%	3%	3%	10%	14%	71%	67%
Services	82%	79%	2%	2%	3%	3%	13%	16%	76%	66%
Government	71%	74%	4%	4%	9%	6%	16%	17%	30%	27%

Source: UWM-CUIR ES202 Longitudinal Database

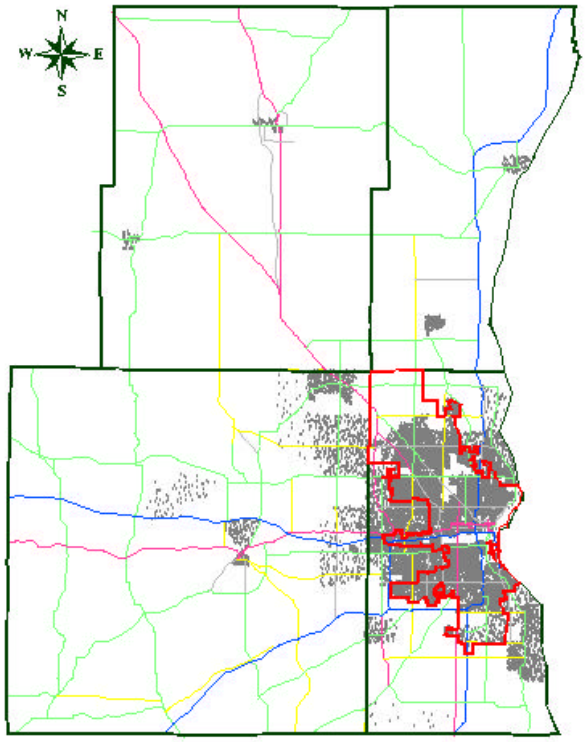
Table 14. Change in Geographic Area's Share of Sources of Employment, 1980-1990

	Geographic Area				
	County				City of Milwaukee
	Milwaukee	Ozaukee	Washington	Waukesha	
	1980-1990				
	Percentage Difference				
Ag & Mining	-1%	-1%	1%	1%	-5%
Construction	-7%	0%	2%	6%	-7%
Manufacturing	-12%	1%	2%	9%	-6%
Transportation/U	-3%	1%	1%	2%	-11%
Trade	-7%	1%	1%	6%	-13%
FIRE	-5%	0%	0%	4%	-4%
Services	-3%	0%	0%	3%	-10%
Government	3%	0%	-4%	1%	-3%

Source: UWM-CUIR ES202 Longitudinal Database

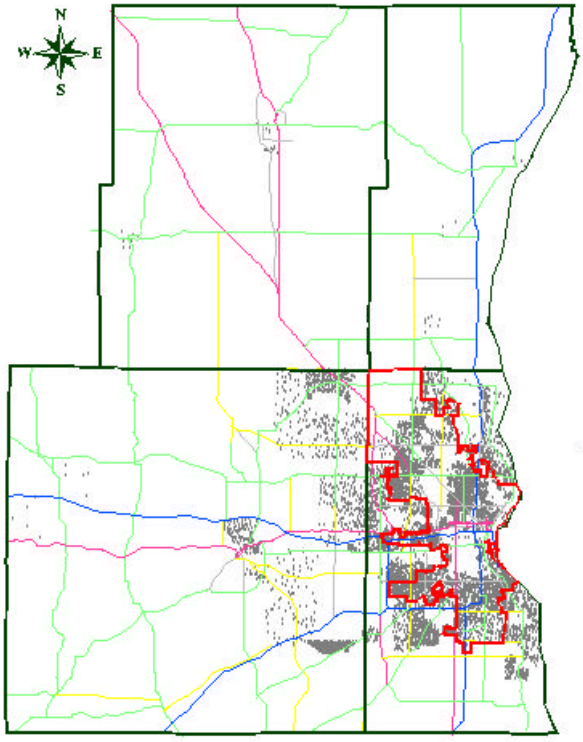
APPENDIX B: MAPS: CHAPTER IV-SECTION A

Spatial Distribution of Population Losses and Gains, 1970-1980, 1980-1990



Map Layers
MSA Counties
City of Milwaukee
Type of Highway/Roads
County Route
Interstate
State Route
US Route

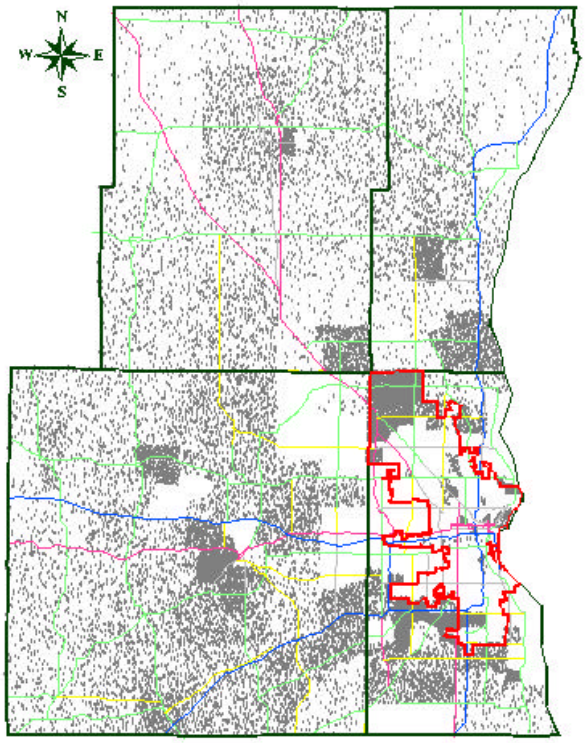
Map 1a
Population Loses, 1970-1980
1 Dot = 5 Persons



Map 1b
Population Loses, 1980-1990
1 Dot = 5 Persons

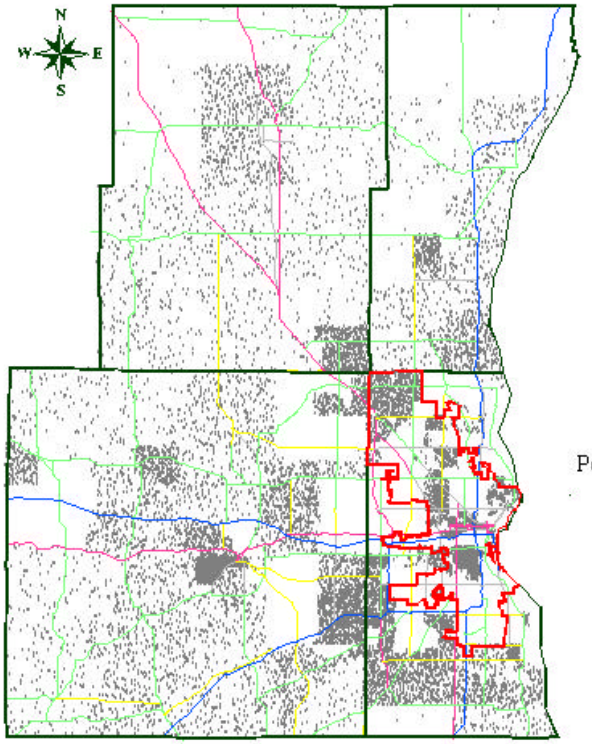
(continued)

Spatial Distribution of Population Losses and Gains, 1970-1980, 1980-1990 (continued)



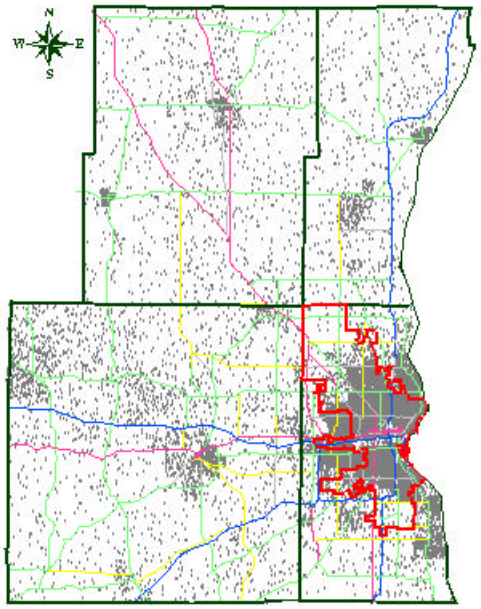
Map Layers
MSA Counties
City of Milwaukee
Type of Highway/Roads
County Route
Interstate
State Route
US Route

Map 1c
Population Gains, 1970-1980
1 Dot = 5 Persons



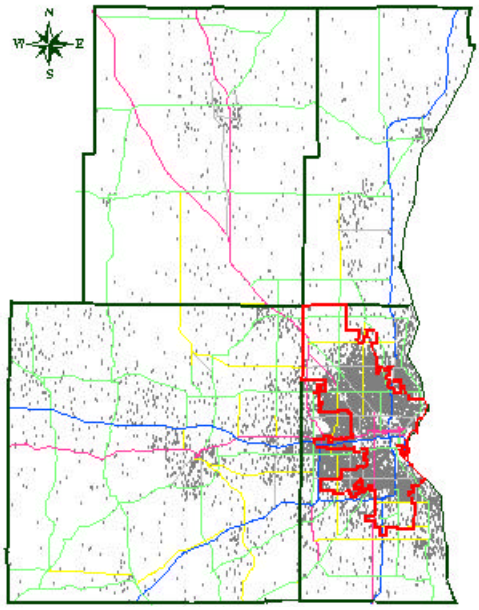
Map 1d
Population Gains, 1980-1990
1 Dot = 5 Persons

Residential Development

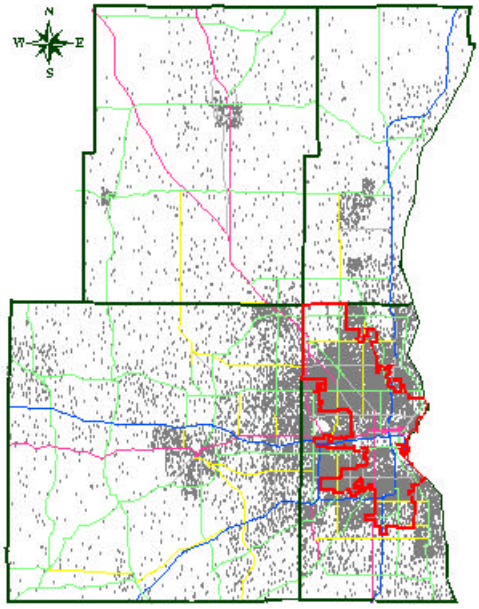


Map Layers
MSA Counties
City of Milwaukee
Type of Highway/Roads
County Route
Interstate Highway
State Route
US Route

Map 2a
Housing Built Before 1940
1 Dot = 5 Housing Units



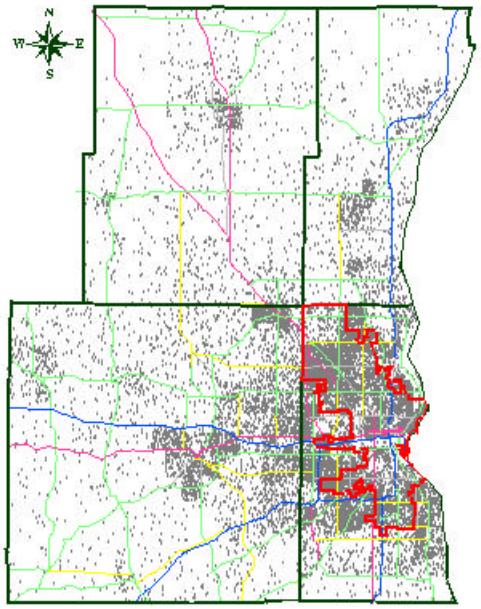
Map 2b
Housing Built 1940-1949
1 Dot = 5 Housing Units



Map 2c
Housing Built 1950-1959
1 Dot = 5 Housing Units

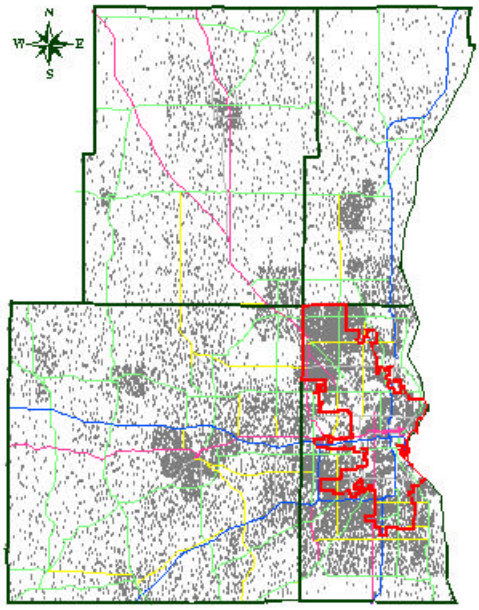
(continued)

Residential Development (continued)

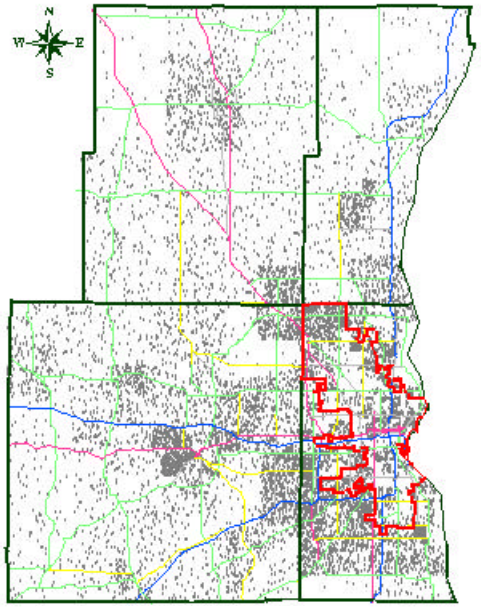


Map Layers
MSA Counties
City of Milwaukee
Type of Highway/Roads
County Route
Interstate Highway
State Route
US Route

Map 2d
Housing Built 1960-1969
1 Dot = 5 Housing Units

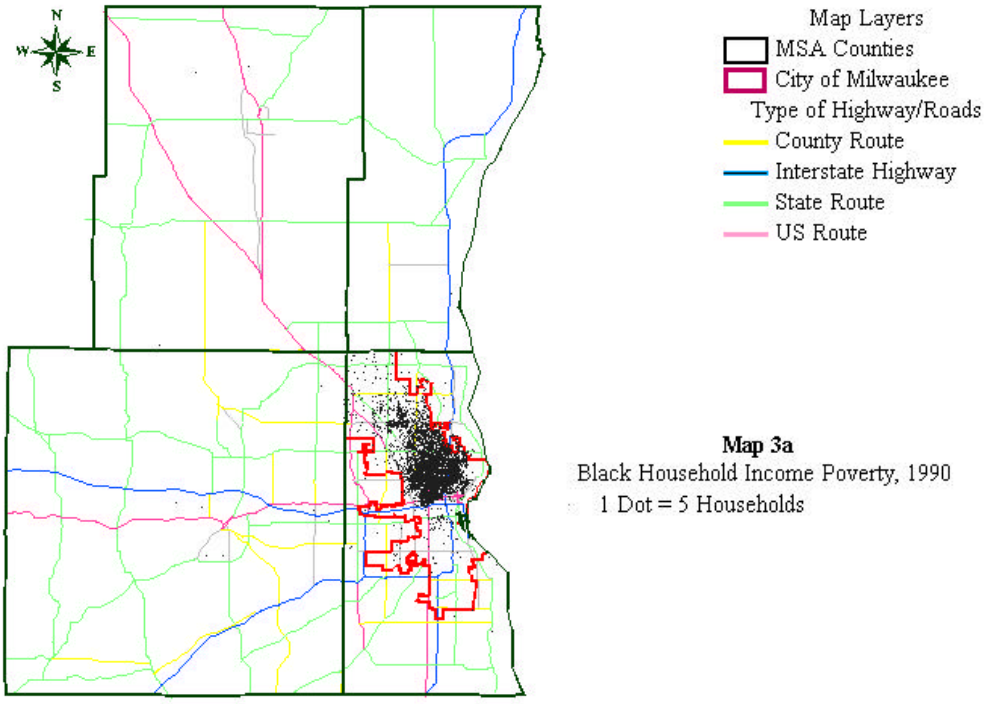


Map 2e
Housing Built 1970-1979
1 Dot = 5 Housing Units

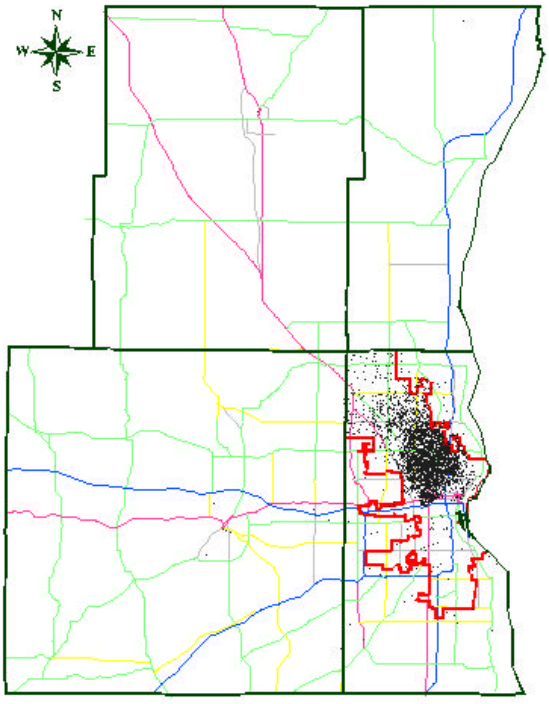


Map 2f
Housing Built 1980-1990
1 Dot = 5 Housing Units

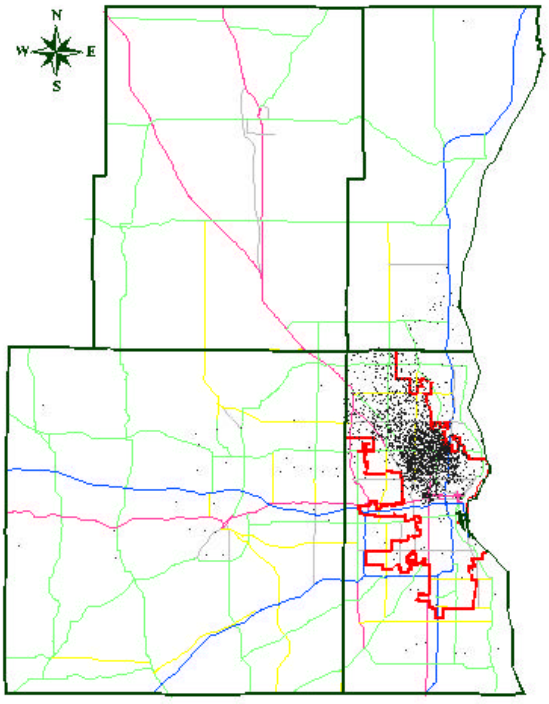
Spatial Distribution of African-American Population by Income, 1990



Map 3a
Black Household Income Poverty, 1990
1 Dot = 5 Households

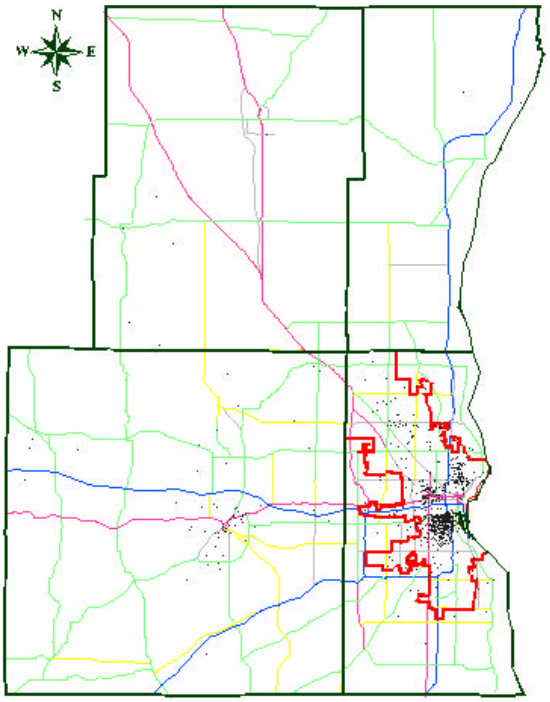


Map 3b
Black Household Moderate Income, 1990
1 Dot = 5 Households



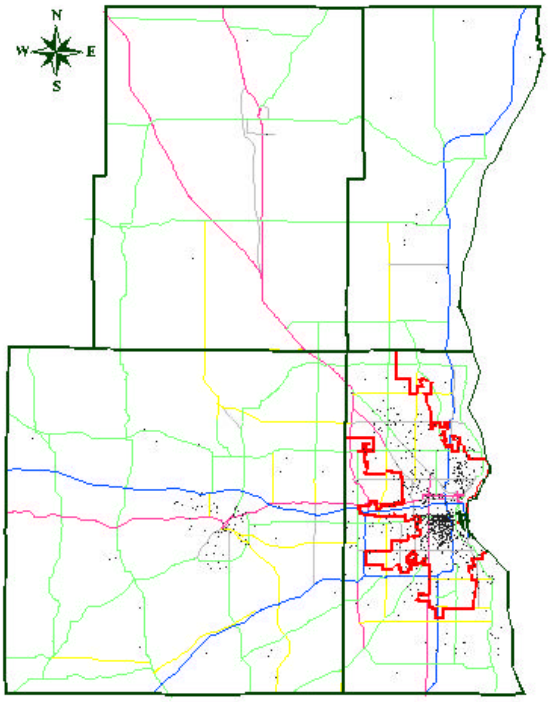
Map 3c
Black Household Middle and Upper Class, 1990
1 Dot = 5 Households

Spatial Distribution of Latino Population by Income, 1990

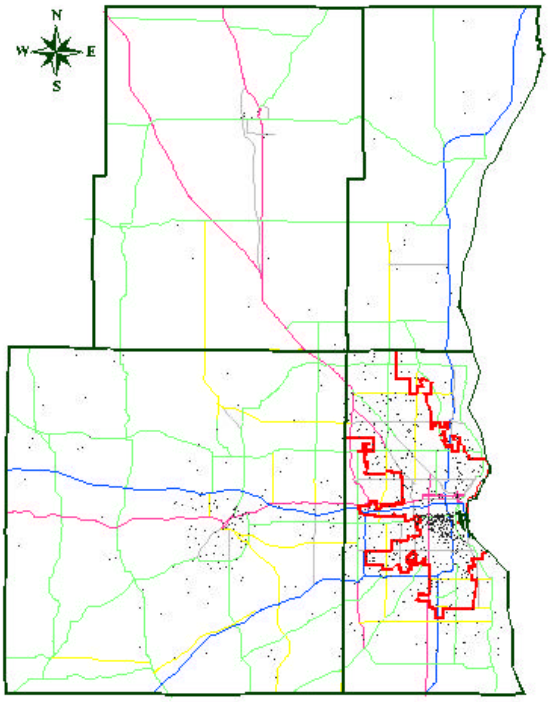


Map Layers
MSA Counties
City of Milwaukee
Type of Highway/Roads
County Route
Interstate Highway
State Route
US Route

Map 4a
Latino Household Income Poverty, 1990
1 Dot = 5 Households



Map 4b
Latino Household Moderate Income, 1990
1 Dot = 5 Households



Map 4c
Latino Household Middle and Upper Class, 1990
1 Dot = 5 Households

APPENDIX C: FIGURES: CHAPTER IV-SECTION B

Figure 0. Milwaukee's Early Settlements

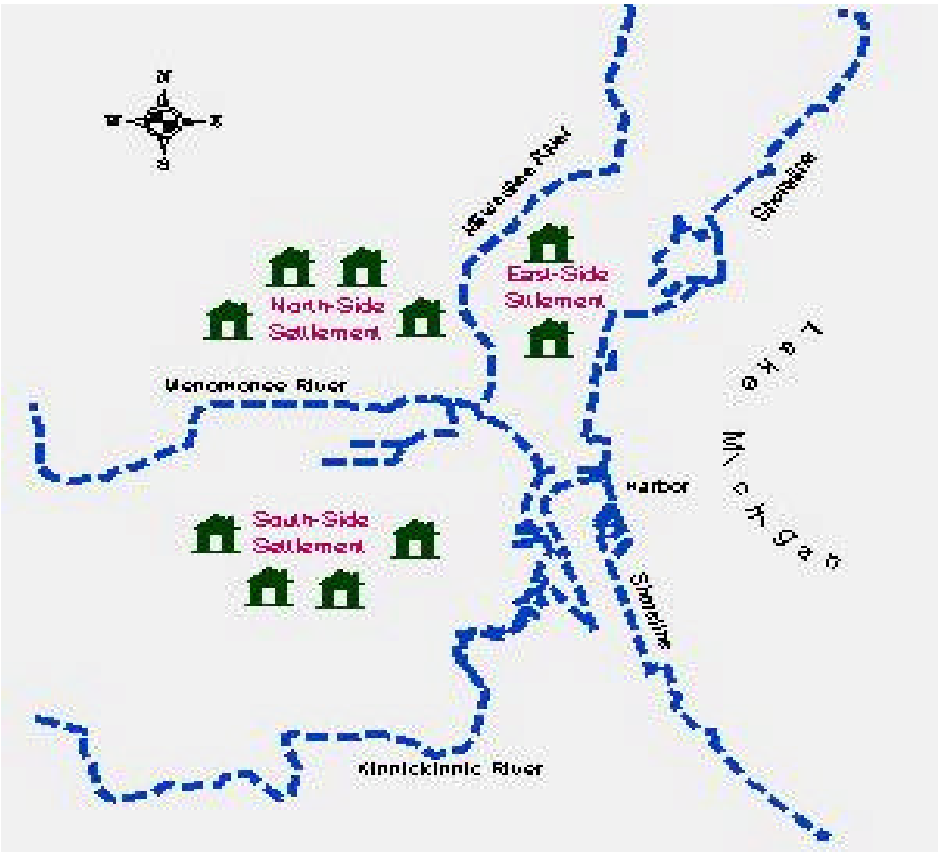
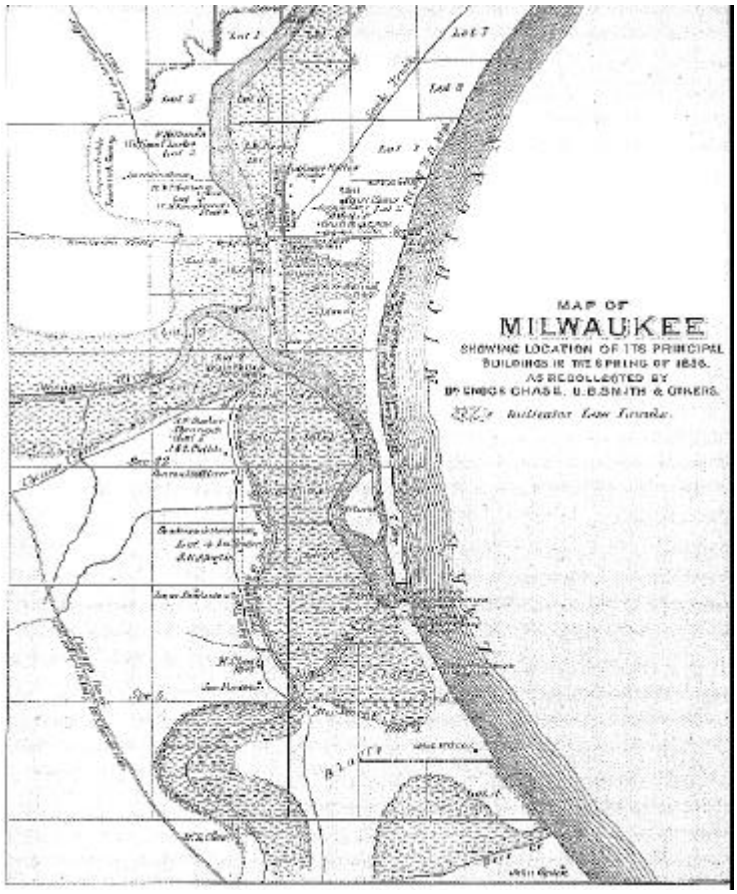


Figure 2. Milwaukee's Checkerboard Grid-iron Plan

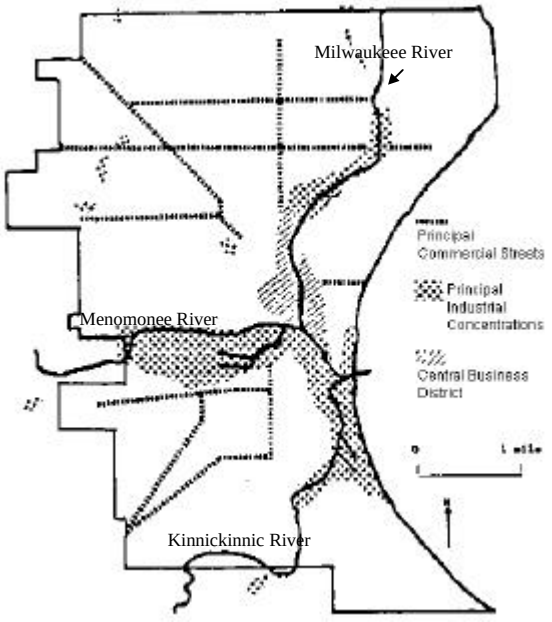
Source: Orum 1995 p. 35

Figure 3. Milwaukee's Early Built Environment and Location of Low Lands, 1836



Source: Orum 1995 p.32

Figure 4. Milwaukee's Principal Industrial and Commercial Districts, 1910



Source: Simons 1978 p. 13

APPENDIX D: TABLES: CHAPTER IV-SECTION B

Table 1. Population Growth of the City of Milwaukee, 1840-1990

		Change	
Year	Population	Number	Percent
1840	1,712		
1850	20,061	18,349	1071.8
1860	45,246	25,185	125.5
1870	71,440	26,194	57.9
1880	115,587	44,147	61.8
1890	204,468	88,881	76.9
1900	285,315	80,847	39.5
1910	373,857	88,542	31
1920	457,147	83,290	22.3
1930	578,249	121,102	26.5
1940	587,472	9,223	1.6
1950	637,392	49,920	8.4
1960	741,324	103,932	16.3
1970	717,372	-23,952	-3.2
1980	636,295	-81,077	-11.3
1990	628,088	-8,207	-1.2

Sources: Simon (1978 p. 11); Beverstock and Stuckert (1972 pp.43,46); DCD Milwaukee (1990, p.3)
*Note: the percent of change is obtained by dividing the absolute population change by the population at the earlier date (Shryock, Siegel, and Associates 1980, p. 372).

Table 2. Population and Population Change by City and Subareas, 1950-1970

	Population							
	1950		1960		1970		Change 1950-1970	
Area	#	% City	#	% City	#	% City	#	%
City of Milwaukee	637,392	100.0	741,324	100.0	717,372	100.0	79,980	
Inner City North	105,647	16.6	92,824	12.5	67,500	9.4	-38,147	-7.2
Transitional North	114,754	18.0	109,896	14.8	103,163	14.4	-11,591	-3.6
Center of City	86,523	13.6	65,206	8.8	51,495	7.2	-35,028	-6.4
Inner City South	37,776	5.9	31,757	4.3	22,635	3.2	-15,141	-2.7
Transitional South	66,331	10.4	58,881	7.9	52,838	7.4	-13,493	-3.0
Balance of City	226,361	35.5	382,760	51.6	419,714	58.5	193,353	23.0

Source: Palay (1973, p. 33 and 36)

Table 3. Population by Race and Ethnicity by City and Sub-areas, 1950-1970

Area	Total (1)	Black #	Black %	Am. Indian (2) #	Am. Indian (2) %	Spanish Spk. (3) #	Spanish Spk. (3) %	Other White #	Other White %
1950									
City of Milwaukee	637,392	21,772	3.4	***	***	532	0.1	614,118	96.3
Inner City North	105,647	19,998	18.9	***	***	34	0.0	85,431	80.9
Transitional North	114,754	35	0.0	***	***	18	0.0	114,628	99.9
Center of City	86,523	1,246	1.4	***	***	104	0.1	84,784	98.0
Inner City South	37,776	14	0.0	***	***	176	0.5	37,472	99.2
Transitional South	66,331	13	0.0	***	***	57	0.1	66,225	99.8
Balance of City	226,361	466	0.2	***	***	143	0.1	225,577	99.7
1960									
City of Milwaukee	741,324	62,458	8.4	1,779	0.2	6,043	0.8	669,529	90.3
Inner City North	92,824	56,985	61.4	***	***	1,123	1.2	34,135	36.8
Transitional North	109,896	2,400	2.2	***	***	396	0.4	106,471	96.9
Center of City	65,206	1,843	2.8	***	***	1,410	2.2	61,016	93.6
Inner City South	31,757	11	0.0	***	***	2,046	6.4	29,457	92.8
Transitional South	58,881	5	0.0	***	***	446	0.8	58,293	99.0
Balance of City	382,760	1,214	0.3	***	***	622	0.2	380,157	99.3
1970									
City of Milwaukee	717,372	105,088	14.6	3,300	0.5	15,589	2.2	589,783	82.2
Inner City North	67,500	58,522	86.7	154	0.2	1,012	1.5	7,533	11.2
Transitional North	103,163	40,441	39.2	1,054	1.0	2,393	2.3	58,667	56.9
Center of City	51,495	2,429	4.7	611	1.2	2,076	4.0	45,719	88.8
Inner City South	22,635	14	0.1	334	1.5	4,337	19.2	17,811	78.7
Transitional South	52,838	14	0.0	276	0.5	1,725	3.3	50,703	96.0
Balance of City	419,714	3,668	0.9	871	0.2	4,046	1.0	409,350	97.5

Source: Palay (1973, p.36)

(1) Includes all races: oriental, etc. Not accounted for in balance of table

(2) Figures not available for selected areas in 1950 and 1960

(3) Cannot be used for comparisons. Figures shown included: only persons born in Mexico for 1950; persons of mexican and puerto rican stock for 1960; persons of spanich language for 1970, as defined by U.S. Bureau of the Census

Table 4. Percent Each Racial/Ethnic Category to the City of Milwaukee Category Totals, 1950-1970

	Total (1)			Black			Am. Indian (2)			Spanish Spk. (3)			Other White		
	1950	1960	1970	1950	1960	1970	1950	1960	1970	1950	1960	1970	1950	1960	1970
Inner City North	16.6	12.5	9.4	91.9	91.2	55.7	***	***	4.7	6.4	18.6	6.5	13.9	5.1	1.3
Transitional North	18.0	14.8	14.4	0.2	3.8	38.5	***	***	31.9	3.4	6.6	15.4	18.7	15.9	9.9
Center of City	13.6	8.8	7.2	5.7	3.0	2.3	***	***	18.5	19.5	23.3	13.3	13.8	9.1	7.8
Inner City South	5.9	4.3	3.2	0.1	0.0	0.0	***	***	10.1	33.1	33.9	27.8	6.1	4.4	3.0
Transitional South	10.4	7.9	7.4	0.1	0.0	0.0	***	***	8.4	10.7	7.4	11.1	10.8	8.7	8.6
Balance of City	35.5	51.6	58.5	2.1	1.9	3.5	***	***	26.4	26.9	10.3	26.0	36.7	56.8	69.4

Source: Palay (1973, p.36)

(1) Includes all races: oriental, etc. Not accounted for in balance of table

(2) Figures not available for selected areas in 1950 and 1960

(3) Cannot be used for comparisons. Figures shown included: only persons born in Mexico for 1950; persons of mexican and puerto rican stock for 1960; persons of spanich language for 1970, as defined by U.S. Bureau of the Census

Table 5. Population and Population Change by City and Subareas, 1970-1990

	Population							
	1970		1980		1990		Change 1970-1990	
Area	#	% City	#	% City	#	% City	#	%
City of Milwaukee	717,124	100%	639,476	100%	632,619	100%	-84,505	
Inner City North	170,516	24%	139,320	22%	131,965	21%	-38,551	-3%
Transitional North	73,969	10%	67,751	11%	71,509	11%	-2,460	1%
Balance of City North	140,244	20%	139,738	22%	138,731	22%	-1,513	2%
Center of City	56,734	8%	52,061	8%	54,579	9%	-2,155	1%
East Side	21,003	3%	19,702	3%	20,279	3%	-724	0%
Inner City South	75,379	11%	65,652	10%	69,892	11%	-5,487	1%
Transitional South	11,722	2%	9,884	2%	10,135	2%	-1,587	0%
Balance of City South	167,557	23%	145,368	23%	135,529	21%	-32,028	-2%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 6. Area, Population and Population Density by City of Milwaukee and Subareas, 1970-1990

	Area Km^2	Population			Density*		
		1970	1980	1990	1970	1980	1990
City and Subareas							
City of Milwaukee	102.13	717,124	639,476	632,619	7,021.68	6,261.39	6,194.25
Inner City North	12.13	170,516	139,320	131,965	14,057.38	11,485.57	10,879.23
Transitional North	6.57	73,969	67,751	71,509	11,258.60	10,312.18	10,884.17
Balance of City North	35.49	140,244	139,738	138,731	3,951.65	3,937.39	3,909.02
Center of City	9.16	56,734	52,061	54,579	6,193.67	5,683.52	5,958.41
East Side	2.17	21,003	19,702	20,279	9,678.80	9,079.26	9,345.16
Inner City South	4.71	75,379	65,652	69,892	16,004.03	13,938.85	14,839.07
Transitional South	0.93	11,722	9,884	10,135	12,604.30	10,627.96	10,897.85
Balance of City South	30.97	167,557	145,368	135,529	5,410.30	4,693.83	4,376.14

* Density Pop. $_X$ Km2

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 7. Population by Race and Ethnicity, 1970-1990

Area	Total (1)	White #	White %	African-American #	African-American %	Latino #	Latino %	Other Race #	Other Race %
1970									
City of Milwaukee	717,124	585,374	82%	101,654	14%	22,095	3%	8,219	3%
Inner City North	170,516	65,002	38%	96,019	56%	7,742	5%	1,760	5%
Transitional North	73,969	71,800	97%	846	1%	934	1%	483	1%
Balance of City North	140,244	135,832	97%	2,194	2%	1,547	1%	674	1%
Center of City	56,734	48,598	86%	2,301	4%	2,298	4%	3,520	4%
East Side	21,003	20,363	97%	171	1%	229	1%	240	1%
Inner City South	75,379	68,287	91%	38	0%	6,422	9%	632	9%
Transitional South	11,722	11,212	96%	0	0%	357	3%	153	3%
Balance of City South	167,557	164,280	98%	85	0%	2,566	2%	757	2%
1980									
City of Milwaukee	639,476	457,315	72%	145,850	23%	26,531	4%	9,824	4%
Inner City North	139,320	25,151	18%	108,076	78%	4,975	4%	1,118	4%
Transitional North	67,751	47,181	70%	17,877	26%	1,647	2%	1,046	2%
Balance of City North	139,738	124,890	89%	11,228	8%	1,621	1%	1,999	1%
Center of City	52,061	40,733	78%	7,512	14%	2,340	4%	1,520	4%
East Side	19,702	18,280	93%	539	3%	367	2%	516	2%
Inner City South	65,652	50,986	78%	184	0%	12,623	19%	1,859	19%
Transitional South	9,884	9,038	91%	7	0%	575	6%	264	6%
Balance of City South	145,368	141,056	97%	427	0%	2,383	2%	1,502	2%
1990									
City of Milwaukee	632,619	387,230	61%	190,470	30%	37,432	6%	17,937	6%
Inner City North	131,965	15,880	12%	108,664	82%	4,854	4%	2,567	4%
Transitional North	71,509	28,975	41%	39,799	56%	1,353	2%	1,382	2%
Balance of City North	138,731	108,614	78%	25,429	18%	2,594	2%	2,094	2%
Center of City	54,579	36,696	67%	12,784	23%	2,149	4%	3,400	4%
East Side	20,279	18,546	91%	498	2%	279	1%	956	1%
Inner City South	69,892	42,587	61%	1,404	2%	20,924	30%	4,977	30%
Transitional South	10,135	8,569	85%	63	1%	1,221	12%	282	12%
Balance of City South	135,529	127,363	94%	1,829	1%	4,058	3%	2,279	3%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 8. Percent Each Category to the City of Milwaukee Category Totals (1970-1990)

	Total (1)			White			African-American			Latino			Other Race		
	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990	1970	1980	1990
Inner City North	24%	22%	21%	11%	5%	4%	94%	74%	57%	35%	19%	13%	21%	11%	14%
Transitional North	10%	11%	11%	12%	10%	7%	1%	12%	21%	4%	6%	4%	6%	11%	8%
Balance of City North	20%	22%	22%	23%	27%	28%	2%	8%	13%	7%	6%	7%	8%	20%	12%
Center of City	8%	8%	9%	8%	9%	9%	2%	5%	7%	10%	9%	6%	43%	15%	19%
East Side	3%	3%	3%	3%	4%	5%	0%	0%	0%	1%	1%	1%	3%	5%	5%
Inner City South	11%	10%	11%	12%	11%	11%	0%	0%	1%	29%	48%	56%	8%	19%	28%
Transitional South	2%	2%	2%	2%	2%	2%	0%	0%	0%	2%	2%	3%	2%	3%	2%
Balance of City South	23%	23%	21%	28%	31%	33%	0%	0%	1%	12%	9%	11%	9%	15%	13%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 9. Sub-areas's Share of the City's Poverty, 1970-1990

	1970 %*	1980 %	1990 %
City	100%	100%	100%
Inner City North	47%	47%	42%
Transitional North	6%	8%	13%
Balance of City North	8%	9%	10%
Center of City	14%	12%	11%
East Side	3%	3%	2%
Inner City South	11%	12%	15%
Transitional South	1%	1%	1%
Balance of City South	10%	8%	6%

* Percent of the city's total number of persons below the poverty level

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 10. City of Milwaukee's Distribution of Poverty by Sub-areas, 1970-1990

	Persons Below Poverty						Change in Poverty					
	1970		1980		1990		1970-90		1970-1980		1980-1990	
	#	%*	#	%	#	%	#	%	#	%	#	%
Inner City North	37,429	22%	40,210	29%	56,997	43%	19,568	21%	2,781	7%	16,787	14%
Transitional North	5,198	7%	6,775	10%	17,364	24%	12,166	17%	1,577	4%	10,589	14%
Balance of City North	6,198	4%	7,769	6%	12,886	9%	6,688	5%	1,571	4%	5,117	4%
Center of City	11,456	20%	9,792	19%	14,445	26%	2,989	6%	(1,664)	-4%	4,653	8%
East Side	2,152	10%	2,223	11%	3,098	15%	946	5%	71	0%	875	4%
Inner City South	8,994	12%	10,481	16%	20,855	30%	11,861	18%	1,487	4%	10,374	14%
Transitional South	1,028	9%	793	8%	1,968	19%	940	11%	(235)	-1%	1,175	11%
Balance of City South	7,922	5%	6,991	5%	7,453	5%	(469)	1%	(931)	-2%	462	1%
Total	80,377	11%	85,034	13%	135,066	21%	54,689	10%	4,657	12%	50,032	8%

* Percent of the total population in each geograpohic area

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 11. Employment by Industry by Sub-area, 1980-1990

	Total	Agr&Min		Constr		Manuf		Transp/Util		Trade		FIRE		Services		Goverm	
1980																	
	Total	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Inner City North	50,455	213	0%	947	2%	16,357	32%	3,131	6%	6,684	13%	2,008	4%	19,548	39%	1,567	3%
Transitional N	31,912	107	0%	898	3%	9,859	31%	2,277	7%	5,517	17%	1,730	5%	10,506	33%	1,018	3%
Balance of City N	73,994	324	0%	2,402	3%	22,146	30%	4,214	6%	16,918	23%	3,995	5%	21,034	28%	2,961	4%
Center of City	22,971	54	0%	414	2%	4,516	20%	1,170	5%	4,472	19%	1,967	9%	9,554	42%	824	4%
East Side	10,624	58	1%	214	2%	1,372	13%	493	5%	2,118	20%	949	9%	5,100	48%	320	3%
Inner City S	27,972	60	0%	640	2%	10,782	39%	1,862	7%	4,978	18%	1,282	5%	7,594	27%	774	3%
Transitional S	4,999	14	0%	183	4%	1,709	34%	283	6%	993	20%	260	5%	1,382	28%	175	4%
Balance of City S	76,232	258	0%	1,981	3%	23,566	31%	5,617	7%	14,531	19%	4,688	6%	21,554	28%	4,037	5%
1990																	
Inner City North	39,147	195	0%	1,183	3%	8,817	23%	3,106	8%	7,652	20%	2,156	6%	14,723	38%	1,315	3%
Transitional N	30,019	165	1%	971	3%	6,581	22%	2,204	7%	6,056	20%	2,290	8%	10,617	35%	1,135	4%
Balance of City N	68,659	395	1%	2,832	4%	16,932	25%	4,412	6%	15,595	23%	5,273	8%	20,938	30%	2,282	3%
Center of City	22,966	77	0%	628	3%	3,133	14%	1,232	5%	4,879	21%	1,888	8%	10,539	46%	590	3%
East Side	13,297	71	1%	344	3%	1,266	10%	591	4%	3,037	23%	1,145	9%	6,347	48%	496	4%
Inner City S	26,264	248	1%	1,136	4%	7,578	29%	1,618	6%	6,341	24%	1,386	5%	7,259	28%	698	3%
Transitional S	4,525	21	0%	244	5%	1,188	26%	329	7%	1,199	26%	234	5%	1,194	26%	116	3%
Balance of City S	69,373	378	1%	2,793	4%	15,525	22%	5,232	8%	14,302	21%	5,453	8%	21,898	32%	3,792	5%
Change 1980-1990																	
Inner City North		-18	0%	236	1%	-7540	-10%	-25	2%	968	6%	148	2%	-4825	-1%	-252	0%
Transitional N		58	0%	73	0%	-3278	-9%	-73	0%	539	3%	560	2%	111	2%	117	1%
Balance of City N		71	0%	430	1%	-5214	-5%	198	1%	-1323	0%	1278	2%	-96	2%	-679	-1%
Center of City		23	0%	214	1%	-1383	-6%	62	0%	407	2%	-79	0%	985	4%	-234	-1%
East Side		13	0%	130	1%	-106	-3%	98	0%	919	3%	196	0%	1247	0%	176	1%
Inner City South		188	1%	496	2%	-3204	-10%	-244	0%	1363	6%	104	1%	-335	0%	-76	0%
Transitional S		7	0%	61	2%	-521	-8%	46	2%	206	7%	-26	0%	-188	-1%	-59	-1%
Balance of City S		120	0%	812	1%	-8041	-9%	-385	0%	-229	2%	765	2%	344	3%	-245	0%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 12. Unemployment by City's Subareas, 1970-1990

	Total Labor Force			Unemployed		Unemployed		Unemployed		Change Unemployment	
	1970	1980	1990	1970		1980		1990		1980-1990	
	#	#	#	#	%	#	%	#	%	#	%
Inner City North	64,629	52,889	48,443	4,390	7%	7,203	14%	9,296	19%	2,093	6%
Transitional North	33,518	32,797	33,503	1,038	3%	2,109	6%	3,484	10%	1,375	4%
Balance of City North	63,043	74,047	72,498	1,992	3%	3,601	5%	3,839	5%	238	0%
Center of City	28,378	27,032	28,515	1,481	5%	1,904	7%	2,612	9%	708	2%
East Side	11,265	12,439	13,875	347	3%	514	4%	578	4%	64	0%
Inner City South	31,115	28,705	29,708	1,446	5%	2,410	8%	3,444	12%	1,034	3%
Transitional South	4,954	4,922	4,930	169	3%	352	7%	405	8%	53	1%
Balance of City South	74,985	75,825	72,489	2,017	3%	3,197	4%	3,116	4%	(81)	0%
City total	311,887	308,656	303,961	12,880	4%	21,290	7%	26,774	9%	5,484	2%

Sources: 1970,1980, and 1990 US Census (1970,1980 ICPSR; 1990 STF3)

Table 13. Housing Age by Sub-area, 1990

	Period Housing Built									
	Before 1900		1900-39		1940-59		1960-69		1970-90	
	#	%*	#	%*	#	%*	#	%*	#	%*
Inner City North	5,841	42%	14,986	28%	2,213	5%	151	2%	262	6%
Transitional North	138	1%	10,873	20%	5,533	12%	167	2%	48	1%
Balance of City North	76	1%	2,600	5%	20,245	44%	4,915	52%	2,708	57%
Center of City	1,209	9%	1,152	2%	111	0%	132	1%	354	7%
East Side	482	3%	2,342	4%	22	0%	10	0%	9	0%
Inner City South	5,142	37%	7,015	13%	152	0%	29	0%	24	1%
Transitional South	305	2%	1,833	3%	34	0%	14	0%	16	0%
Balance of City South	760	5%	12,606	24%	17,845	39%	4,118	43%	1,308	28%
Total City	13,953	100%	53,407	100%	46,155	100%	9,536	100%	4,729	100%

*Percent of city totals for each period

Source: DCD, Milwaukee Property File, 1997

Table 14. Housing Types by Subarea, 1990

	1990								
		Single Fly		Duplex		Multi-Fly		Mixed:Res-Comm	
	Total	#	%	#	%	#	%	#	%
Inner City North	25,119	11,798	47%	11,054	42%	1,428	5%	839	3%
Transitional North	17,427	10,275	59%	6,412	24%	401	2%	339	1%
Balance of City North	36,033	29,936	83%	4,271	16%	1,601	6%	225	1%
Center of City	4,397	2,064	47%	1,147	4%	908	3%	278	1%
East Side	3,462	1,944	56%	1,080	4%	370	1%	68	0%
Inner City South	13,610	6,332	47%	5,487	21%	919	3%	872	3%
Transitional South	2,369	1,026	43%	1,113	4%	121	0%	109	0%
Balance of City South	39,184	30,701	78%	6,760	26%	1,305	5%	418	2%

Source: DCD, Milwaukee Property File, 1997

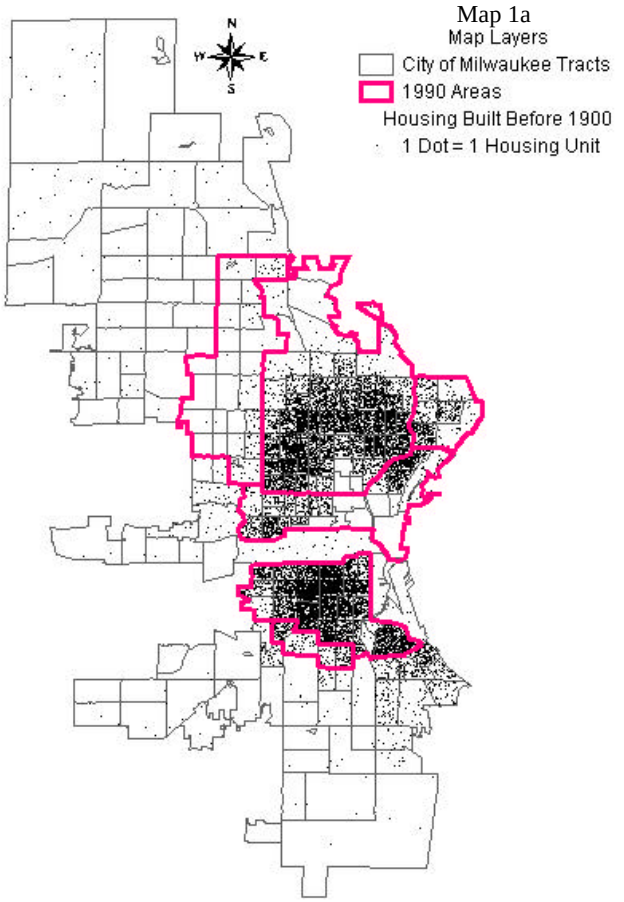
Table 15. Housing Tenure by Subarea, 1980-1990

	Total Units		Owner-Occupied		Renter-Occupied				Change R-Occ	
	1980	1990	1980	1990	1980		1990		1980-1990	
	#	#	#	#	#	%	#	%	#	%
Inner City North	45,612	42,803	19,350	14,548	26,262	58%	28,255	62%	1,993	4%
Transitional North	26,587	25,710	14,977	12,323	11,610	44%	13,387	50%	1,777	7%
Balance of City North	52,550	55,336	31,694	30,616	20,856	40%	24,720	47%	3,864	7%
Center of City	26,606	25,873	5,429	3,589	21,177	80%	22,284	84%	1,107	4%
East Side	8,355	8,311	2,388	2,492	5,967	71%	5,819	70%	(148)	-2%
Inner City South	24,334	24,622	10,523	8,626	13,811	57%	15,996	66%	2,185	9%
Transitional South	3,797	3,796	1,949	1,656	1,848	49%	2,140	56%	292	8%
Balance of City South	55,757	56,593	35,541	35,139	20,216	36%	21,454	38%	1,238	2%
City Total	243,598	243,044	121,851	108,989	121,747	50%	134,055	55%	12,308	5%

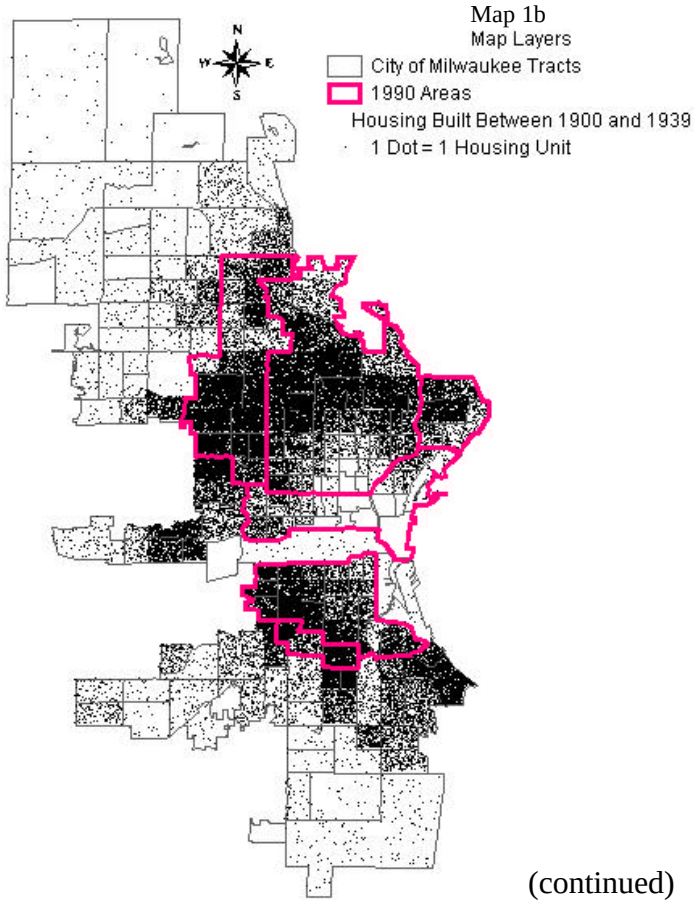
Source: DCD, Milwaukee Property File, 1997

APPENDIX E: MAPS: CHAPTER IV-SECTION B

Milwaukee's Residential Development



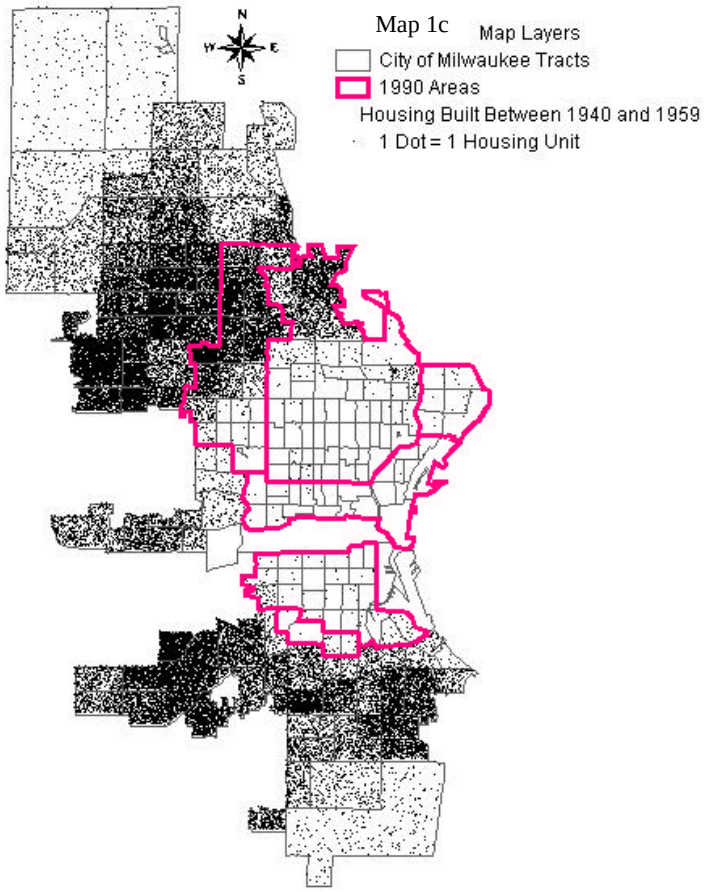
Map 1a

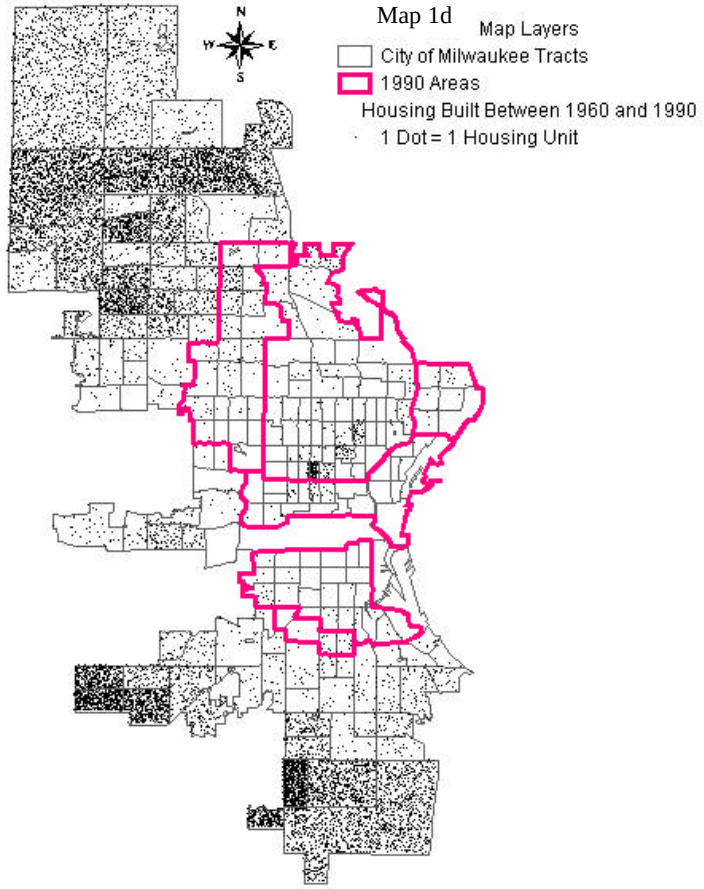


Map 1b

(continued)

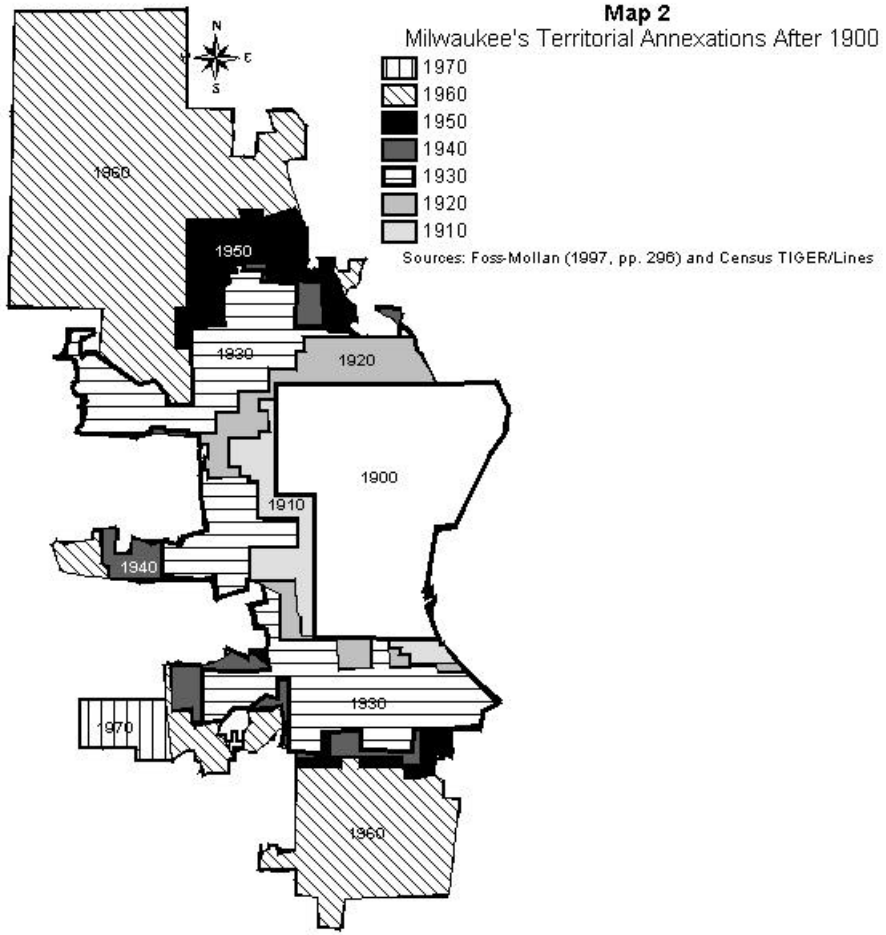
Milwaukee's Residential Development (continued)





Map 2

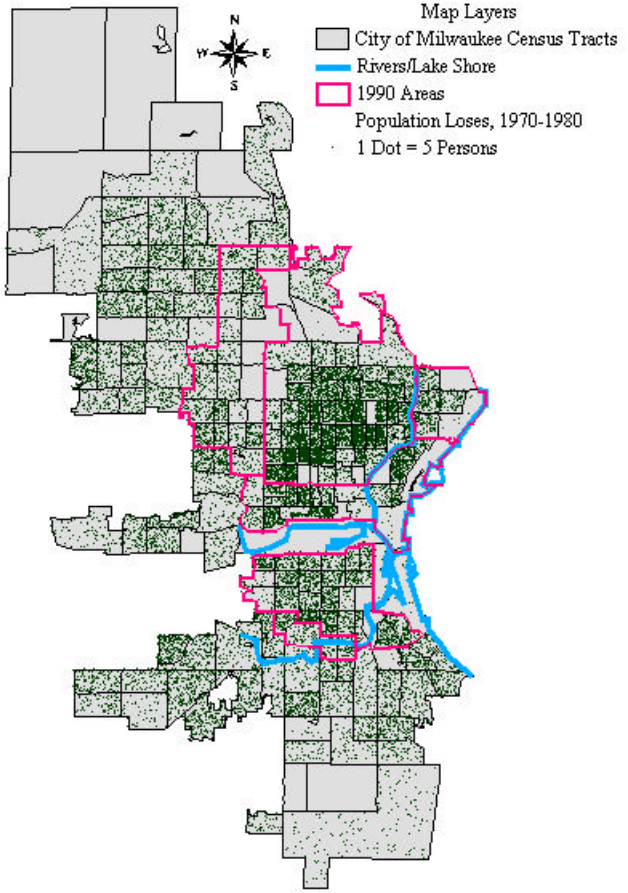
Milwaukee's Territorial Annexations After 1900



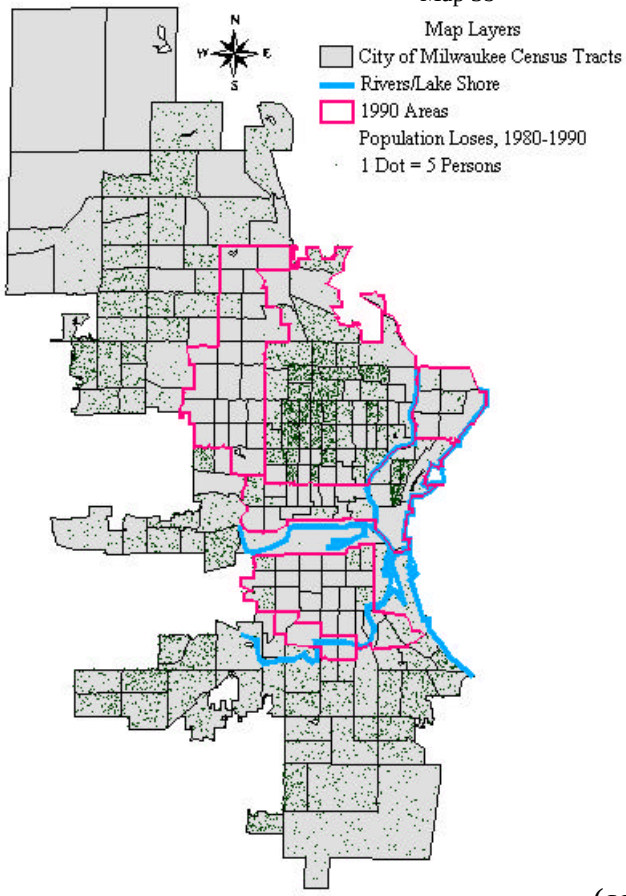
Sources: Foss-Mollan (1997, pp. 296) and Census TIGER/Lines

Spatial Distribution of Population Losses and Gains, 1970-1980, 1980-1990

Map 3a



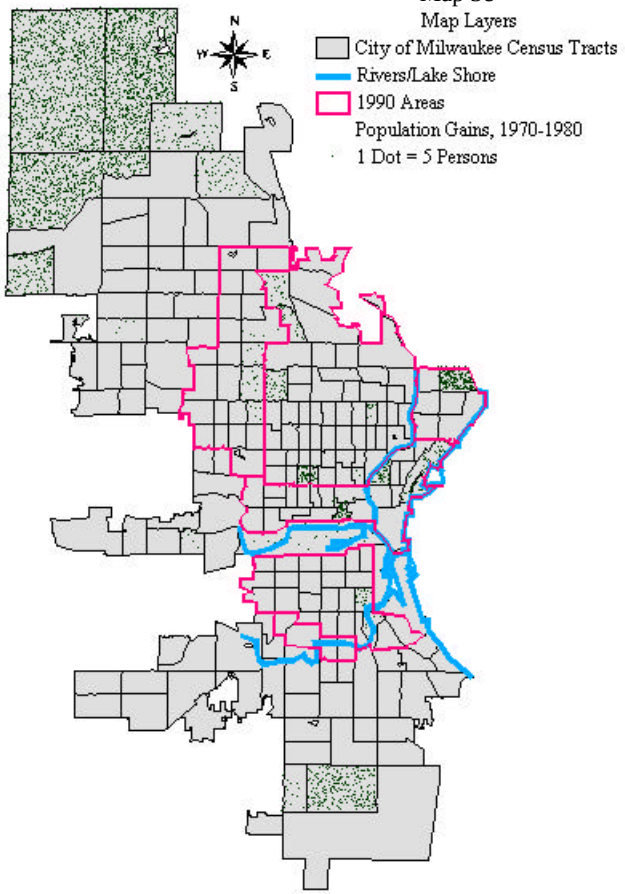
Map 3b



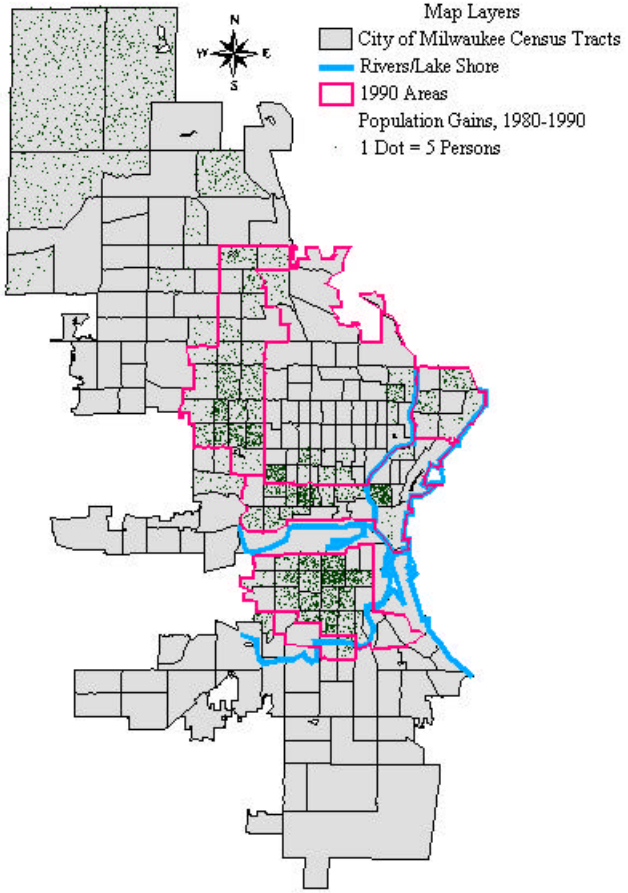
(continued)

Spatial Distribution of Population Losses and Gains, 1970-1980, 1980-1990 (continued)

Map 3c

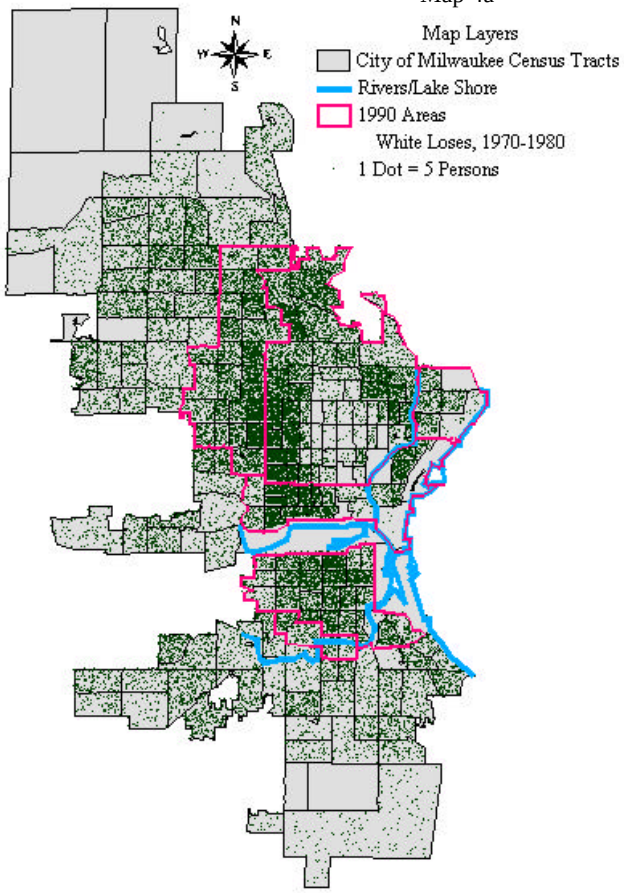


Map 3d

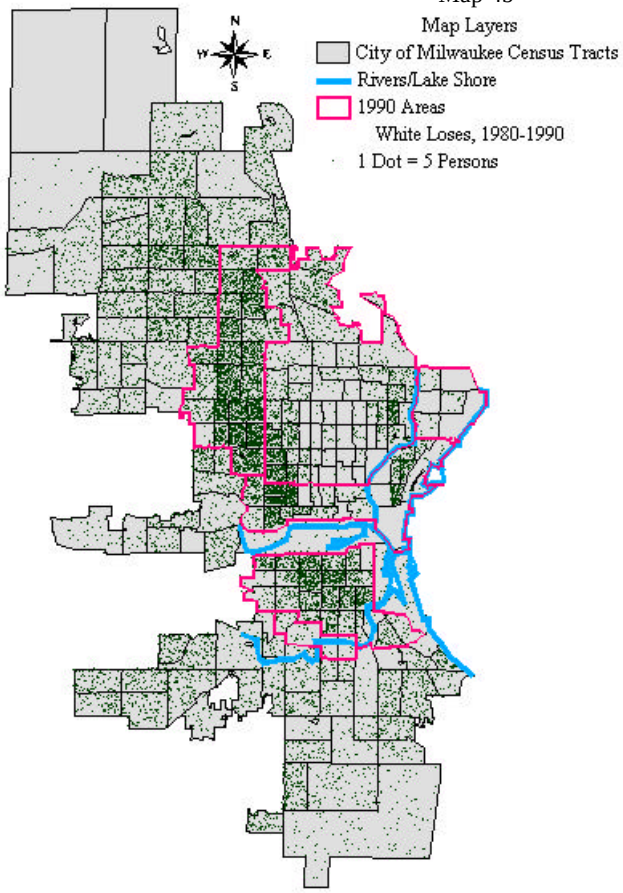


Spatial Distribution of White Losses and Gains, 1970-1980-1980-1990

Map 4a



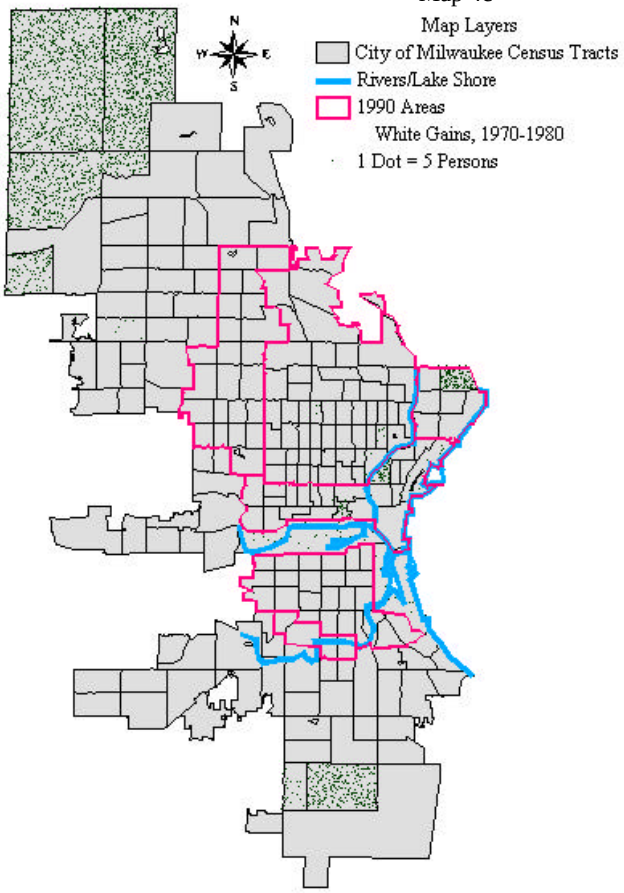
Map 4b



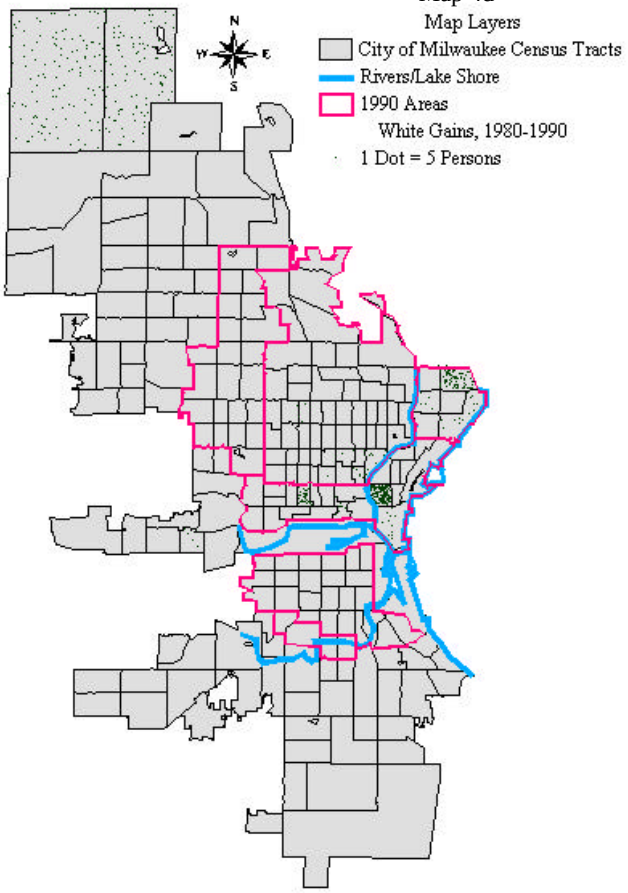
(continued)

Spatial Distribution of White Losses and Gains, 1970-1980-1980-1990 (continued)

Map 4c

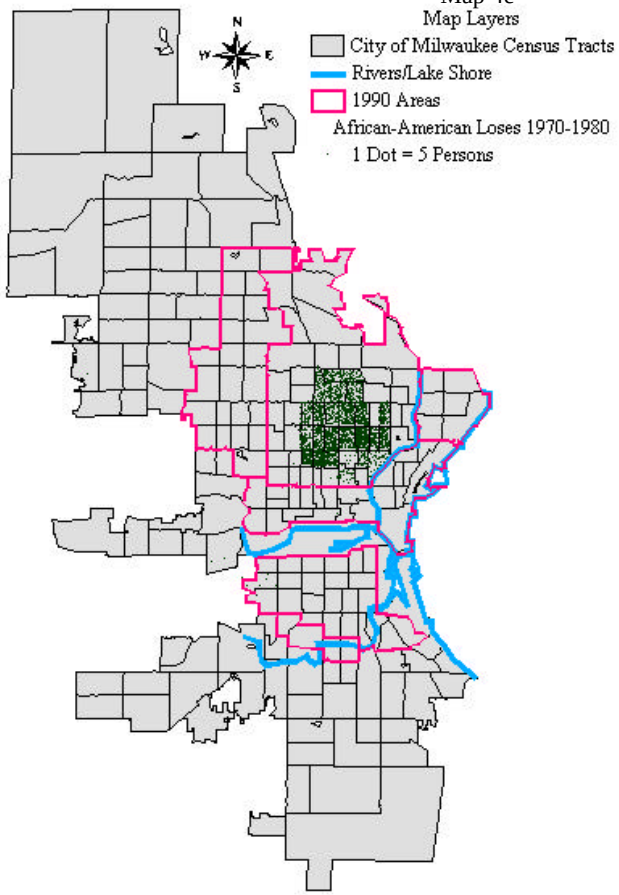


Map 4d

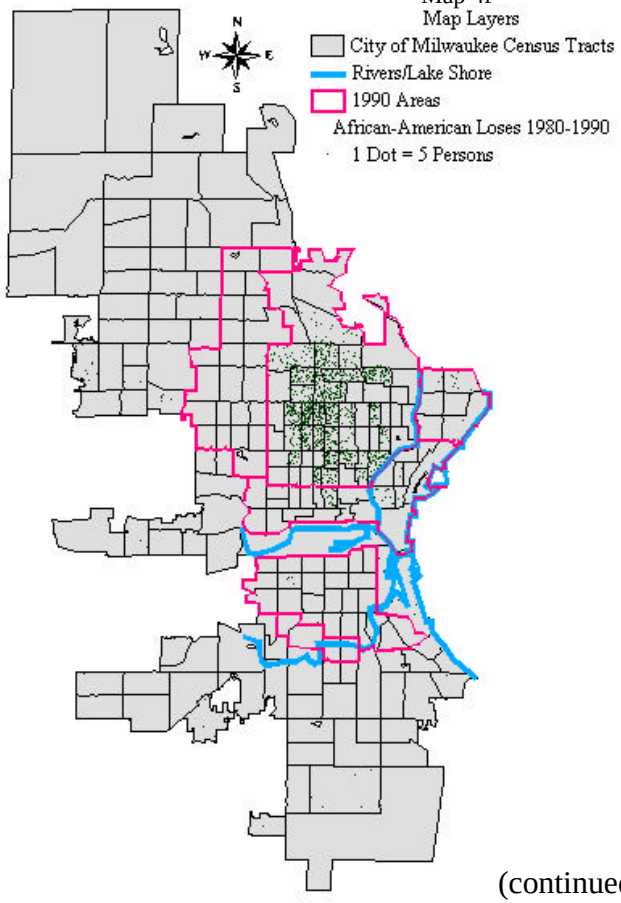


Spatial Distribution of African-American Losses and Gains, 1970-1980, 1980-1990

Map 4e



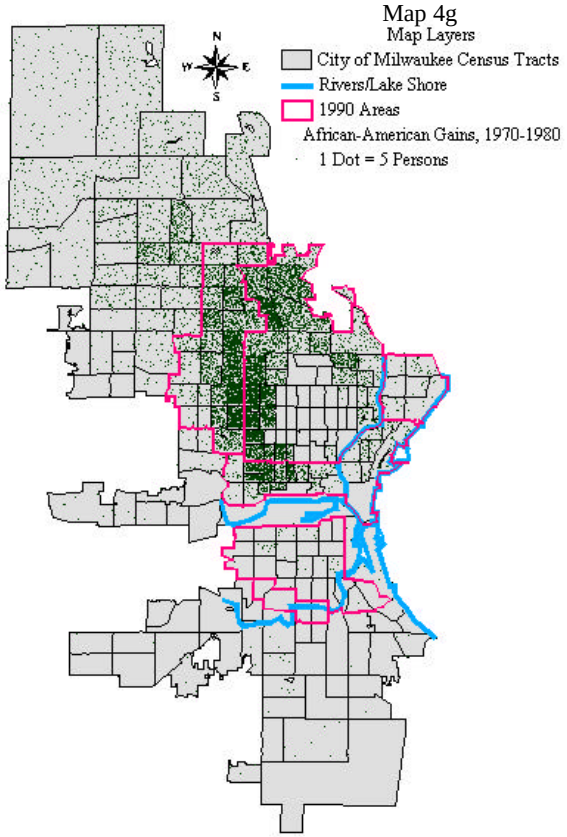
Map 4f



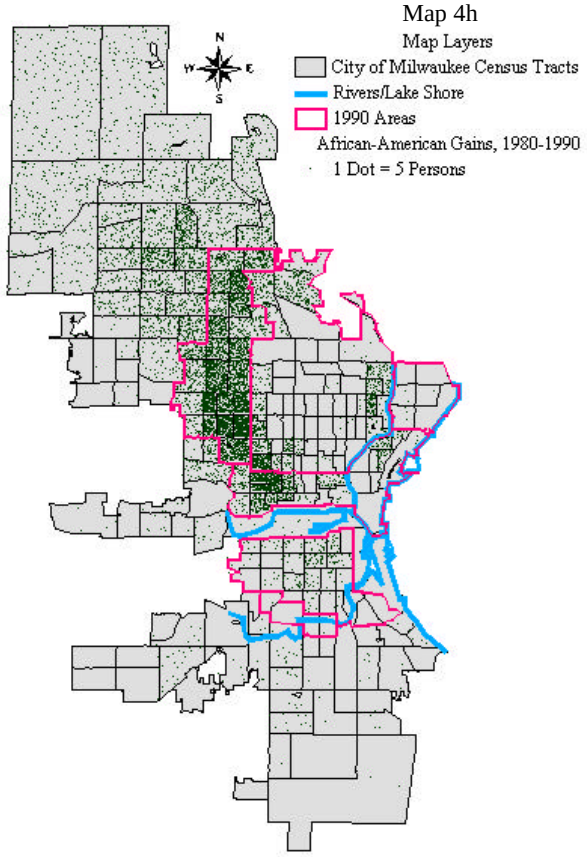
(continued)

Spatial Distribution of African-American Losses and Gains, 1970-1980, 1980-1990 (continued)

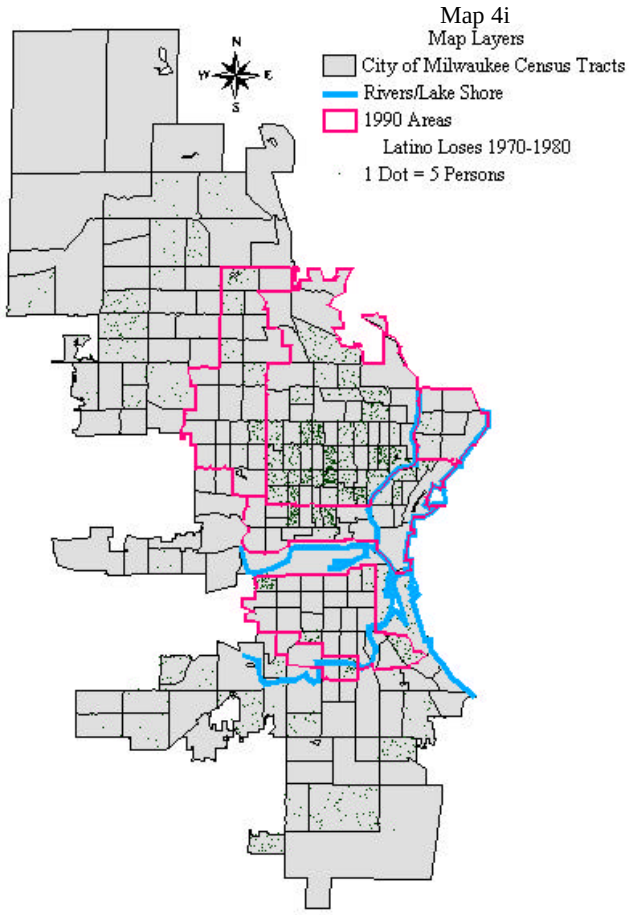
Map 4g

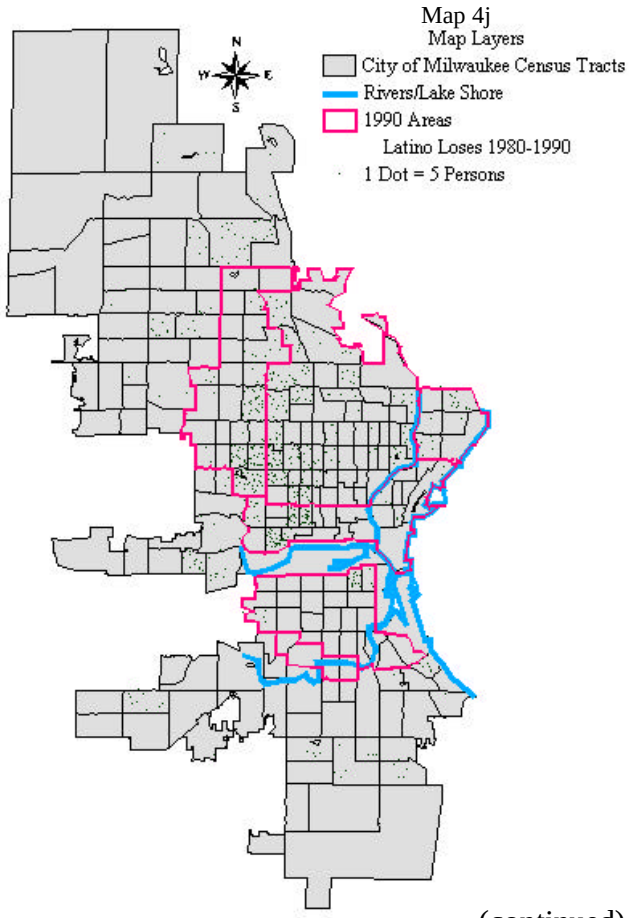


Map 4h



Spatial Distribution of Latino Losses and Gains, 1970-1980, 1980-1990

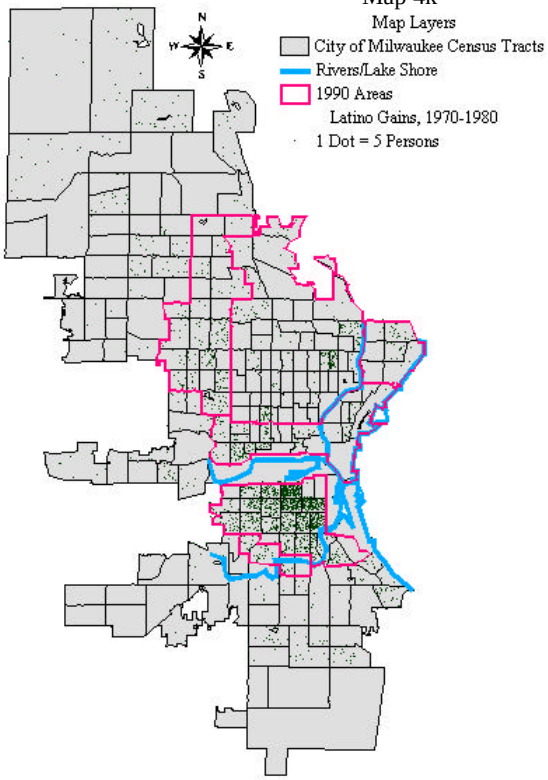




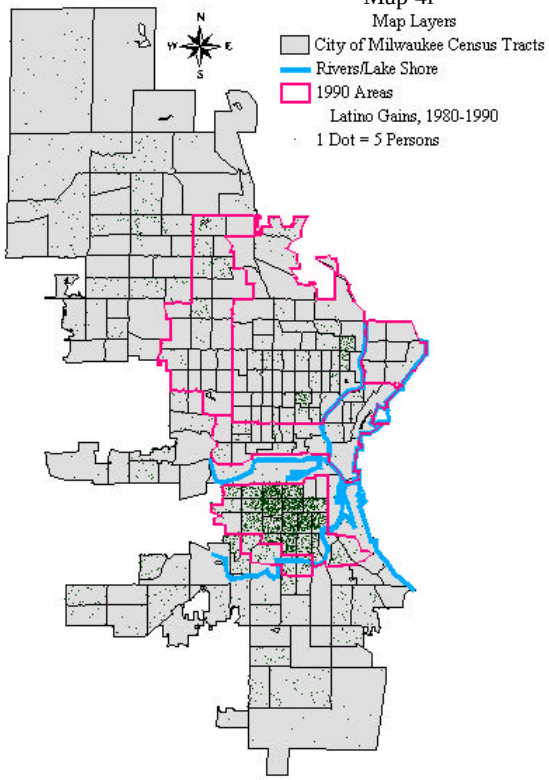
(continued)

Spatial Distribution of Latino Losses and Gains, 1970-1980, 1980-1990 (continued)

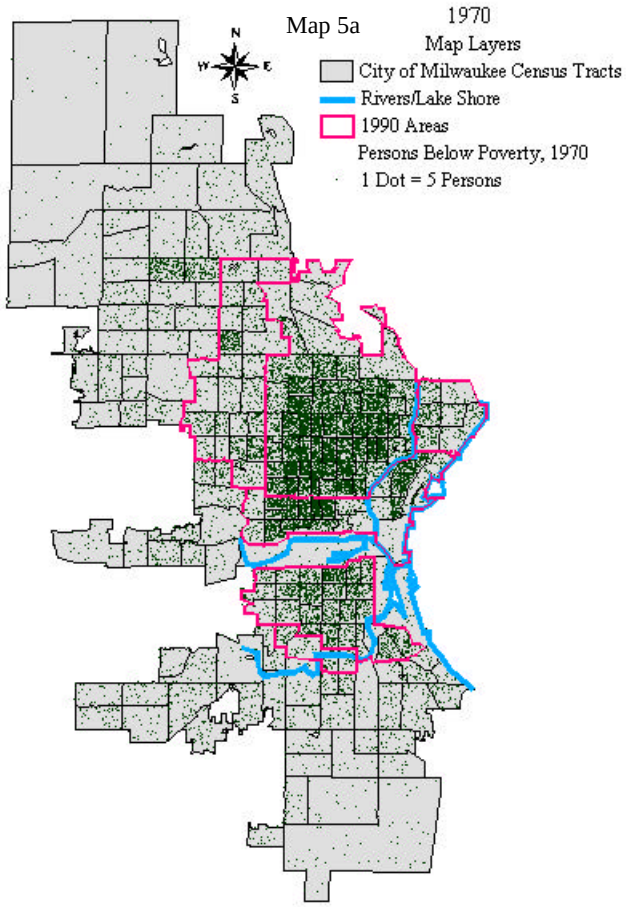
Map 4k

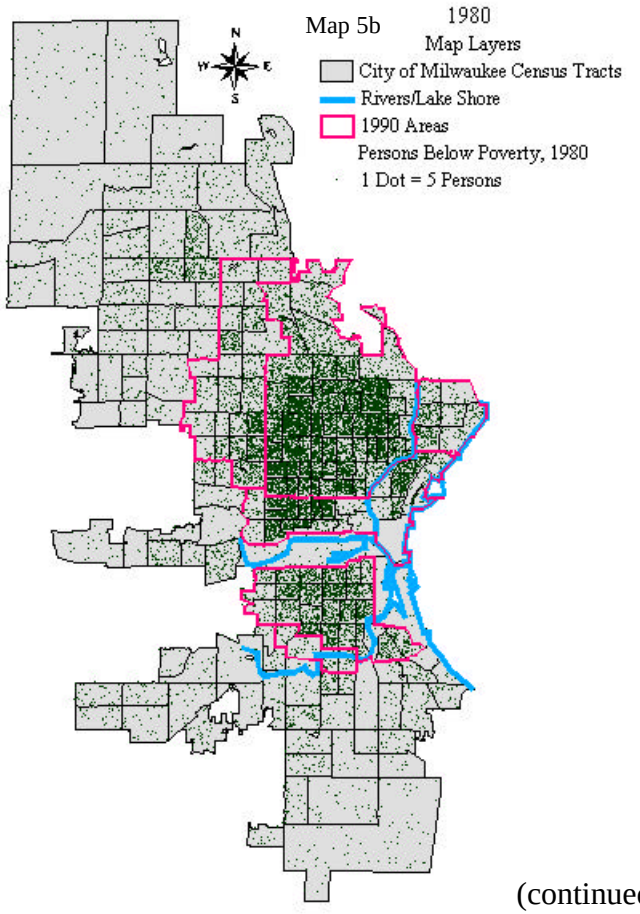


Map 4l



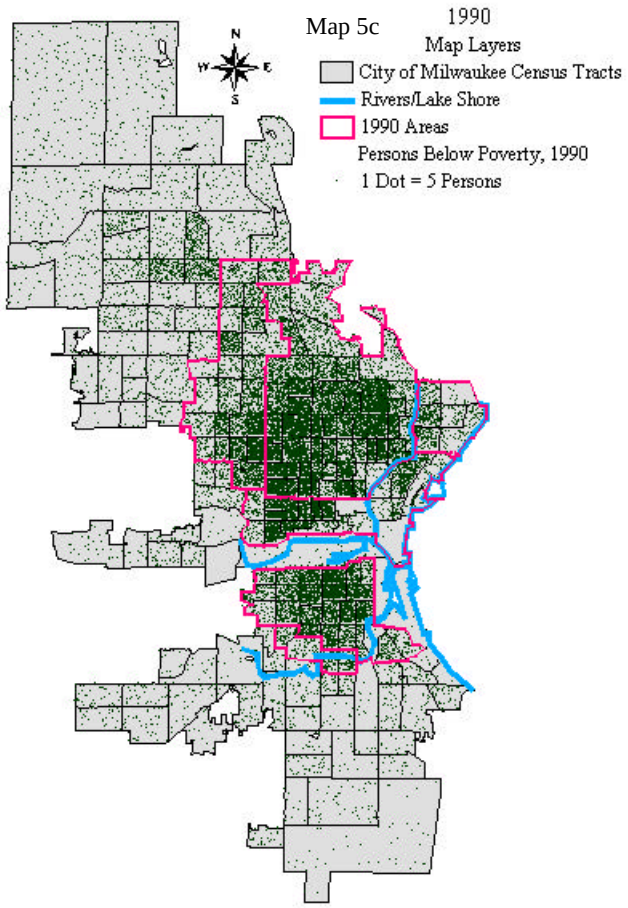
Spatial Distribution of Poverty, 1970-1990





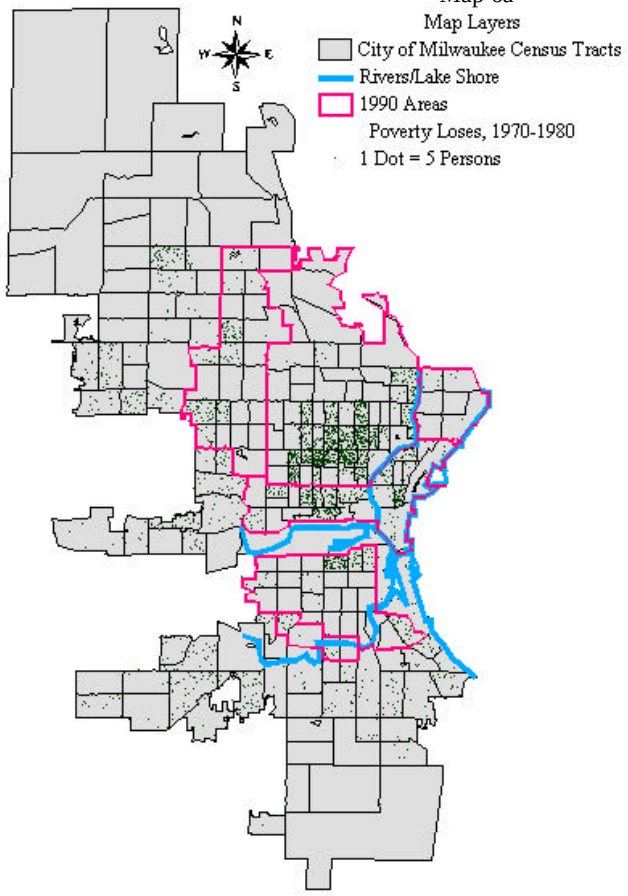
(continued)

Spatial Distribution of Poverty, 1970-1990 (continued)

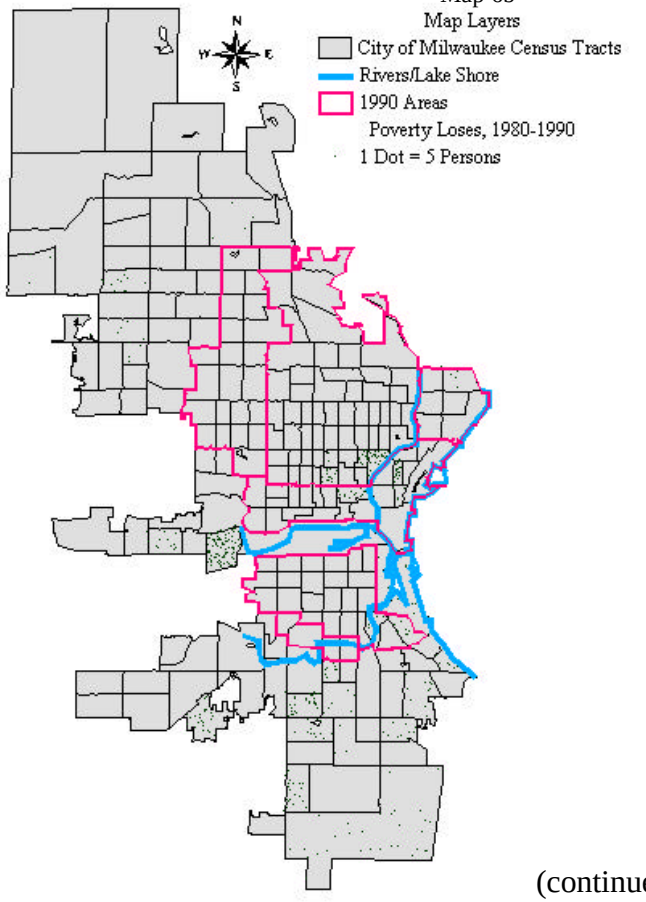


Spatial Distribution of Poverty Losses and Gains, 1970-1980, 1980-1990

Map 6a



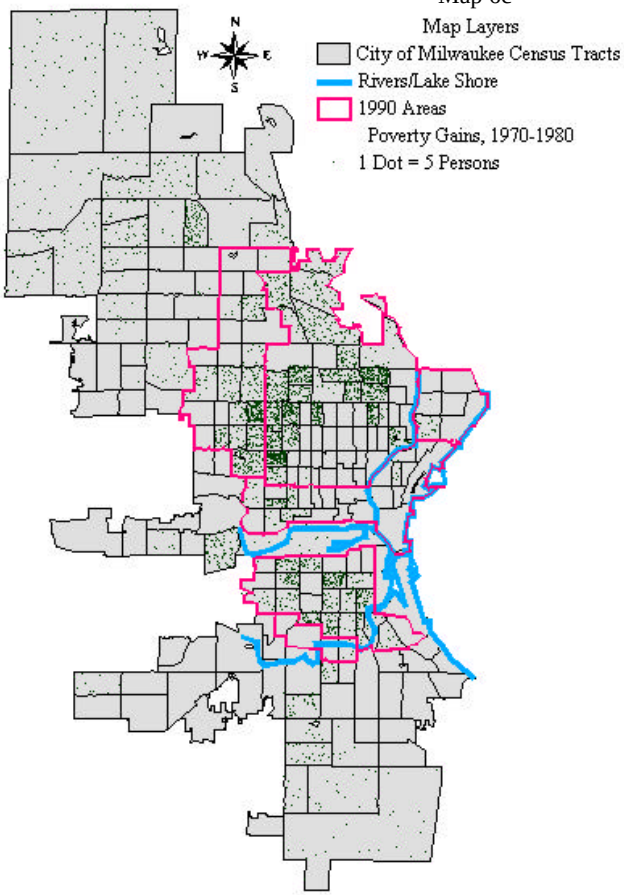
Map 6b



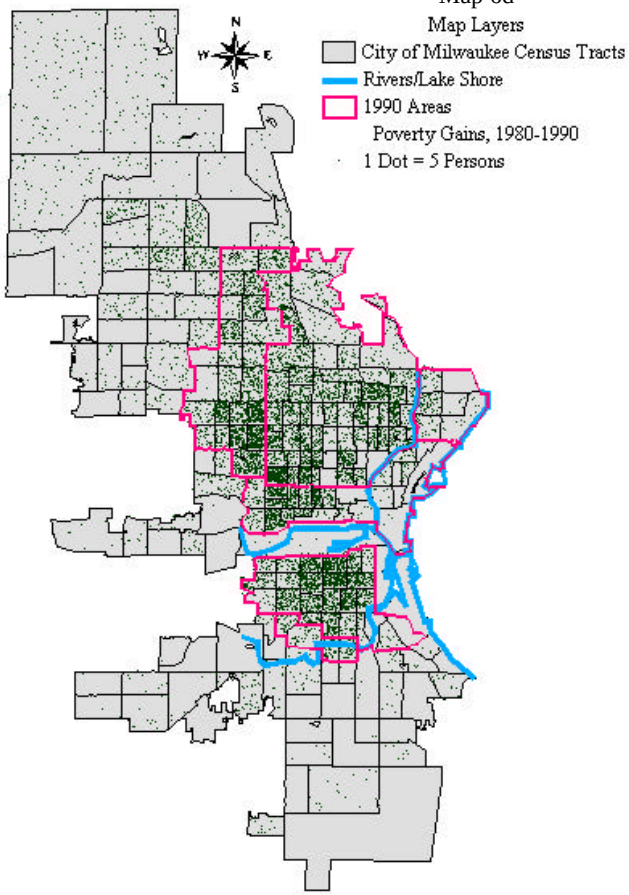
(continued)

Spatial Distribution of Poverty Losses and Gains, 1970-1980, 1980-1990 (continued)

Map 6c

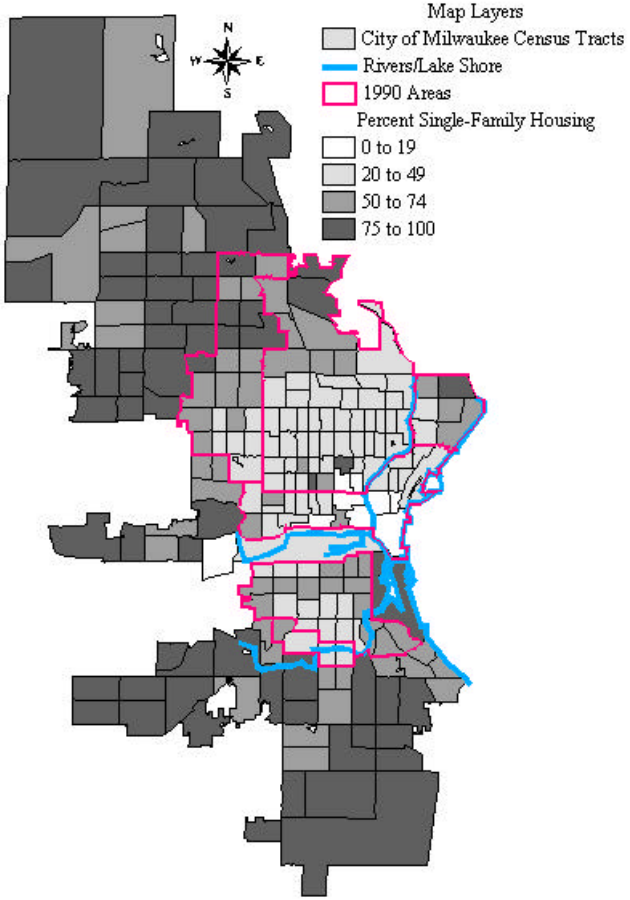


Map 6d

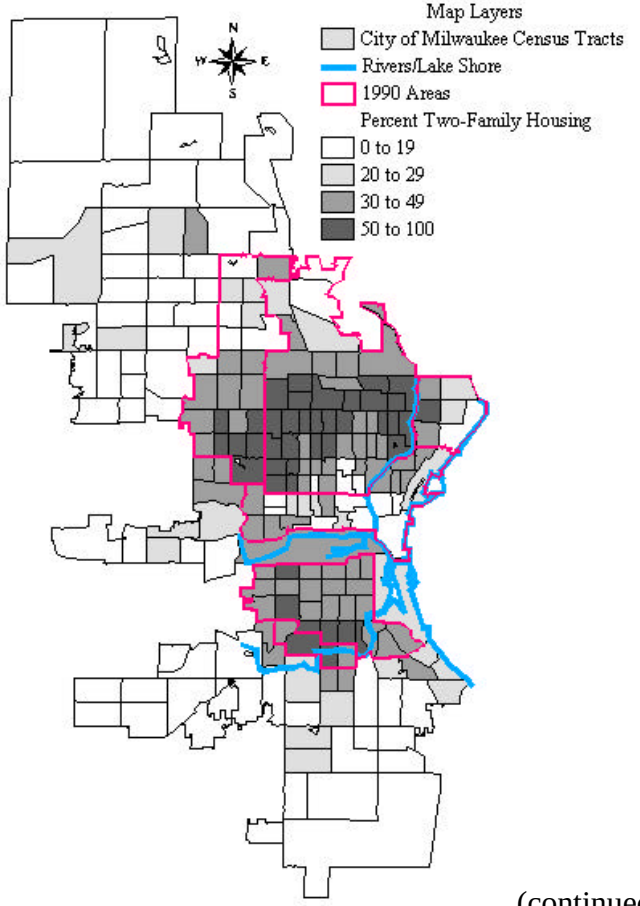


Neighborhoods' Share of Housing Types, 1990

Map 7a

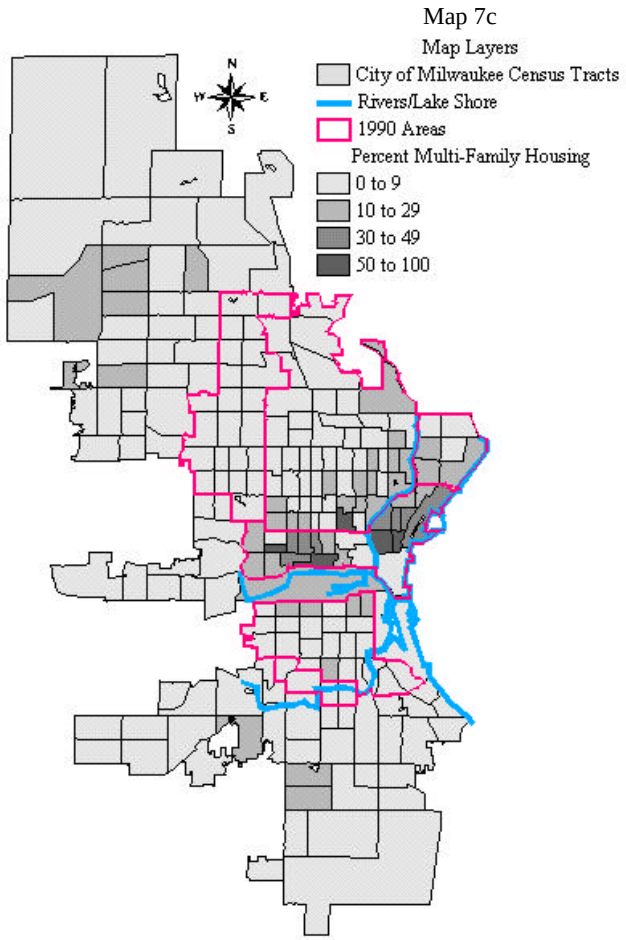


Map 7b



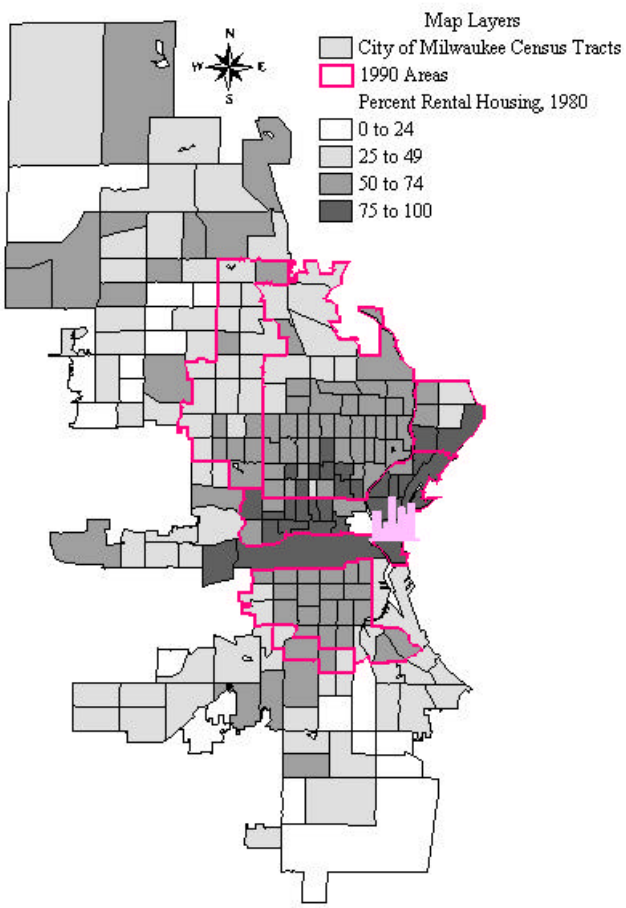
(continued)

Neighborhoods' Share of Housing Types, 1990 (continued)

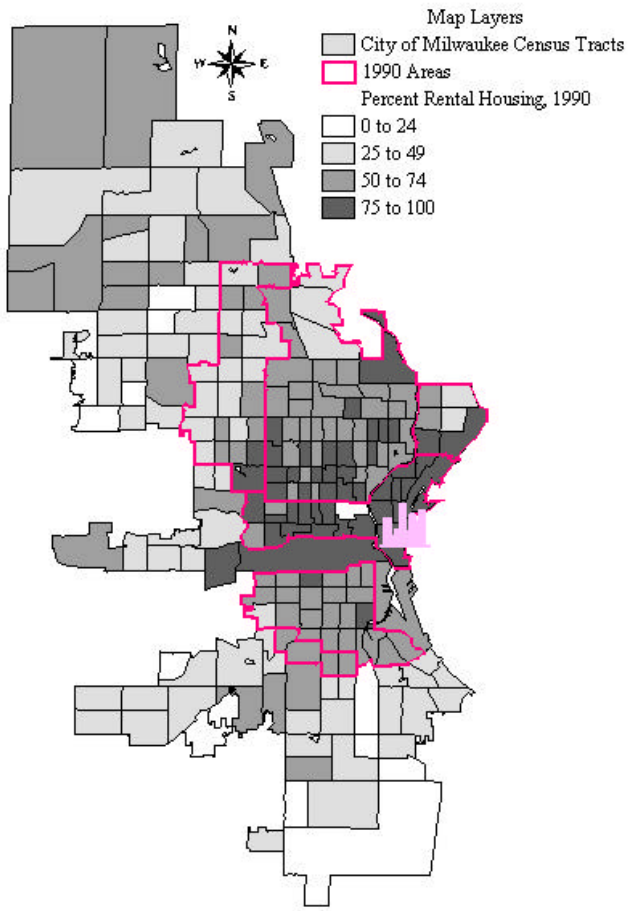


Spatial Distribution of Neighborhoods' Share of Rental Housing, 1980-1990

Map 8a

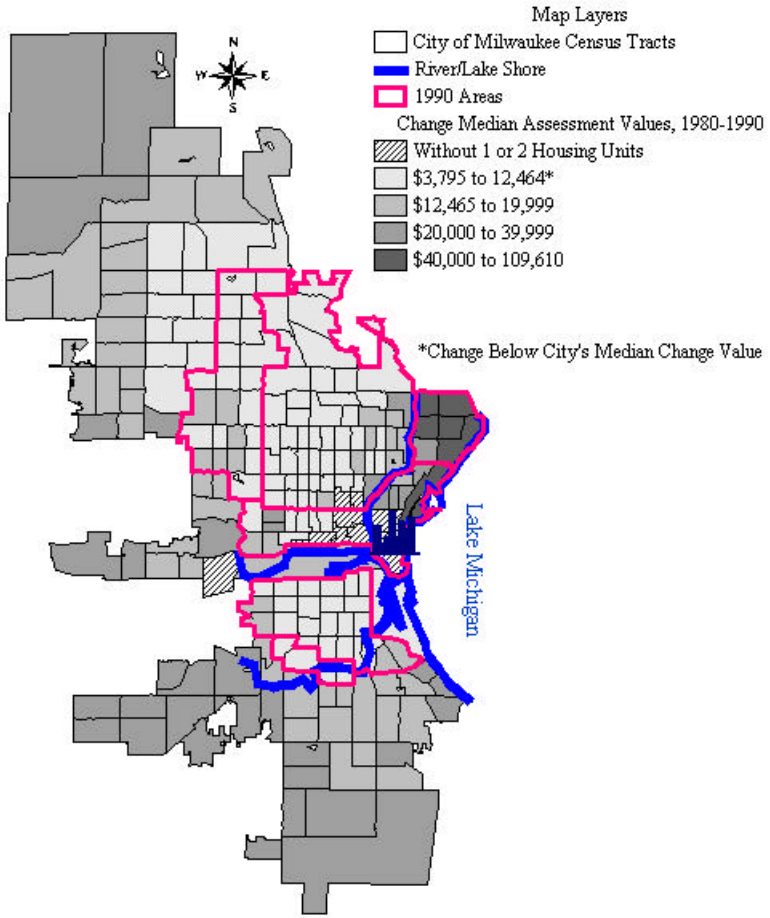


Map 8b



Spatial Distribution of Changes in Home Assessment Values, 1980-1990

Map 9



APPENDIX F: TABLES: CHAPTER V

Table 1a. Correlation Matrix for Variables in the Economic Transformation Model

		PDPOV89	PUNEMP8	PDUNEM89	PMANUF8	PDMANU89	PBLUEC8	PDBLUE89	PSERV8	PDSERV89
PDPOV89	Pearson	1.000	0.172	0.550	0.313	-0.161	0.378	-0.128	0.013	0.013
	Sig.(2-tailed)		0.011	0.000	0.000	0.018	0.000	0.060	0.852	0.855
	N	218	218	217	218	217	218	217	218	217
PUNEMP8	Pearson	0.172	1.000	0.096	0.045	-0.174	0.211	-0.175	0.493	-0.322
	Sig.(2-tailed)	0.011		0.159	0.511	0.010	0.002	0.010	0.000	0.000
	N	218	218	217	218	217	218	217	218	217
PDUNEM89	Pearson	0.550	0.096	1.000	0.164	-0.086	0.212	-0.082	0.180	-0.041
	Sig.(2-tailed)	0.000	0.159		0.015	0.209	0.002	0.232	0.008	0.549
	N	217	217	217	217	217	217	217	217	217
PMANUF8	Pearson	0.313	0.045	0.164	1.000	-0.639	0.888	-0.484	-0.394	-0.032
	Sig.(2-tailed)	0.000	0.511	0.015		0.000	0.000	0.000	0.000	0.644
	N	218	218	217	218	217	218	217	218	217
PDMANU89	Pearson	-0.161	-0.174	-0.086	-0.639	1.000	-0.528	0.632	0.242	-0.127
	Sig.(2-tailed)	0.018	0.010	0.209	0.000		0.000	0.000	0.000	0.061
	N	217	217	217	217	217	217	217	217	217
PBLUEC8	Pearson	0.378	0.211	0.212	0.888	-0.528	1.000	-0.598	-0.280	-0.126
	Sig.(2-tailed)	0.000	0.002	0.002	0.000	0.000		0.000	0.000	0.064
	N	218	218	217	218	217	218	217	218	217
PDBLUE89	Pearson	-0.128	-0.175	-0.082	-0.484	0.632	-0.598	1.000	0.144	-0.090
	Sig.(2-tailed)	0.060	0.010	0.232	0.000	0.000	0.000		0.034	0.188
	N	217	217	217	217	217	217	217	217	217
PSERV8	Pearson	0.013	0.493	0.180	-0.394	0.242	-0.280	0.144	1.000	-0.589
	Sig.(2-tailed)	0.852	0.000	0.008	0.000	0.000	0.000	0.034		0.000
	N	218	218	217	218	217	218	217	218	217
PDSERV89	Pearson	0.013	-0.322	-0.041	-0.032	-0.127	-0.126	-0.090	-0.589	1.000
	Sig.(2-tailed)	0.855	0.000	0.549	0.644	0.061	0.064	0.188	0.000	
	N	217	217	217	217	217	217	217	217	217

Table 1b. Results of Multiple Regression of Economic Transformation Variables

Variables	B	Std. Error	Beta	t	Sig.
(Constant)	-8.42280	4.58061		-1.83880	0.06737
PMANUF8	-0.07419	0.17890	-0.06482	-0.41471	0.67878
PDMANU89	-0.02480	0.14687	-0.01539	-0.16886	0.86607
PSERV8	0.05565	0.07863	0.06885	0.70779	0.47987
PDSERV89	0.12007	0.05539	0.16959	2.16765	0.03132
PUNEMP8	0.11568	0.10167	0.08363	1.13781	0.25651
PDUNEM89	0.68107	0.08723	0.46270	7.80762	0.00000
PBLUEC8	0.46239	0.16160	0.46184	2.86134	0.00465
PDBLUE89	0.34085	0.16009	0.18420	2.12907	0.03442

Dependent Variable: PDPOV89

R^2= .405 F= 17.68

Table 2a. Correlation Matrix for Variables in the Racial Segregation Model

		PDPOV89	PMIN8	PDMIN89	PLATINO8	PDLATI89	PAA8	PDAA89	SEGREG8	HSEGREG8	PPOV8
PDPOV89	Pearson	1.000	0.430	0.342	0.272	0.041	0.353	0.309	0.327	0.308	0.226
	Sig. (2-tailed)		0.000	0.000	0.000	0.550	0.000	0.000	0.000	0.000	0.001
	N	218	218	218	218	218	217	217	218	218	218
PMIN8	Pearson	0.430	1.000	-0.126	0.112	-0.167	0.963	-0.038	0.930	0.877	0.778
	Sig. (2-tailed)	0.000		0.064	0.099	0.013	0.000	0.577	0.000	0.000	0.000
	N	218	218	218	218	218	217	217	218	218	218
PDMIN89	Pearson	0.342	-0.126	1.000	0.098	0.079	-0.150	0.918	-0.223	-0.352	-0.138
	Sig. (2-tailed)	0.000	0.064		0.151	0.247	0.027	0.000	0.001	0.000	0.041
	N	218	218	218	218	218	217	217	218	218	218
PLATINO8	Pearson	0.272	0.112	0.098	1.000	0.273	-0.159	-0.017	0.122	-0.123	0.152
	Sig. (2-tailed)	0.000	0.099	0.151		0.000	0.019	0.801	0.071	0.069	0.025
	N	218	218	218	218	218	217	217	218	218	218
PDLATI89	Pearson	0.041	-0.167	0.079	0.273	1.000	-0.235	-0.316	-0.188	-0.122	-0.026
	Sig. (2-tailed)	0.550	0.013	0.247	0.000		0.000	0.000	0.005	0.073	0.702
	N	218	218	218	218	218	217	217	218	218	218
PAA8	Pearson	0.353	0.963	-0.150	-0.159	-0.235	1.000	-0.034	0.890	0.904	0.737
	Sig. (2-tailed)	0.000	0.000	0.027	0.019	0.000		0.622	0.000	0.000	0.000
	N	217	217	217	217	217	217	217	217	217	217
PDAA89	Pearson	0.309	-0.038	0.918	-0.017	-0.316	-0.034	1.000	-0.124	-0.270	-0.104
	Sig. (2-tailed)	0.000	0.577	0.000	0.801	0.000	0.622		0.068	0.000	0.126
	N	217	217	217	217	217	217	217	217	217	217
SEGREG8	Pearson	0.327	0.930	-0.223	0.122	-0.188	0.890	-0.124	1.000	0.809	0.670
	Sig. (2-tailed)	0.000	0.000	0.001	0.071	0.005	0.000	0.068		0.000	0.000
	N	218	218	218	218	218	217	217	218	218	218
HSEGREG8	Pearson	0.308	0.877	-0.352	-0.123	-0.122	0.904	-0.270	0.809	1.000	0.665
	Sig. (2-tailed)	0.000	0.000	0.000	0.069	0.073	0.000	0.000	0.000		0.000
	N	218	218	218	218	218	217	217	218	218	218
PPOV8	Pearson	0.226	0.778	-0.138	0.152	-0.026	0.737	-0.104	0.670	0.665	1.000
	Sig. (2-tailed)	0.001	0.000	0.041	0.025	0.702	0.000	0.126	0.000	0.000	
	N	218	218	218	218	218	217	217	218	218	218

Table 2b. Results of Multiple Regression of Racial Segregation Variables

Variables	B	Std. Error	Beta	t	Sig.
(Constant)	1.33043	1.11794		1.19008	0.23534
SEGREG8	4.30480	2.52569	0.17007	1.70441	0.08976
HSEGREG8	11.66512	2.96898	0.40983	3.92900	0.00012
PDMIN89	0.49980	0.05899	0.51141	8.47288	0.00000
PPOV8	-0.07152	0.06265	-0.08998	-1.14157	0.25491

Dependent Variable: PDPOV89

R^2= .336 F= 26.98

Table 3a. Correlation Matrix for Variables in the Demographic Composition Model

		PDPOV89	PAGE01	PD01489	PAGE6508	PD6589	PFEMH8	PDFEMH89
PDPOV89	Pearson	1.000	0.528	0.487	-0.289	-0.285	0.439	0.319
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
	N	218	218	218	218	218	213	213
PAGE0148	Pearson	0.528	1.000	-0.081	-0.674	0.126	0.591	-0.018
	Sig. (2-tailed)	0.000		0.234	0.000	0.063	0.000	0.789
	N	218	218	218	218	218	213	213
PD01489	Pearson	0.487	-0.081	1.000	0.163	-0.480	0.041	0.372
	Sig. (2-tailed)	0.000	0.234		0.016	0.000	0.555	0.000
	N	218	218	218	218	218	213	213
PAGE6508	Pearson	-0.289	-0.674	0.163	1.000	-0.238	-0.421	0.021
	Sig. (2-tailed)	0.000	0.000	0.016		0.000	0.000	0.758
	N	218	218	218	218	218	213	213
PD6589	Pearson Corre	-0.285	0.126	-0.480	-0.238	1.000	-0.181	-0.300
	Pearson	0.000	0.063	0.000	0.000		0.008	0.000
	N	218	218	218	218	218	213	213
PFEMH8	Pearson	0.439	0.591	0.041	-0.421	-0.181	1.000	-0.324
	Sig. (2-tailed)	0.000	0.000	0.555	0.000	0.008		0.000
	N	213	213	213	213	213	213	213
PDFEMH89	Pearson	0.319	-0.018	0.372	0.021	-0.300	-0.324	1.000
	Sig. (2-tailed)	0.000	0.789	0.000	0.758	0.000	0.000	
	N	213	213	213	213	213	213	213

Table 3b. Results of Multiple Regression of Demographic Composition Varia

Variables	B	Std. Error	Beta	t	Sig.
(Constant)	-11.71201	2.68356		-4.36435	0.00002
PAGE0148	0.51535	0.08014	0.44235	6.43026	0.00000
PD01489	0.96643	0.12395	0.40294	7.79662	0.00000
PAGE6508	0.07992	0.10542	0.04615	0.75814	0.44923
PD6589	-0.02655	0.13261	-0.01137	-0.20018	0.84154
PFEMH8	0.14249	0.03711	0.26252	3.84023	0.00016
PDFEMH89	0.23923	0.05252	0.25808	4.55516	0.00001

Dependent Variable: PDPOV89

R^2= .617 F= 55.35

Table 4a. Correlation Matrix for Variables in the Invasion-Succession/Life Cycle Model

		PDPOV89	DISTANCE	SECTOR	PH0039	PH2FLY9	PDRENT89	HVALUE89	PMIN8	POPCH89	PMOVERS9
PDPOV89	Pearson	1.000	-0.188	-0.212	0.362	0.467	0.216	-0.370	0.430	0.203	0.230
	Sig. (2-tailed)		0.005	0.002	0.000	0.000	0.001	0.000	0.000	0.003	0.001
	N	218	218	218	211	213	217	208	218	218	217
DISTANCE	Pearson	-0.188	1.000	-0.298	-0.812	-0.555	-0.191	0.055	-0.342	-0.034	-0.491
	Sig. (2-tailed)	0.005		0.000	0.000	0.000	0.005	0.433	0.000	0.619	0.000
	N	218	218	218	211	213	217	208	218	218	217
SECTOR	Pearson	-0.212	-0.298	1.000	0.253	-0.025	-0.124	0.542	-0.236	-0.001	0.216
	Sig. (2-tailed)	0.002	0.000		0.000	0.720	0.068	0.000	0.000	0.991	0.001
	N	218	218	218	211	213	217	208	218	218	217
PH0039	Pearson	0.362	-0.812	0.253	1.000	0.814	0.332	-0.099	0.410	0.139	0.538
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.157	0.000	0.044	0.000
	N	211	211	211	211	211	211	208	211	211	211
PH2FLY9	Pearson	0.467	-0.555	-0.025	0.814	1.000	0.405	-0.296	0.480	0.133	0.385
	Sig. (2-tailed)	0.000	0.000	0.720	0.000		0.000	0.000	0.000	0.052	0.000
	N	213	213	213	211	213	213	208	213	213	213
PDRENT89	Pearson	0.216	-0.191	-0.124	0.332	0.405	1.000	-0.380	0.240	0.172	0.236
	Sig. (2-tailed)	0.001	0.005	0.068	0.000	0.000		0.000	0.000	0.011	0.000
	N	217	217	217	211	213	217	208	217	217	217
HVALUE89	Pearson	-0.370	0.055	0.542	-0.099	-0.296	-0.380	1.000	-0.363	-0.010	-0.036
	Sig. (2-tailed)	0.000	0.433	0.000	0.157	0.000	0.000		0.000	0.881	0.606
	N	208	208	208	208	208	208	208	208	208	208
PMIN8	Pearson	0.430	-0.342	-0.236	0.410	0.480	0.240	-0.363	1.000	-0.095	0.281
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.161	0.000
	N	218	218	218	211	213	217	208	218	218	217
POPCH89	Pearson	0.203	-0.034	-0.001	0.139	0.133	0.172	-0.010	-0.095	1.000	0.274
	Sig. (2-tailed)	0.003	0.619	0.991	0.044	0.052	0.011	0.881	0.161		0.000
	N	218	218	218	211	213	217	208	218	218	217
PMOVERS9	Pearson	0.230	-0.491	0.216	0.538	0.385	0.236	-0.036	0.281	0.274	1.000
	Sig. (2-tailed)	0.001	0.000	0.001	0.000	0.000	0.000	0.606	0.000	0.000	
	N	217	217	217	211	213	217	208	217	217	217

Table 4b. Results of Multiple Regression of Invasion-Succession/Life Cycle Variables

	B	Std. Error	Beta	t	Sig.
(Constant)	-4.32909	4.18337		-1.03483	0.30201
DISTANCE	1.11102	0.55115	0.21305	2.01582	0.04517
SECTOR	-2.00011	2.87857	-0.05417	-0.69483	0.48798
PH0039	0.07175	0.04405	0.26082	1.62889	0.10493
PH2FLY9	0.12226	0.07312	0.19428	1.67219	0.09607
PDRENT89	-0.11622	0.08430	-0.09159	-1.37859	0.16958
HVALUE89	-0.00018	0.00006	-0.21210	-2.78061	0.00595
PMIN8	0.07791	0.02296	0.24370	3.39315	0.00083
POPCH89	0.00621	0.00218	0.17683	2.85447	0.00477
PMOVERS9	0.02913	0.07532	0.02785	0.38676	0.69935

Dependent Variable: PDPOV89

R^2= .362 F= 12.49

Table 5a. Correlation Matrix for Variables in the Arbitrage Model

		PDPOV89	INCOME89	PDMIN89	PDRENT	ADJACENT
PDPOV89	Pearson	1.000	-0.418	0.342	0.216	-0.120
	Sig. (2-tailed)		0.000	0.000	0.001	0.078
	N	218	216	218	217	218
INCOME89	Pearson	-0.418	1.000	-0.256	-0.294	0.375
	Sig. (2-tailed)	0.000		0.000	0.000	0.000
	N	216	216	216	216	216
PDMIN89	Pearson	0.342	-0.256	1.000	0.249	-0.063
	Sig. (2-tailed)	0.000	0.000		0.000	0.356
	N	218	216	218	217	218
PDRENT89	Pearson	0.216	-0.294	0.249	1.000	-0.140
	Sig. (2-tailed)	0.001	0.000	0.000		0.039
	N	217	216	217	217	217
ADJACENT	Pearson	-0.120	0.375	-0.063	-0.140	1.000
	Sig. (2-tailed)	0.078	0.000	0.356	0.039	
	N	218	216	218	217	218

Table 5b. Results of Multiple Regression of Arbitrage Variables

Variables	B	Std. Error	Beta	t	Sig.
(Constant)	9.39514	1.36336		6.89118	0.00000
INCOME89	-0.00041	0.00008	-0.35376	-5.15947	0.00000
PDMIN89	0.23376	0.06192	0.23919	3.77519	0.00021
PDRENT89	0.07299	0.08129	0.05753	0.89793	0.37025
ADJACENT	1.03194	1.86548	0.03591	0.55317	0.58073

Dependent Variable: PDPOV89

R^2= .238 F= 16.47

APPENDIX G: MODELS AND VARIABLES

Models and Variables

Dependent Variable: Neighborhood change as measured by changes in the neighborhood's share of poverty between 1980 and 1990

- **PDPOV89 Percentage difference 1980-1990/persons below poverty**

Current Ecological Models

Model 1: Economic Transformation

- Labor force in the manufacturing sector (economic sector)
  - PMANUF8 Percentage 1980
  - PDMANU89 Percentage difference 1980-1990
- Labor force in the service sector (economic sector)
  - PSERV8 Percentage 1980
  - PDSERV89 Percentage difference 1980-1990
- Unemployment
  - PUNEMP8 Percentage 1980
  - PDUNEM89 Percentage difference 1980-1990
- Blue collar workers (occupations)
  - PBLUEC8 Percentage 1980
  - PDBLUE89 Percentage difference 1980-1990

Model 2: Racial Segregation

- Minority population
  - PMIN8 Percentage 1980
  - PDMIN89 Percentage difference 1980-1990
- Latino Population
  - PLAT8 Percentage 1980
  - PDLAT89 Percentage difference 1980-1990
- African-American Population
  - PAA8 Percentage 1980
  - PDAA89 Percentage difference 1980-1990
- Neighborhood segregation (Ghetto/Barrio and Core Ghetto/Barrio)
  - SEGREG8 Dummy variable 50>% minority 1980 = 1
  - HSEGREG8 Dummy variable 75>% minority 1980 = 1
- Neighborhood poverty
  - PPOV8 Percentage 1980

Model 3: Demographic Composition

- Population 0-14 years of age
  - PAGE0148 Percentage 1980
  - PD01489 Percentage difference 1980-1990
- Population 65 or more years of age
  - PAGE658 Percentage 1980
  - PD6589 Percentage difference 1980-1990
- Female-headed families
  - PFEMH8 Percentage 1980
  - PDFEMH89 Percentage difference 1980-1990

Classic Ecological Models

Model 4: Life Cycle/Invasion Succession

- Location and Place
  - DISTANCE straight-line distance from the CBD to the center of the tract
  - SECTOR Dummy variable with tracts roughly located between the lake and the Milwaukee and Kinnickinnic Rivers = 1
- Housing
  - PH0039 Percentage housing built before 1940
  - PH2FLY9 Percentage two family housing 1990
  - PDRENT89 Percentage difference in rental housing 1980-1990
  - HVALUE89 Change in median home assessment values 1980-1990
- Race, population, and mobility
  - PMIN8 Percentage minority 1980
  - POPCH89 Population change 1980-1990
  - PMOVERS9 Percentage head of households who move into housing unit between 1989 and march of 1990

Model 5: Arbitrage Model

- INCOME89 Change in tract's average family income 1980-1990
- PDMIN89 Percentage difference minorities 1980-1990
- PDRENT89 Percentage difference in tracts' rental housing units 1980-1990
- ADJACENT Dummy variable with predominantly white tracts adjacent to tracts with more than 10 percent minority population = 1.