

Metropolitan Growth Patterns' Impact on Intra-Regional Spatial Differentiation and
Inner-Ring Suburban Decline: Insights for Smart Growth

A Dissertation
Presented to
The Academic Faculty

by

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In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in the
College of Architecture

Georgia Institute of Technology

April 2005

Metropolitan Growth Patterns' Impact on Intra-Regional Spatial Differentiation and
Inner-Ring Suburban Decline: Insights for Smart Growth

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ACKNOWLEDGEMENT

During my academic years in the City and Regional Planning Program at the Georgia Institute of Technology, I have been interested in alternative growth policies that address negative consequences of uncontrolled urban sprawl in the metropolitan areas. The purposes of such policies are to reinforce existing communities, to reduce socioeconomic disparity, and to preserve natural environments. I have gained valuable information and support from not only intensive coursework, special advisement by faculty members, and diverse research experiences in the City and Regional Planning Program but also unflagging support and concern from my family and friends. Upon completion of this work, I am pleased to be able to thank them for all of their support throughout this process.

First of all, I would like to thank Dr. Steve French, my advisor, the director of the Center for GIS, and the chair of my dissertation committee, for his continuous financial support and advice during my graduate studies. Through his efforts, I became a capable, independent urban scholar. He also provided me with a variety of research opportunities. I am especially thankful to Dr. Nancey Green Leigh, my co-advisor. She always encouraged me and provided invaluable insights into my dissertation research. I also would like to thank my three committee members: Dr. Cheryl Contant, Dr. Randall Guensler, and Dr. Greg Lewis. As the director of the City and Regional Planning Program, Dr. Contant provided me with great opportunities for teaching and research. I wish to thank Dr. Guensler, a professor in the Civil Engineering at Georgia Tech, for offering me an opportunity to teach in transportation planning. This experience opened up a new horizon of integrated land use and transportation research. Finally, I'd like to thank Dr. Lewis, a professor and director of public administration and urban studies at Georgia State University. Information I learned in his advanced method classes served as the backbone to my research.

I wish to thank all the faculty members in the city and regional planning program—Drs. Bill Drummond, Michael Dobbins, Michael Elliott, Larry Frank, Tom Galloway, Larry Keating, Catherine Ross, David Sawicki, and Anne Steinman—for providing high-quality education and thoughtful concern for my well-being during my graduate studies. I also wish to thank the administrative staff—Jeanne Greenway, Norma Denuex, Dot Matthews, and Mercedes Saghini. They were always so kind and helpful to me in all administrative matters.

I'd like to thank my current and former colleagues in the Ph.D. program—Sarah Coffin, Jay Forrest, Kathryn Frank, Dwayne Guthrie, Elizabeth Keysar, Rich Killingsworth, Jaecheol Kim, Dee Merriam, Mitch Moody, Ai Ning, Lynn Patterson, Brian Stone, Muthu Subrahmanyam, Eric Sundquist, Caitlin Waddick, and Ray White—for their helpful comments and sincere concern for my research and academic life. I also want to thank the entire staff of the Center for Geographic Information Systems—Danielle Ayan, Paul Beaty, Tony Giarrusso, Janet Peterson, Bobby Pohan, Siva Ramachandramurthy, and James Tsai—where I have been working since 1999. I wish to thank Jane Chisholm for her helpful class regarding academic writing. She also reviewed my dissertation and gave valuable comments. Finally, I'd like to thank all current and previous friends and colleagues at Georgia Tech.

I am especially thankful to my former mentors and advisors for my planning background—Drs. Jeong Hee Moon, Hong-Koo Yuh, Joo-Hyung Lee, Jung Hyun Rho, Hong Bae Kim, Kyushik Oh, and Mack Joong Choi—in the Department of Urban Planning at Hanyang University in Seoul, Korea. Finally, I would like to thank my family for their endless love and encouragement. I am especially thankful to Eunha, my wife, for her sincere love, thoughtful support, faithful prayers, and continuous devotion. I give special thanks to my two sons, Ju-An and Seoung-An. They always make me laugh and give me joy and happiness. I also wish to thank my parents for their immeasurable love and support and my sisters and brothers for their encouragement.

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SUMMARY

Since the early twentieth century, most metropolitan regions in the country have experienced dramatic increases in suburbanization, which has transformed the metropolitan area into diverse subareas. Due to intra-regional spatial differentiation, the traditional dichotomous metropolitan structure of the central city and the suburbs is not well-suited for intra-regional analyses and policy implications. Thus, this dissertation introduces an alternative approach that presents a multi-ring metropolitan structure in which the metropolitan area is differentiated by the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs. Using longitudinal census data from 1970 to 2000, this research focuses on the impact of metropolitan growth patterns and policies on intra-regional spatial differentiation and the decline of inner-ring suburbs in the four metropolitan areas of Atlanta, Cleveland, Philadelphia, and Portland.

The findings of this research confirmed that intra-regional spatial differentiation increased over time. In addition, it showed that the inner-ring suburbs in the four metropolitan areas were increasingly vulnerable to socioeconomic decline regardless of their growth patterns and policies. In contrast, the downtowns and some parts of the inner city showed gradual recovery from the deterioration patterns of the last several decades. The outer-ring suburbs continued to thrive, drawing most of the new population and housing development.

This dissertation also explored the association between metropolitan growth patterns and policies and the extent of spatial differentiation and socioeconomic disparity in the subareas. Analyses found that strong decentralization trends are associated with increases in intra-regional spatial differentiation and socioeconomic disparity, while

urban containment policies are associated with their reduction. However, despite its strong urban containment policies, the Portland region exhibited a clear pattern of inner-ring suburban decline, which suggests that the inner-ring suburbs require local initiatives directed toward revitalization.

In conclusion, this research has shown that excessive development at the urban fringe is associated with the abandonment of the blighted inner city and more importantly, in the decline of the inner-ring suburbs. The inner-ring suburbs, with their existing valuable assets, should be fertile grounds for smart growth strategies. Moreover, the central city and outer-ring suburbs have a vital mission to save and invigorate the inner-ring suburbs, as they represent the primary link and conduit to all the surrounding areas of a metropolitan region. Only by recognizing the interdependence of all the areas and by applying sound, holistic policies can the decision-making entities of the government ensure the survival and future stability of the metropolitan areas.

CHAPTER 1

INTRODUCTION

1.1. Research Background

The traditional suburban developments have been challenged by negative consequences of sprawl such as excessive consumption of green space, traffic congestion, and inefficient use of existing resources. As an alternative approach, the smart growth movement emphasizes the reuse of existing resources in already urbanized areas and preserves green space at the edge of the metropolitan area. As one of smart growth strategies, the revitalization of the central cities has been well emphasized in the planning literature and planning practices. In addition to the central city, urban scholars, planners, and policy makers have only recently begun to consider the issues of the deterioration and revitalization of the inner-ring suburbs and the role they play in the evolution of metropolitan structures (Hudnut 2003; Lucy and Phillips 1995, 2000a, 2000b; Orfield 1997, 2002).

As automobile-dependent suburban developments that transformed the metropolitan region into diverse subareas and nodes accelerated and expanded, the inner-ring suburbs were left behind in a sense that they are not an official category of geographic analysis for which data is officially collected and published for the purpose of analysis. The concept of the inner-ring suburb rests on the notion of the space “in-between” the central city and outer-ring suburbs or edge cities (Leigh and Lee 2004). Just

as important, however, is that the concept carries a time dimension. In other words, the inner-ring suburbs are geographic areas that developed at a specific point along with transportation systems in time of the history of American cities.

However, trends of spatial decentralization in metropolitan areas may increase the economic vulnerability of the inner-ring suburbs. After all, they lack the centrality and the attraction of the central city, and the desirable residential areas of the outer-ring suburbs at the metropolitan fringe (Fitzgerald and Leigh 2002; Hudnut 2003; Orfield 1997). In an early example of a case study in the Minneapolis and St. Paul metropolitan region, Orfield (1997) analyzed the expansion of poverty from the central city to the suburbs. In his analysis, the concentration of poverty in the city was exacerbated by divestment and middle class flight, which ultimately spread to the adjacent inner-ring suburbs.

In addition, the recent trends of migration “back to the city” and “gentrification,” both reactions to the negative impact of extreme sprawl, are causing the displacement of traditional poverty populations and newly settled immigrant populations from the central city. According to Sohmer and Lang (2001), the downtowns of a numbers of metropolitan areas are burgeoning even while their central cities are experiencing overall population loss. The resurgence of gentrification can also be found in the case studies of eight U.S. cities by Wyly and Hammel (1999). Generally, research has suggested that gentrification may lead to increased economic need and vulnerability in the inner-ring suburbs.

The question is whether the current decline of the inner-ring suburbs should be as a serious concern as that of the central cities has been. Fishman’s (2000) survey of U.S.

metropolitan areas, which ranked the trends identified by scholars as having the most influence on the previous and future development of U.S. metropolitan areas, suggests that it should be. The top-ranking trends include (1) an increasing intra-regional disparity among declining central cities, inner-ring suburbs, and the rest of the region; (2) a continuing disparity between central cities and suburbs, increasing the need for regional coalition building; (3) a change in the household characteristics of metropolitan areas, such as aging Babyboomers and shrinking household size; and (4) the continuing problem of poverty in central cities and adjacent inner-ring suburbs.

Fishman's survey noted a consensus among urban scholars that central cities and inner-ring suburbs are vital to the strength of a metropolitan region, concluding that the strategic location of the inner-ring suburbs between the metropolitan center and urban fringe could provide a new model of development. Such a model would utilize the objectives of smart growth movement, redirecting public investment to urbanized areas, which would stem urban sprawl at the periphery of the metropolitan areas. Fitzgerald and Leigh (2002) suggested in their book, *Economic Revitalization: Cases and Strategies for City and Suburb*, that such economic development strategies, by promoting equity and sustainability, should be applied to the inner-ring suburbs.

Although a number of urban scholars have expressed considerable concern about the inner-ring suburbs, the issue of their decline associated with regional growth patterns and policies has not been explored in the planning literature. Hence, this dissertation investigates the decline of inner-ring suburbs in the context of intra-regional spatial differentiation from a case study of four metropolitan areas—i.e., Atlanta, Cleveland, Philadelphia, and Portland—all of which exhibit different growth patterns and policies. It

will analyze the impact of metropolitan growth patterns and policies on the decline of the inner-ring suburbs and intra-metropolitan socioeconomic disparity. Finally, it will discuss revitalization strategies that recognize the role of the inner-ring suburbs in metropolitan smart growth strategies and the interdependence of all the areas within the metropolitan area. It is hoped that the methodology used in this research for defining and analyzing inner-ring suburbs can serve as a basis for the development of comprehensive models aimed at understanding the nature of the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs. This dissertation seeks to contribute specifically to our understanding of the inner-ring suburbs with their corresponding growth and decline issues and more generally to our knowledge of spatial differentiation within the metropolitan region.

1.2. Research Goals and Objectives

Through a literature review and empirical case studies for four metropolitan areas (i.e., Atlanta, Cleveland, Philadelphia, and Portland), this research identified two goals and five objectives. The research goals include (1) an examination in the impact of metropolitan growth patterns and policies on the decline of inner-ring suburbs and socioeconomic disparity in the context of intra-regional spatial differentiation; and (2) an examination of need for targeting inner-ring suburban revitalization/redevelopment and its role in the metropolitan smart growth strategies.

This research also addresses five research objectives: 1) the development of methodologies that define and characterize spatial patterns of the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs; (2) an examination of spatial differentiation in terms of demographic, socioeconomic, and housing characteristics found in the inner-ring suburbs relative to the downtown, inner city, and outer-ring suburbs; (3) investigation of the general growth and decline trends in the inner-ring suburbs and identification of the associated factors of decline in the inner-ring suburbs; (4) an examination of intra- and inter-regional socioeconomic disparities and divergence; and finally (5) an exploration of the planning and policy implications stemming from the current status of inner-ring suburbs that enhance metropolitan smart growth strategies.

This dissertation contributes significantly to the body of knowledge on the inner-ring suburbs and their deterioration in the newly identified “multi-ring metropolitan structure,” recognizing intra-regional spatial differentiation over time. First of all, this research will present the literature on metropolitan formation and the smart growth

movement and critically assess how well the existing literature characterize and explain the evolution of inner-ring suburbs as well as what role the inner-ring suburbs play in metropolitan smart growth strategies.

This dissertation will then characterize previous research that specifically focus on inner-ring suburbs in terms of what they have to offer on defining such areas, describing the socioeconomic issues, and policy prescriptions for such areas, and afterwards, identifying the gaps in the literature. This research then will present a methodology for defining inner-ring suburbs and suggested policy prescriptions that will help planners and policy makers more effectively address the socioeconomic needs of the inner-ring suburbs and the broader goals of metropolitan smart growth.

1.3. Research Organization

This dissertation consists of five chapters as shown in the research organization of Figure 1.1. Chapter 1, the introduction, includes a background discussion that addresses the research needs for the inner-ring suburbs, the research goals and objectives, and expected contributions.

Chapter 2 is a comprehensive review of the literature. It focuses on five categories of planning literature: suburbanization/sprawl, back-to-the-city trend/gentrification, urban and suburban decline, intra- and inter-regional spatial differentiations, and smart growth/regionalism. The decentralization/urban sprawl literature addresses the possible impact of suburban sprawl development on urbanized areas such as the central cities and inner-ring suburbs. In addition to the decentralization trend, its counteractive movements of back-to-the-city trend will provide some insights on the revitalization in central cities. This research also includes a theoretical background of urban decline and extends its core knowledge such that it connects urban decline with suburban decline in the context of the spatial differentiation within metropolitan areas. The last part of literature review, which focuses on smart growth and new regionalism, establishes relationships between smart growth principles and the inner-ring suburbs in the context of metropolitan regional planning. In particular, the literature review on smart growth includes growth management and new urbanism. After identifying gaps in the literature, this chapter identifies the limitations of existing literature and provides important research propositions that more accurately describe the evolution of inner-ring suburbs and intra-regional spatial differentiation over time.

Chapter 3 of the research methodology begins with a description of the metropolitan areas of the case studies. This research has selected four metropolitan areas (i.e., Atlanta, Cleveland, Portland, and Philadelphia) and will compare each of them and contrast inner-ring suburbs with their downtown, inner city, and outer-ring suburbs. This chapter provides a methodology for identifying the subareas of the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs. This chapter then follows with a description of research methods and data sources, and statistical hypotheses with selected variables. This research utilized the factor analysis and the random-effect regression model as primary methods with the longitudinal census data (i.e., 1970, 1980, 1990, and 2000), which are unique and extremely useful to analyze neighborhood change over time. In addition to this data source, ArcView 3.3/ArcGIS 9.0 and STATA 8.0 were the primary methodological tools used for spatial analyses and advanced statistical analysis.

Chapter 4 includes the sections on the analysis and findings, both of which address a variety of demographic, socioeconomic, and housing characteristics as well as the trends of growth and decline of inner-ring suburbs relative to the other subareas using descriptive statistics, multivariate statistics, and GIS analyses.

Chapter 5 concludes with critical findings and policy implications that can help planners and policy makers more effectively address the socioeconomic and physical needs of the inner-ring suburbs relative to the inner city and the outer-ring suburbs, and assist them with formulating the broader goals of metropolitan smart growth. This chapter also includes the caveat limitations of this research and provides directions for future research.

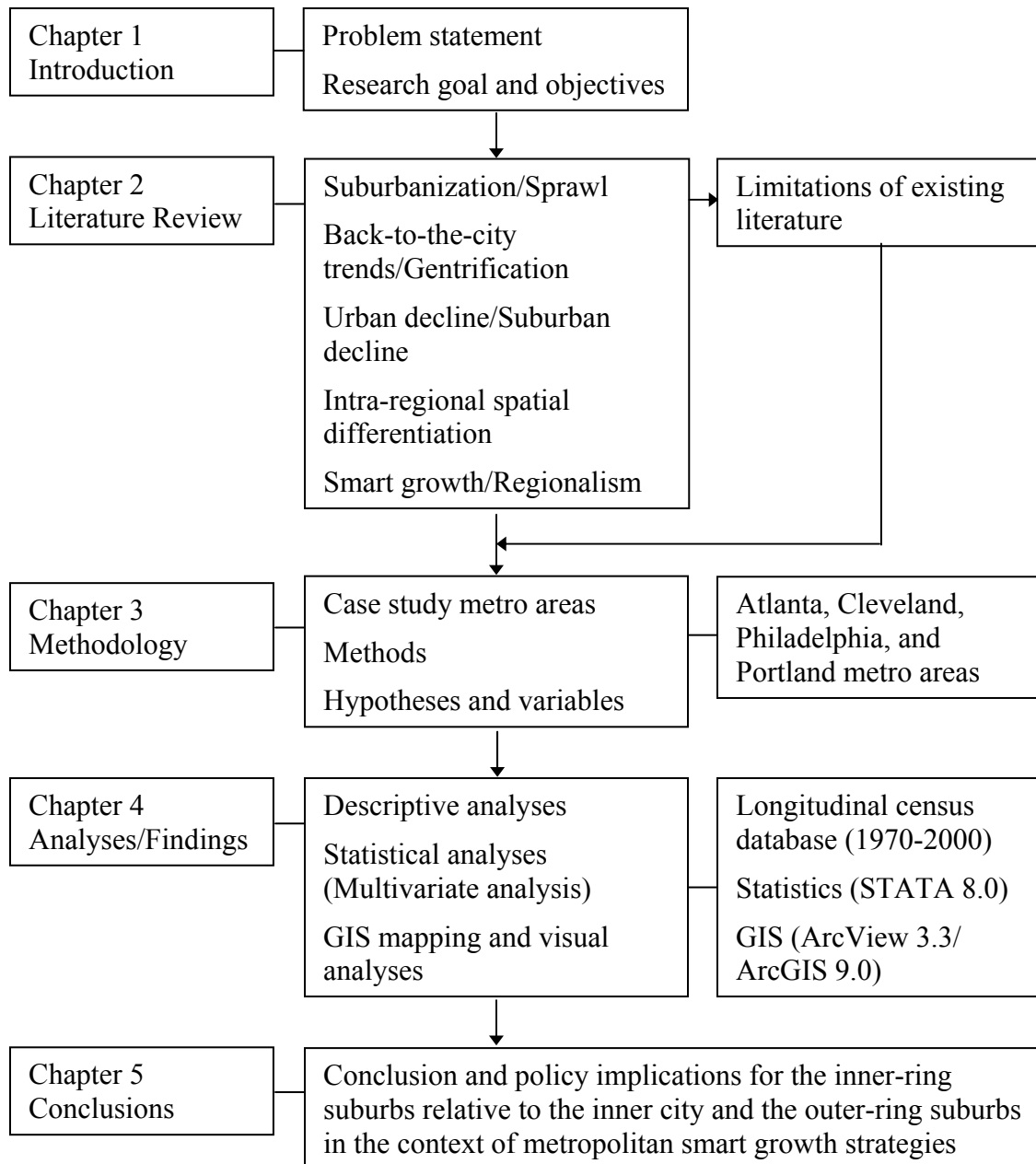


Figure 1.1. Research Organization

CHAPTER 2

LITERATURE REVIEW ¹

2.1. Suburbanization and the Emergence of Suburban Rings

Since early in the twentieth century, suburbanization has significantly increased in a majority of metropolitan regions. Researchers have attempted to identify the causes of the trend in suburbanization. According to Bradbury, Downs, and Small (1982, 12), the principal cause has been “rising real income, greater use of cars and trucks, widespread desire for living in relatively new and low-density settlements, economic advantages of home ownership, and strongly entrenched tendencies for people to segregate themselves socioeconomically and racially by neighborhoods.” To explain the issues of suburbanization and urban decline, they proposed six theories: disamenity avoidance, tax avoidance, positive attraction, economic evolution, biased policies, and demographic trends (Bradbury, Downs, and Small 1982, 12).

The disamenity avoidance theory postulates that residents and firms move to the suburbs to avoid inner city disamenities such as crime, air pollution, and traffic congestion; The tax avoidance theory hypothesizes that that households and firms move to the suburbs to avoid the tax burdens of central cities; the positive attraction theory asserts that the migration of residents is related to their preferences for low-density living, bigger houses, or economic opportunities; the economic evolution theory, which relates

¹ The revised version of this chapter was published in the author’s article “the role of inner-ring suburbs in metropolitan smart growth strategies” (Lee and Leigh 2005).

to the cycle of firms, posits that the central city offers advantages that aid in the development of new firms and that these firms move to the suburbs to take advantage of cheaper land and labor; the biased policy theory argues that public policies cause suburbanization and the decline of central cities; and finally, the demographic trend theory asserts that demographic trends and characteristics cause suburbanization and urban decline.

Mieszkowski and Mills (1993) proposed two contrasting theories that explain suburbanization: the natural evolution theory and the flight-from-bligh theory. The natural evolution theory posits that suburbanization is the result of rising income levels. Households with higher income levels tend to inhabit the newer, larger homes constructed at the periphery of the metropolitan area, leaving behind the older, smaller households, which are replaced by lower income families. The flight-from-bligh theory suggests that the middle and higher income groups tend to flee to suburban areas to avoid racial tension, crime, high taxes, low environmental quality, and other problems that dominate the central cities.²

Other factors associated with suburbanization are government policies relating to land use controls, housing, and transportation (Bergstrom, Dorfman, and Ihlandfeldt 1999; Duany, Plater-Zyberk, and Speck 2000; Katz 2002). In a survey of urban scholars, Fishman (2000) determined that the three greatest influences judged to have shaped the U.S. metropolises were “the 1956 interstate highway acts and the dominance of the automobile,” “federal housing administration mortgage financing and subdivision regulation,” and “deindustrialization of central cities” (200). Other scholars have claimed

² The flight-from-bligh theory is basically derived from the Tiebout’s public choice theory of “voting with their feet” (Tiebout 1956).

that of the three, the most significant influence on suburbanization has been the Interstate Highway Act of 1956 (Duany, Plater-Zyberk, and Speck 2000; Jackson 1985), which resulted in improved transportation systems, facilitating the movement of households and industry to the suburbs. The resulting industrial restructuring within the intra-metropolitan region also accelerated suburbanization. As industries moved to the suburbs, so did the population, and this migration led to the suburbanization of jobs (O’Sullivan, 2003). With regard to housing policies, suburbanization has been most accelerated by federal subsidies and mortgage insurance for single-family housing (Arigoni 2001).

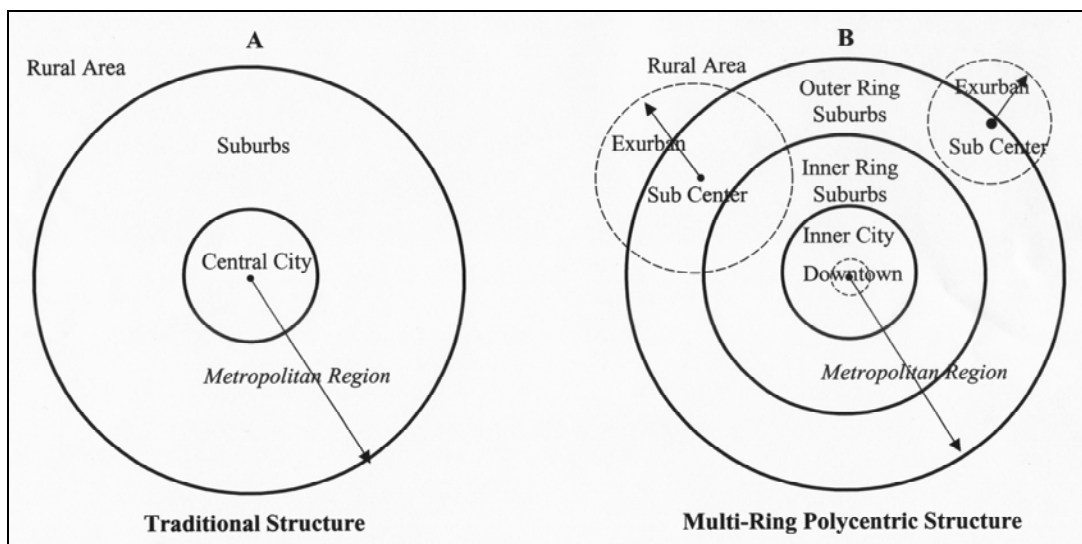


Figure 2.1. Emergence of Suburban Rings and Sub-centers in the Metropolitan Areas

Source: Leigh and Lee (2004, 16). Reprinted with permission

The diverse suburban form can be attributed to the improvement of transportation systems. This process, according to Adams (1970), began back in the walking-horsecar era (1800-1890), and continued with the electric streetcar era (1890-1920), the recreational automobile era (1920-1945), and finally, the freeway era (1945-the present).

The two modes of transportation that most strongly contributed to the development of the inner-ring suburbs over time were electric rail and private automobiles. Electric rail and trolleys dominated before World War II, and thus, streetcar suburbs were established around train stations and relatively close to the central city. Therefore, the dominant metropolitan spatial structure was a monocentric form that held most of the jobs in the core city (See Diagram A in Figure 2.1).

After WWII, with their greater convenience and enhanced mobility of private automobiles, significant suburbanization in many metropolitan areas in the United States has transformed the metropolitan structure into polycentric forms with emerging suburban sub-centers (Garreau 1991; Giuliano and Small 1991; McMillen 1998) or more dispersed forms beyond polycentricity (Gordon and Richardson 1996; Lang 2003). Given these dramatic changes in the metropolitan spatial structure, an important assumption of the monocentric model, that “all jobs are located in the Central Business District (CBD),” is no longer valid. According to Richardson (1988) in his research on thirty cities across the country, only eight percent of jobs were located in the CBD while 92 percent of jobs are located outside of the CBD.

Furthermore, suburban areas have been substantially differentiated over time. Given the development sequences and development patterns in the metropolitan region, suburban development is more likely to show ring patterns such as those in the inner-ring suburbs and the outer-ring suburbs surrounding the inner city. The inner cities also need to be distinguished from the downtown, as they have been historically differentiated within the central city. Therefore, current metropolitan areas are more likely to present multi-ring polycentric structure with intra-regional rings (i.e., the downtown, the inner-

city, the inner-ring suburbs, and the outer-ring suburbs, and exurbs) and sub-centers (See Diagram B in Figure 2.1).

2.2. Definition of the Inner-Ring Suburbs

If smart growth strategies that address the needs of the inner-ring suburbs are to be developed, a concrete definition of “inner-ring suburbs” is essential to an analysis of their socioeconomic conditions of the inner-ring suburbs. Among the terms that have been assigned to the inner-ring suburbs are “old suburbs” (Persky and Kurban 2001), “inner suburbs” (Bollens 1988; Jackson 1985; NAHB 2002; Orfield 1997), “inner-ring suburbs” (Downs 1997; Drier 1996), “older inner-ring suburbs” (Bier and Post 2003), “sitcom suburbs” (Hayden 2000), “post-World War II suburbs” (Design Center for American Urban Landscape 1999; Lucy and Phillips 2000b; Seaver, Morrish, and Rapson 1998), “first suburbs” (Puentes and Orfield 2002; Schwarz 2003), “first-ring suburbs” (Fishman 2000; Rokakis and Katz 2001), “first-generation suburbs” (DVRPC 1998), and “first-tier suburbs” (Hudnut 2003).

Despite minor differences in meaning among these terms, they all identify the same concept. Hudnut (2003) claimed that the inner-ring suburbs have been slighted by urban scholars, who neither recognize nor define them, even though they account for approximately 25 percent of metropolitan areas. Therefore, he suggested the label “first-tier suburbs,” a relatively accurate but neutral term. He claims that this label not only accounts for the timing of development but also reflects the geographical location beyond the central city.

Other more specific definitions for inner-ring suburbs relate to a specific time in the history of suburban development. The Ohio First Suburbs Consortium (FSC) (2004) defined them as “first suburbs” or “generally suburbs that were built, or mostly built,

adjacent to or near central cities before 1960.” Seaver, Morrish, and Rapson (1998) and the University of Minnesota’s Design Center for American Urban Landscape (UM-DCAUL) (1999) defined them as “post-WWII communities” constructed between 1945 and 1965. Similarly, Lucy and Phillips (2000b, 57) defined them as “middle-aged neighborhoods” built between 1945 and 1970. They argued that these neighborhoods are “ordinary single-use residential-only subdivisions of the type constructed in every metropolitan area from the end of WWII through 1970” (2000b, 55).

Schwarz (2003) has distinguished two types of inner-ring suburbs: pre-war suburbs and post-war suburbs. The pre-war suburbs, developed in the mid-nineteenth to early twentieth century, are characterized a distinctive architecture, tree-lined streets, and accessible commercial areas and public transportation. By contrast, the post-war suburbs, constructed rapidly to provide housing for the Baby Boom generation, are characterized by homogeneous architecture and automobile-dependent neighborhoods (Schwarz 2003).

The post-war suburbs, in Hayden’s (2000) view, consisted of rapidly-constructed, mass-produced housing developments; and Thomas (1998, 35) attempted to explain them in terms of the background of postwar suburban development, asserting that American cities, having suffered from a lack of housing developing during the Great Depression and World War II, had to provide housing for returning veterans. Mass-housing builders and low-interest government mortgage programs (courtesy of the Federal Housing Administration and Veterans Administration³) enabled the rapid development of suburbs. Between 1947 and 1964, developers and builders produced more than 1.2 million dwelling units each year (Teaford 1986, 100).

³ Thomas (1998, 37) argued “at least of 40% of all home sold each year from 1947 to 1957 were financed through FHA and VA mortgages.”

Despite the slight differences among the various terms for the inner-ring suburbs, all of them generally focus on post-war suburbs and issues of deterioration. Thus, following the same vein, this dissertation defines inner-ring suburbs as “post-WWII suburbs that were constructed between 1950 and 1969 and for which the primary mode of transportation access has been the automobile” (Lee and Leigh 2005, 333). To distinguish between the earlier streetcar suburbs and automobile communities, this research will discuss and highlight the role of automobiles in suburbanization.

2.3. Suburban Sprawl and Its Consequences

The fundamental impact of uncontrolled suburbanization has been urban sprawl, a label that has opened itself up to value judgments. Generally, sprawl indicates that suburbanization has been a product of inefficient development. Despite the lack of consensus on a specific definition of sprawl, it has generally been defined as dispersed low-density, auto-dependent development (See Table 2.1).

Over the past decade, the negative consequences of sprawl in terms of land use, transportation, housing, the environment, and socioeconomic aspects have been documented by a number of urban scholars: land consumption (American Farmland Trust 1997; Kahn 2000; Landis 1995); transportation such as vehicle miles traveled, traffic congestion, gasoline consumption, and air pollution (Ewing, Pendall, and Chen 2002; Kahn 2000; Newman and Kenworthy 1989); affordable housing (Arigoni 2001; Danielsén, Lang, and Fulton 1999); public service costs (Burchell and Listokin 1995; Speir and Stephenson 2002); water shortages (Otto et al. 2002); neighborhood social ties (Ewing 1997; Freeman 2001); public health (Ewing et al. 2003; McCann and Ewing 2003); and social equity (Bullard, Johnson, and Torres 1999).

Ewing et al. (2002), most notably, analyzed how sprawl affected to the quality of life in his study of 83 metropolitan areas in the United States, concluding that metropolitan areas that undergo sprawl are likely to have higher rates of vehicle ownership, which leads to more driving, more ozone pollution, higher risks of fatal crashes, and decreased use of walking and alternative transport.

Although sprawl and its negative impact have been documented extensively in the literature, its impact and subsequent policies for preventing or ameliorating it in the central city and inner-ring suburbs have not been clearly discussed. Bergstrom, Dorfman, and Ihlandfeldt (1999) studied the relationship between sprawl and urban decline and taxes, development regulation and incentives, and transportation policies in the metropolitan Atlanta region, and identified a strong causative relationship between suburban-favored public policies cause both sprawl and urban decay. Furthermore, Downs (1997) argued that growth patterns in U.S. metropolitan areas undermined the fiscal strength of the central cities and inner-ring suburbs. In a subsequent study, however, Downs (1999) found no significant statistical correlation between urban deterioration and sprawl. Using population changes (1980-1990) in the central city and an urban decline index based on several variables to measure the decline for 162 urbanized areas with over 150,000 residents in 1990, he argued instead that it was concentrated urban poverty, or concentrated low-income households that led to urban decline.

According to Ewing, Pendall, and Chen (2002), the approach by Downs neither identified the causes nor the consequences of sprawl due to its inadequate definition of sprawl and limited research methods. Furthermore, the approach does not recognize the differentiations within the central city itself, that is, the downtown, the inner city, and a part of the inner-ring suburbs—the central city cannot serve as an accurate unit of analysis with which to explore the relationship between urban decline and sprawl (Lee and Leigh 2005). Even a high sprawl index for a metropolitan region can be accompanied by what seems like a small decline in the central city if the downtown undergoes rapid growth, which masks deterioration in the inner city or inner-ring suburbs.

Although researchers have thoroughly discussed the issue of sprawl and its impact on central cities and suburbs in general, few have examined the causal relationship between sprawl and the decline of the inner-ring suburbs. In his analysis of the cycle of housing movement, Bier (1998; 2001) discussed the impact of new housing construction on the outer edge of central cities and old suburbs and argued that the dynamic movement on the population and industry toward the outer edge of metropolitan areas stimulates economic growth resulting from the demand for newer and larger housing and cheaper land for business development. He concluded that along with the construction of newer, larger housing in the metropolitan fringe comes the abandonment of aged and obsolete housing in the central cities and older suburbs. In addition, he observed, as did Berry many years earlier, that this situation is exacerbated when new housing construction on the edge of metropolitan area exceeds the growth in the number of households in the metropolitan area (Berry 1985; Bier 1998, 2001).

One of the effects of sprawl, according to Freilich (1999, 16), is a decline in the existing developed areas such as cities and first- and second-ring suburbs. He concluded that by depriving the city and first- and second-ring suburban residents of job opportunities and adequate services, sprawl actually causes the socioeconomic problems of these communities (Freilich 1999, 22). Orfield (1997, 2002) agreed that suburban sprawl led to the decline of inner-ring suburbs and central cities because it broadened the gap between the socioeconomic levels within a metropolitan region.

Jargowsky (2001) established a strong relationship between sprawl and concentrated poverty and regional inequality within metropolitan areas, arguing that because of sprawl, newly-developed affluent suburbs leave the poor geographically and

socially isolated in the central cities. In a more recent analysis using national census data, Jargowsky (2003) provides some evidence that the number of high-poverty tracts has increased in older suburbs surrounding major central cities.

Table 2.1. Definition of Sprawl

Definitions	
Nelson and Duncan (1995, 1)	“Unplanned, uncontrolled, and uncoordinated single-use development that does not provide for an attractive and functional mix of uses and/or is not functionally related to surrounding land uses and which variously appears as low density, ribbon or strip, scattered, leapfrog, or isolated development.”
Ewing (1997)	The combination of three characteristics: leapfrog or scattered development, commercial strip development and large expanses of low-density or single-use developments.
Gore (1998)	“The chaotic, ill-planned development that makes it impossible for neighbors to greet one another on a sidewalk, makes us use up to a quart of gasoline to buy a quart of milk, and makes it hard for kids to walk to school or for children to have anywhere safe to play outside.”
Moe (1999)	“The poorly planned, low-density, auto-oriented development that spreads out from the edges of communities.”
Sierra Club (1999)	“Low-density development beyond the edge of service and employment, which separates where people live from where they shop, work, recreate, and educate—thus requiring cars to move between zones.”
U.S. Department of Housing and Urban Development (1999)	“A particular type of suburban development characterized by very low-density settlements, both residential and non-residential; dominance of movement by use of private automobiles, unlimited outward expansion of new subdivisions and leap-frog development of these subdivisions; and segregation of land uses by activity.”
Downs (1999, 956)	Unlimited outward extension of low-density residential and commercial settlements, leapfrog development, fragmentation of powers over land use among many small localities, dominance of transportation by private automotive vehicles, widespread strip commercial development, great fiscal disparities among localities, and segregation of types of land uses in different zones.
Ewing, Pendall, and Chen (2002, 7)	“Low-density development with residential, shopping and office areas that are rigidly segregated; a lack of thriving activity centers; and limited choices in travel routes.”
Beck, Kolankiewicz, and Camarota (2003, 92)	“The increase in the physical area of a town or city over time, as undeveloped or rural land at its periphery is permanently converted to developed or urbanized land as population and/or per capita land consumption grow.”
Smart Growth America ¹	“Irresponsible development that takes out tax dollars away from our communities and destroys farmland and open space.”
Vermont Forum on Sprawl ²	“Dispersed development outside of compact urban and village centers along highways and in rural countryside.”
American Farmland Trust ³	“Low density development that spreads out from cities, leaving the core hollowed out and in decline, while wastefully consuming some of America’s most productive farmland.”
National Wildlife Federation ⁴	“A pattern of growth involving low-density development in the suburbs, beyond the edges of existing towns and cities.”

¹ Smart Growth America: Introduction to smart growth, <http://www.smartgrowthamerica.com> (accessed on 10/25/03).

² Vermont Forum on Sprawl: <http://www.vtsprawl.org/Learnabout/sprawl/whatisprawlmain.htm> (accessed 10/28/03).

³ American Farmland Trust: <http://www.farmland.org/cfl/urban.htm> (accessed 10/28/03).

⁴ National Wildlife Federation: <http://www.nwf.org/smartgrowth/definition.html> (accessed 10/28/03).

2.4. Recent Trends of Gentrification and Central City Rebound

Coined by Glass (1964), “gentrification” trends have had a long tradition in urban history.⁴ Insights into these trends can be gained from Van den Berg et al.’s (1982) concept of reurbanization as part of the dynamic process of urbanization. They identified four stages of urban development for the core, ring, and functional urban region (FUR): urbanization, suburbanization, desurbanization, and reurbanization.⁵

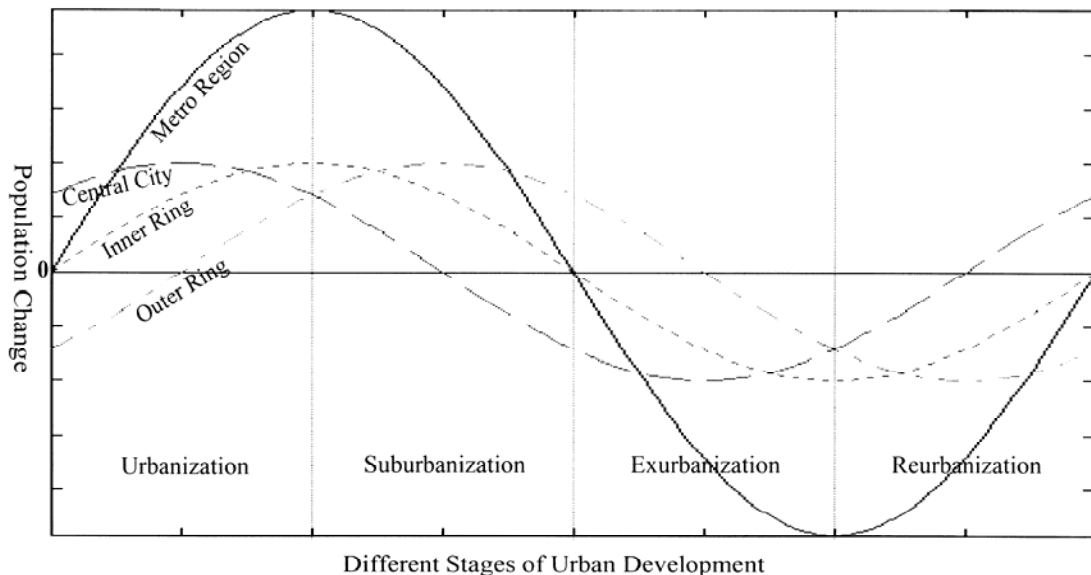


Figure 2.2. Population Growth in Different Stages of Urban Development

Source: Adapted from Van den Berg et al. (1982, 38). Reproduced with permission.

Originally published in Lee and Leigh (2005, 335).

⁴ Badcock (2001, 1560) documented that “Ruth Glass (1964) first used the term ‘gentrification’ to describe the movement of the ‘gentry’ into rundown, tenanted Georgian and Victorian terraces in the West End of London which they purchased to rehabilitate and occupy.” See more definitions of gentrification: Marcuse (1985); Smith and Williams (1986, 1); Wyly and Hammel (1999, 716); Kennedy and Leonard (2001, 6); and the Gentrification Task Force of Atlanta City Council (2001, 5).

⁵ The FUR, similar to a metropolitan area, is a nodal region identifying urban centers and delimiting zones dependent on those centers (Van den Berg et al. 1982, 55).

This research shows an adoption of an original graph of different stages of urban development by Van den Berg et al. to illustrate the basic concept of the urban development pattern differentiated by population change in the central city (the downtown and inner city), inner ring, outer ring, and metropolitan region. Of the four different stages of urban development, the fourth, “reurbanization,” encompasses the back-to-the-city trend.

As was the case with sprawl, the definitions of back-to-the-city and gentrification remain a subject of debate in the academic literature (See Table 2.2).⁶ While some use the terms gentrification and revitalization interchangeably, Kennedy and Leonard (2001) make a distinction. They define gentrification in relationship to revitalization and reinvestment in central cities; it is a displacement process by higher income households that upgrade the physical as well as socioeconomic component of lower income neighborhoods. In contrast, they define revitalization and reinvestment as “the process of enhancing the physical, commercial and social components of the neighborhood” and the “flow of capital into a neighborhood primarily to upgrade physical components of the neighborhood,” respectively (Kennedy and Leonard 2001, 6). However, as the following quotes from Ley (1996) and Badcock (2001) indicate, the notion of gentrification from revitalization and reinvestment are difficult to distinguish: “Over the past decade,

⁶ Kennedy and Leonard (2001, 5) identified five categories of gentrification: (1) the decades-long process of disinvestments and re-investment in a particular neighborhood by public policies and property owners for profits; (2) the term interchangeable with urban revitalization; (3) physical upgrading of low-income neighborhood; (4) the economic actions of newcomers such as renovation and upgrading of the housing stock; and (5) the class and racial tensions and dislocation in the socioeconomic perspectives. For more information about a discussion of historical definitions, see Palen and London (1984, 6-10). Marcuse (1999, 790) also pointed out that “the definitions gentrification can be conflicting because gentrification is likely to be viewed as benign if it is focused on geographic/physical/financial aspects, while it is more likely to be viewed negatively when it is considered as the displacement of lower-income households by upper-income ones.”

however, many authors, more attentive to changes in housing class than to those in the housing stock in the inner city, have broadened gentrification to include both sides of the middle-class housing market, the renovation of old properties and the redevelopment of new units, with both conceived as part of a broader restructuring of the city” (Ley 1996, 3); “Nowadays it makes no sense to try and separate it [gentrification] out conceptually from the broader transformation known as revitalization” (Badcock 2001, 1560).

Table 2.2. Definition of Gentrification

	Definition
Marcuse (1985)	The movement into a previously working-class area by upper income households, generally professionals, managers, technicians, and the new gentry, resulting in the displacement of the former lower-income residents.
Smith and Williams (1986, 1)	“The rehabilitation of working-class and derelict housing and the consequent transformation of an area into a middle-class neighborhood.”
Wyly and Hammel (1999, 716)	“Class transformation of those parts of the city that suffered from systematic outmigration, disinvestment, or neglect in the midst of rapid economic growth and suburbanization.”
Kennedy and Leonard (2001, 6)	“The process by which higher income households displace lower income residents of a neighborhood, changing the essential character and flavor of that neighborhood.”
The Gentrification Task Force of Atlanta City Council (2001, 5)	“An increase in property values resulting from development that often increases economic tensions and displacement of low income homeowners and renters of all age groups within the neighborhood as well as results in a change in the character of the neighborhood.”

Beyond definitional issues, other challenges for gentrification research come from data limitations for analyzing the process of gentrification over time (Atkinson 2000; Engels 1999; Millard-Ball 2002). In particular, not only are data that identify and tract

displaced households difficult to obtain, but the concept of displacement in gentrification also varies considerably (Marcuse 1986).⁷ Furthermore, many researchers (Berry 1985, 1999; DeGiovanni 1984; Kasarda et al. 1997; Kennedy and Leonard 2001) have argued that gentrification, geographically limited in both scale and number of cities, does not change neighborhood characteristics. For example, Berry (1999, 783) has argued that gentrification is “confined to cities with substantial central business district office growth and with housing markets characterized by substantial suburb-to-inner city filtering.”

Although the trend of decentralization still dominates metropolitan areas throughout the United States, Census 2000 shows that many cities experienced a growth in population and a reduction in poverty concentration. These recent trends can be attributed to the back-to-the-city movement and gentrification that took place throughout the 1990s. Empirical evidence for gentrification can be found in Wyly and Hammel (1999), who documented a recent resurgence of inner-city capital investment from case studies of eight U.S. cities during the 1990s. They concluded that “when viewed at the level of the metropolitan region, gentrification remains confined to islands of renewal in seas of decay, but when the lens is focused on the urban core, it is clear that public officials now view some of the nation’s most distressed public housing projects as islands of decay in seas of renewal” (Wyly and Hammel 1999, 761). Gratz and Mintz (1998) noted a similar positive change and sustainable growth occurring in many downtowns throughout the country. In addition, Hoffman (2003) came to the same conclusion after

⁷ Millard-Ball (2002, 835) summarized four categories of displacements by Marcuse (1986): (1) direct last-resident displacement, which counts only the last resident in the unit; (2) chain displacement, which also counts previously displaced households occupying the same building; (3) exclusionary displacement, when a household does not even get to move into the building; and (4) displacement pressure, involving households that in effect “jump before they are pushed.”

identifying significant revitalization in the 1990s of inner city neighborhoods in five major cities—New York, Boston, Chicago, Atlanta, and Los Angeles.

This emerging rebound and revitalization of the population in the 1990s was also noted in Sohmer and Lang (2001) (See Appendix Table A-1), who used downtown boundaries (as official downtown boundaries are not provided by the U.S. Bureau of Census) mapped by the University of Pennsylvania for 24 U.S. central cities.⁸ Analyzing the population growth of the downtowns relative to their central cities and metropolitan statistical areas, they found population gains in 75 percent of them in the 1990s. They concluded that this rebound is occurring for two reasons. The first is the recent demographic trend in which the number of empty nesters, young professionals, and non-traditional families are more likely to prefer downtown living. The second is the social-physical amenities of downtowns, including a sense of place as well as proximity to mass transit and jobs, cultural activities, and entertainment.

Because of urban sprawl, which reduces the desirability of any previous amenities of suburban communities, living downtown is often preferable to living in the suburbs. According to researchers, increased traffic congestion, lengthening commutes, air pollution, and other such negative externalities created by decentralization, have fueled the back-to-the-city movement (Kennedy and Leonard 2001; Haughey 2001). Haughey (2001), supporting many of the findings discussed above, specified three reasons for the back-to-the-city trend in American cities in the 1990s : (1) an improved dwelling environment; (2) the negative effects of sprawl such as those state above; and (3) changes

⁸ According to Sohmer and Lang (2001, 2), the researchers in the University of Pennsylvania identified downtown census tracts for 34 central cities across the country through interviews with city organizations and by examining historic maps of each city's downtown.

in demographics and lifestyles (i.e., increases in single professionals, childless couples, empty nesters, and immigrants). Grogan and Proscio (2000, 3-8) claimed that four other trends accounted for the central city rebound in America: (1) an expansion of grassroots revitalization efforts; (2) a resurgence of functioning private markets in former deteriorated areas; (3) a decrease in crime rates; and (4) the unshackling of inner-city life from the giant bureaucracies that once dominated these areas.

As mentioned, the assets of suburban communities have been overshadowed by increases in poverty and crime that were once confined to the central cities. Berube and Frey (2002) reported significant increases in poverty in suburban communities in the 1990s. During the same period, others noted increases in poverty in the older suburbs and significant decreases in concentrated poverty in central cities (Jargowsky 2003; Kingsley and Pettit 2003; Lee 2004; Leigh and Lee 2004).

Despite such findings, a number of urban scholars have observed that the changes in central city regeneration and gentrification are minor relative to the continued strong decentralization occurring in U.S. metropolitan areas. While this may well be true, the positive signs of regeneration taking place in the central cities are reversing traditional population declines of the past several decades. By contrast, back-to-the-city trends and gentrification may displace the poor in the central cities and forced them to move to the inner-ring suburbs, which increases the level of poverty and accelerates the decline of inner-ring suburbs.

2.5. Recent Evidence on Urban and Suburban Poverty

During the past several decades, urban scholars and policy makers have been interested in poverty and its concentration and persistency in central cities (Jargowsky and Bane 1991; Jargowsky 1997, 2001; Karsada 1993; Wilson 1987). From 1960 to 1990, core cities in metropolitan areas experienced steady increases in poverty. Furthermore, significant shifts of middle class households to the suburbs from the central cities left the poor in inner cities and urban neighborhoods deteriorated into concentrated poverty. Therefore, a significant amount of research has documented the spatial concentration of poverty and its negative effects, and outlined several policy implications that can be used to revitalize deteriorating neighborhoods in central cities.

In contrast, suburban poverty and its spatial variations have only recently begun to receive significant recognition. Drawing on new data from Census 2000, recent studies show that during the 1990s poverty became notably less concentrated in central cities while that in the suburbs increased across the country. These studies also show that many central cities have experienced population growth in the 1990s, reversing the historical trend of population decline during the previous several decades. Berube and Frey (2002) investigated changes in poverty in the 102 most populous metropolitan areas between 1990 and 2000. They found that most cities experienced declines in their poverty rates, while their suburbs experienced increases. However, they pointed out that the poverty rate in central cities was still more than twice as high as it was in the suburbs.

Recent research, drawing on new data from Census 2000, however, provides dramatic changes in poverty and its spatial distribution within metropolitan regions.

According to Census 2000, the national poverty rate dropped .7 percent from 13.1 percent in 1990 to 12.4 percent in 2000. Jargowsky (2003) provided a national analysis of high-poverty tracts and their poverty population. His analysis showed that high poverty tracts, comprising tracts with poverty rates of 40 percent or more, declined from 3,417 in 1990 to 2,510 in 2000, representing a dramatic drop in poverty nationwide. He also found significant differentiations among high-poverty neighborhoods in terms of racial/ethnic composition as well as geographical locations of region in the country. More importantly, his analysis provides some evidence on the increase in poverty in older suburbs surrounding the major central cities of metropolitan regions.

Subsequent research by Kingsley and Pettit (2003) reached similar conclusions about decreases in concentrated poverty across the country. They found that the poor living in extreme-poverty tracts (i.e., those with poverty rates of 40 percent or more), dropped from 17 percent in the 1990 to 12 percent in 2000. As such, the share of poverty population living in high-poverty tracts (poverty rates of 30 percent or more) also decreased from 31 percent in 1990 to 26 percent in 2000. They also addressed neighborhood distress using high school dropouts, female-headed households with children, and the employment rate of female adults in high-poverty tracts during the 1990s. Their analysis showed that although neighborhood conditions in high-poverty tracts generally improved in the 1990s, the neighborhood distress level is still high relative to the metropolitan average.

Thus, these recent studies provide strong evidence of the changing geography of urban and suburban poverty at the metropolitan or regional levels. However, many research areas that address the dynamic changes in poverty within metropolitan region

remain unexplored. In particular, the dynamic changes in poverty and its concentration with regard to changes in metropolitan spatial structures need to be examined.

2.6. Theoretical Perspectives on Urban and Suburban Decline

2.6.1. Urban Decline Theory

Most suburban decline theories are based on the neighborhood decline theory, the roots of which lie in urban ecological theory of the early 1900s (Hurd 1903; Burgess 1925; Hoyt 1939). Urban ecologists viewed the life cycle of urban environments as a process of “competition-invasion-succession-segregation” similar to that of natural ecosystems. They argued that the process of the invasion-succession of low-income households caused the deterioration of neighborhoods in the inner cities (Downs 1981; Hoover and Vernon 1959; Lowry 1960). Therefore, the blight of inner-ring suburbs can be caused by the “spill over effect” of deteriorated inner cities. The classic urban ecological model, however, has been criticized by numerous urban scholars such as Quinn (1940), Hawley (1944), and Berry and Kasarda (1977) because of its critical limitation in judging the ecological process of invasion and succession without regarding the political, cultural, and institutional aspects of human society.

After World War II, the urban ecological theory that explained neighborhood change was repackaged into “theories of the neighborhood life cycle” (Hoover and Vernon 1959), the “filtering process” (Lowry 1960) and the “trickle-down process” (Downs 1981). Hoover and Vernon (1959) affirm that the general life pattern of neighborhoods is one of inevitable decline through a five-stage process (See Table 2.3). Subsequent research by the Real Estate Research Corporation (1975) proposed an

updated five-stage process that emphasized the concentration of low-income residents as a cause of decline.

Table 2.3. Different Stages of Neighborhood Change

Edgar Hoover and Raymond Vernon (1959)	Real Estate Research Corporation (1975)
<u>Stage 1</u>	<u>Stage 1 Healthy</u>
Single-family residential development	Homogeneous housing and moderate to upper income; insurance and conventional financing available
<u>Stage 2</u>	<u>Stage 2 Incipient Decline</u>
Transition to higher density, apartment construction	Aging housing, a decline in income and education level, an influx of middle-income minorities, and fear of racial transition
<u>Stage 3</u>	<u>Stage 3 Clearly Declining</u>
Downgrading to accommodate higher density through conversion and over-crowding of existing structures, and the spread of ethnic and minority districts	Higher density, visible deterioration, a decrease in white in-movers, more minority children in schools, mostly rental housing, problems in securing insurance and financing
<u>Stage 4</u>	<u>Stage 4 Accelerating Decline</u>
Thinning-out or “shrinkage,” characterized by population loss and decline in housing units	Increasing vacancies, predominantly low income and minority tenants or elderly ethnics, high unemployment, fear of crime, no insurance or institutional financing available, declining public services, and absentee-owned properties
<u>Stage 5</u>	<u>Stage 5 Abandoned</u>
Renewal through public intervention, redevelopment, and replacement of obsolete housing with new multifamily units	Severe dilapidation, poverty, and squatters, high crime and arson, negative cash flow from buildings, single-family residential development of existing structures, spread of ethnic and minority districts

Source: Metzger (2000, 9)

Lowry (1960) explained the neighborhood change via the filtering process. That is, lower-income households cannot afford to buy new houses built for middle- or upper-income households. According to Bear and Williamson (1988), as a residential structure ages, higher-income households move into new and higher-quality structures, allowing lower-income households to occupy their old housing. In the long run, such filtering processes lead to the occupation of old-housing neighborhoods by poorer households. Downs (1981) also suggested the notion of housing filtering through the trickle-down process, observing that, in the long run, suburbs occupied by lower-income households will decline. The critical factors causing neighborhood decline are demographic, social, and economic forces. Bradbury, Downs, and Small (1982) observed that neighborhood decline involves both physical deterioration of structures and decreasing socioeconomic status of residents. They define urban decline in two ways: descriptive decline and functional decline. Descriptive decline refers to the loss of population and employment, while functional decline is associated with changes that are socially undesirable, such as the increase in crime and abandoned houses.

The neighborhood life-cycle theory, however, has been criticized by many researchers from the political economy perspective. For example, Solomon and Vandell (1982) focused on the capital movements that explain neighborhood decline. Byrum (1992) argued that government policies for the development of suburbs caused the decline of inner-city neighborhoods based on empirical research on the Twin Cities of Minneapolis-St. Paul. Metzger (2000) also challenged the neighborhood life cycle theory, arguing that neighborhood decline has been caused by disinvestments that reflect the attitudes of developers, realtors, lenders, and appraisers.

2.6.2. Suburban Decline Theory

Although the issue of solving problems associated with the deterioration of the central city have been paramount, more and more studies have centered on the decline of suburbs and associated problems (Bier 2001; Bollens 1988; Drier 1996; DVRPC 1998, 2003; Fitzgerald and Leigh 2002, Hudnut 2003; Lee and Leigh 2003, 2004, 2005; Leigh and Lee 2004; Lucy and Phillips 2000a, 2000b, 2003; Orfield 1997, 2002; Persky, Sclar, and Wiewel 1992; Puentes and Orfield 2002; Rusk 1999; Smith, Caris, and Wyly 2001). Such studies reflect a consensus among researchers that the inner-ring suburbs could be the most vulnerable areas within metropolitan regions. Before the early 1980s, issues of decline in the suburbs were largely ignored, as revitalization of the central city and inner-city neighborhoods were the priorities. However, in his landmark book, *Crabgrass Frontier*, Kenneth Jackson (1985) brought the deterioration in the inner-ring suburbs, which were showing the same socio-fiscal problems found in central cities, to the forefront:

The cycle of decline has recently caught up with the inner suburbs. Some.... are prospering because of their extraordinary religious and racial diversity. Others, however, are already encountering fiscal, educational, racial, and housing crises as severe as those which troubled major cities in the 1960s and 1970s. In these aging areas, a stable tax base coupled with increased service costs necessitated by a more elderly and less affluent population have put heavy pressure on revenues (Jackson 1985, 301).

Analyzing a sample of suburban American cities, Bollens (1988) analyzed municipal decline and inequality between 1960 and 1980, reporting that because their socioeconomic features are not the same, suburban cities are not equally affected by decentralization in either population or employment. He concluded that suburbanization is not merely the result of spillover of lower-income residents from the central city, but a function of the filtering-down process that occurs when migration to outer-fringe suburban municipalities takes place.

Orfield (1997) undertook perhaps the most comprehensive analysis of suburban differentiation. He argued that because of the process of invasion and succession proposed in urban ecological theory, the inner-ring suburbs decline even more rapidly than the central cities. If the metropolitan area is assumed to have a concentric zone structure, inner-city neighborhoods spread into the inner-ring suburbs located between the inner city and outer-ring suburbs in the metropolitan region, bringing with them problems caused by blight. In addition to the added blight, the inner-ring suburbs, with their existing housing stocks and residential environments, cannot compete with the outer-ring suburbs, nor do they have the resources to compete the central cities with their diverse social, cultural, and recreational opportunities. In the worst possible case, a similar trend of deterioration will occur in the second ring, third ring, and outer ring suburbs in the future. Evidence of such a spreading deterioration from the inner city to the inner-ring suburbs was provided by Orfield (1997) in his original case study of the Minneapolis-St. Paul metropolitan area. His analyses were supported by Stegman and Turner (1996), who stated the following:

The distress and decline of high-poverty areas do not remain confined to the central city but gradually spread out to affect suburban areas as well. Older suburbs—and even some “edge cities”—increasingly find themselves in competition with newer areas of development that can attract more affluent families, retail centers, and jobs (Stegman and Turner 1996, 159-160).

The U.S. Department of Housing and Urban Development also supports Orfield, stating the following:

The challenges once concentrated in central cities have spread to some older and inner-ring suburbs....that are facing such urban ills as crime, poverty, and population loss. The challenges are not restricted to one or two regions of the country but are national in scope (HUD 1999, iii).

An extension of Orfield's (2002) case studies included Atlanta, Chicago, Denver, Minneapolis-Saint Paul, San Francisco, and New York, all geographically diverse areas. Through cluster analyses of demographic, economic, and housing measures at the municipality level between 1993 and 1998, he identified six suburban community types: at-risk segregated suburbs, at-risk older suburbs, at-risk low-density suburbs, bedroom-developing suburbs, affluent job center suburbs, and very affluent job center suburbs. His analyses showed that many old suburbs, which account for 40 percent of the metropolitan population, fall into the category of at-risk suburbs. He concluded as follows:

The myth of urban deterioration and suburban prosperity suggests that social and economic decline stops neatly at the borders of central cities. Nothing could be further from the truth. Once poverty and social instability permeate communities just outside the central city and begin to grow in older satellite cities, decline accelerates and intensifies (Orfield 2002, 35).

More evidence of the deterioration of inner-ring suburbs is revealed in Lucy and Phillips (1995, 2000a, 2000b, 2001, 2003). According to the conventional theory of neighborhood change, they argued that the residents of old or aging inner-ring suburbs suffer relative income declines compared with the residents of the outer-ring suburbs. Lucy and Phillips (2000b, 57) also found that income decline in these suburbs was as evident in areas dominated by middle-age housing built between 1945 and 1970 as it was in areas dominated by older housing built before 1945. However, as they also discovered older neighborhoods that were still thriving, they concluded that “suburban decline usually occurs where there are large numbers of small houses with little aesthetic charm, where the houses are located in inconvenient settings, where there are few public amenities, and where there often are no alternatives to automobile transportation” (Lucy and Phillips 2000b, 57).

In their study of the suburbs of the 35 largest metropolitan areas, Lucy and Phillips (2001) continued to analyze population growth and decline patterns between 1990 and 2000. In general, they found that the slower-growing cities of the Midwest and Northeast were more likely to contain declining suburbs, and suggested that these suburbs were not necessarily adjacent to central cities, thereby confirming Bollens’s (1988) findings discussed earlier. More recently, Hoffman (2003, 252) noted that the

once pervasive urban problems of the inner city tend to be spreading outside the central city to the inner-belt suburbs, small cities, and towns.

Focusing on the fastest-growing metropolitan regions of the South and the West, Kotkin (2001) analyzed several older suburbs and observed that many of them are thriving and evolving into ethnically diverse cities in these areas. He claimed that the increase in the immigrant population in the older suburbs was not an indication of decline but rather a reflection of renewed middle-class aspirations. His argument supports the phenomenon of a re-emerging melting pot in the inner suburbs, which are generating new economies in the twenty-first century, just as central cities did in the twentieth century (Kotkin 2000, 2001).

Despite these positive theories, studies have suggested that older suburbs show symptoms of decline similar to those that occurred in the central cities over the last several decades. In assessing what factors have led to the decline of inner-ring suburbs, conventional suburban decline theory has emphasized the human ecological perspective in terms of “who moves in” and “who moves out.” However, Smith, Caris, and Wyly (2001) challenged this theory by providing the “suburban (inner-ring suburbs) disinvestments theory.” Citing suburban disinvestment in housing and land markets resulting from discrimination and uneven development in Camden County, New Jersey, they provided empirical evidence of such practices for the decline of older suburbs.

In his study of first-tier suburbs, Hudnut (2003) also found evidence of population decline, loss of tax base, aging infrastructures, and rising poverty in many older suburbs throughout the country, noting that one of their most critical issues is disinvestments. He

quotes Mayor Tom Longo of Garfield Heights, an inner-ring suburb in the Cleveland metropolitan area, as follows:

We are caught in the crossfire between renovation in the heart of the city and new developments out on the farmlands. The dollars are going to those other two places (51), and the fiscal crossfire of public policy.... seems often to favor green field development and downtown revitalization at the expense of older first-tier suburbs (53).

Hudnut analyzed this process in the Cleveland metropolitan area, which experienced disinvestment from the inner-ring suburbs to the central city and outer-ring suburbs. He identified five policies that encouraged development or revitalization of these areas rather than the inner-ring suburbs: (1) direct subsidies for new highways in undeveloped areas; (2) indirect subsidies for expanding utilities in peripheral communities through changes in the utility fees of inner-ring suburban residents; (3) state tax abatement incentives in the exurbs and the more urban areas; (4) a small number of subsidies for road maintenance despite high gasoline taxes; and (5) a state capital budget favoring traditional urban centers (Hudnut 2003, 53-56).

Therefore, the inner-ring suburbs urgently require neighborhood revitalization. Such a need has been met by two federal programs: the Community Development Block Grant (CDBG) and Housing Opportunities for People Everywhere VI (HOPE VI).⁹

⁹ See official websites for CDBG and HOPE VI programs: Community Development Block Grant (CDBG) Programs, The U.S. Housing and Urban Development, <http://www.hud.gov/offices/cpd/communitydevelopment/programs/index.cfm?state=nm> (accessed on October 28, 2003); What is HOPE VI? The U.S. Housing and Urban Development, <http://www.hud.gov/offices/pih/programs/ph/hope6/index.cfm> (accessed on October 28, 2003).

However, communities eligible for CDBG funds are low-income neighborhoods of the central cities of Metropolitan Statistical Areas (MSAs), metropolitan cities with populations of 50,000 or more, and qualified urban counties with a population of at least 200,000. Low-to-moderate income suburban neighborhoods are ineligible for these funds, as evidenced in the following quote: “CDBG and other urban development funding rules thwart older, built-out suburbs’ efforts to maintain their middle-class neighborhoods. Income based guidelines for CDBG funding, empowerment zones, and other federal assistance programs restrict spending to low-moderate income groups and slum and blight conditions” (Hudnut 2003, 85).

The HOPE VI program funds are used to relieve severely distressed public housing, so most inner-ring suburbs are not eligible for the grants because they are typically single-family residential neighborhoods. According to Hudnut (2003), the HOPE VI grants went to only a few of first-tier suburbs.¹⁰ Thus, limited to the most desperate areas in the central cities, the two major funding resources for improving the living conditions of low-income households exclude most inner-ring suburbs.

¹⁰ Alexandria, Virginia; Camden and Jersey City, New Jersey; and Richmond, California (Hudnut 2003, 260).

2.6.3. Indicators for Urban and Suburban Decline

Many researchers have provided indicators for neighborhood decline. At the municipality level, Bollens (1988) classified suburbs into four categories: troubled suburbs (i.e., those with an income level lower than the central city sample mean for that year), potentially troubled suburbs (i.e., those with an income level 10% above the central city sample mean), healthy suburbs (i.e., those with an income level between 10% and 25% above the central city sample mean), and very healthy suburbs (i.e., those with an income level higher than the central city sample mean).

Lucy and Philips (2000b) also used “relative income” (the median family income of suburbs compared with median family income of their metropolitan area) to identify declining suburbs at the jurisdictional level. In particular, as household income declines, reinvestment by property owners for maintaining their properties declines, lowering property values as well as tax bases of municipalities. In turn, lowered property values and tax bases reduce public services and public reinvestment in infrastructure, such as roads, sewage, water systems, and schools, followed by neighborhood decline.

Kasarda (1993) identified inner city neighborhoods by poverty levels combined with joblessness, female-headed families, and welfare recipients at the tract level and identified four neighborhood types using the standard deviation method: poverty, extreme poverty, distressed, and severely distressed neighborhoods. In a different approach, Orfield (1997) examined the economic conditions of municipalities in Philadelphia by z-scores based on four different socioeconomic indicators: the tax base per household, the number of female-headed households as a percentage of all households with children, the

percentage of children under five living below the poverty level, and median income. A subsequent study by Orfield (2002) identified six types of suburban communities for six major metropolitan areas by cluster analysis with socioeconomic and housing variables: at-risk segregated suburbs, at-risk low-density suburbs, bedroom-developing suburbs, affluent job center suburbs, and very affluent job center suburbs.

Many studies have used population growth as an important indicator of shifts in neighborhood economic conditions. Simmons and Lang (2001) emphasized the importance of population growth in the economic performance of a city because population gains usually induce housing demands as well as other economic activities. Indeed, population growth can be a strong indicator representing economic growth in a large-scale unit such as a city, a county, a region, or a state, but it may be limited in the neighborhood unit. In other words, population change alone is not a strong indicator of growth and a decline in the inner-ring suburbs. For instance, population gains due to the migration of low-income households would not necessarily indicate thriving neighborhoods. Migration patterns by race can be a complementary indicator of population growth addressing neighborhood decline. During the past decades, ample research has shown that “white flight” has led to a deterioration of inner city neighborhoods by leaving behind low-income minorities.

Thus, the literature provided evidence that a variety of indicators such as income, unemployment, poverty, welfare, poverty, and population change are useful indicators that can be utilized in the examination of urban and suburban decline. Of these indicators, the most common single indicators are income status, poverty level, and population change.

2.7. Metropolitan Smart Growth Strategies and New Regionalism

The concept of smart growth does not designate a new paradigm. Richmond (2000, 13) pointed out that concepts of smart growth have been repackaged over time from “carrying capacity” (1970s) to “growth management” (1980s) to “sustainable development” (1990s). In addition to these important concepts, smart growth must be explained within the context of “new urbanism” and “new regionalism.”

The concept of smart growth in the 1970s, carrying capacity, refers to the maximum capacity of natural resources that can support human activities within a certain geographical area. With its root in the environmental protection movement of the late 1960s and early 1970s, carrying capacity emphasized the harmful nature of land development beyond the limits of natural ecosystems. The concept of growth management of the 1980s, whose origins also lay in the environmental protection and land preservation movement indicated that the conceptual framework of growth management appeared in the late 1960s as interests in the environmental protection movement increased (Porter 1997, 8).

As some of the earliest examples of growth management at the local level, the city of Lexington, Kentucky, implemented “urban service area” in 1958 and the township of Ramapo, a suburb of New York City, implemented “urbanizing tier systems” in 1969. In the 1980s, growth management became a dominant term that dealt with the negative impact of urban sprawl. With these early experiments in growth management systems, a variety of growth management techniques have been implemented at the local, regional, and state levels across the country during the past 30 years (Freilich 1999).

Sustainable development of the 1990s also addressed the concepts of carrying capacity and growth management. The concept emerged as a broad and popular term after release of the 1987 Brundtland Report by the United Nations World Commission on Environment and Development (WCED), which defined sustainable development as “development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs” (WCED 1987, 8). At a subsequent United Nations conference on environment and sustainable development at Rio de Janeiro in 1992, the principles of sustainable development that dealt with problems in terms of environmental, social, and economic issues from local to global aspects were discussed.

Berke and Manta Conroy (2000, 23) emphasized the concepts of reproduction and balance in sustainable development, defining it as “a dynamic process in which communities anticipate and accommodate the needs of current and future generations in ways that reproduce and balance local social, economic, and ecological systems, and link local actions to global concerns.” The concept of sustainable development is very broad and can be applied to various project units—from a building to a global issue.

Similar to the term “sustainable development,” “smart growth” also became popular in the 1990s and has been one of primary concern to urban scholars, policy makers, and planning practitioners since the mid-1990s. While the concept of smart growth is also consistent with the fundamental concepts of carrying capacity, growth management, and sustainable development, it provides more specific strategies in terms of design, planning, and public policies for land use, transportation, housing, and the environment. The principal idea of smart growth is how to redirect future development

from the urban fringe to urbanized areas that possess significant amounts of buildable land by preserving open space and revitalizing existing communities.

Such smart growth strategies have been integrated with the more sophisticated design principles of “new urbanism,” which was introduced by architects and urban designers in the early 1990s. The fundamental concept of new urbanism is that physical forms of a built environment have a significant impact on human social behavior. Thus, this concept led to the more specific concepts of compact and mixed-use development, transit-oriented development (TOD), walkable communities, and attractive civic spaces. These principles of new urbanism are well matched with revitalization issues of smart growth strategies.

In addition to new urbanism at the micro scale, smart growth strategies need to be explained in the context of “new regionalism” at the macro scale. New regionalism has strong roots in the conventional regionalism developed in the early 19th century (Wheeler 2002). New regionalism indicates that a metropolitan area (or other regions on different scale) is an integrated system between the central city and suburbs. Therefore, new regionalism emphasizes the formation of regional coalitions that solve planning problems in urban and suburban areas.

2.7.1. Growth Management

The earliest example of growth management systems was the concept of the “urban service area,” implemented in Lexington, Kentucky in 1958, the purpose of which was to develop lands served by public services (e.g., sewer systems) and to protect farmland outside the designated urban service area (Roeseler 1982, 110). In addition to the earliest Lexington case, a more sophisticated example of growth management was implemented in the township of Ramapo, New York, in 1969. According to Fulton et al. (2002, 10-11), Ramapo’s growth management system, the earliest example of a growth management system, was innovative because it included (1) timing and sequencing, (2) a linkage between timing/sequencing and a capital improvement program, (3) an integration of planning, zoning, and a capital improvement program, and (4) lower taxes for some undeveloped land. Freilich (1999) emphasized the “urbanizing tier systems” that Ramapo developed for controlling urban growth. According to Freilich (1999, 7-8), the typical tier system that can be applied for metropolitan areas are Tier I (the central city), Tier II (first- or second-ring of built-up suburbs), Tier III (active growth areas), and Tier IV (rural and agricultural preservation areas). These tiers can be designated by their functionality, not by their administrative boundaries.

Influenced by these two examples of growth management systems, various types of growth management systems have been successfully implemented in several states and local governments across the country over the past 30 years. During the last two decades, growth management systems and techniques at the state, regional, and local levels have been comprehensively documented by urban scholars (Brower, Godschalk, and Porter

1989; Daniels 1999; DeGrove 1992; DeGrove and Metzger 1993; Freilich 1999; Kelly 1994; Knapp and Nelson 1992; Nelson and Dawkins 2004; Nelson and Duncan 1995; Porter 1997; Weitz 1999).¹¹ Growth management techniques, in general, include: (1) housing/population caps, commercial/industrial caps, and temporary moratoria, (2) urban growth boundaries (UGBs), urban service boundaries (USAs), urban limit lines, and the green belt, (3) concurrency, adequate public facilities (APF), and development impact fees, (4) zoning and other land use regulations such as planned unit developments (PUDs), the purchase of development rights (PDRs), and the transfer of development rights (TDRs), (5) financial or tax incentives for infill and redevelopment, (6) conservation easement and the direct purchase of land for conservation, (7) environmental regulations, and (8) tax-base revenue sharing. The applications and implementation of these techniques are diverse in terms of their strengths and flexibility at the local, community, regional, and state levels. Of these growth management techniques, Nelson and Duncan (1995) referred to the techniques of growth boundary (e.g., UGBs, USAs, urban limit lines, and the green belt) as “urban containment” policies.

Many urban scholars have provided definitions of growth management (See Table 2.4). In general, growth management is a policy tool that controls urban sprawl according to fundamental concepts of “where to grow” and “where not to grow.” Unlike conventional land use regulations, which only deal with the type and bulk of building,

¹¹ Dawkins and Nelson (2003, 4) identified U.S. states with statewide growth management program and date of adoption: Florida (Local Government Comprehensive Planning and Land Development Regulations Act and State Comprehensive Plan, 1985), Maine (Comprehensive Planning and Land Use Management Act, 1988), Maryland (Economic Growth, Resource Protection, and Planning Act, 1992), New Jersey (State Planning Act, 1986), Oregon (Land Conservation and Development Act, 1973), Rhode Island (Comprehensive Planning and Land Use Regulation Act, 1988), Vermont (Growth Management Act, 1988), and Washington (Growth Management Act, 1990).

growth management includes two other important concepts for development: timing and sequencing (Freilich 1999; Fulton et al. 2002).

Table 2.4. Definition of Growth Management

	Definition
Godschalk et al. (1977, 4)	“A conscious government program intended to influence the rate, amount, type, location, and/ or quality of future development within a local jurisdiction.”
Chinitz (1990, 4)	“Growth management seeks to maintain an ongoing equilibrium between development and conservation, between various form of development and the concurrent provision of infrastructure, between the demands for public services generated by growth and the supply of revenues to finance those demands, and between progress and equity.”
DeGrove (1992, 1)	“Growth management, far from being a code word for no-growth or slow-growth efforts, has as central to its meaning a commitment to plan carefully for the growth that comes to an area so as to achieve a responsible balance between the protection of natural systems—land, air, and water—and the development required to support growth in the residential, commercial, and retail areas.....It is deeply committed to a responsible fit between development and the infrastructure needed to support the impacts of development....”
Porter (1997, 10)	“A dynamic process in which governments anticipate and seek to accommodate community development in ways that balance competing land use goals and coordinate local with regional interests.”
Fulton et al. (2002, 3)	“Growth management measures are those local government land-use regulations that restrict the rate, intensity, type, and distribution of development in a jurisdiction whether adopted as an ordinance by the governing body or enacted through the initiative ballot process. ‘growth management schemes also regulate timing and sequencing of development within a community’ ”(Fulton 1999, 190).

Nelson and Duncan (1995) addressed the purposes of growth management in terms of five issues: (1) controlling urban sprawl, (2) protecting taxpayer money, (3) expediting economic development, (4) shaping efficient urban form, and (5) improving the quality of life. Nelson and Duncan (1995, 73) also argued that “the benefits of successful urban containment techniques can include greater predictability of the development process, more cost-effective provision of public services, encouragement of

infill and redevelopment of existing urban areas, reduction of urban sprawl, and protection of agricultural land and environmental resources.” In addition, Johnson (2001, 719) provided three goals of the urban growth boundary: “(1) to manage the rate of growth of residential and commercial development, (2) to increase use of mass transit, and (3) to encourage infill development of inner-ring suburbs as opposed to developing as far away from the central city as possible.” Thus, growth management or urban containment policies focus on two themes: revitalization and redevelopment in already urbanized areas served by public infrastructures and protection of the natural environment at the urban fringe.

Despite a significant amount of documentation and research on the growth management systems and their implementation, the impact of growth management systems on revitalization in already urbanized areas has not been comprehensively addressed in academic literature because the length of time after implementing growth management policies can be a critical factor in the analysis of their effects. Recently, however, Dawkins and Nelson (2003) assessed the impact of statewide growth management systems on central-city revitalization by analyzing the panel data of construction activities for 293 metropolitan areas. Their analyses indicated that statewide growth management programs have observable effects on residential construction activities in the central cities.

Subsequently, Nelson et al. (2004) also examined the impact of urban containment on central-city revitalization using construction data (i.e., residential and non-residential construction between 1985 and 1995) from 144 central cities in the U.S. They also categorized three urban containment policies based on their restrictions: closed

containment, isolated containment, and open containment. They found that central cities with containment policies in the metropolitan area showed more development than other central cities without such policies. However, they also found that suburban development was significant regardless of containment policies in the metropolitan area. Therefore, they surmise as follows: “urban containment appears to shift metropolitan development demand away from rural and exurban areas outside containment boundaries to suburban and urban areas inside themit suggests that central-city gains do not have to come at the cost of reduced development in suburban areas located within urban growth boundaries” (Nelson et al. 2004, 421). Although their research addressed only the relationship between urban containment policies and central-city revitalization, it shows that urban containment policies can be effective tools that revitalize the declining inner-ring suburbs. Inner-ring suburbs are also urbanized communities that have experienced physical deterioration and socioeconomic decline. Therefore, the revitalization issues of the inner-ring suburbs must be emphasized in growth management. Porter (1997) addressed this point as follows:

Growth management programs can be framed to address these problems [the vicious cycle of poverty concentration, social despair, and fiscal distress that plagues much of urban America] in fundamental ways, they can redirect economic and social forces by balancing the spread of new development with efforts to stabilize or revive existing neighborhoods, business centers, and industrial areas and by modifying tax and infrastructure investment policies that influence so many location decisions (Porter 1997, 177).

2.7.2. Smart Growth

The concept of “smart growth” has been defined in broad and various ways (see Table 2.5). It is believed that this term was coined by Los Angeles City Council candidate Ryan Snyder in 1988 (O’Neill 2000, 1).¹² Later on, Arigoni (2001, 1) defined it as “new policies and practices that, as a package, provide better housing, transportation, economic expansion, and environmental outcomes than do traditional approaches to development.” Another definition, “a well-planned development that protects open space and farmland, revitalizes communities, keeps housing affordable and provides more transportation choices,” was put forth by Smart Growth America. Nelson (2001, 1) defined smart growth as “a set of policies designed to achieve five goals: (1) preservation of public goods; (2) minimization of adverse land use interactions and maximization of positive ones; (3) minimization of public fiscal costs; (4) maximization of social equity; and (5), very broadly, maximization of the quality of life.”

As shown in Table 2.5, the various definitions of smart growth describe movements that control the negative impact of sprawl development and provide alternative ways for future growth. Smart growth is an alternative growth model that counters sprawl development by efficiently using natural and built environments that reduce a variety of socioeconomic inequalities and protect the natural environment.

¹² “In an article that appeared in the Los Angeles Times on November 20, 1988, Los Angeles city council candidate Ryan Snyder explained that he opposes slow growth because it unfairly shifts the development burden from one community to another. Rather, Snyder announced, I’m for smart growth” (O’Neill 2000, 1).

Table 2.5. Definition of Smart Growth

	Definitions
O' Neill (2000, 2)	"Smart growth is about ensuring that neighborhoods, towns, and regions accommodate growth in ways that are economically sound, environmentally responsible, and supportive of community livability-growth that enhances the quality of life."
Nelson (2001, 1)	"Smart growth as a set of policies designed to achieve five goals: (1) preservation of public goods; (2) minimization of adverse land use interactions and maximization of positive ones; (3) minimization of public fiscal costs; (4) maximization of social equity; and (5), very broadly, maximization of quality of life."
Arigoni (2001, 9)	"Smart growth is new policies and practices that, as a package, provide better housing, transportation, economic expansion, and environmental outcomes than do traditional approaches to development."
National Association of Home Builders (2002, 2)	"Smart growth means meeting the underlying demand for housing created by an ever-increasing population and prosperous economy by building political consensus and employing market-sensitive and innovative land use planning concepts. At the same time, smart growth means meeting that housing demand in "smarter" ways by planning for and building to higher densities, preserving meaningful open space and protecting environmentally sensitive areas."
Beck et al. (2003, 92)	Smart growth is "the use of a variety of land-use, planning, statutory, regulatory and other tools to reduce haphazard, low-density, and poorly planned development in a given region."
Litman (2003, 5-7)	"Smart growth refers to development principles and planning practices that result in more efficient land use and transportation patterns" and "smart growth involves a village with mixed commercial and medium-density residential development, and transportation systems that balance walking, cycling, driving, and public transit."
Smart Growth America ¹	"Smart growth is well-planned development that protects open space and farmland, revitalizes communities, keeps housing affordable and provides more transportation choices."
Vermont Forum on Sprawl ²	"Smart growth is growth that fosters economic vitality in community centers while maintaining the rural working landscape."
Environmental Protection Agency ³	"Smart growth is development that serves the economy, the community, and the environment. (It changes the terms of the development debate away from the traditional growth/no growth question to 'how and where should new development be accommodated.')."
City of Asheville ⁴	Smart Growth is "a development pattern that makes efficient use of our limited land, fully utilizes our urban services and infrastructure, promotes a wide variety of transportation and housing options, absorbs and effectively serves a significant portion of the future population growth, ..., protects the architectural and environmental character of the City through compatible, high quality, and environmentally-sensitive development practices."

¹ Smart Growth America: Introduction to smart growth, <http://www.smartgrowthamerica.com> (accessed on 10/25/03)

² Vermont Forum on Sprawl: <http://www.vtsprawl.org/Learnabout/smartgrowth/smartgrowthmain.htm> (accessed 10/28/03)

³ Environmental Protection Agency: <http://www.epa.gov/smartgrowth> (accessed 10/28/03)

⁴ The City of Asheville: <http://www.ci.asheville.nc.us/planning/new.htm> (accessed 10/28/03)

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Downs (2001) identified fourteen elements of smart growth and surveyed the extent of agreement about them among four different groups (anti- or slow-growth advocates and environmentalists, pro-growth advocates, inner-city advocates, and better-growth advocates). While he concluded that these groups have formed differing concepts of smart growth, he found general agreement about four elements of smart growth: (1) preserving open space and protecting the quality of the environment; (2) redeveloping inner-core areas and developing infill sites; (3) removing barriers to urban design innovation in both cities and new suburbs; and (4) creating a greater sense of community.

Table 2.6. Comparison of Smart Growth Principles

Smart Growth Principles	Danielsen (1999)	O'Neill (2000)	Downs (2001)	SGN* (2001)	APA* (2002)	NAHB* (2002)	Litman (2003)
Revitalization of existing community	○	○	○	○	○	○	○
Reuse of existing infrastructure	○	○	○	○	○	○	○
Infill development	○	○	○	○	○	○	○
Mixed use development	○	○	○	○	○	○	○
Housing affordability Diverse housing choices	○	○		○	○	○	○
Alternative transportation modes	○	○		○	○		○
Remove barriers and provide incentives for smart growth		○	○	○		○	○
Sense of community			○	○	○		○
Higher-density compact development	○			○	○	○	
Open space preservation		○	○	○	○		
Pedestrian friendly streets			○	○	○		
Collaboration and citizen participation		○		○	○		

* SGN: Smart Growth Network; APA: American Planning Association; NAHB: National Association of Home Builders

In Table 2.6, this research compares smart growth principles that have appeared in the planning literature.¹³ The table reveals common emphases on revitalization of existing communities, reuse of the existing infrastructure, infill development, and housing affordability for smart growth principles. In other words, the focus of smart growth is on revitalizing urbanized areas with infill development and redevelopment as well as on formulating revitalization strategies for protecting open space at the fringe.

Table 2.7. Alternative Ways to Supply Housing

	Ranking*		
	First	Second	Third
Build new homes in outlying areas	29%	26%	45%
Build new homes in existing, partially developed suburban areas	37%	51%	12%
Build new homes on vacant land in the central city or inner suburbs	35%	23%	42%

* Survey question: there are at least three ways to direct development to meet housing needs due to growth in number of households. Please rank them (1 is most preferred; 3 is third-most preferred).

Source: National Association of Home Builders (2002, 6). Reprinted with permission.

One of the groups that emphasize “revitalizing older suburban and inner-city markets” as a smart growth principle was the National Association of Home Builders (NAHB 2002), which conducted a survey on housing choice and smart growth with a 2000 household sample that was derived from a national panel of households maintained

¹³ It should be noted that Yun (2002) has already provided the comparison table for smart growth principles and characteristics of Smart Growth America (SGA), American Planning Association (APA), Urban Land Institute (ULI), and Congress for New Urbanism (CNU). In addition, the Smart Growth Network and International City/County Management Association (2002) provide 10 principles and specified 100 policy implementation for smart growth (See Appendix Table A-2).

by the National Family Opinion (NFO). One of the survey questions asked about the alternative ways to meet housing needs in the future. As can be seen in Table 2.7, “building new homes in the central city or inner-ring suburbs” was a close second to “building new homes in existing, partially developed suburban areas” (NAHB 2002). This survey result indicated that inner-ring suburbs can be potential candidates for supplying housing to accommodate the future growth of metropolitan region.

Proponents of smart growth agree that revitalizing established areas as the inner-ring suburbs is a critical component to the smart growth strategy, and the literature has confirmed this belief. For example, Hudnut has described these areas as pivot points in metropolitan areas, arguing that because they are old and stressed, they require “urban acupuncture” to revitalize them and prevent further loss to the outer-tier suburbs¹⁴:

If the inner ring communities survive, they will have a huge impact on both the center city and the suburbs out in the second, third, and fourth tiers. And if the first tier does not reinvent itself, 30 or 40 years from now, many of today’s younger second and third tiers of suburbs may find themselves in the same leaky boat (Hudnut 2003, 41).

Smart growth also requires the establishment of affordable housing. Because many suburban areas limit the amount of affordable housing in their jurisdictions through exclusionary zoning, and housing prices in central cities can be too costly for low-to-moderate income households, revitalization strategies in the central city and inner suburbs could ease the housing problem by specifically providing affordable housing for

¹⁴ Hudnut noted that the phrase [urban acupuncture] was coined by the legendary mayor of Curitiba, Brazil, Jaime Lerner.

low to moderate income households. Hudnut (2003) pointed out the potential advantage inner-ring suburbs offer for alleviating the affordable housing crisis:

The affordable housing crisis offers first-tier suburbs an opportunity to promote aggressively the development of workforce housing and mixed-income communities....located as they are, halfway to everywhere, it makes sense for first-tier suburbs to capitalize on their geographical advantage by providing a broad spectrum of housing choices for a range of incomes, combining the benefits of affordability with better proximity to jobs for low- and moderate-income workers (Hudnut 2003, 263-264).

2.7.3. New Urbanism

Along with the smart growth movement, the urban design movement, called “new urbanism,” appeared in the early 1990s and offered alternative development strategies to the conventional sprawl pattern of land development. After the founding of the Congress for New Urbanism (CNU) in 1993, the principles and strategies of new urbanism have been rigorously implemented across the country. These principles and strategies of new urbanism include compact and mixed-use development, pedestrian-oriented development, and transit-oriented development (TOD) at a variety of project scales from building to regions (Calthorpe 1993; Calthorpe and Fulton 2001; CNU 1999; Duany, Plater-Zyberk, and Speck 2000; Katz 1994). Despite the fundamental concepts of new urbanism that originated from architects and urban designers, the principles and strategies of new urbanism are also consistent with the broad goals of the smart growth movement.

Bohl (2000, 762) defined new urbanism as “a movement in architecture and planning that advocates design-based strategies based on traditional urban forms to help arrest suburban sprawl and inner-city decline and to build and rebuild neighborhoods, towns, and cities.” He examined the applications and implementation of New Urbanism within the context of urban revitalization and regeneration. He concluded that the principles of design and policy in new urbanism can be potentially effective tools for revitalizing distressed inner-city neighborhoods. He pointed out that the principles and strategies of new urbanism, such as diverse and mixed-use development, have been applied to inner-city revitalization through the HOPE VI and Homeownership Zone Programs of U.S. Housing and Urban Development (HUD). However, he also observed

that design and planning practices of new urbanism have exclusively focused on suburban applications regardless of the increasing numbers of new urbanist infill projects in urbanized areas.

By contrast, Ellis (2002, 267) argued that “new urbanism has long since moved beyond its first greenfield projects into a wide range of inner-city infill developments at unmistakably urban densities,” defending the “new suburbanism” challenged by critics. Deitrick and Ellis (2004) introduced four new urbanist projects in terms of three types of strategies for inner-city revitalization in Pittsburgh: community infill, neighborhood infill, and scattered-site infill. They emphasized the significant efforts of new urbanists in the community revitalization of the inner city.

Despite the applications of new urbanism to inner-city revitalization with infill development, the principles of new urbanism have not been applied in declining inner-ring suburbs. Unlike the neighborhoods in the inner cities, those in the inner-ring suburbs are dispersed single-family residential areas experiencing physical deterioration in housing, commercial malls, and public infrastructures. However, the principles of new urbanism can be effectively applied to the revitalization strategies in the inner-ring suburbs. Hudnut argued “implementing new urbanist/neotraditionalist principles in the first tier [inner-ring suburbs] would provide a useful antidote to that low-density, automobile-dependent development we call sprawl in the natural areas outside cities and towns” (Hudnut 2003, 382).

2.7.4. New Regionalism

With a long history beginning in the early 19th century, the diverse concepts of regionalism have developed over time. Wallis (1994) identified three waves of regionalism in the evolution of regions: monocentric city regions during the industrialization era, polycentric metropolitan regions, and globally competitive post-industrial regions. Foster (2001) provided several types of regions and regionalism, arguing that metropolitan regions are the focus of discussion for regionalism.¹⁵

Table 2.8. Historic Eras of Regional Planning

Era	Key Figures	Characteristics
Ecological regionalism (early 19 th century)	Geddes, Howard, Mumford, MacKaye	Concerned with problems of the overcrowded 19 th -century industrial city; tried to balance city and countryside; relatively holistic, normative, and place-oriented approach.
Regional science (late 1940s to present)	Isard, Alonso, Friedmann	Emphasized regional economic development, quantitative analysis, and social science methods.
Neo-Marxist regional economic geography (late 1960s to present)	Harvey, Castells, Massey, Sassen	Developed analysis of power and social movements within the region.
Public choice regionalism (late 1960s to present; most dominant in the 1980s)	Tiebout, Ostrom, Gordon, Richardson	Analyzed region in terms of a free-market version of neo-classical economics.
New regionalism	Calthorpe, Rusk, Downs, Yaro, Hiss, Orfield, Katz, Pastor	Concerned with the environment and equity as well as economic development; focused on specific regions and the problems of postmodern metropolitan landscapes; often relatively place-oriented; often action-oriented and normative.

Source: Wheeler (2002, 269)

¹⁵ Region: bioregions, economic regions, cultural regions, administrative regions, political regions, marketing regions, service regions. Regionalism: environmental regionalism, economic regionalism, political regionalism, equity regionalism, growth-based regionalism, cultural regionalism, ad hoc regionalism. See Foster (2001) for the details.

As shown in Table 2.8, Wheeler (2002) provided five historic eras for regional planning: logical regionalism (early 19th century), regional science (late 1940s to the present), neo-marxist regional economic geography (late 1960s to the present), public choice regionalism (late 1960s to the present), and new regionalism (1990s to the present). He argued that new regionalism is concerned with the environment and equity as well as economic development. According to Wheeler, new regionalism “(1) focuses on specific territories and spatial planning; (2) tries to address problems created by the growth and fragmentation of postmodern metropolitan regions; (3) takes a more holistic approach to planning that often integrates planning specialties such as transportation and land use as well as environmental, economic, and equity goals; (4) emphasizes physical planning, urban design, and sense of place as well as social and economic planning; and (5) often adopts a normative or activist stance” (Wheeler 2002, 270).

The focus of new regionalism, with its emphasis on the environment, equity, and economic development, is to understand the interdependent relationship between the central city, sub-centers, and suburban rings in the metropolitan region. The early 1990s witnessed a significant number of debates on the relationship between the central city and suburbs in the literature, with many researchers emphasizing the regional context when dealing with the decline of central city and economic inequalities between the central city and the suburbs as well as the negative impact of sprawl (Byrum 1992; Calthorpe 1993; Cisneros 1993; Downs 1994; Katz 2000; Orfield 1997, 2002; Pastor 2001; Pastor et al. 2000; Rusk 1993, 1999, 2003; Savitch 1993; Voith 1992; Yaro 1996).

The rationale behind the regional approach assumes significant relationships between the central city and suburbs. Mumphrey and Akundi (1998, 149) summarize the

current debate on this relationship with six hypotheses: suburban dependence, the edge city, elasticity, downtown dependence, interdependence, and the tight labor market.

Suburban dependency hypothesizes that since suburbs depend on the well-being of the central city, the decline of the central city leads to the decline of the suburbs. Ledebur and Barnes (1992; 1993) compared employment growth, per capita income, and median household income from a sample of 56 metropolitan areas between 1988 and 1991. They found that 82 percent of the variation in suburban median household income is explained by central-city median household incomes. As a result, they concluded that central city decline leads to suburban decline, justifying reinvestment in the central cities, and stated “if cities and suburbs are ‘in it together,’ a strong economic justification can be made for addressing the needs of central cities and cooperation among cities and suburbs to meet the mutual economic needs of their metropolitan area” (Ledebur and Barnes 1993, 3).

Voith (1992) correlated percentage changes in population, income, and employment between the central city with those of the suburbs within the Philadelphia Federal Reserve District. His analysis led to the conclusion that cities and their suburbs are complementary. Savitch et al. (1993) also argued that the central city and their surrounding regions are highly interdependent. Their correlation analysis of the per capita income between the 59 central cities and their suburbs in 1979 and 1987 showed that the correlations were statistically significant. However, critics of the suburban dependency hypothesis criticized previous studies on the relationship between central cities and suburbs (Blair and Zhang 1994, Hill and Wolman 1995; Ihlanfeldt 1995; Swanstrom 1996). They argued that previous research ignored external factors in the regression

models. They argued that the apparent correlations between suburban and central-city growth might be attributed to overall state economic development.

The suburban dependency theory was proposed by Bingham and Kalich (1996), who conducted analyses of income and commuting trends in Cleveland, Ohio. The downtown dependency hypothesis, unlike the suburban dependency hypothesis, which argues that the Central Business District (CBD) depends on the suburbs, showed that commuting by suburban residents into the downtown area increased from 1980 to 1990, supporting the notion that the CBD depends on the central city. In addition, they described the commuters from the suburbs to downtown: professional, highly skilled, well-paid, white collar, and well educated (Bingham and Kalich 1996, 166). Although the downtown dependence hypothesis has its own strengths that explain the relationship between the central city and the suburb, it also has some limitations. One is that it does not deal with polycentric urban structure because it assumes metropolitan areas are characterized by a traditional monocentric model. Another limitation is the unspecified definition of the central city and the CBD. This hypothesis does not consider central-city agglomerations not located in the CBD (Mumphrey and Akundi 1998, 154).

The edge-city hypothesis, developed by Blair and Zhang (1994) assumes that suburbs are evolving into self-sufficient cities with their own employment centers competing with the central cities (Fishman 1987; Garreau 199; Muller 1986). To examine the implications of the edge-city hypothesis, they divided the metropolis into three areas: the central city, the inner suburbs, and the outer suburbs. While the correlation between income change in the central city and that in the inner suburbs is strongly tied to the income change of the state, a correlation between the income change in the central city

and that in the outer suburbs does not exist. Thus, they concluded that the extent of suburban dependency is smaller than previous believed.

The elasticity hypothesis, proposed by Rusk (1993) analyzed the relationship between the central city and the suburbs. He argued that cities that acquire vacant land resulting from expanding borders for new development have higher levels of economic growth and development. According to Rusk, while cities with the greatest elasticity had vacant city land to develop and political and legal tools to annex new land, cities—typically older cities—with inelasticity were unable or unwilling to expand their city limits (Rusk 1993, 10). Rusk measured central-city elasticity to analyze changes in per capita income, population, and employment and calculated the index of central-city elasticity by adding the city's initial density ranking and three times the ranking for its percentage of increase in its territory. His analysis shows that the population growth in elastic cities was evenly distributed between the central city and the suburbs while the population growth in inelastic cities was concentrated in suburbs. On the basis of his analysis, he argued for the creation of metropolitan governments and tax sharing between the central city and the suburbs.

Blair, Staley, and Zhang (1996) reviewed Rusk's article and criticized several aspects of his research. First, they argued that Rusk did not control the effect of the state-level and regional-level variables. Second, they argued that the assumption that economic development takes place on vacant, undeveloped land expanded by annexation is not true because the potential for redevelopment in the central city is greater since the central city often contains abandoned sites and other open lands for development. Third, they argued Rusk's argument that "elastic cities expand their city limits; inelastic cities do not" may

be a statistical artifact because elastic cities may simply capture economic growth by absorbing a relatively wealthier, suburban population through territorial expansion (Blair and Zhang 1994). They also found modest evidence that central city elasticity enhances growth, which is supported by Rusk. On the contrary, they found that elasticity does not explain changes in per capita income and poverty levels in metropolitan areas.

Mumphrey and Akundi (1998) reviewed previous literature on the relationship between cities and regions and provided theoretical insights into the “interdependency hypothesis.” They argued that this hypothesis is certainly different from the dependence hypothesis in that it assumes an equal or nearly equal power relationship between the central city and the suburbs. In other words, the central city and the suburbs have their independencies from each other while they also have their dependencies on each other. Mumphrey and Akundi (1998, 154) explained the interdependent relationship as follows: “One source of interdependence between the central city and suburbs is the agglomeration of economic activity. Suburbs rely on the central city because certain types of economic activity agglomerate at the center. Similarly, the central cities rely on suburbs because certain types of economic activity agglomerate in suburban locations.”

The last hypothesis, the “tightening labor markets hypothesis” highlights the imputation of causality and the lack of controls in the regression models of previous research, which fails to explain the relationship between the central city and the suburbs. The proponents of this hypothesis argued that conditions in the central city influence the economic production of metropolitan areas because of existing complementary relationship. Hill and Wolman (1995) cited three areas that are negatively affected by economic and social decline of the central city. First of all, the concentration of poor

people in the central city deteriorates the capital stock of firms in the central city, generating higher operating costs. These costs place a burden on suburban firms because of the function of the central city as the hub of many critical infrastructure systems. Second, the decline of the central city generates fiscal externalities that not only deteriorate the relative quality of life—education or public goods—in the central city, but also affect suburbs in the long run. As a result, agglomeration economies can be lost because of disinvestment due to severe fiscal externalities in the central city. Hill and Wolman (1995, 1997) argued that the inequalities in income are primarily generated by the degree of tightness or looseness in the regional labor market. Because of this aspect of a labor market, the recent decline in demand for unskilled and semiskilled labor will result in differences in the spatial distribution of earnings across metropolitan areas (Hill and Wolman 1995). Hill and Wolman (1997) examined the impact of the tightness in labor market on income disparities in the central city and the suburbs. Their results show that a tightening labor market will not reduce income disparities because central city labor is not a substitute for suburban labor. In other words, economic growth and increased employment in the suburbs widens rather than narrows the economic gap between the central city and the suburbs. They conclude that “disparities can be narrowed if central cities are better able to attract and retain residents with higher levels of education” (Hill and Wolman 1997).

Thus far, many researchers have acknowledged a significant relationship between the central city and the suburbs. The U.S. Housing and Urban Development (1999) claims that the regional approach may solve many of the problems confronting metropolitan areas, stating:

There is a strong consensus on the need for joint city/suburb strategies to address sprawl and the structural decline of cities and older suburbs. We now have a historic opportunity for cooperation between cities and counties-urban as well as suburban-to address the challenges facing our metropolitan areas (HUD 1999, i).

Thus, the issue of the declining inner-ring suburbs needs to be addressed through regionalism and regional planning efforts. Hudnut (2003) emphasizes the existence of the inner-ring suburbs relating to the central city and outer-ring suburbs in a regional context. Fitzgerald and Leigh (2002, 22) observed that “the new regionalism, which includes the new smart-growth movement, is calling for metropolitan or regional strategies to prevent the decline of inner cities and inner-ring suburbs while stemming urban sprawl.” They suggested that the inner-ring suburbs should be emphasized in smart growth strategies stemming from sprawl because of their locational advantages and existing infrastructures that will accommodate the future growth of the metropolitan region.

2.8. Limitations of Existing Literature

A number of researchers have addressed the decline of the suburbs and subsequent problems. However, only a slim body of research on the inner-ring suburbs, has dealt with their role in metropolitan smart growth strategies, leading to the following needs for research.

2.8.1. Emergence of the Multi-Ring Polycentric Metropolitan Structure

Research has traditionally been limited in its analytical reliance on the inherent dichotomous structure of the central city and the suburbs. The main premise of this approach is that the metropolitan region had a monocentric structure (See Diagram A in Figure 2.1). However, the structure has changed considerably. Metropolitan regions have evolved into diverse areas consisting of the downtown, the inner city, inner-ring suburbs, outer-ring suburbs, and suburban sub-centers, but official definitions of the central city and the suburbs do not reflect this change. Thus, any data that were generated according to official definitions and that were used in the analyses of the metropolitan structure and its suburban rings and sub-centers are not sufficient.

To reflect the change in structure, this research advocates a new approach that accounts for suburban differentiation as well as the polycentric form (See Diagram B in Figure 2.1). This approach treats the metropolitan region as an interactive system comprised of the downtown, the inner city, inner-ring suburbs, outer-ring suburbs, sub-centers, and exurbs. Thus, the approach considers the inner-ring suburbs separate entities

within the context of the entire metropolitan system. This approach will compel planners, urban scholars, and policy makers to develop strategies that support smart growth for each subarea as well as for the metropolitan region as a whole.

2.8.2. Identification of the Inner-Ring Suburbs

No methodological technique that facilitates the identification of the geographic boundaries of the inner-ring suburbs below the municipal level has been proposed in the literature. Most prior research has regarded suburban areas as “the portion of the metropolitan area located outside of the central city,” a definition put forth by the Office of Management and Budget (U.S. Department of Commerce 1994). However, most central American cities have expanded their territory through annexations (Baldassare 1986); hence, the distinction between the central city and the suburb lacks clarity. That is, a certain portion of the suburban areas has already been included in the official territory of the central cities. Furthermore, Persky and Wiewel (2000) treat suburban areas as monolithic portions outside the central city, indicating that a statistical average used for all suburbs outside the officially defined central city could produce misleading results.

Downs (1997, 359) simply defined the inner-ring suburbs as “legally separate communities immediately adjacent to and contiguous with the central city of a metropolitan area.” Orfield (1997) provided a map of the central cities, inner-ring suburbs, mid-developing suburbs, east-developing suburbs, and southern and western developing suburbs of the Minneapolis and St. Paul metropolitan region. Although the map accounts for the diversity of all the suburban areas, it is based on a municipal

boundary of a city or a county. The notion of municipal boundaries was also used by Persky and Kurban (2001) to identify older suburbs, middle suburbs, new suburbs, and satellites for the metropolitan Chicago area. However, this notion is inadequate for the inner-ring suburbs, as county and municipal boundaries are too crude. According to Puentes and Orfield (2002), the methods for designating areas as inner-ring suburbs, including adjacency to the central city, age of suburbs, age of housing, and urban counties, and distance from the central city, have limitations. Distance from the central city and adjacency to the central city are not applicable because of the diverse size and growth patterns of metropolitan areas as well as their level of jurisdictions adjacent to the central city. Puentes and Orfield also claimed that measuring the age of the suburbs or the housing is not a suitable method for identifying inner-ring suburbs.

Instead, this research contends that neighborhood geographies, which may or may not correspond to jurisdictional boundaries and that are identifiable by time of development should be used to identify the inner-ring suburbs. Although this research has criticized the use of the census definition of the suburbs as a portion of the metropolitan area beyond the central city, the U.S. Census actually provides a useful measure for defining the inner-ring suburbs based on a principal feature of the inner-ring suburbs: the dominance and concentration of housing stocks built between 1950 and 1969. As a result, this research proposes the following definition of the inner-ring suburbs: low-density, single-family residential suburban areas built between 1950 and 1969.

2.8.3. Development of a Model that Addresses the Decline of the Inner-Ring Suburbs

Clearly, a more accurate definition of the inner-ring suburbs is needed. In addition, theoretical model must be developed based on an empirical understanding of the inner-ring suburbs such that the inner-ring suburbs are recognized and acknowledged for their contribution to metropolitan decline. To address this need, this research proposes two concepts: the general decline model and selective decline model. The former model attempts to explain why the inner-ring suburbs may be the areas most vulnerable to decline within the metropolitan region, unlike the traditional concept, which considers the inner cities the most vulnerable. A conceptual model of the general decline of the inner-ring suburbs is correlated with three critical trends in metropolitan areas: spillover of blight from the inner cities into the adjacent inner-ring suburbs, the back-to-the-city movement (i.e., movement to the inner city and downtown areas that skips over the inner-ring suburbs), and continued decentralization to the outer-ring suburbs.

The critical impact of spillover from blighted areas, however, is not likely to be uniform in all metropolitan areas, even in the inner-ring suburbs. Research by Lucy and Phillips (1995, 2000a) and Kotkin (2001) provided some empirical evidence that inner suburbs have actually thrived within some major metropolitan areas. This finding calls for a selective decline model of the inner-ring suburbs. Despite the lack of a clear explanation for why some inner-ring suburbs thrive, Leinberger (1995) provided some explanation that may be useful for the development of a selective decline model of the inner-ring suburbs. He found in the Minneapolis-St. Paul region that spatial growth

patterns from the central city to the outer-ring suburbs occurred in a “favored quarter,”¹⁶ described as “the fertile crescent,” which consisted of only 27 percent of the region’s population but received 83 percent of all federal and state road investment in the 1980s (Walljasper 2000). This region experienced most of the job growth and upper-income residential development, suggesting that the inner-ring suburbs within “favored quarter” areas may not experience decline, but instead, thrive.

2.8.4. Empirical Studies of the Metropolitan Areas with Different Growth Patterns

Another limitation of the existing body of research on the inner-ring suburbs is that it lacks empirical studies of the metropolitan areas with different growth patterns and policies. Most of the existing research has been based on the analysis of mature metropolitan regions located in the Midwest or Northeast. In fact, the issue of the decline of the inner-ring suburbs appears not to have been a concern of policy makers in fast-growing metropolitan regions, perhaps due to their strong economies. However, the inner-ring suburbs of fast-growing metropolitan areas may have begun to show the same symptoms experienced in inner cities over the past decades (i.e., white flight, population and employment loss, and increases in low-income minority households and poverty). In addition, no research has empirically investigated the impact of metropolitan growth policies (e.g., urban containment policies) on intra-regional spatial differentiation and inner-ring suburban decline.

¹⁶ The concept of favored quarter area is basically based on the urban sectoral model by Hoyt (1939) who emphasized the axial growth patterns of upper-income households from CBD modifying Burgess’s concentric urban growth model.

CHAPTER 3

METHODOLOGY

3.1. Case Study Areas, Analysis Unit, and Data Sources

This dissertation selected four U.S. metropolitan areas—Atlanta, Cleveland, Philadelphia, and Portland—for the examinations of the demographic, socioeconomic, and housing conditions found in the inner-ring suburbs and analyzed the inter- and intra-regional spatial differentiations and the decline of the inner-ring suburbs from 1970 to 2000 (See Figure 3.1). This research sought to analyze a metropolitan area from each of the four major regions of the U.S, and then made specific decisions that reflected the distinctive growth (or decline) patterns of each metropolitan area and its urban and regional policies. Unlike most prior empirical research on suburban decline that analyzed mature metropolitan areas located in the Midwest or Northeast, this research expanded the geographical analysis of the inner-ring suburbs to the fast-growing metropolitan regions: Atlanta in the South and Portland in the West.

In a recent study of 83 metropolitan regions conducted by Smart Growth America, the Atlanta metropolitan area was ranked one of the most sprawling regions as well as the one of the fast growing areas in the country (Ewing et al. 2002). Census 2000 revealed that the population of the metro Atlanta 13-county region reached 3.7 million, a dramatic increase of 153.2 percent from 1970 to 2000 (See Table 3.1). Furthermore, the City of Atlanta experienced an increase of 5.7 percent from 394,017 in 1990 to 416,474 in 2000, reversing a 20-year trend in population decline. The Atlanta metropolitan can be

a useful case study area for analyzing the impacts of strong decentralization and central city rebound on the intra-regional spatial differentiation and the decline of the inner-ring suburbs.

Table 3.1. Population Changes

Metropolitan Region (Central City)	Population				Change Rate (%)			
	1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta Region	1,460,670	1,950,003	2,653,616	3,698,679	33.5	36.1	39.4	153.2
(City of Atlanta)	494,864	422,633	394,017	415,474	-14.6	-6.8	5.4	-16.0
Cleveland Region	2,063,097	1,898,116	1,830,965	1,863,479	-8.0	-3.5	1.8	-9.7
(City of Cleveland)	750,707	573,691	505,556	478,393	-23.6	-11.9	-5.4	-36.3
Philadelphia Region	4,816,771	4,715,681	4,856,965	5,036,646	-2.1	3.0	3.7	4.6
(City of Philadelphia)	1,947,771	1,687,222	1,585,577	1,517,550	-13.4	-6.0	-4.3	-22.1
Portland Region	880,454	1,105,127	1,239,841	1,529,211	25.5	12.2	23.3	73.7
(City of Portland)	507,897	481,847	490,239	533,603	-5.1	1.7	8.8	5.1

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

The Portland metropolitan region is known for its growth management policies. In the early 1970s, Oregon's statewide land-use planning created boundaries for urban growth. The Urban Growth Boundary (UGB) of the Portland metropolitan area is now a nationally regarded model for growth management systems and can be an effective model for revitalizing the central city and inner-ring suburbs because it encourages development within its boundary. The four-county population of the Portland metropolitan area was 1.5 million in 2000, experiencing an increase of 73.7 percent from 1970 to 2000. The City of Portland also experienced an increase of 8.8 percent in population during the last decade, with 533,603 people in 2000. Given its growth rates and growth management

policies, the Portland region is an appropriate area for a case study in which the impact of urban containment policies on the intra-regional spatial differentiation and the decline of inner-ring suburbs will be explored.

To contrast with the fast-growing metropolitan areas, this research also includes the Cleveland and Philadelphia metropolitan areas. Both metropolitan areas experienced very slow growth, accompanied by central city population loss, over the past decades. The Cleveland metropolitan area has a unique coalition of “First Suburbs Consortium (FSC),” created by elected officials from the first suburban communities in 1996. The FSC aims at revitalizing mature, developed communities with raising public and political awareness of the problems in deteriorating first suburbs (Ohio First Suburbs Consortium 2004). The Ohio FSC is the largest government-led organization in the country for the first suburban revitalization and includes 15 communities adjacent to or near the City of Cleveland.¹⁷ The population of the four-county metropolitan area of Cleveland lost 9.7 percent, from 2.1 million in 1970 to 1.7 million in 2000. However, the population of this region increased 1.8 percent in the 1990s, reversing the continuous decline from 1970 to 1990. Although this region showed a slight increase in population in the last decade, the population of the City of Cleveland decreased 36.3 percent, from 750,707 in 1970 to 478,393 in 2000.

According to research by the Delaware Valley Regional Planning Commission (DVRPC 1998, 2003), the Philadelphia metropolitan region also has emerging problems in the first generation communities that developed in the decades following World War

¹⁷ The FSC member communities include Bedford, Bedford Heights, Brook Park, Cleveland Heights, Cuyahoga Heights, Euclid, Fairview Park, Garfield Heights, Lakewood, Maple Heights, Parma, Shaker Heights, South Euclid, University Heights, and Warrensville Heights, <http://www.firstsuburbs.org/neohio/index.htm> (accessed on July 7, 2004).

II. The population of the Philadelphia metropolitan region increased 4.6 percent from 1970 to 2000, despite having decreased slightly in the 1970s. However, the population of the City of Philadelphia decreased 22.1 percent, from 1.95 million in 1970 to 1.52 million in 2000. The metropolitan Philadelphia area is one of the most matured regions in the country; thus, it should provide useful insights into the patterns of growth and decline in the inner-ring suburbs.

With four case study metropolitan areas, this dissertation explored intra- and inter-regional spatial differentiations and the decline of their inner-ring suburbs. The unit of analysis for the case studies is the census tract, which overcomes a key limitation of the existing literature that has used municipal levels—city and county—as units of analysis. The tract-based approach also allows a more specific analysis of the inner-ring suburbs relative to the downtown, the inner city and the outer-ring suburbs.

The primary data source is the Neighborhood Change Database (NCDB) produced by GeoLytics, which contains longitudinal Census Long and Short Form Data of 1970, 1980, 1990, and 2000.¹⁸ These data allow a comparison of changes over time because all the tract boundaries were normalized to the tract boundary of 2000. The NCDB is a unique database that provides longitudinal, cross-sectional census data for every tract in the country from 1970 to 2000.

¹⁸ “Census CD Neighborhood Change Database (NCDB) gives us access to US Census data from 1970, 1980, 1990 and 2000 at the census tract level. This easy-to-use product was developed in association with The Urban Institute and partially funded by Rockefeller Foundation. It is the only source of census data with variables and tract boundaries that are consistently defined to the 2000 Census tract boundaries. It is an invaluable resource for policy makers, community organizations, and researchers who want to analyze changes that have occurred in U.S. neighborhoods over four census decades,” <http://www.geolytics.com/USCensus,Neighborhood-Change-Database-1970-2000,Products.asp> (accessed on July 4, 2004).

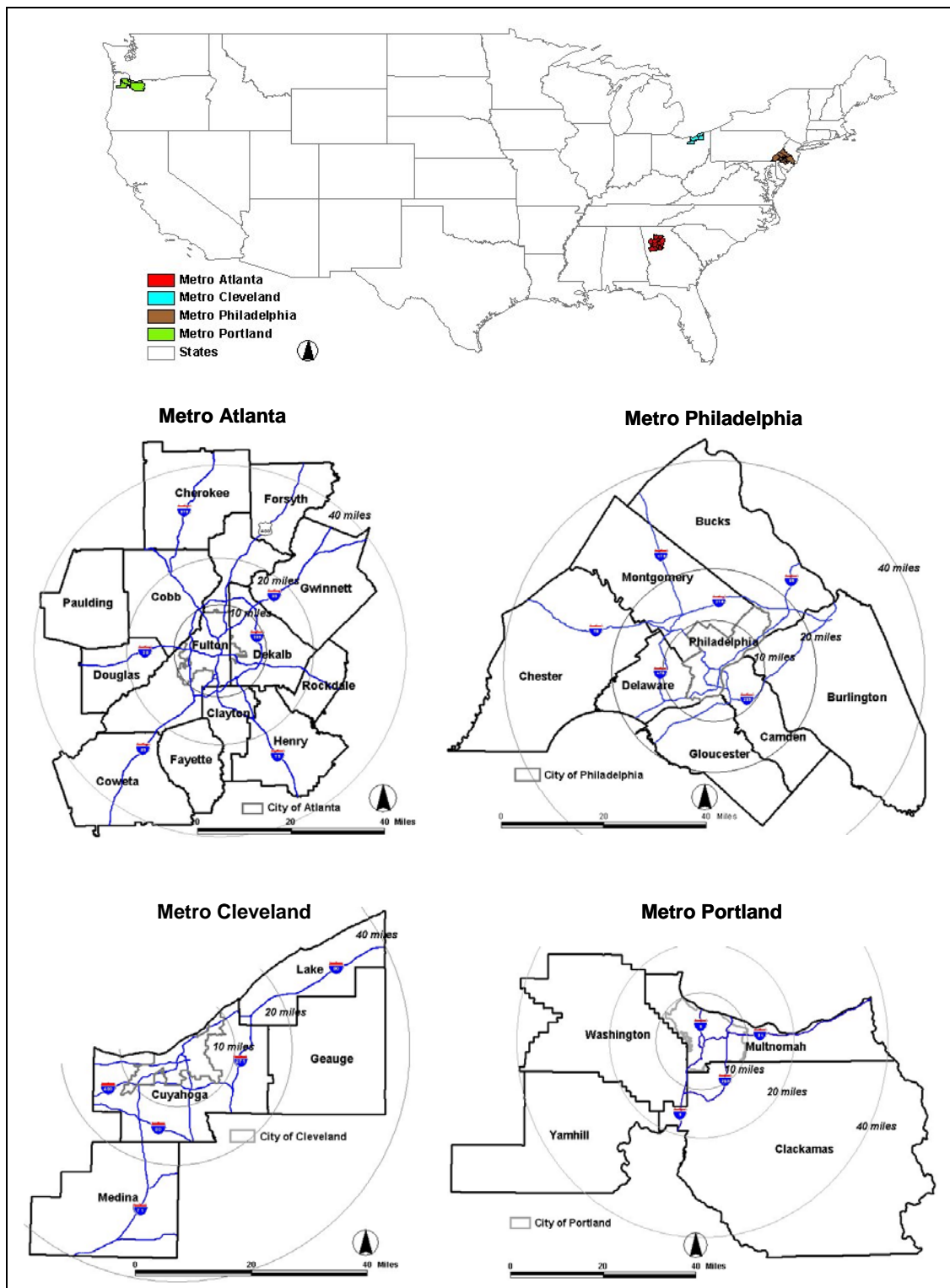


Figure 3.1. Case Study of Metropolitan Areas

3.2. Research Methods

3.2.1. Methodological Flow

The methodological flow for analysis begins with the definitions and the identifications of the four subareas in each metropolitan area: the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs (See Figure 3.2). These subareas were identified from an analysis of housing stock for specified time periods using the “predominance level” and the “density contour” of specified housing stock.

Next, this dissertation identified four areas of research and analyzed them with descriptive statistics, multivariate statistics, and GIS analyses. The four research areas are intra- and inter-regional differentiations, the general decline model of the inner-ring suburbs, the selective decline model of the inner-ring suburbs, and the impact of metropolitan growth patterns and policies on the decline of the inner-ring suburbs and socioeconomic disparities among the four subareas. For each analysis, this study provides a specific hypothesis, statistical model, selected variables, analyses, and findings.

Finally, this research documents findings and discusses planning and policy implications for both the inner-ring suburbs and the entire metropolitan region of each metropolitan area in the context of smart growth strategies at the local and regional levels.

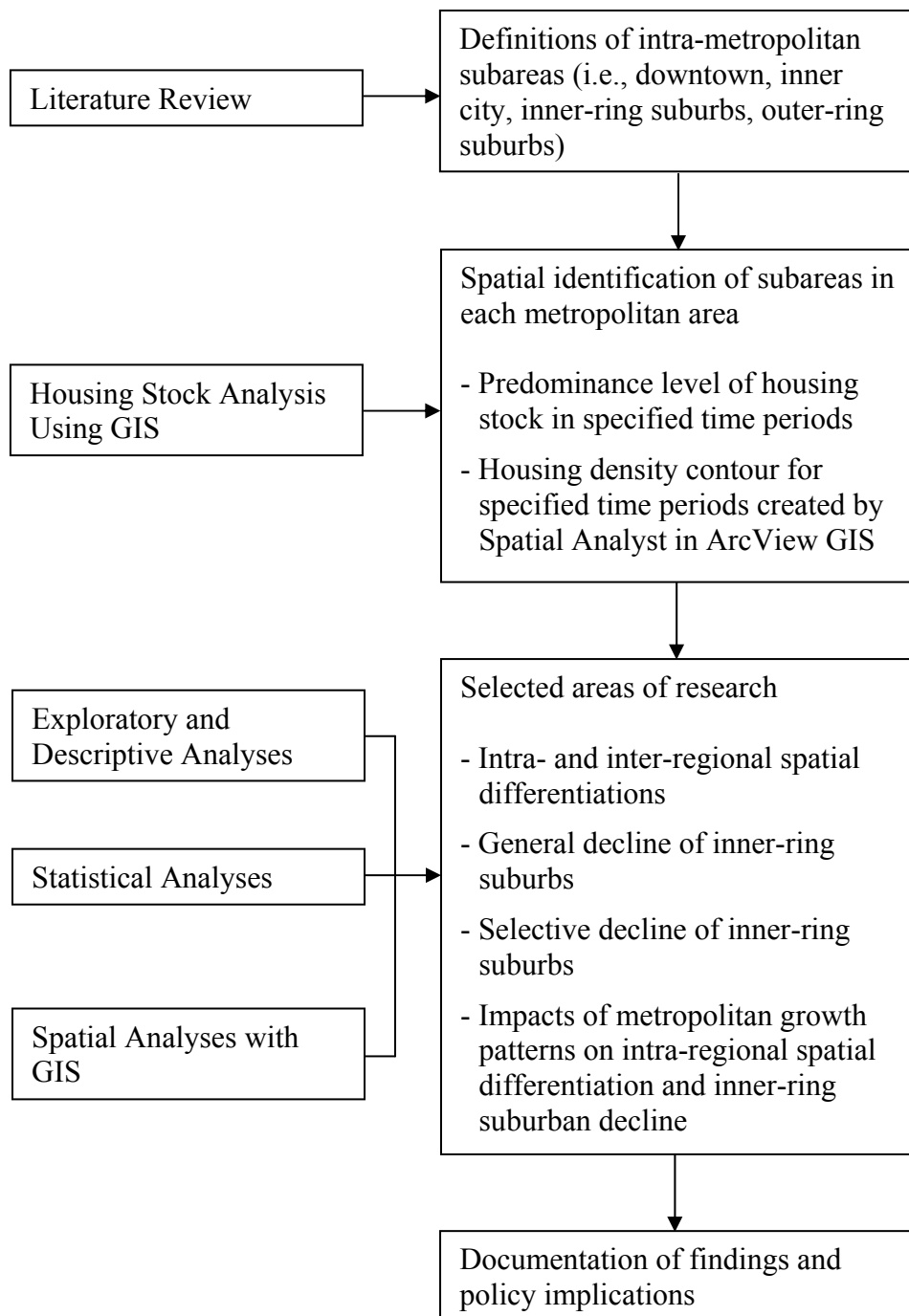


Figure 3.2. Methodological Flow

3.2.2. Identifications of the Downtown, the Inner City, the Inner-Ring Suburbs, and the Outer-Ring Suburbs

The traditional metropolitan structure with the central city and its suburbs is severely limited for understanding these heterogeneous subareas and their dynamic changes in the metropolitan areas. Rejecting the dichotomous structure of the central city and suburbs, this research adopts the multi-ring metropolitan form consisting of four subareas (i.e., the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs) to examine growth patterns in terms of demographic, socioeconomic, and housing variables for the Atlanta, Cleveland, Philadelphia, and Portland metropolitan areas from 1970 to 2000.

The identification of the inner-ring suburbs is a critical component of this research. As mentioned earlier in this dissertation, previous research identified the inner-ring suburbs at a jurisdictional level, which does not adequately deal with unincorporated inner-ring suburban areas within the metropolitan region. Furthermore, municipal boundaries are limited to representing a contiguous shape of the inner-ring suburbs.

As defined earlier, the inner-ring suburbs in this research refer to low-density, single-family residential suburban areas, built between 1950 and 1969 and accessed by automobiles as the primary transportation mode. At the tract level, the age of housing provides a reasonable measure by which to identify the inner-ring suburbs because one of the primary characteristics of the inner-ring suburbs is the dominance and concentration of housing stocks built between 1950 and 1969.

Table 3.2 lists housing units by built year for the case study regions. While the fast-growing areas showed lower proportions of the 1950-1969 housing stock to the total housing stock (Atlanta 19.3 % and Portland 21.3%), the slow-growing areas showed higher proportions of 1950-1969 housing stock (Cleveland 35.1 % and Philadelphia 31.2 %). By contrast, the fast-growing areas showed significantly higher proportions of new housing stock developed after 1970 (Atlanta 73.6 % and Portland 55.3 %).

These housing units by development period are illustrated by dot density distribution using GIS for each region (See Figures 3.3 to 3.6). Each dot represents 50 new housing units distributed randomly within each census tract. These four case study areas exhibit similar housing development patterns over time. Until 1950, all four metropolitan areas showed concentrations of housing developments within the central city. However, these four housing developments expanded to suburban areas within 20 miles from the downtown, shaping the inner-ring suburbs in the 1950s and 1960s. Since 1970, these metropolitan regions have experienced dispersed suburbanization at the fringe of the region, beyond 20 miles from the downtown.

Table 3.2. Housing Units by Built Year for the Case Study Regions

Metro Region	Built Year		Housing Units	Percentage
Atlanta	Before 1950	Pre-1939	56,623	4.0%
		1940-1949	44,888	3.1%
		Subtotal	101,511	7.1%
	1950-1969	1950-1959	101,809	7.1%
		1960-1969	174,526	12.2%
		Subtotal	276,335	19.3%
	1970-1989	1970-1979	258,815	18.1%
		1980-1989	357,607	25.0%
		Subtotal	616,422	43.1%
	1990-1999	Subtotal	435,957	30.5%
Cleveland	Before 1950	Pre-1939	201,084	25.1%
		1940-1949	93,647	11.7%
		Subtotal	294,731	36.8%
	1950-1969	1950-1959	159,679	20.0%
		1960-1969	120,939	15.1%
		Subtotal	280,618	35.1%
	1970-1989	1970-1979	101,345	12.7%
		1980-1989	55,007	6.9%
		Subtotal	156,352	19.5%
	1990-1999	Subtotal	68,287	8.5%
Philadelphia	Before 1949	Pre-1939	511,763	25.3%
		1940-1949	223,972	11.1%
		Subtotal	735,735	36.4%
	1950-1969	1950-1959	349,361	17.3%
		1960-1969	281,889	13.9%
		Subtotal	631,250	31.2%
	1970-1989	1970-1979	261,301	12.9%
		1980-1989	202,795	10.0%
		Subtotal	464,096	23.0%
	1990-1999	Subtotal	190,604	9.4%
Portland	Before 1950	Pre-1939	104,491	16.5%
		1940-1949	43,922	6.9%
		Subtotal	148,413	23.4%
	1950-1969	1950-1959	61,577	9.7%
		1960-1969	73,535	11.6%
		Subtotal	135,112	21.3%
	1970-1989	1970-1979	129,139	20.3%
		1980-1989	79,319	12.5%
		Subtotal	208,458	32.8%
	1990-1999	Subtotal	142,715	22.5%

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

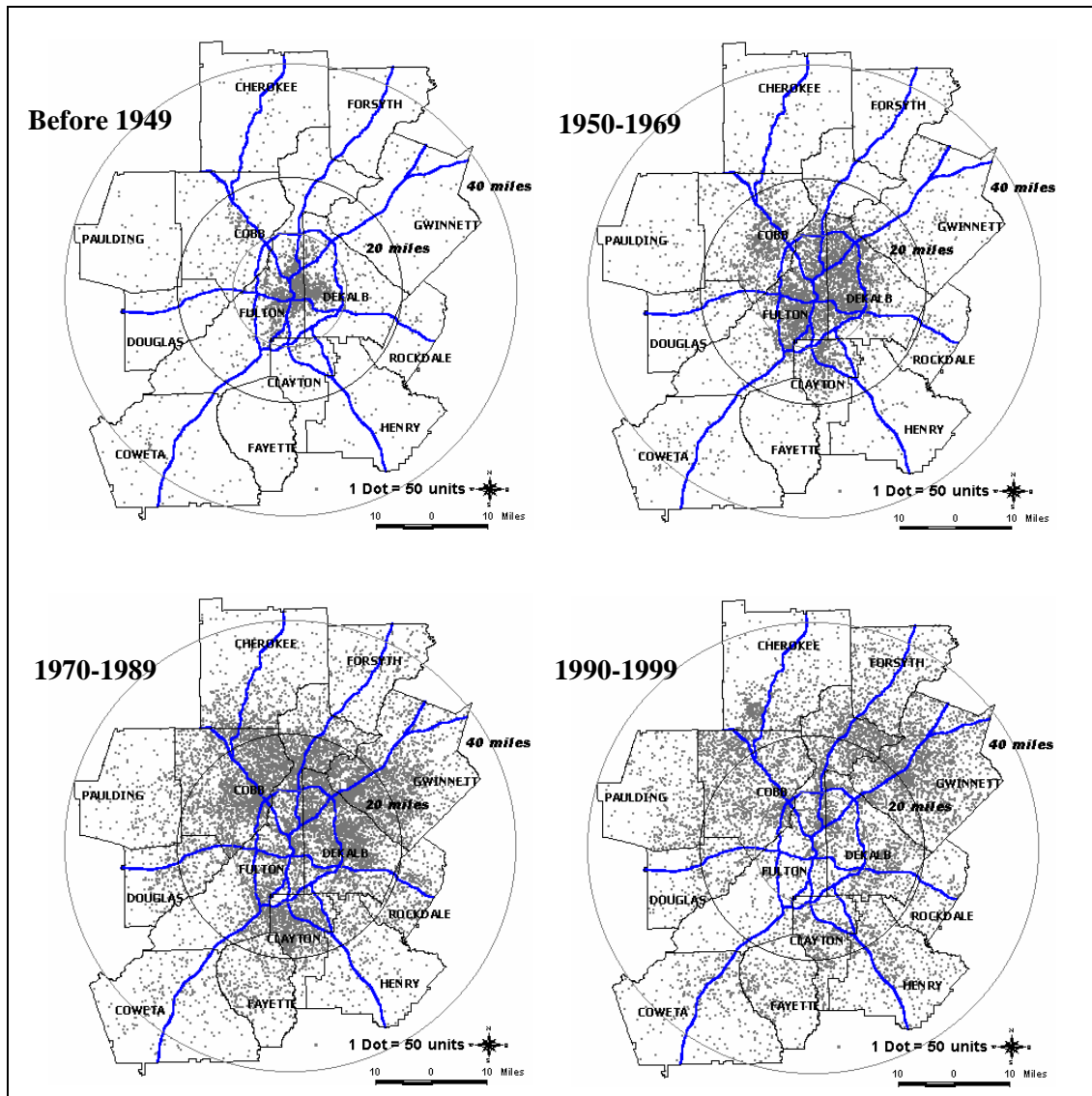


Figure 3.3. Spatial Distribution of Housing Units by Built Years for Metropolitan Atlanta

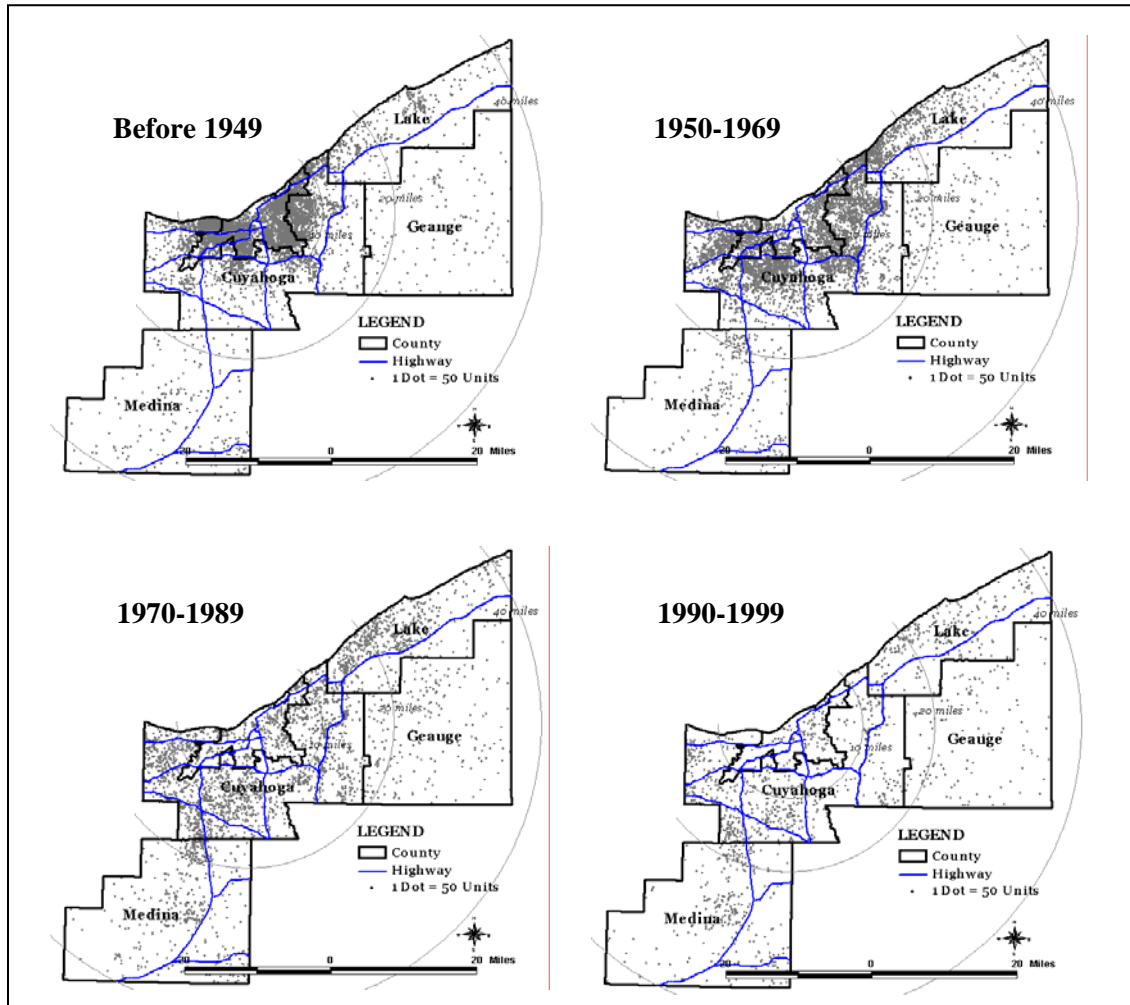


Figure 3.4. Spatial Distribution of Housing Units by Built Years for Metropolitan Cleveland

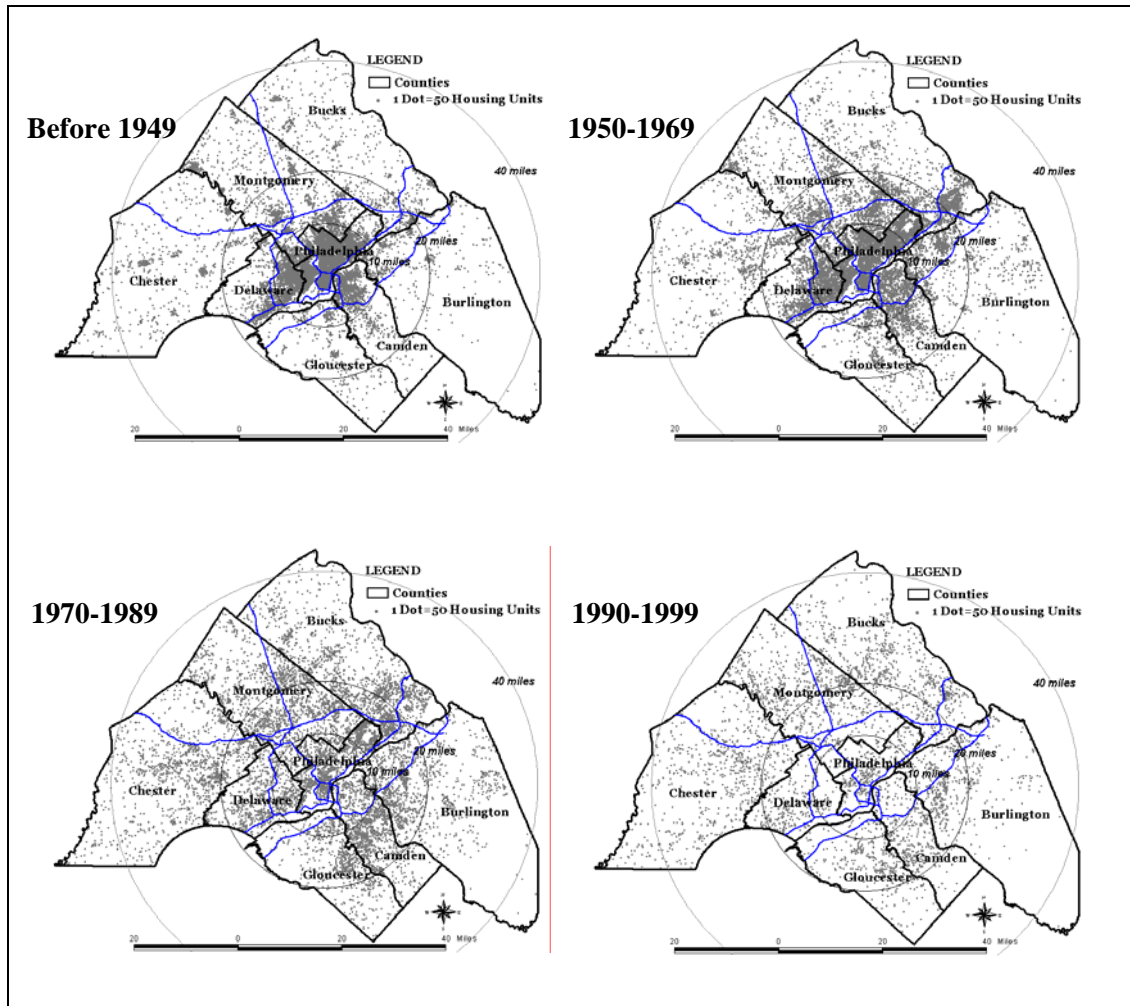


Figure 3.5. Spatial Distribution of Housing Units by Built Years for Metropolitan Philadelphia

Source: Originally published in Leigh and Lee (2004, 17). Reprinted with permission.

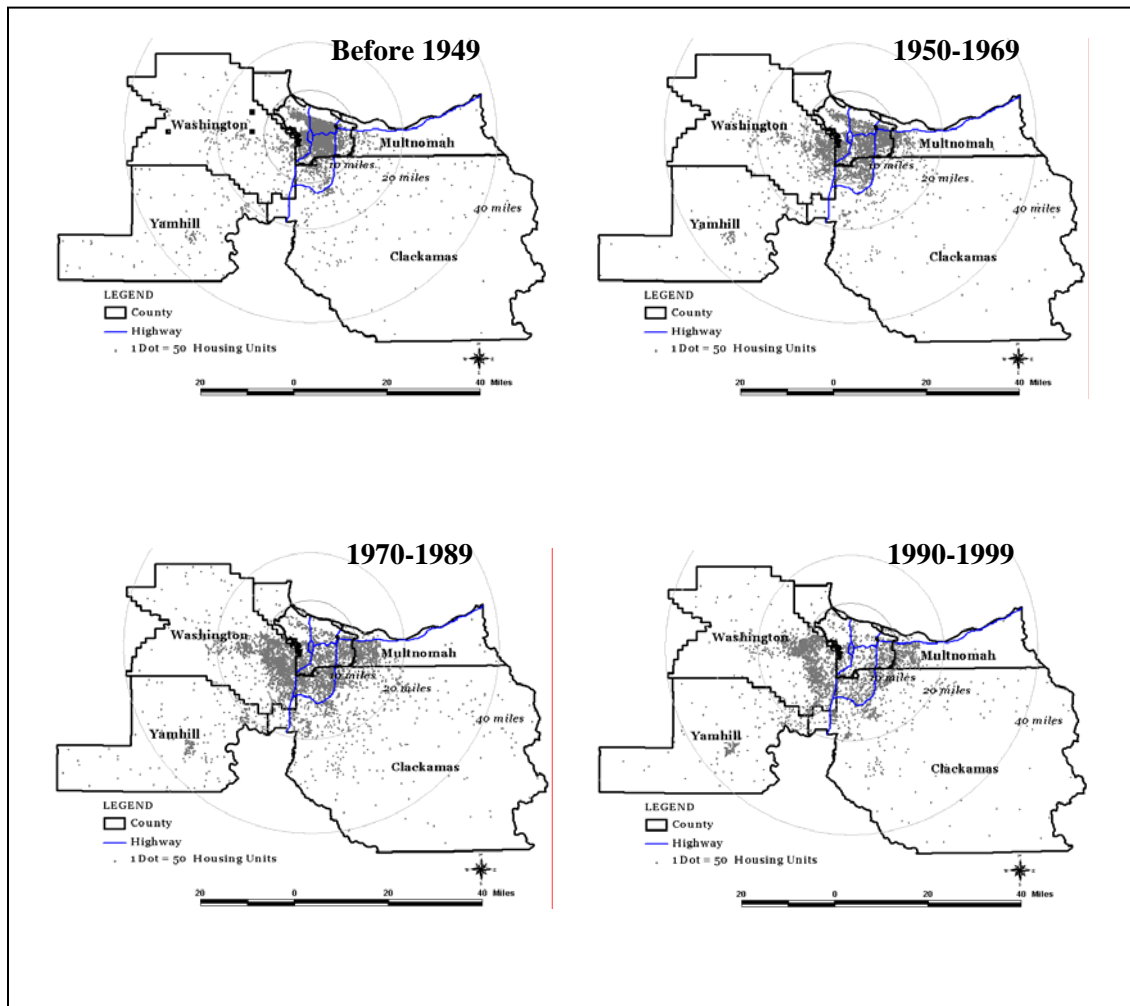


Figure 3.6. Spatial Distribution of Housing Units by Built Years for the Metropolitan Portland

Since the 2000 census provides the number of housing units built within ten-year intervals, the number of residential housing units in each tract can be aggregated into four time periods: before 1950, 1950 to 1969, 1970 to 1989, and 1990 to 1999. This research identifies the inner-ring suburbs by both the “predominance level” (relatively higher percentage) of 1950-1969 housing stock in each tract and density and contour maps of 1950-1969 housing stock created by the Spatial Analyst in ArcView GIS.

To obtain the continuous boundaries of the inner-ring suburbs, this research converts the aggregate residential housing units built between 1950 and 1969 into density and contour maps that identify the inner-ring suburbs in the form of the continuity surrounding the inner city. The outer boundary of the inner-ring suburbs can be obtained by overlaying a density contour map on the map of the predominance level.¹⁹ Similar to the identification of inner-ring suburbs, this research obtained the outer boundary of the inner city. The inner city is defined as the area that has a concentration of housing stock built before 1950. The outer-ring suburbs are all of the suburban areas except the inner-ring suburbs in the metropolitan area.

This study also separated the downtown from the inner city. Rather than developing new methods to identify downtown census tracts, this research used downtown tracts predefined in the research of Sohmer and Lang (2001). The authors’ original source is that of downtown tracts mapped by the University of Pennsylvania for 24 central U.S. cities. Despite the lack of clear definitions or identification methods for

¹⁹ Density calculation function of Spatial Analyst in ArcView 3.3: Cell size 100m, Radius 2 miles, Density type of Kernel, and Area units in Square Miles. Density contours of the outer boundary of inner-ring suburbs from the analysis of 1950-1969 housing stock: 200 line for the Atlanta, Philadelphia, and Portland regions and 300 line for the Cleveland region. Density contours of the outer boundary of the inner city from the analysis of before-1950 housing stock: 400 line for all regions.

the downtown in the literature, the research team of the University of Pennsylvania identified downtown boundaries through interviews with city officials and examination of the historic maps of the downtown in each city (Sohmer and Lang 2001).

Table 3.3. Downtown Census Tracts for the Case Study Regions

Metro Region	County	Tract Numbers in Census 2000
Atlanta	Fulton	18, 19, 20, 21, 27, 28, 32, 33, 35, 36, 43, 48
Cleveland	Cuyahoga	1033, 1071, 1072, 1073, 1074, 1075, 1076, 1077, 1078, 1079, 1091, 1092
Philadelphia	Philadelphia	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 125, 128, 134, 136, 366, 366.99
Portland	Multnomah	51, 53, 54, 56, 57

Source: The University of Pennsylvania, Department of City and Regional Planning, 2001.

As shown in Table 3.3, the size and number of tracts of the downtowns vary by metropolitan region. These separations of the downtown from the inner city allow us to explore spatial differentiation within the central city and compare the inner-ring suburbs with the inner city, excluding the downtown.

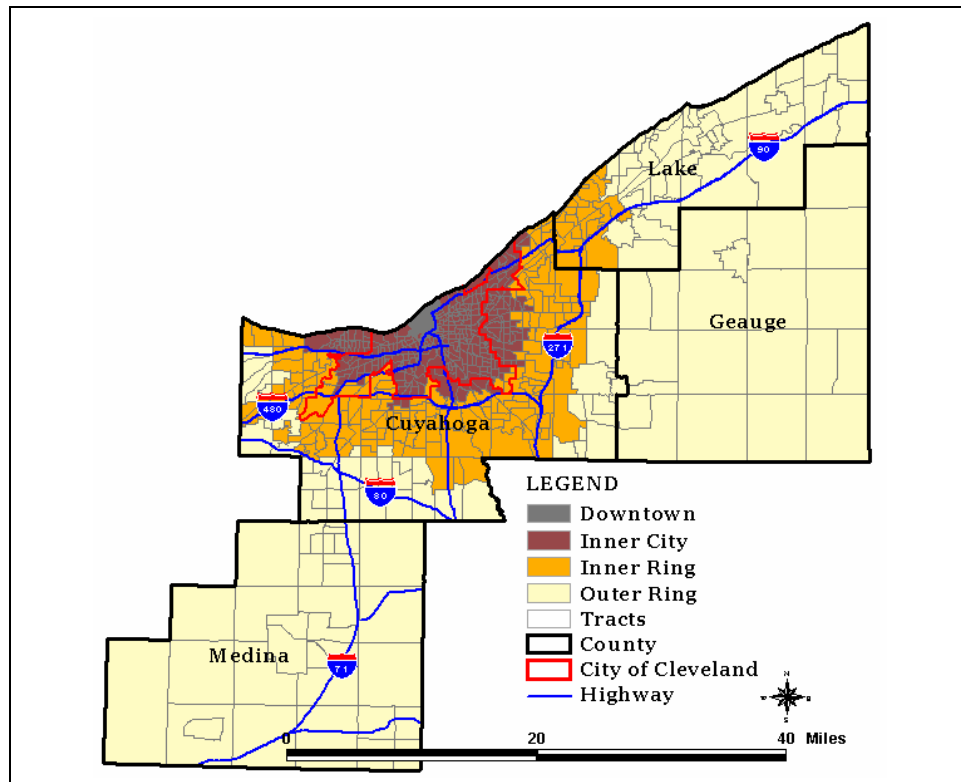
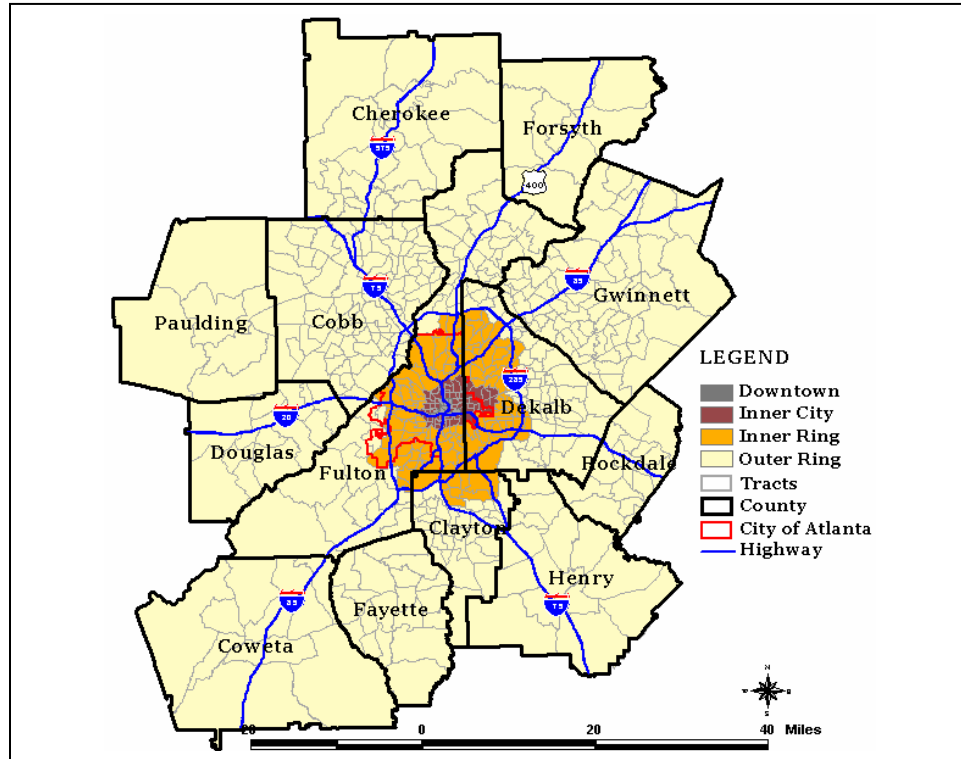


Figure 3.7. Identification of the Downtown, the Inner City, the Inner-Ring Suburbs, and the Outer-Ring Suburbs: Atlanta and Cleveland Metropolitan Regions

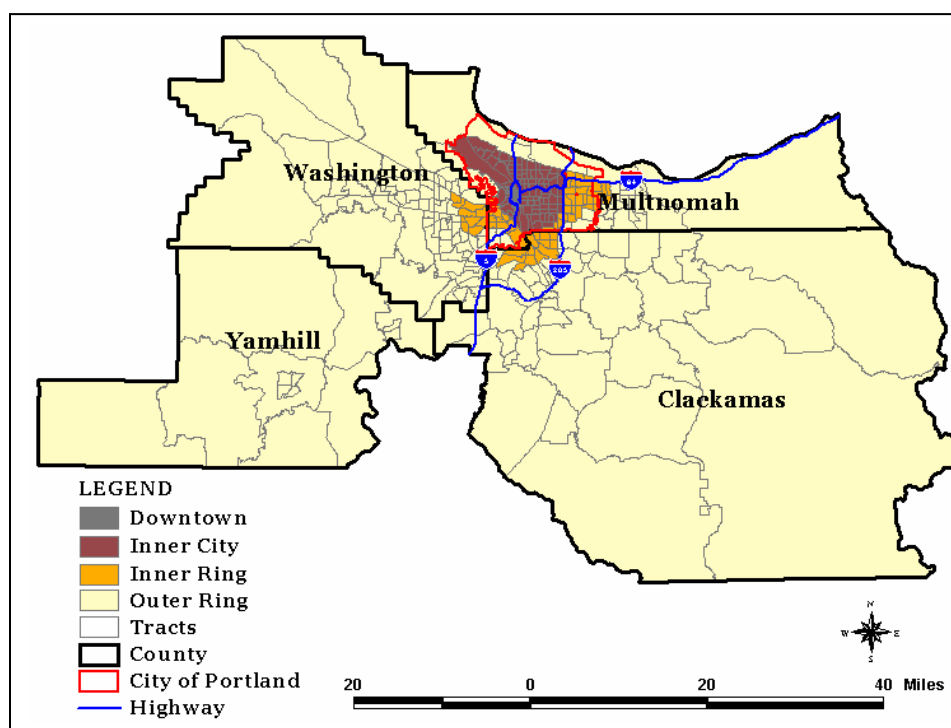
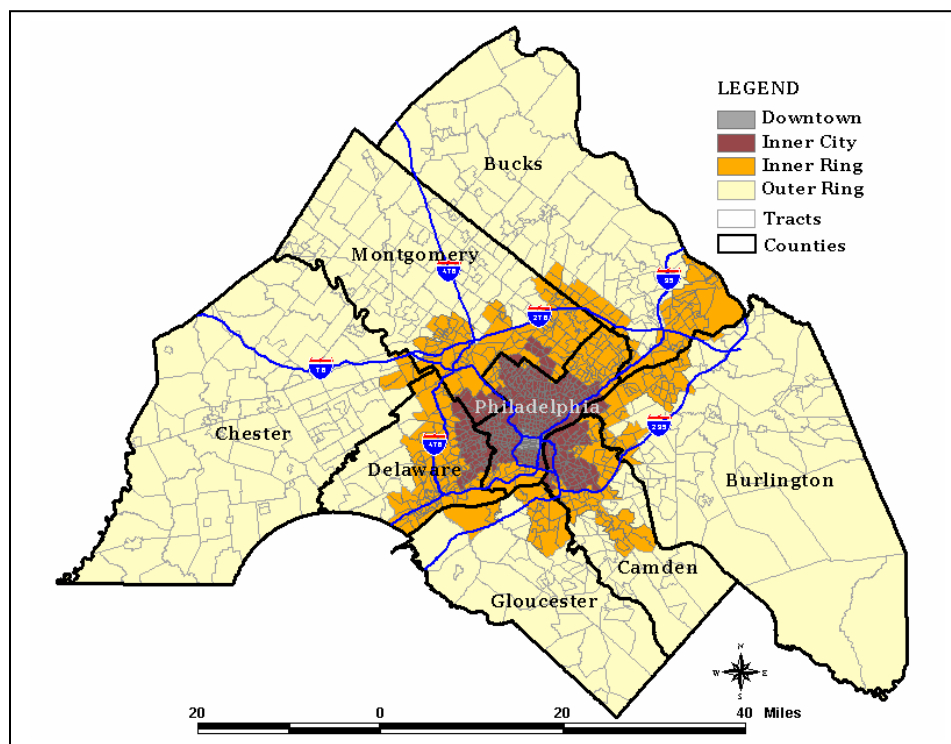


Figure 3.8. Identification of the Downtown, the Inner City, the Inner-Ring Suburbs, and the Outer-Ring Suburbs: Philadelphia and Portland Metropolitan Regions

3.2.3. Statistical Methods, Indexes, and GIS Techniques for Analysis

This research uses exploratory and descriptive approaches as well as statistical analyses and GIS techniques to analyze the inner-ring suburbs relative to the downtown, the inner city, and the outer-ring suburbs of the four metropolitan regions of Atlanta, Portland, Cleveland, and Philadelphia. In particular, this research focuses on the general growth and decline patterns of inner-ring suburbs from 1970 to 2000, controlling for regional variations. After examining the general patterns of inner-ring suburbs, this research compares and contrasts the inner-ring suburbs among the regions.

This dissertation utilizes basic descriptive statistics (e.g., percentages, ratios and rates, tables, charts, or graphs), Analysis of Variance (ANOVA), Ordinary Least Squares (OLS) regression, the Random-Effect Model (Generalized Least Squares regression), and Factor Analysis in multivariate statistics. In addition to these statistical techniques, this research utilizes the GINI Index, the Dissimilarity Index, and the Isolation Index for insight into socioeconomic inequalities, and applies GIS techniques as critical tools to examine the change in spatial patterns for selected variables over time.

ANOVA is a useful method with which one can test the statistical significances of the mean differences between groups, comparing the amount of variation among the subareas with the amount of variation within the subareas (Healey 1999, 236). The ANOVA multiple comparison analysis, built in STATA 8.0, provides a powerful tool for analyzing the mean differences of the variables and their significances among the multiple subareas (e.g., from the inner-ring suburbs to the downtown, the inner city, and

the outer-ring suburbs). In particular, ANOVA can be an effective approach with which intra-regional spatial differentiation using each individual variable over time is examined.

OLS regression is the most common statistical method in social science for investigating the impact of independent variables on a dependent variable. Beyond simple OLS analysis, this research includes advanced regression models such as pooled OLS, random-effect GLS regression, and fixed-effect regression due to the cross-sectional, longitudinal data structure of the four metropolitan areas and four time periods.

This research applies random-effect and fixed-effect regression models to longitudinal data. The advantage of this model over the pooled OLS is that it controls for unobserved heterogeneity among the census tracts. The primary assumption of the random effect model is that the omitted variables are uncorrelated with all the explanatory variables in a model (Wooldridge 2000, 449). When the omitted variables are correlated with the included variables, the fixed-effect model gives a consistent, efficient estimator. However, since the fixed-effect model controls for time-constant omitted variables, the model drops all time-constant explanatory variables in the model.

Of the three models (i.e., pooled OLS, random-effect, and fixed-effect models), the best model, as identified and confirmed by the “Breusch and Pagan Lagrangian Multiplier (BPLM)” test and “Hausman” test (Wooldridge 2002, 288), was the random-effect model, which provides the most consistent and efficient standard errors when spatial- and temporal-dummy variables were included in the model.

Another method of analysis this research uses is factor analysis. This analytical method is a variable reduction tool that creates a few composite dependent variables for regression analysis, provides correlations among the variables, and identifies insignificant

variables for exclusion from the analysis. In factor analysis, critical components are the factor loadings, factor estimation methods, factor rotation methods, and eigenvalue. Factor loading scores, representing a significance of each variable relative to other variables, need to be greater than .5 to be considered as a significant variable in the factor. For factor estimation and rotation methods, many different methods are available in statistical packages. The most common methods are “principle components factors” for an estimation method, and “varimax” for a rotation method. Finally, an eigenvalue, the sum of squared factor loadings, indicates the amount of variance explained by the extracted factor. As a rule of thumb, the factor should have an eigenvalue greater than 1 to be considered as a significant factor.

As supplementary analytical methods, this research includes several indices that can measure inequality. These inequality measures have been developed by researchers to analyze economic disparity and racial segregation. Duncan and Duncan (1955) provided a dissimilarity index and a GINI segregation index. In addition, Massey and Denton (1988) classified segregation indices into five dimensions: dissimilarity, exposure, concentration, centralization, and clustering. This research utilizes the indices of dissimilarity, GINI, and exposure, which have been most commonly used to measure inequality (Reardon and Firebaugh 2002).

Reardon and Firebaugh (2002) extended previous segregation indices that have been limited to measuring segregation between two groups into indices for multi-group segregation. They have derived six segregation indices for a multigroup: a dissimilarity index, a GINI index, an information theory index, a squared coefficient of variation index, a relative diversity index, and a normalized exposure index. These indices can be easily

calculated in the STATA 8.0 statistical package because all functions have been implanted in it. Of various segregation measures in the literature, this research uses the GINI indices, the dissimilarity index, and isolation index for an analysis of racial segregation and socioeconomic disparities among subareas.

GIS techniques are also effective tools in this research. GIS analyses can provide spatial distribution of each variable (e.g., population change, poverty, or income), factor scores from factor analyses, and several indexes. These spatial distributions can help us to identify clusters and directions in the growth and decline patterns of subareas within the metropolitan region.

3.3. Research Hypotheses, Methods, and Variables

This research explores four research hypotheses relating to (1) intra-regional spatial differentiation; (2) the general decline of the inner-ring suburbs; (3) selective decline of the inner-ring suburbs; and (4) the impact of metropolitan growth patterns and policies on the decline of inner-ring suburbs and intra-regional socioeconomic disparity among subareas.

3.3.1. Intra-Regional Spatial Differentiation

This first hypothesis is that increasing intra-regional spatial differentiation has occurred such that the central city as well as the suburbs has been diversified into heterogeneous subareas within the metropolitan region. Spatial differentiation in the central city can be examined by separating the downtown from the inner city, while that in the suburbs can be analyzed by separating the inner-ring suburbs from the outer-ring suburbs.

Hypothesis 1:

Intra-regional spatial differentiation has increased between the subareas (i.e., the downtown and the inner city; the inner-ring suburbs and the outer-ring suburbs) in terms of demographic, socioeconomic, and housing variables (12 variables in Table 3.4) from 1970 to 2000.

As shown in Table 3.4, this research selected twelve static variables related to demographic, socioeconomic, and housing characteristics. Demographic variables include the proportion of minorities, the proportion of the young, and the proportion of the elderly. A subarea that has a growing cohort of young workers and a shrinking cohort of retirees is regarded as one with strong economic potential (Metropolitan Philadelphia Policy Center 2001). That is, growth in the working-age cohort suggests increased employment, income, and demand for owner-occupied housing. By contrast, growth in the elderly cohort may suggest economic stagnation, while it could also provide opportunities for strategic economic development if this group is composed of affluent retirees with a high demand for entertainment, recreation, and medical services.

Socioeconomic variables include the unemployment rate, the welfare recipient rate, the poverty rate, the proportion of college-educated population, and relative per capita income to region's average. Higher rates in unemployment, welfare recipients, and poverty, and lower rates in the college-educated population and per capita income suggest socioeconomic deterioration in neighborhoods.

Finally, housing variables are relative housing values, housing ownership, the vacancy rate, and housing units with problems. A lower housing value and ownership as well as a higher vacancy rate and housing problems suggests physical deterioration in neighborhoods.

This research applies ANOVA multiple comparison tests that examine the mean differences among selected variables between the subareas in each year (i.e., 1970, 1980, 1990, and 2000). The comparison groups for the ANOVA multiple comparison test area are “the downtown versus the inner city,” “the inner city versus the inner ring,” and “the

inner ring versus the outer ring” from 1970 to 2000. In addition to ANOVA multiple comparison tests, this research also applies the random-effect regression models for an examination of intra-regional spatial differentiation.

Table 3.4. Independent Variables for ANOVA Multiple Comparison Tests

Categories	Variables		
	Name	Calculation	Time
Demographic	MINPOP	Proportion of the minority (nonwhite population/total population)	‘70, ‘80, ‘90, ‘00
	YOUNG	Proportion of the young (16-34 years old population/ total population)	‘70, ‘80, ‘90, ‘00
	ELD	Proportion of the elderly (+65 years old population/total population)	‘70, ‘80, ‘90, ‘00
Socioeconomic	UNEMP	Proportion of unemployment (unemployed persons +16 years old/ +16 years population)	‘70, ‘80, ‘90, ‘00
	WEL	Proportion of welfare recipient (families with public assistance income/total families)	‘70, ‘80, ‘90, ‘00
	POV	Proportion of poverty (population under poverty/total population)	‘70, ‘80, ‘90, ‘00
	EDU	Proportion of college graduates (persons +25 years old with a college or graduate degree/ +25 years old population)	‘70, ‘80, ‘90, ‘00
	RPCI	Relative per capita income (percentage of PCI to regional average)	‘70, ‘80, ‘90, ‘00
Housing	RAHV	Relative average housing value (percentage of average housing value to regional average)	‘70, ‘80, ‘90, ‘00
	OWNH	Proportion of owner-occupied housing units (owner-occupied housing units/total housing units)	‘70, ‘80, ‘90, ‘00
	VACH	Proportion of vacant housing units (vacant housing units/total housing units)	‘70, ‘80, ‘90, ‘00
	OCROWD	Proportion of housing units in overcrowded housing problem (overcrowded housing units/ total housing units)	‘70, ‘80, ‘90, ‘00

3.3.2. General Decline of the Inner-Ring Suburbs

The second hypothesis is that the inner-ring suburbs, in general, have declined relative to the downtown, the inner city, and the outer-ring suburbs within the metropolitan area from 1970 to 2000. The conventional argument is that suburbs depopulate the central cities, attracting the population and jobs to suburbs. That is, the suburbs have grown at the expense of the central cities. During the past decades, therefore, urban scholars focused on the declines of only the downtown and the inner city within the context of strong decentralization or suburbanization.

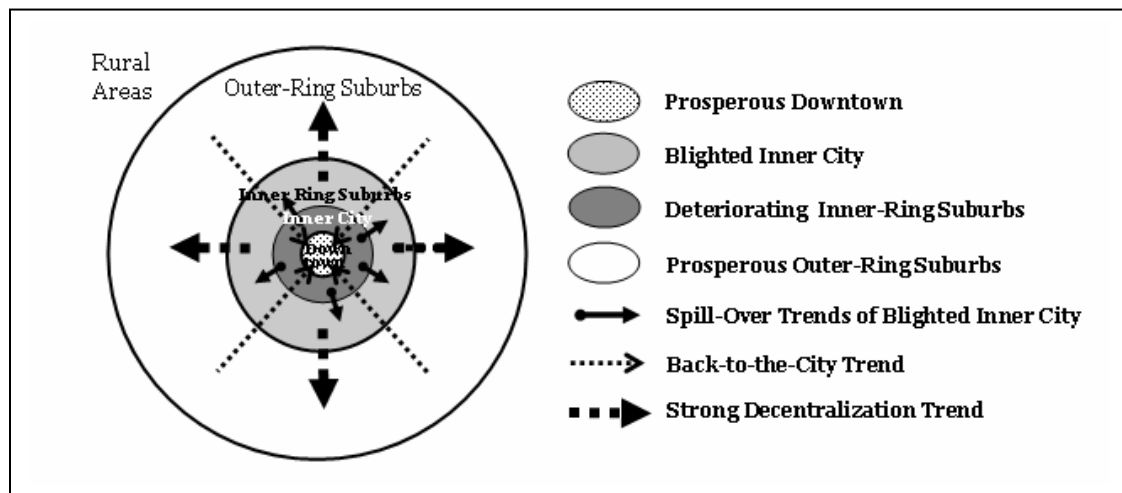


Figure 3.9. General Decline Model of the Inner-Ring Suburbs

However, the conventional argument of “suburban growth at the expense of central cities” needs to be reconsidered in dynamic intra-regional spatial differentiation. The newly proposed argument in this dissertation is that outer-ring suburbs and the downtown have grown at the expense of the inner city and inner-ring suburbs. Recent

research also shows that the suburbs are growing without significant decreases in population and jobs in the central cities for some metropolitan areas.

Figure 3.9 presents a conceptual model of the decline of the inner-ring suburbs with three distinct trends—spillover effects of blighted areas from the inner-cities to the inner-ring suburbs, back-to-the-city trends toward the downtown and the inner city, and strong decentralization trends outward the outer-ring suburbs. That is, inner-city blight can spill over into adjacent inner-ring suburbs, and the socioeconomic status of the inner-ring suburbs deteriorates as indicated by an increase in poverty, unemployment, and neighborhood disinvestment. At the same time, the back-to-the-city movement is fueled by middle- and upper-income households moving from the outer-ring suburbs (or other areas outside the metropolitan region) to the downtown and the inner city. Furthermore, because decentralization trends are still very strong in most metropolitan areas, the outer-ring suburbs continue to gain significant population, employment, and income over the inner-ring suburbs.

Hypothesis 2:

The inner-ring suburbs have declined relative to the downtown, the inner city, and the outer-ring suburbs due to the spillover effect of blighted areas from the inner city to the inner-ring suburbs, back-to-the-city movement toward the downtown and the inner city, and the decentralization trend toward the outer-ring suburbs.

To analyze the general decline of the inner-ring suburbs, this research uses descriptive analysis, factor analysis, OLS analysis, and random-effect regression models.

Descriptive analysis clarifies the general growth trends of inner-ring suburbs at the subarea level over time. It also provides empirical evidence on whether the inner-ring suburbs show the same symptoms (i.e., population loss, white flight, poverty increase, and physical deterioration in housing) experienced in the inner cities during the past several decades.

The results from descriptive analyses need to be confirmed by OLS analyses. For demographic aspects, OLS analyses focus on two population indicators—racial growth patterns and migration trends for each tract—to examine the back to the city trend and decentralization trend in terms of population. In addition, gentrification related migration patterns can be tracked by “residence within 5-years” information in census data, although it is very difficult to track gentrification within a metropolitan region due to limited data (e.g., the Bureau of Census provides this data for 1990 and 2000 only) and the official boundary unit for data collection based on the dichotomous structure of the central city and suburbs.

To analyze socioeconomic changes, this study conducts OLS analyses on two static variables, poverty rate and relative per capita income (per capita income relative to the regional average), the most critical indicators of neighborhood deterioration.

This study also examined two static variables, relative housing value (average housing value relative to the region’s average) and the proportion of overcrowded housing units, to assess physical deterioration in neighborhoods.

Statistical model 2.1: OLS regression analyses for demographic indicators

$$y \text{ (demographic indicator)} = \beta_0 + \beta_x * \text{spatial dummies} + \beta_y * \text{regional dummies} + e$$

· demographic indicator:

- 1) The growth rate of the total population in the 1970s, 1980s, and 1990s
- 2) The growth rate of the white population in the 1970s, 1980s, and 1990s
- 3) The growth rate of the minority population in the 1970s, 1980s, and 1990s
- 4) The proportion of the population that migrated from the central city of the same metropolitan area in 1990 and 2000
- 5) The proportion of the population that migrated from the central city of the different metropolitan area in each year in 1990 and 2000
- 6) The proportion of the population that migrated from the suburbs of the same metropolitan area in each year in 1990 and 2000
- 7) The proportion of the population that migrated from the suburbs of the different metropolitan area in each year in 1990 and 2000
- 8) The growth rate of the population that migrated from the central city of the same metropolitan area in the 1990s.
- 9) The growth rate of the population that migrated from the central city of the different metropolitan area in each year in the 1990s
- 10) The growth rate of the population that migrated from the suburbs of the same metropolitan area in each year in the 1990s
- 11) The growth rate of the population that migrated from the suburbs of the different metropolitan area in each year in the 1990s

· spatial dummies: downtown, inner city, inner ring, and outer ring

- regional dummies: Atlanta, Cleveland, Philadelphia, and Portland
- e: error term

Statistical model 2.2: OLS regression analyses for socioeconomic indicators

$$y \text{ (socioeconomic indicator)} = \beta_0 + \beta_x^* \text{ spatial dummies} + \beta_y^* \text{ regional dummies} + e$$

- socioeconomic indicators:
 - 1) Poverty rate in 1970, 1980, 1990, and 2000
 - 2) Per capita income relative to the regional average in 1970, 1980, 1990, and 2000
- spatial dummies: downtown, inner city, inner ring, and outer ring
- regional dummies: Atlanta, Cleveland, Philadelphia, and Portland
- e: error term

Statistical model 2.3: OLS regression analyses for housing indicators

$$y \text{ (housing indicator)} = \beta_0 + \beta_x^* \text{ spatial dummies} + \beta_y^* \text{ regional dummies} + e$$

- housing indicators:
 - 1) Average housing value relative to the region's average in 1970, 1980, 1990, and 2000
 - 2) Proportion of overcrowded housing units in 1970, 1980, 1990, and 2000
- spatial dummies: downtown, inner city, inner ring, and outer ring
- regional dummies: Atlanta, Cleveland, Philadelphia, and Portland
- e: error term

Thus far, this study developed OLS regression models with each dependent variable based on demographic and socioeconomic characteristics. For a more sophisticated regression analysis, this research also developed random-effect models with integrated variables extracted from twelve variables in Table 3.4 using a factor analysis. Since all variables in Table 3.4 relate to neighborhood deterioration and prosperity, a factor analysis identifies integrated factors based on correlations between variables that represent the levels of deterioration and prosperity in neighborhoods. In the following random-effect model, a dependent variable is an extracted factor, while independent variables are subareas, years, and interaction dummies between space and time.

Statistical model 2.4: random-effect model with spatial-temporal variables
for each metropolitan region

$$y(\text{factor } n) = \beta_0 + \beta_x * \text{spatial-dummies} + \beta_y * \text{time-dummies} + \beta_z * \text{interaction dummies of space and time} + u + e$$

- factor n: factors extracted from factor analysis
- spatial dummies: downtown, inner city, inner ring, and outer ring
- time dummies: 1970, 1980, 1990, and 2000
- u: unobserved effect
- e: error term

3.3.3. Selective Decline of the Inner-Ring Suburbs

This research addressed the overall decline of the inner-ring suburbs through the general decline model of the inner-ring suburbs (See Figure 3.9). The important concept of the decline of the inner-ring suburbs is the dispersion of blighted areas from the inner city to the inner-ring suburbs. However, the impact of spillover from blighted areas is not likely to be uniform across the metropolitan area. Therefore, this research proposes the selective decline model of the inner-ring suburbs, which indicates the existence of prosperous neighborhoods in the inner-ring suburbs (See Figure 3.10).

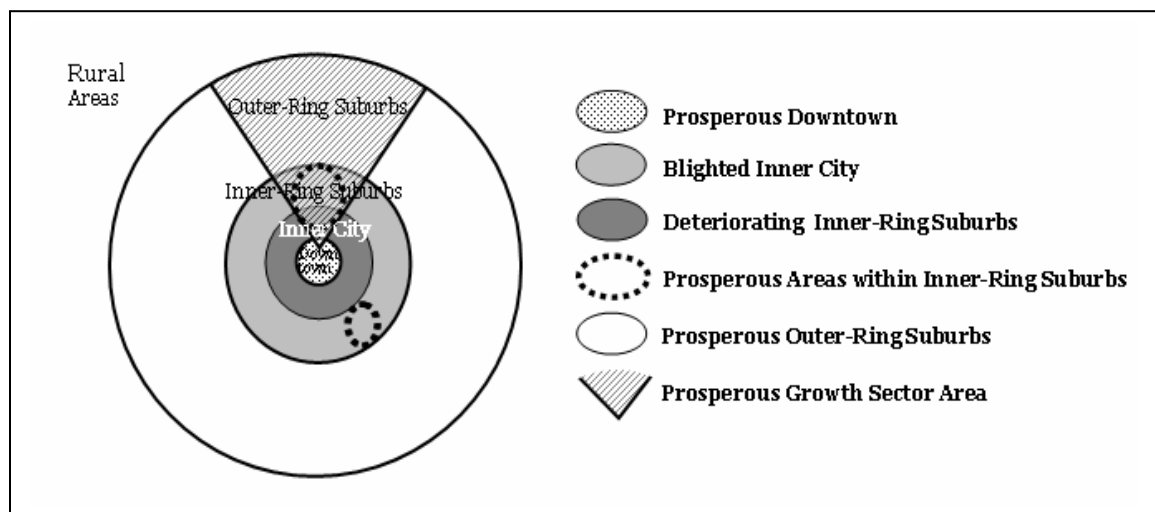


Figure 3.10. Selective Decline Model of the Inner-Ring Suburbs

A clear explanation for thriving inner suburbs has not been explored sufficiently in the literature. However, Leinberger (1995) and Orfield (1997) provided a valuable concept of “favored quarter,” which identifies the direction of spatial growth patterns from the central city to the outer-ring suburbs. The favored quarter of the metropolitan

area experienced most of the job growth and upper-income residential development of a metropolitan region, indicating that the inner-ring suburbs within the favored quarter areas do not experience decline. However, no scholars have provided specific boundaries of the favored quarter for metropolitan areas at the tract level.

Whether they are located within the axis of the “favored quarter” sector or not, some inner-ring suburbs can be economically prosperous due to other factors such as demographic, socioeconomic, and housing conditions in inner-ring suburban neighborhoods, locational advantage to job markets, and housing reinvestments. Therefore, hypothesis 3 suggests that the inner-ring suburbs decline selectively with respect to specific conditions in each inner-ring suburban neighborhood.

Hypothesis 3:

The inner-ring suburbs declined selectively with regard to their demographic, socioeconomic, housing characteristics, proximity to job markets, and housing reinvestments.

This research adopts two approaches that examine the selective decline of inner-ring suburbs: descriptive and statistical methods. Using the descriptive approach, this research counts the number of prosperous tracts in each decade that can be identified by the prosperity factor score from the factor analysis. These prosperous tracts are evident in the GIS mapping for each region from 1970 to 2000. The GIS maps specifically identify the spatial clusters of prosperous tracts in the metropolitan region.

A statistical method to examine hypothesis 3 is an OLS regression analysis for each metropolitan area. The dependent variable is the prosperity factor score in 2000, and independent variables are the growth rates of the total population, the white population, poverty, and overcrowded housing problem (See Table 3.5). This research hypothesizes that the prosperity factor score in 2000 has a positive correlation with total population growth and white population growth and a negative correlation with increases in poverty and overcrowded housing. This research also includes two other independent variables: the median built year of housing as a proxy variable of housing reinvestments and the average commuting time as the proxy variable for the accessibility to jobs. This research hypothesizes that the prosperity factor score in 2000 has a positive correlation with the median built year of housing and a negative correlation with the average commuting time.

Table 3.5. Independent Variables for the Selective Decline Model in the Inner-Ring Suburbs

Category	Variables		
	Name	Description	Time
Demographic Change	POPCH	Change rate in population	1980-2000
	WPOPCH	Change rate in the white population	1980-2000
Socioeconomic Change	POVCH	Change rate in the poverty rate	1980-2000
Housing Change	OCROWDCH	Change rate in overcrowded housing	1980-2000
Housing reinvestment	MBUILT	Median built year of housing	2000
Proximity to Jobs	CTIME	Average commuting time (journey to work)	2000
Subareas	DAREA1	Dummy variable of the downtown	
	DAREA2	Dummy variable of the inner city	
	DAREA3	Dummy variable of the inner-ring suburbs	
	DAREA4	Dummy variable of the outer-ring suburbs	

Statistical model 3.1: OLS regression analysis for each metropolitan region

$$y (\text{Factor PFS}_{2000}) = \beta_0 + \beta_x * D_{1980-2000} + \beta_y * SE_{1980-2000} + \beta_z * H_{1980-2000} \\ + \beta * MB_{2000} + \beta * CT_{2000} + \beta_x * \text{spatial dummies} + e$$

Statistical Model 3.2: OLS regression analysis for the inner-ring suburbs in each metropolitan region

$$y (\text{Factor PFS}_{2000}) = \beta_0 + \beta_x * D_{1980-2000} + \beta_y * SE_{1980-2000} + \beta_z * H_{1980-2000} \\ + \beta * MB_{2000} + \beta * CT_{2000} + e$$

- Factor PFS₂₀₀₀: prosperity factor score in 2000 extracted from factor analysis
- D₁₉₈₀₋₂₀₀₀: growth rates of total population and white population between 1980 and 2000
- SE₁₉₈₀₋₂₀₀₀: increases in poverty between 1980 and 2000
- H₁₉₈₀₋₂₀₀₀: increases in overcrowded housing between 1980 and 2000
- MB₂₀₀₀: median built year of housing in 2000 (proxy variable for housing reinvestments)
- CT₂₀₀₀: average commuting time in 2000 (proxy variable for the accessibility to jobs)
- e: error term

3.3.4. Impact of Metropolitan Growth Patterns and Policies on Intra- and Inter-Regional Spatial Differentiations, Socioeconomic Disparities, and the Decline of the Inner-Ring Suburbs

This research compares and contrasts intra-regional spatial differentiation, socioeconomic disparity, and the decline of inner-ring suburbs found in the four different metropolitan areas, taking into account their growth policies and patterns. According to Orfield (1997, 2), intra-regional socioeconomic disparities arise from the concept of the “push-pull of regional polarization.” The push force indicates that the blighted areas in the central cities push people and their socioeconomic resources to the fringe of the metropolitan area, while the pull force indicates that the metropolitan peripheries pull people and resources as well as public investment. As a result, the push-pull force causes increases in intra-regional disparity and the central city and suburb disparity.

This research assumes that metropolitan growth patterns and policies have a significant impact on intra-regional spatial differentiation, socioeconomic disparity, and the decline of inner-ring suburbs. Figure 3.11 illustrates two regional growth policies: decentralization model (Diagram A) and regional growth control model (Diagram B). In addition to regional growth policies, regional growth patterns—slow growth, moderate growth, or fast growth—also have an impact on intra-regional spatial differentiation and socioeconomic disparities among the subareas.

As shown in the Diagram B in Figure 3.11, this research hypothesizes that strong suburbanization and exurbanization trends not only significantly differentiate intra-metropolitan areas, but also are associated with decline of the inner-ring suburbs.

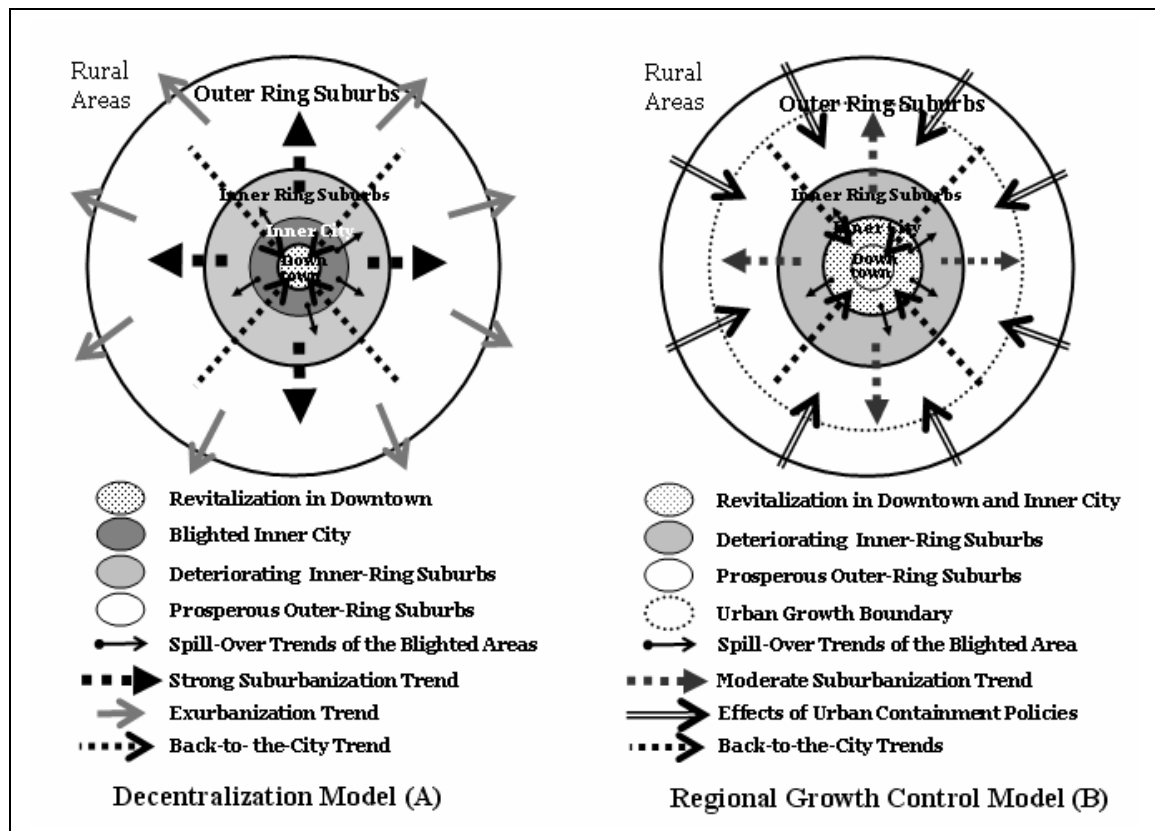


Figure 3.11. Impact of Metropolitan Growth Policies on Intra-Regional Spatial Differentiation and the Decline of Inner-Ring Suburbs

By contrast, urban containment policies can be associated with a reduction in intra-regional spatial differentiation and socioeconomic disparity. However, urban containment policies might be limited to reducing the inner-ring suburban decline because such policies shift development to the downtown and the inner city which have competitive locational advantages, skipping the inner-ring suburbs. In addition to the central-city revitalization by urban containment policies, such policies may shift development to the outer-ring suburbs within the urban growth boundary because of a moderate or strong decentralization trend in the metropolitan area.

Hypothesis 4:

Portland, the metropolitan area with a strong urban containment policy, exhibits relatively less intra-regional spatial differentiation and socioeconomic disparity, less deterioration of its central city (i.e., the downtown and the inner city), and the same pattern of inner-ring suburban decline, comparing to the other three metropolitan areas (i.e., Atlanta, Cleveland, and Philadelphia).

Hypothesis 4 can be examined by same analytical methods (i.e., factor analysis and the random-effect model) adopted for hypothesis 2. This research also uses other analytical methods, the GINI index for economic inequality and dissimilarity and isolation indices for racial segregation, to examine racial, socioeconomic disparities among subareas in the four metropolitan areas.

CHAPTER 4

ANALYSIS AND FINDINGS

4.1. Intra-Regional Spatial Differentiation

When intra-metropolitan areas have evolved into diverse subareas, they exhibit spatial differentiations over time. Identifying the four subareas, this research examines whether the four subareas (i.e., the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs) were spatially differentiated from 1970 to 2000 in terms of demographic, socioeconomic, and housing characteristics, and then analyzed the key variables for intra-regional spatial differentiation.

This research applied two methods for intra-regional spatial differentiation among the subareas in the four metropolitan areas: ANOVA multiple comparison tests and random-effect GLS models. ANOVA multiple comparison tests were applied for static and dynamic variables from the selected variables in Table 3.4, which represent demographic, socioeconomic, and housing characteristics. By contrast, random-effect regression models were applied for the integrated indicators of the selected variables in Table 3.4 from a factor analysis in the next section.

Three group pairs for the ANOVA multiple comparison were the downtown versus the inner city, the inner city versus the inner-ring suburbs, and the inner-ring suburbs versus the outer-ring suburbs. Tables 4.1 and 4.2 provide the results of the ANOVA multiple comparison tests for static variables.

Table 4.1. ANOVA Multiple Comparison Tests for Static Variables

Variables	Comparison Pairs	Atlanta				Cleveland			
		1970	1980	1990	2000	1970	1980	1990	2000
Minority Prop.	Downtown - Inner City	5.8	16.1	18.1	14.9	-10.9	11.3	16.8	0.8
	Inner City - Inner Ring	31.0**	15.0**	5.6	-2.7	25.1	31.4**	33.3**	34.7**
	Inner Ring - Outer Ring	13.9**	37.5**	40.0**	31.2**	3.1	7.5	11.2*	15.7**
Young Prop.	Downtown - Inner City	-2.0	-4.4	5.6	13.3**	3.6	4.3	5.3	22.6**
	Inner City - Inner Ring	-1.1	3.0	2.8	4.7*	0.5	2.3**	3.7**	5.3**
	Inner Ring - Outer Ring	1.9*	1.7	0.3	3.8**	0.6	-1.0	0.2	0.8
Elderly Prop.	Downtown - Inner City	3.2	0.7	-1.7	-1.8	5.0**	4.0	-1.7	-6.9*
	Inner City - Inner Ring	6.1**	5.3**	1.6	-2.0	4.2**	0.9	-4.6**	-6.8**
	Inner Ring - Outer Ring	1.7**	3.8**	4.2**	3.8**	0.6	4.8**	7.3**	7.2**
Unemployment Rate	Downtown - Inner City	1.8**	4.1**	2.2	12.4**	-0.5	-1.5	4.9	6.0*
	Inner City - Inner Ring	1.9**	2.2**	3.0**	5.1**	2.4**	5.4**	10.0**	7.0**
	Inner Ring - Outer Ring	0.8**	3.2**	4.4**	5.2**	0.0	-0.6	0.3	1.1
Welfare Rate	Downtown - Inner City	9.8**	15.9**	15.1**	0.7	0.0	-3.8	5.2	5.1
	Inner City - Inner Ring	7.7**	7.4**	6.2**	3.0*	6.7**	12.1**	16.9**	13.9**
	Inner Ring - Outer Ring	1.0	5.0**	7.0**	6.9**	-0.2	0.3	0.5	1.4
Poverty Rate	Downtown - Inner City	18.1**	26.2**	24.3**	13.1**	11.2**	11.9**	16.9**	12.3**
	Inner City - Inner Ring	15.8**	14.7**	12.7**	7.0**	11.4**	17.0**	22.5**	18.9**
	Inner Ring - Outer Ring	1.9	10.1**	12.9**	12.5**	1.0	0.0	0.0	1.7
College Degree	Downtown - Inner City	-4.0	-11.6	-14.2	-9.2	-3.0	4.4	3.9	10.2
Population	Inner City - Inner Ring	-6.8**	-0.8	3.2	7.1	-4.3**	-5.3**	-6.4**	-7.4**
	Inner Ring - Outer Ring	5.0**	-0.2	-3.7	-4.9	0.8	-1.2	-3.0	-4.6
Relative Per Capita Income	Downtown - Inner City	-25.1	-38.5	-47.8*	-39.1	-11.6	-18.1	-28.8	-10.1
	Inner City - Inner Ring	-32.1**	-24.0**	-12.4	3.9	-23.8**	-34.5**	-40.2**	-35.3**
	Inner Ring - Outer Ring	13.6**	-7.5	-14.7*	-12.7	11.4	3.7	-9.2	-19.6**
Relative Housing Value	Downtown - Inner City	-	-28.0	-34.6	-10.8	-29.6	-16.6	-26.2	131.7**
	Inner City - Inner Ring	-	-20.8	-4.3	18.3	-41.1**	-50.2**	-44.3**	-32.1**
	Inner Ring - Outer Ring	-	-21.3*	-11.6	0.1	5.6	-36.4**	-27.9**	-38.3**
Housing Ownership Prop.	Downtown - Inner City	30.0**	-26.7**	-25.6**	-20.4	6.7	-37.2**	-35.7**	-38.5**
	Inner City - Inner Ring	-24.1**	-17.3**	-12.8**	-10.5*	-28.7**	-29.0**	-29.2**	-29.1**
	Inner Ring - Outer Ring	-14.5**	-22.4**	-20.5**	-23.0**	-2.8	-3.8	-4.6	-7.3*
Vacant Housing Prop.	Downtown - Inner City	-1.7	-0.4	3.8	-1.5	2.9	-0.2	12.7**	13.4**
	Inner City - Inner Ring	2.3	4.7**	5.1**	3.8**	3.4**	6.5**	6.9**	7.3**
	Inner Ring - Outer Ring	-1.3**	0.9	3.0**	3.1**	0.8	-2.6**	-0.9	0.1
Overcrowded Housing Prop.	Downtown - Inner City	7.2**	3.7	4.0	-2.1	16.6**	2.1	12.9**	13.2**
	Inner City - Inner Ring	3.7**	5.6**	5.3**	4.1**	4.7**	7.6**	7.3**	7.7**
	Inner Ring - Outer Ring	-6.7**	0.5	3.1**	3.4**	-2.7**	-3.3**	-1.2	0.0

**p<0.01; *p<0.05.

Table 4.2. ANOVA Multiple Comparison Tests for Static Variables (Cont.)

Variables	Comparison Pairs	Philadelphia				Portland			
		1970	1980	1990	2000	1970	1980	1990	2000
Minority Prop.	Downtown - Inner City	2.9	-9.7	-14.9	-20.9*	0.2	-5.0	-2.4	0.1
	Inner City - Inner Ring	19.6**	23.9**	26.8**	29.4**	8.5	10.8**	12.6**	7.3**
	Inner Ring - Outer Ring	1.8	4.2	5.9*	9.0**	0.3	0.8	0.8	2.9
Young Prop.	Downtown - Inner City	3.8	9.4**	14.2**	16.9**	1.3	3.6	8.8	9.3
	Inner City - Inner Ring	-0.5	-0.1	0.7	3.6**	-0.8	2.4	3.1*	7.1**
	Inner Ring - Outer Ring	-0.9	-1.7*	-0.5	0.2	0.8	0.7	0.6	0.6
Elderly Prop.	Downtown - Inner City	5.8**	3.1	-0.4	-0.6	10.6**	10.3**	2.1	1.3
	Inner City - Inner Ring	4.8**	3.3**	0.1	-2.7**	8.0**	5.1**	0.5	-3.0**
	Inner Ring - Outer Ring	0.2	2.6**	4.0**	3.8**	0.0	2.1*	3.7**	4.2**
Unemployment Rate	Downtown - Inner City	0.6	-2.2	-2.7	-3.1	5.9**	7.4**	7.7**	16.2**
	Inner City - Inner Ring	1.3	5.0**	5.0**	6.1**	1.8**	2.1**	2.6**	0.8
	Inner Ring - Outer Ring	0.1	0.7	1.0	0.9	-0.3	0.1	0.6	0.9
Welfare Rate	Downtown - Inner City	2.3	-3.3	-6.4**	-10.0*	-1.8	6.2**	9.4**	9.0**
	Inner City - Inner Ring	5.2**	10.1**	9.0**	9.6**	3.4**	3.4**	3.0**	1.0
	Inner Ring - Outer Ring	0.6	1.5	1.8*	2.8**	0.6	0.8	0.9	2.5**
Poverty Rate	Downtown - Inner City	9.9**	1.4	2.0	-1.2	21.6**	22.8**	23.4**	24.9**
	Inner City - Inner Ring	7.9**	11.9**	12.4**	13.5**	7.7**	6.3**	8.4**	3.4*
	Inner Ring - Outer Ring	0.4	0.8	2.0	2.3*	-0.2	0.9	1.8	2.8*
College Degree	Downtown - Inner City	8.2**	21.7**	31.8**	36.7**	1.7	-0.5	3.4	-2.6
Population Prop.	Inner City - Inner Ring	-4.4**	-4.1**	-4.0**	-5.9**	-7.2**	-3.3	-0.7	7.1
	Inner Ring - Outer Ring	1.1	-2.8*	-4.9**	-7.2**	4.6**	2.0	1.1	-0.6
Relative Per Capita Income	Downtown - Inner City	36.7**	54.0**	64.7**	66.5**	7.6	5.1	-8.2	-11.9
	Inner City - Inner Ring	-10.4**	-22.0**	-25.1**	-26.5**	-13.8*	-7.2	-17.3	-3.1
	Inner Ring - Outer Ring	10.7**	3.2	-5.0	-11.7**	16.2**	-0.4	4.2	-2.2
Relative Housing Value	Downtown - Inner City	-	92.7**	72.7**	68.0**	-32.0	60.4**	-15.0	-61.7*
	Inner City - Inner Ring	-11.4**	-43.3**	-42.1**	-35.0**	-33.9**	-19.4**	-19.7*	0.8
	Inner Ring - Outer Ring	-3.6**	-20.1**	-23.8**	-23.4**	5.0	-6.4	-7.5	-9.8
Housing Ownership Prop.	Downtown - Inner City	-32.1**	-36.7**	-34.9**	-24.9**	14.4	-46.2**	-42.9**	-44.0**
	Inner City - Inner Ring	-12.2**	-10.4**	-10.3**	-14.2**	-11.1**	-11.7**	-9.6**	-6.1
	Inner Ring - Outer Ring	1.6	-0.6	-2.6	-4.8**	-3.9	-5.1	-7.2*	-5.5
Vacant Housing Prop.	Downtown - Inner City	5.4**	5.0**	6.4**	-1.4	6.1**	9.7**	2.9	5.8**
	Inner City - Inner Ring	2.1**	4.6**	4.7**	5.8**	1.2	1.3	2.5**	0.3
	Inner Ring - Outer Ring	-0.9**	0.9	0.5	0.8	-1.4	-1.4**	-0.6	-0.7
Overcrowded Housing Prop.	Downtown - Inner City	11.9**	7.1**	6.3**	-1.0	43.1**	39.1**	10.9**	10.8**
	Inner City - Inner Ring	2.4**	5.5**	5.1**	6.3**	3.7*	2.3*	2.8**	0.5
	Inner Ring - Outer Ring	-2.0**	0.9	-0.1	0.9	-2.5	-1.9	-0.8	-0.7

**p<0.01; *p<0.05.

Of the demographic variables, spatial differentiation among minority populations is significant for the pairs of the inner city versus the inner-ring suburbs and the inner-ring suburbs versus the outer-ring suburbs. In the Atlanta and Portland regions, a narrow gap between the inner city and the inner-ring suburbs indicates that the inner-ring suburbs experienced significant increases in the proportion of minorities. In the Cleveland and Philadelphia regions, the inner-ring suburbs also showed higher increases in the proportion of minorities than the outer-ring suburbs from 1970 to 2000, although the proportion of minorities in the inner-ring suburbs is significantly lower than that in the inner city (See Appendix Table A-4).

Spatial differentiation in the young population became statistically significant for pairs of the downtown versus the inner city and the inner city vs. the inner-ring suburbs over time. The downtown experienced higher increases in the proportion of the young than the inner city as did the inner city over the inner-ring suburbs. In other words, the downtown and the inner city attracted the young population over the inner-ring suburbs and the outer-ring suburbs from 1970 to 2000. In contrast, spatial differentiation in the elderly population is significant in the inner city and the inner-ring suburbs pair as well as the inner-ring suburbs and the outer-ring suburbs pair, indicating that the inner-ring suburbs experienced significant increases in the elderly population over the inner city and the outer-ring suburbs.

With respect to socioeconomic variables (i.e., unemployment, the welfare recipient rate, the poverty rate, the proportion of college-educated population, and per capita income relative to the region's average), spatial differentiation is generally significant for the downtown and the inner city pair and the inner city and the inner-ring

suburbs pair. However, the gap between the inner city and the inner-ring suburbs decreased over time because the economic condition in the inner-ring suburbs deteriorated, while it improved in the inner city. Spatial differentiation in socioeconomic variables also became statistically significant for the inner-ring suburbs and the outer-ring suburbs pair. That is, the inner-ring suburbs increased in the poverty rate and the welfare recipient rate, but decreased in per capita income over the outer-ring suburbs. For instance, the per capita income in the inner-ring suburbs was 10 percent higher than that in the outer-ring suburbs in 1970, but it was lower than that in the outer-ring suburbs in 2000.

In addition, intra-regional spatial differentiation among socioeconomic variables of the metropolitan regions differs. For instance, the Philadelphia region revealed significant spatial differentiation in the per capita income for the downtown and the inner city pair and the inner city and the inner-ring suburbs pair, but the Portland region showed less spatial differentiation in these pairs. Furthermore, spatial differentiation in the per capita income for all group pairs is significantly lower in the Portland region relative to the three other regions. These findings indicate that metropolitan growth patterns and policies have significantly associated with intra-regional socioeconomic differentiation.

Finally, housing variables (i.e., relative housing values, home ownership, the vacancy rate, and housing units with an overcrowding problem) showed a significant level of spatial differentiation for the downtown and the inner city pair and the inner city and the inner-ring suburbs pair. For relative housing values, the Cleveland and Philadelphia regions showed a high level of spatial differentiation for all comparison

pairs, although the gap between the inner city and the inner-ring suburbs decreased from 1970 to 2000.

Spatial differentiation in housing ownership also showed similar patterns for all metropolitan areas: from lower ownership in the downtown to higher ownership in the outer-ring suburbs. In particular, the Atlanta region showed the most differentiated pattern in housing ownership among the subareas, while the Portland region showed the least differentiated pattern. For spatial differentiation in the housing vacancy and overcrowding problems, the downtown and the inner city pair and the inner city and the inner-ring suburbs pair showed significant spatial differentiation. The inner city, particularly, showed a higher level of housing vacancy and overcrowding problems relative to the other subareas.

In contrast to Tables 4.1 and 4.2, Tables 4.3 and 4.4 provide the results of the ANOVA multiple comparison tests for dynamic variables of change rates in each decade. The change rates of demographic variables showed that the inner-ring suburbs experienced a lower growth rate in total population but a higher growth rate in the elderly population. The inner-ring suburbs also showed a higher growth rate in minority populations over the outer-ring suburbs, although the gap between the inner-ring suburbs and the outer-ring suburbs decreased slightly over time. In contrast, the downtown and the inner city showed a higher growth rate in the young population over the inner- and outer-ring suburbs.

Table 4.3. ANOVA Multiple Comparison Tests for Dynamic Variables

Variables	Comparison Pairs	Atlanta			Cleveland		
		70-80	80-90	90-00	70-80	80-90	90-00
Population	Downtown - Inner City	8.8	16.3	49.5	89.1**	-12.3	60.0**
	Inner City - Inner Ring	-26.9	-4.2	1.2	-17.2**	-6.9**	-5.3
	Inner Ring - Outer Ring	-121.1**	-85.8**	-49.0**	-36.8**	-18.9**	-19.5**
Minority Prop.	Downtown - Inner City	8.8	16.3	49.5	89.1**	-12.3	60.0**
	Inner City - Inner Ring	-26.9	-4.2	1.1	-17.2**	-6.9	-5.3
	Inner Ring - Outer Ring	121.1**	85.8**	49.0**	36.8**	18.9**	19.5**
Young Prop.	Downtown - Inner City	4.0	25.8**	27**	15.8	-9.2	40.4**
	Inner City - Inner Ring	13.4**	-0.6	8.6*	7.4**	7.3*	7.6*
	Inner Ring - Outer Ring	2.6	3.7	-10.3**	6.4	-2.3	-3.2
Elderly Prop.	Downtown - Inner City	11.1	-16.8	0.8	-5.7	-53.3	-45.8
	Inner City - Inner Ring	-36.1**	-39.7**	-40.9*	-58.0**	-47.1**	-13.7*
	Inner Ring - Outer Ring	-55.8**	-3.7	5.9	-55.5**	-0.9	6.2
Unemployment Rate	Downtown - Inner City	450	-173.9	74.2	-104.3	-12.6	27.2
	Inner City - Inner Ring	-54.3	1.4	40.9	19.8	44.6**	-20.0*
	Inner Ring - Outer Ring	73.5**	12.4	-0.1	-34.6	13.5	19.7
Welfare Rate	Downtown - Inner City	4.8	18.8	-86.9	-122.5	21.9	-23.2
	Inner City - Inner Ring	-204.1**	-35.8*	9.4	-14.6	20.1	-48.9**
	Inner Ring - Outer Ring	-229.6**	-25.4*	40.3	-75.1	-1.6	-23.0
Poverty Rate	Downtown - Inner City	9.3	-3.9	-6.4	-3.0	-26.0	-18.3
	Inner City - Inner Ring	-80.9**	-18.0	-30.7	17.6	-19.4	-55.7**
	Inner Ring - Outer Ring	-127.0**	-26.9**	25.3	-36.3**	-0.6	-16.5
College Degree Population Prop.	Downtown - Inner City	-150.0**	121.1**	53.4	44.4	0.6	109.0*
	Inner City - Inner Ring	140.0**	37.8**	92.9**	32.8	12.2	30.9*
	Inner Ring - Outer Ring	-93.9**	-26.7**	-5.6	-43.8*	-9.1	0.5
Relative Per Capita Income	Downtown - Inner City	-37.9	-36.2	305.2**	-35.5*	-6.2	91.9*
	Inner City - Inner Ring	3.6	25.7	35.5	-25.8**	-19.1	15.8*
	Inner Ring - Outer Ring	50.6**	26.6*	-4.4	14.6**	38.1*	11.7
Relative Housing Value	Downtown - Inner City	-	38.4	54.4**	115.5	-24.4	7.0
	Inner City - Inner Ring	-	48.8**	58.7**	-43.7	14.1**	42.5**
	Inner Ring - Outer Ring	-	-12.6*	-15.2**	98.9**	6.1	17.8*
Housing Ownership Prop.	Downtown - Inner City	-34.3*	89.1**	348.9**	-66.9**	-58.2*	-50.2
	Inner City - Inner Ring	12.4	14.6	3.8	1.2	4.8	4.5
	Inner Ring - Outer Ring	10.1*	1.0	-3.6	1.3	0.7	3.3
Vacant Housing Prop.	Downtown - Inner City	321.8**	92.6	-26.4	-14.0	141.2*	41.0
	Inner City - Inner Ring	19.7	-55.0	1.4	18.3	-1.1	-38.7**
	Inner Ring - Outer Ring	70.0**	44.3*	15.8**	-57.1**	38.4*	37.8**
Overcrowded Housing Prop.	Downtown - Inner City	289.5**	29.7	-27.4	-58.8	147.1**	38.3
	Inner City - Inner Ring	-9.8	-53.9*	1.0	19.8	-7.0	-41.6**
	Inner Ring - Outer Ring	-109.1**	-53.3**	-17.1**	9.4	-35.5*	-42.2**

**p<0.01; *p<0.05.

Table 4.4. ANOVA Multiple Comparison Tests for Dynamic Variables (Cont.)

Variables	Comparison Pairs	Philadelphia			Portland		
		70-80	80-90	90-00	70-80	80-90	90-00
Population	Downtown - Inner City	20.7	38.1	19.0*	8.4	27.9*	35.5
	Inner City - Inner Ring	-39.3	-1.9	0.6	-16.9	-6.2	-5.2
	Inner Ring - Outer Ring	-18.6	-32.1**	-21.6**	-80.9**	-23.7**	-53.2**
Minority Prop.	Downtown - Inner City	20.7	38.1**	19.0*	8.4	27.9*	35.5
	Inner City - Inner Ring	-39.3	-1.9	0.6	-16.9	-6.2	-5.2
	Inner Ring - Outer Ring	18.6	32.1**	21.6**	80.9**	23.7**	53.2**
Young Prop.	Downtown - Inner City	21.8**	16.9**	12.2	9.5	78.4**	1.9
	Inner City - Inner Ring	0.1	6.4**	9.6**	12.7**	2.4	14.2**
	Inner Ring - Outer Ring	3.4	-1.9	-3.5	1.7	0.5	3.8
Elderly Prop.	Downtown - Inner City	-24.7	-36.6	3.6	-1.3	-28.7	-5.8
	Inner City - Inner Ring	-38.6	-32.6*	-16.1*	-45.5**	-43.2**	-24.7**
	Inner Ring - Outer Ring	-26.4	-13.8	2.8	-42.4**	-7.6	-1.9
Unemployment Rate	Downtown - Inner City	-121.5*	-6.8	-6.3	11.1	49.9	61.3
	Inner City - Inner Ring	39.5*	5.2	10.2	4.1	-1.7	-13.6
	Inner Ring - Outer Ring	0.3	2.2	-1.1	16.7	6.5	-0.3
Welfare Rate	Downtown - Inner City	-166.5	-22.0	-39.5	-92.2	17.1	-19.8
	Inner City - Inner Ring	-51.8	-5.0	-13.0	-9.9	-9.6	-56.1
	Inner Ring - Outer Ring	-89.8**	-5.5	-1.3	-0.5	-6.7	-43.4
Poverty Rate	Downtown - Inner City	-63.1	6.0	-31.1	-9.0	3.5	-7.8
	Inner City - Inner Ring	-4.5	0.8	-25.7	-27.2*	1.2	-30.3
	Inner Ring - Outer Ring	-22.1*	-21.3*	-14.2	-32.6**	-9.9	-7.5
College Degree Population Prop.	Downtown - Inner City	244.1**	16.8	-3.5	-64.4	292.5**	-42.2
	Inner City - Inner Ring	24.6*	18.0**	2.5	83.2**	16.2	45.5**
	Inner Ring - Outer Ring	-44.4*	-5.3	-6.6	-48.4**	-4.4	-9.4
Relative Per Capita Income	Downtown - Inner City	55.9**	35.0**	4.9	-24.8	-12.8	-25.3
	Inner City - Inner Ring	-26.0**	-13.7**	-4.1	12.3	3.7	28.0**
	Inner Ring - Outer Ring	16.4**	15.1**	8.3**	42.6**	10.2	9.9
Relative Housing Value	Downtown - Inner City	-	36.6**	-7.7	133.9	1.8	113.3*
	Inner City - Inner Ring	-22.6**	-15.5**	14.2**	42.0**	-0.3	65.8**
	Inner Ring - Outer Ring	-35.0**	12.3**	2.5	45.2**	5.2	3.9
Housing Ownership Prop.	Downtown - Inner City	12.3	6.3	52.4**	-8.9	-16.5	-13.1
	Inner City - Inner Ring	1.7	-1.5	-5.7*	1.2	1.1	13.7
	Inner Ring - Outer Ring	8.6	1.2	2.1	1.0	2.6	-2.9
Vacant Housing Prop.	Downtown - Inner City	-97.4	16.8	-62.3*	11.2	-46.5	-0.4
	Inner City - Inner Ring	21.3	-17.0	-0.3	-12.6	8.3	-39.5*
	Inner Ring - Outer Ring	-0.9	16.8	29.7**	0.9	35.4	-26.2
Overcrowded Housing Prop.	Downtown - Inner City	-109.0	-5.2	-58.8*	-7.9	-63.5	-1.8
	Inner City - Inner Ring	27.5	-17.8	0.2	-19.9	-4.4	-39.8*
	Inner Ring - Outer Ring	-30.1	-25.0	-30.0**	-9.8	-41.9*	18.2

**p<0.01; *p<0.05.

With respect to the growth rates of socioeconomic variables, the differences in the growth rates among the subareas differed from region to region and became statistically insignificant over time. However, the inner-ring suburbs showed a higher increase in the rate of poverty and a lower increase in the proportion of college-educated population and the per capita income than the inner city.

Finally, the differences in the growth rates of housing variables showed different patterns in each region. However, the growth rate in the average housing value showed that the downtown and the inner city experienced higher increase rates in housing values over the inner- and outer-ring suburbs. This pattern is particularly significant in the inner city and the inner-ring suburbs for all regions. For the change rate in the housing ownership, the downtown only showed higher increase rates in the Atlanta and Philadelphia regions.

Thus, although the degree of spatial differentiation among the subareas varied by the variables and the regions, the ANOVA analyses confirmed that four subareas—the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs—must be considered as heterogeneous spatial entities that form a metropolitan area. The ANOVA analyses also found that intra-regional spatial differentiation is considerably dynamic over time and different from region to region, each with different growth patterns and policies. However, since the ANOVA analyses with 12 variables showed complex results, the next section of the dissertation also includes an advanced method for an analysis of intra-regional spatial differentiation and socioeconomic disparity.

4.2. General Decline of the Inner-Ring Suburbs

The general decline of the inner-ring suburbs indicates an overall trend of decline in the inner-ring suburbs relative to the other subareas. Since the absolute level of neighborhood decline has always been and still is higher in the downtown and the inner city than it is in the inner- and outer-ring suburbs, this study focused on the trend of decline in the inner-ring suburbs from 1970 to 2000.

This research analyzed several variables from three categories (i.e., demographic, socioeconomic, and housing indicators) related to neighborhood growth and decline, and then developed combined indicators from a factor analysis. After examining the individual variables with conventional OLS regression, this research conducted advanced regression analyses called “random-effect GLS regression” with integrated indicators from the factor analysis.

4.2.1. Changes in the Demographic Indicators in the Subareas

Decentralization and its counterpart, the back-to-the-city movement, can be identified by examining population changes and migration patterns among the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs. Table 4.5 shows the dynamics in population growth from each of the four metropolitan regions and their subareas from 1970 to 2000.

The outer-ring suburbs experienced significant increases in population relative to the downtown, the inner city, and the inner-ring suburbs in each decade across all metropolitan regions, reflecting a strong decentralization toward the fringe of a metropolitan area. The downtown also showed significant population gains in the 1990s after experiencing a moderate decline in the 1970s and a slight increase in the 1980s. In contrast, the inner city and the inner-ring suburbs decreased their population or experienced a slight increase relative to the other subareas.

Table 4.5. Population Changes by the Subareas

Region	Subarea	Population				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	20,247	15,987	17,493	22,333	-21.0	9.4	27.7	10.3
	Inner City	234,300	173,595	158,757	164,837	-25.9	-8.5	3.8	-29.6
	Inner Ring	601,797	586,294	559,282	619,753	-2.6	-4.6	10.8	3.0
	Outer Ring	604,326	1,174,127	1,918,084	2,891,756	94.3	63.4	50.8	378.5
	Total	1,460,670	1,950,003	2,653,616	3,698,679	33.5	36.1	39.4	153.2
Cleveland	Downtown	8,695	8,739	7,132	9,488	0.5	-18.4	33.0	9.1
	Inner City	956,612	760,833	683,461	642,044	-20.5	-10.2	-6.1	-32.9
	Inner Ring	751,015	695,510	655,468	644,137	-7.4	-5.8	-1.7	-14.2
	Outer Ring	346,775	433,034	484,904	567,810	24.9	12.0	17.1	63.7
	Total	2,063,097	1,898,116	1,830,965	1,863,479	-8.0	-3.5	1.8	-9.7
Philadelphia	Downtown	87,279	77,835	79,205	82,759	-10.8	1.8	4.5	-5.2
	Inner City	2,141,506	1,820,023	1,710,325	1,641,247	-15.0	-6.0	-4.0	-23.4
	Inner Ring	1,570,878	1,522,607	1,477,055	1,449,774	-3.1	-3.0	-1.8	-7.7
	Outer Ring	1,017,108	1,295,216	1,590,380	1,862,866	27.3	22.8	17.1	83.2
	Total	4,816,771	4,715,681	4,856,965	5,036,646	-2.1	3.0	3.7	4.6
Portland	Downtown	8,300	8,193	9,568	12,994	-1.3	16.8	35.8	56.6
	Inner City	348,517	320,558	318,190	330,378	-8.0	-0.7	3.8	-5.2
	Inner Ring	230,733	238,708	249,312	276,233	3.5	4.4	10.8	19.7
	Outer Ring	292,904	537,668	662,771	909,606	83.6	23.3	37.2	210.5
	Total	880,454	1,105,127	1,239,841	1,529,211	25.5	12.2	23.3	73.7

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Population growth by race showed different patterns in each subarea. The white population has been the primary contributor of population growth in the downtown and the outer-ring suburbs, while white flight has become a clear pattern in the inner-ring

suburbs. For instance, the white population decreased in the inner-ring suburbs in all regions in the 1990s. In contrast, the minority population increased significantly in the inner- and outer-ring suburbs although it showed slightly different growth patterns in each of the subareas (See Appendix Tables A-3 and A-4).

Table 4.6. OLS Analysis for Total Population Change

Dummy Variables	1970-1980		1980-1990		1990-2000	
	Coef.	t	Coef.	t	Coef.	t
Downtown	-0.015	-0.06	0.171**	2.72	0.339**	4.03
Inner City	-0.257**	-3.15	-0.006	-0.28	-0.008	-0.27
Outer Ring	0.526**	6.73	0.413**	20.74	0.315**	11.55
Atlanta	0.223	1.91	0.309**	10.61	0.009	0.24
Cleveland	-0.264*	-2.32	-0.081**	-2.81	-0.262**	-6.60
Philadelphia	-0.155	-1.51	0.009	0.36	-0.261**	-7.35
Constant	0.237*	2.21	-0.055*	-2.01	0.205**	5.50
Model Summary	N=	2739	N=	2809	N=	2825
	F(6, 2732)=	30.22	F(6, 2802)=	205.33	F(6, 2818)=	75.04
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.0622	R ² =	0.3054	R ² =	0.1378

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

OLS regression analysis confirmed the general findings from the change in the population pattern in each of subareas. In Table 4.6, the dependent variable is the population change in each decade. The constant is the inner-ring suburbs of the Portland metropolitan area. The regression coefficients of the downtown, the inner city, and the outer-ring suburbs indicate relative differences based on the constant (y-intercept) after controlling for regional differences in population growth. The result indicates that population growth in the downtown and the outer-ring suburbs has been faster than that in the inner-ring suburbs over the three decades.

The downtown coefficient of .339 in the 1990s indicates that the population growth rate in the downtown is 33.9 percent higher than that in the inner-ring suburbs. In

contrast, insignificant coefficients for the inner city in the 1980s and 1990s indicate that the inner-ring suburbs show the same pattern of slow population growth as that of the inner city.

Table 4.7. OLS Analysis for White Population Change

Dummy	1970-1980		1980-1990		1990-2000	
Variables	Coef.	t	Coef.	t	Coef.	t
Downtown	-0.102	-0.44	0.477**	4.63	0.611**	3.95
Inner City	-0.303**	-3.88	0.011	0.33	0.063	1.21
Outer Ring	0.632**	8.46	0.430**	13.20	0.202**	4.07
Atlanta	0.105	0.94	0.198**	4.16	0.076	1.05
Cleveland	-0.312**	-2.86	-0.107*	-2.27	-0.184*	-2.54
Philadelphia	-0.185	-1.89	-0.020	-0.48	-0.239**	-3.69
Constant	0.159	1.55	-0.093*	-2.10	0.132	1.95
Model Summary	N=	2730	N=	2791	N=	2799
	F(6, 2723)=	41.10	F(6, 2784)=	68.77	F(6, 2792)=	14.85
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.0830	R ² =	0.1291	R ² =	0.0309

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

Table 4.8. OLS Analysis for Minority Population Change

Dummy	1970-1980		1980-1990		1990-2000	
Variables	Coef.	t	Coef.	t	Coef.	t
Downtown	-11.845	-1.90	-0.885	-0.97	-0.689	-0.92
Inner City	-8.366**	-3.93	0.015	0.05	0.744**	2.91
Outer Ring	-7.695**	-3.72	1.681**	5.72	1.395**	5.74
Atlanta	14.484**	4.83	3.284**	7.71	0.525	1.50
Cleveland	-0.431	-0.14	0.533	1.25	-0.271	-0.77
Philadelphia	-2.861	-1.07	0.787*	2.07	-0.308	-0.98
Constant	11.843**	4.27	0.206	0.52	1.245**	3.79
Model Summary	N=	2503	N=	2744	N=	2758
	F(6, 2496)=	13.99	F(6, 2737)=	29.69	F(6, 2751)=	10.05
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.0325	R ² =	0.0611	R ² =	0.0214

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

Tables 4.7 and 4.8 show regression analyses for the population growth in the white population and minority populations for each of the subareas. The regression

results from Table 4.7 show that the white population contributed the most significant population growth in the downtown and the outer-ring suburbs (See Appendix Table A-3). Table 4.8 shows that the inner-ring suburbs experienced a significant increase in minority populations in the 1970s and slow growth in the 1990s. However, a significant contributor to population growth in the inner-ring suburbs was minority populations (See Table 4.5 and Appendix Table A-4). In contrast, as they experienced significant growth in total population, the outer-ring suburbs were more likely to accommodate minority populations over time.

For an analysis of the back-to-the-city movement, this study used the migration data from the Bureau of the Census, which provides migration data for only 1990 and 2000. These data include the population of 5+ years old who moved from the central city of the same metropolitan area, from the central city of a different metropolitan area, from the suburbs of the same metropolitan area, and from the suburbs of a different metropolitan area within the past 5 years. These migration data can be used for regression analyses, but the limitation is that the spatial unit for data collection is different from that of the four subareas classified in this research. Despite their limitation, these data can provide general trends in total population changes among the subareas.

The first regression in Table 4.9 showed the destination of persons from the central city of the same metropolitan area. The movers from the central city of the same metropolitan area are more likely to settle in the downtown, the inner city, and the inner-ring suburbs and less likely to move into the outer-ring suburbs. This pattern is consistent in both 1990 and 2000.

Table 4.9. OLS Analysis for Migration Patterns in 1990 and 2000

Dummy Variables	From the central city of the same metro				From the central city of the different metro			
	1990		2000		1990		2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	0.171**	13.62	0.141**	11.25	0.068**	12.23	0.106**	17.94
Inner City	0.125**	29.24	0.129**	30.70	0.004*	2.11	0.012*	5.84
Outer Ring	-0.077**	-18.87	-0.080**	-19.96	0.006**	3.06	0.004**	2.20
Atlanta	-0.023**	-3.82	-0.048**	-8.25	0.013**	5.09	0.011**	4.04
Cleveland	-0.060**	-10.07	-0.069**	-11.84	-0.036**	-13.72	-0.045**	-16.60
Philadelphia	-0.075**	-14.22	-0.085**	-16.29	-0.037**	-15.55	-0.047**	-19.10
Constant	0.164**	29.58	0.173**	31.83	0.063**	25.68	0.068**	26.71
Model	N= 2825		N= 2819		N= 2825		N= 2819	
Summary	F(6, 2818)=	475.22	F(6, 2812)=	530.87	F(6, 2818)=	180.73	F(6, 2812)=	240.93
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.5029	R ² =	0.5311	R ² =	0.2779	R ² =	0.3395

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of Portland metropolitan area.

The second regression in Table 4.9 represents the destination of persons from the central cities of the different metropolitan areas. The analysis shows that the downtown and the outer-ring suburbs are the preferred destinations and the inner-ring suburbs are the least preferred place for movers from the central city of the different metropolitan areas.

Table 4.10. OLS Analysis for Migration Patterns in 1990 and 2000 (Cont.)

Dummy Variables	From the suburbs of the same metro				From the suburbs of the different metro			
	1990		2000		1990		2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	-0.109**	-9.03	-0.077**	-6.33	0.053**	7.61	0.053**	8.81
Inner City	-0.098**	-23.78	-0.097**	-23.77	-0.007**	-2.97	0.001	0.59
Outer Ring	0.092**	23.43	0.084**	21.55	0.042**	18.59	0.029**	14.91
Atlanta	0.015**	2.60	0.031**	5.48	0.013**	3.84	0.008**	2.71
Cleveland	0.023**	4.11	0.036**	6.32	-0.008*	-2.47	-0.011**	-3.95
Philadelphia	0.019**	3.69	0.016**	3.18	-0.001	-0.43	-0.003	-1.03
Constant	0.165**	30.81	0.163**	30.90	0.037**	11.99	0.034**	13.15
Model	N= 2825		N= 2819		N= 2825		N= 2819	
Summary	F(6, 2818)=	444.05	F(6, 2812)=	418.37	F(6, 2818)=	142.17	F(6, 2812)=	88.34
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.4860	R ² =	0.4716	R ² =	0.2324	R ² =	0.1586

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of Portland metropolitan area.

In contrast, although the results of the OLS analyses in Table 4.10 are not completely consistent, the two regression analyses indicate that movers from the suburbs are most likely to locate in the outer-ring suburbs. However, the trend of settlement in the downtown increased from 1990 to 2000. In the second regression in Table 4.10, the inner city and the inner-ring suburbs are the least preferred destinations for movers from the suburbs of a different metropolitan area. In other words, they are more likely to locate in the downtown or the outer-ring suburbs.

Table 4.11. OLS Analysis for the Growth Rate in Migration from 1990 to 2000

Dummy Variables	From the central city of the same metro		From the central city of the diff. metro		From the suburbs of the same metro		From the suburbs of the diff. metro	
	1990-2000		1990-2000		1990-2000		1990-2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	-0.132	-0.54	1.034*	2.37	0.822**	4.97	0.466	1.54
Inner City	-0.206*	-2.51	0.169	1.15	0.159**	2.97	0.291**	2.96
Outer Ring	0.256**	3.25	0.435**	3.15	0.234**	4.64	0.139	1.51
Atlanta	-0.443**	-3.91	0.278	1.39	0.232**	3.16	0.091	0.68
Cleveland	-0.402**	-3.54	-0.327	-1.63	-0.144*	-1.97	-0.240	-1.80
Philadelphia	-0.164	-1.61	-0.224	-1.25	-0.250**	-3.80	-0.094	-0.79
Constant	0.558**	5.25	0.464*	2.47	0.260**	3.78	0.299*	2.40
Model	N=	2773	N=	2748	N=	2787	N=	2721
Summary	F(6, 2766)=	10.03	F(6, 2741)=	6.39	F(6, 2780)=	23.95	F(6, 2714)=	2.93
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0075
	R ² =	0.0213	R ² =	0.0138	R ² =	0.0491	R ² =	0.0064

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

Finally, the four regression models in Table 4.11 show the growth rate in migration for each migration type. Although the patterns are not consistent for each migration type, these models generally support that the increased rate of migration in the inner-ring suburbs was relatively lower than the rates in the downtown, the inner city, and the outer-ring suburbs.

4.2.2. Changes in the Socioeconomic Indicators in the Subareas

This research selected the poverty rate and per capita income as socioeconomic indicators for descriptive analyses that address the socioeconomic decline in each subarea from 1970 to 2000. The increased poverty rate and decreased per capita income indicate socioeconomic deterioration in the neighborhoods.

Table 4.12. Changes in the Poverty Rate in the Subareas

Region	Subarea	Poverty Rate (%)				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	42.9	59.8	59.5	39.1	16.8	-0.3	-20.4	-3.8
	Inner City	23.9	29.2	28.4	22.0	5.3	-0.8	-6.4	-1.9
	Inner Ring	9.6	16.3	17.3	18.2	6.7	1.0	0.9	8.5
	Outer Ring	8.1	7.0	5.7	6.5	-1.2	-1.2	0.7	-1.7
	Total	11.8	12.1	9.7	9.2	0.3	-2.3	-0.5	-2.5
Cleveland	Downtown	30.6	43.2	52.9	51.5	12.5	9.7	-1.3	20.9
	Inner City	14.6	18.5	23.4	22.0	3.9	4.9	-1.4	7.5
	Inner Ring	3.5	3.9	4.7	5.7	0.4	0.8	1.0	2.2
	Outer Ring	4.7	4.0	4.6	4.2	-0.7	0.7	-0.5	-0.5
	Total	8.9	9.9	11.8	11.0	1.0	1.9	-0.8	2.1
Philadelphia	Downtown	21.3	19.3	18.7	17.3	-2.0	-0.6	-1.4	-4.0
	Inner City	14.4	20.2	19.8	22.0	5.9	-0.5	2.3	7.6
	Inner Ring	5.4	6.6	6.0	7.1	1.2	-0.6	1.1	1.7
	Outer Ring	6.0	6.0	4.0	4.5	0.0	-2.0	0.5	-1.6
	Total	9.8	12.0	10.4	11.2	2.1	-1.5	0.7	1.3
Portland	Downtown	34.2	32.5	38.3	33.8	-1.7	5.8	-4.5	-0.4
	Inner City	12.7	13.3	15.8	13.5	0.6	2.6	-2.3	0.8
	Inner Ring	6.6	7.6	9.1	11.0	1.0	1.5	2.0	4.5
	Outer Ring	7.8	6.6	7.1	7.4	-1.2	0.5	0.2	-0.4
	Total	9.7	8.9	10.0	9.6	-0.7	1.0	-0.4	-0.1

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

As shown in Table 4.12, the overall poverty rates peaked in 1980 (in Atlanta and Philadelphia) and 1990 (in Cleveland and Portland) and decreased over time (except in Philadelphia in 2000). Although the downtown and the inner city still showed a higher level of poverty than the other subareas, they experienced substantial decline in poverty

in the 1990s. Of all the inner cities, Philadelphia's inner city increased only in the level of poverty over time.

By contrast, the inner-ring suburbs continuously increased in the level of poverty from 1970 to 2000, a trend that is uniform for four metropolitan areas. The level of poverty in the inner-ring suburbs is particularly higher in the fast-growing regions (Atlanta and Portland) than in the slow-growing regions (Cleveland and Philadelphia). The outer-ring suburbs also increased in the level of poverty in the 1990s after experiencing a moderate decline in the 1970s and 1980s. However, the level of poverty in the outer-ring suburbs is significantly lower than it is in the other subareas.

The changes in the level of poverty of each racial group also differ by subarea (See Appendix Tables A-5 and A-6). While white poverty decreased significantly in the downtown and moderately in the inner city, it increased gradually in the inner-ring suburbs over time. For more detailed analyses, white poverty can be examined with the growth in the white population (See Appendix Table A-3). The analyses showed "white re-growth" in the downtown and "white flight" in the inner-ring suburbs. Thus, a decrease in white poverty in the downtown is more likely to relate to the immigration of upper-income white households, while an increase in white poverty in the inner-ring suburbs is more likely to relate to the outmigration of upper-income white households. The white poverty in the inner-ring suburbs could also be due to aging population because the elderly population in the inner-ring suburbs significantly increased relative to other subareas from 1970 to 2000 (See Tables 4.1 to 4.4).

Minority poverty decreased significantly in the downtown and the inner city in the 1990s after experiencing a peak in 1980 and 1990. However, despite substantial

decreases in minority poverty at the regional level in the 1980s and 1990s, minority poverty slightly increased in the inner-ring suburbs in the 1990s. Given a substantial increase in minority populations in the inner-ring suburbs in the 1990s, an increase in the poverty rate is more likely to relate to the immigration of lower-income households. The Portland region, particularly, experienced a substantial increase in minority poverty in the inner-ring suburbs from 16.2 percent to 22.9 percent in the 1990s, despite a decrease in the regional poverty rate from 22.5 percent to 19.6 percent during the same period (See Appendix Table A-6). In addition, the inner-ring suburbs in the Portland metropolitan area experienced a dramatic increase of 166.0 percent in its minority population from 16,331 in 1990 to 43,446 in 2000 (See Appendix Table A-4).

Table 4.13. OLS Analysis for the Poverty Rate

Dummy Variables	1970		1980		1990		2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	0.233**	19.82	0.243**	15.72	0.269**	15.30	0.203**	12.88
Inner City	0.094**	23.39	0.125**	23.67	0.143**	23.79	0.129**	23.87
Outer Ring	-0.001	-0.37	-0.027**	-5.28	-0.037**	-6.50	-0.040**	-7.83
Atlanta	0.024**	4.32	0.053**	7.18	0.040**	4.76	0.045**	5.99
Cleveland	-0.016**	-2.88	0.001	0.07	0.013	-1.52	0.009	1.21
Philadelphia	-0.011*	-2.16	0.004	0.64	-0.022**	-2.90	-0.004	-0.59
Constant	0.062**	11.87	0.068**	9.81	0.084**	10.76	0.085**	12.05
Model	N= 2841		N= 2841		N= 2841		N= 2841	
Summary	F(6, 2834)=	182.64	F(6, 2834)=	203.02	F(6, 2834)=	225.76	F(6, 2834)=	221.58
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.2789	R ² =	0.3006	R ² =	0.3234	R ² =	0.3193

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

This study conducted regression analyses that confirm the important findings from the descriptive analyses: decreases in poverty rate in the downtown and inner city and increases in the poverty rate in the inner-ring suburbs. In Table 4.13, the dependent

variable is the poverty rate and the independent variables are spatial dummies: the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs.

As shown in Table 4.13, the poverty rate increased in the inner-ring suburbs and decreased in the downtown and the inner city. The poverty gap between the inner-ring suburbs and the outer-ring suburbs also increased over time. The Y-intercept is the expected poverty rate of the inner-ring suburbs, which increased 2.3 percent from 6.2 percent in 1970 to 8.5 percent in 2000. In contrast, after continuous increases in poverty from 1970 to 1990, the downtown and the inner city showed decreases in poverty in the 1990s.

Table 4.14. Change in Per Capita Income Relative to the Regional Average

Region	Subarea	Proportion of Relative PCI (%)				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	50.8	35.4	29.1	49.9	-30.3	-17.8	71.4	-1.8
	Inner City	76.5	73.7	78.5	97.4	-3.7	6.5	24.1	27.2
	Inner Ring	112.2	98.4	95.3	96.3	-12.2	-3.2	1.1	-14.1
	Outer Ring	98.6	105.6	103.8	101.3	7.0	-1.7	-2.4	2.7
Cleveland	Downtown	74.1	77.2	64.9	62.4	4.2	-16.0	-3.9	-15.9
	Inner City	89.9	83.6	76.8	76.1	-7.0	-8.2	-0.9	-15.4
	Inner Ring	113.4	114.6	112.2	107.0	1.1	-2.1	-4.6	-5.6
	Outer Ring	99.5	105.8	116.8	119.7	6.3	10.3	2.5	20.3
Philadelphia	Downtown	140.8	159.7	163.1	152.4	13.4	2.1	-6.5	8.3
	Inner City	92.0	82.3	75.1	70.6	-10.6	-8.7	-6.0	-23.2
	Inner Ring	109.0	111.2	108.2	104.6	2.0	-2.6	-3.4	-4.0
	Outer Ring	99.6	108.2	115.9	120.0	8.7	7.1	3.5	20.5
Portland	Downtown	101.3	106.6	88.7	93.3	5.2	-16.8	5.2	-7.9
	Inner City	97.9	96.0	89.3	94.7	-2.0	-7.0	6.1	-3.3
	Inner Ring	109.6	100.9	105.4	96.0	-7.9	4.4	-8.9	-12.5
	Outer Ring	94.9	101.9	103.3	103.3	7.4	1.4	0.0	8.8

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

The income change is a direct measure that addresses an economic condition of a neighborhood. Due to regional differences in per capita income (PCI), this research

adopted relative per capita income (RPCI)—percentage of PCI to metropolitan average PCI—that allows us to compare the four metropolitan areas. Table 4.14 showed changes in the RPCI for each region over time. For example, the RPCI of 50.8 in the downtown indicates that the PCI in the downtown is 50.8 percent of the regional average PCI.

The downtown and the inner city in the fast-growing regions (Atlanta and Portland) showed dramatic increases in RPCI in the 1990s after experiencing decreases in the 1970s or 1980s. The outer-ring suburbs in these regions showed slight decreases in the RPCI between 1980 and 2000. By contrast, the downtown and the inner city in the slow-growing regions (Cleveland and Philadelphia) showed gradual decreases in RPCI. However, the outer-ring suburbs in the slow-growing regions showed continuous increases in RPCI relative to the inner city and inner-ring suburbs between 1970 and 2000. These change patterns in RPCI in the outer-ring suburbs indicate that higher-income households and well-paid jobs in the metropolitan areas have shifted to the outer-ring suburbs, contributing to continuous increases in RPCI. While this trend slows down in the fast-growing regions, it continues in the slow-growing regions.

In Table 4.14, the higher RPCI of the inner-ring suburbs in 1970 indicates that the inner-ring suburbs were once the affluent suburbs in the metropolitan regions. However, the inner-ring suburbs in the four metropolitan areas showed a gradual decline in RPCI between 1970 and 2000. The change rates in RPCI between 1970 and 2000 show that the trend of decline in RPCI is more significant in the fast-growing regions than in the slow-growing regions. Furthermore, the RPCI of the inner-ring suburbs in the slow-growing regions is relatively higher than that in the fast-growing regions. This finding indicates

that a strong decentralization trend can be more detrimental to the inner-ring suburbs in the fast-growing regions than to those in the slow-growing regions.

Table 4.15. OLS Analysis for Per Capita Income Relative to the Regional Average

Dummy Variables	1970		1980		1990		2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	-0.072	-1.31	-0.087	-1.46	-0.121	-1.71	0.014	0.19
Inner City	-0.166**	-8.95	-0.238**	-12.02	-0.271**	-11.26	-0.241**	-10.20
Outer Ring	-0.119**	-6.71	-0.010	-0.53	0.059**	2.57	0.105**	4.67
Atlanta	-0.036	-1.36	-0.065*	-2.36	-0.093**	-2.78	-0.097**	-2.95
Cleveland	0.008	0.31	-0.001	-0.05	-0.002	-0.06	0.007	0.21
Philadelphia	0.034	1.44	0.033	1.34	0.035	1.17	0.023	0.78
Constant	1.103**	45.19	1.086**	42.20	1.055**	33.78	1.018**	33.12
Model	N= 2730		N= 2809		N= 2825		N= 2819	
Summary	F(6, 2732)=	16.69	F(6, 2802)=	33.85	F(6, 2818)=	39.83	F(6, 2812)=	41.85
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.0354	R ² =	0.0676	R ² =	0.0782	R ² =	0.0820

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

Table 4.15 confirmed an economic decline in the inner-ring suburbs. The Y-intercept, the RPCI of the inner-ring suburbs, showed continuous decreases from 1.103 in 1970 to 1.018 in 2000 after controlling for regional variations. In contrast, the RPCI of the outer-ring suburbs showed continuous increases from -.119 in 1970 to .105 in 2000. That is, the income gap between the inner-ring suburbs and the outer-ring suburbs increased over time. In addition, the RPCIs of the downtown and the inner city increased in the 1990s after experiencing continuous decline from 1970 (-.166) to 1990 (-.271). These regression analyses supported a potential trend of economic recovery in the downtown and the inner city backed by the back-to-the-city movement and a continuous trend of economic decline in the inner-ring suburbs in the four metropolitan areas.

4.2.3. Changes in the Housing Indicators in the Subareas

Distressed neighborhoods experience physical deterioration in housing. To examine housing deterioration in subareas, this research selected two housing indicators: housing values and overcrowded housing. Since housing values represent housing conditions as well as neighborhood environments, they can be a useful indicator for identifying physical deterioration in neighborhoods. Overcrowded housing is also identified as a sign of neighborhood decline because it is usually accompanied by an influx of a poor population.

Table 4.16. Changes in Average Housing Value Relative to the Regional Average

Region	Subarea	Relative AHV to the Region's AHV				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	-	25.9	53.0	89.1	-	104.4	68.3	244.0*
	Inner City	-	69.6	97.8	137.6	-	40.4	40.7	97.6*
	Inner Ring	-	91.3	101.1	111.8	-	10.7	10.6	22.4*
	Outer Ring	-	106.7	99.9	96.7	-	-6.4	-3.2	-9.4*
Cleveland	Downtown	46.4	40.5	30.4	200.2	-12.6	-24.9	558.2	331.7
	Inner City	81.9	69.2	69.2	70.8	-15.5	0.0	2.2	-13.5
	Inner Ring	109.6	105.7	101.6	95.2	-3.6	-3.9	-6.3	-13.2
	Outer Ring	106.7	128.5	126.5	127.0	20.5	-1.6	0.4	19.1
Philadelphia	Downtown	-	147.4	131.3	140.7	-	-10.9	7.2	-4.5
	Inner City	218.9	63.2	57.9	57.4	-71.1	-8.4	-0.9	-73.8
	Inner Ring	98.8	113.2	108.7	102.2	14.6	-4.0	-6.0	3.4
	Outer Ring	58.4	134.4	134.8	129.5	130.1	0.3	-3.9	121.8
Portland	Downtown	49.8	137.4	65.1	165.0	175.8	-52.6	153.6	231.1
	Inner City	81.6	75.8	77.4	88.6	-7.1	2.0	14.6	8.6
	Inner Ring	114.7	118.9	102.9	95.3	3.7	-13.5	-7.4	-16.9
	Outer Ring	111.9	108.7	110.4	105.9	-2.8	1.6	-4.1	-5.3

* Change rates between 1980 and 2000.

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Table 4.16 shows the average housing value relative to the regional average housing value in each of the subareas. The housing value in the inner-ring suburbs

decreased continuously from 1980 to 2000, except in the metropolitan Atlanta region. The Atlanta region is the only area that experienced increases in housing values in the downtown, the inner city, and the inner-ring suburbs, and decreases in the outer-ring suburbs in housing value from 1980 to 2000. However, the downtown experienced the most significant increases in housing value relative to the other subareas in the 1990s. The inner city also showed moderate to significant increases in housing value. In particular, the Atlanta region showed the highest housing value in the inner city in 2000.

Table 4.17. OLS Analysis for Average Housing Value Relative to the Regional Average

Dummy Variables	1970		1980		1990		2000	
	Coef.	t	Coef.	T	Coef.	t	Coef.	t
Downtown	-0.656**	-4.61	0.289**	2.58	0.060	0.63	0.359**	3.84
Inner City	-0.329**	-18.87	-0.411**	-13.08	-0.378**	-14.40	-0.274**	-9.94
Outer Ring	-0.023	-1.42	0.201**	6.70	0.181**	7.24	0.168**	6.39
Atlanta	(dropped)		-0.111*	-2.50	-0.151**	-4.15	-0.128**	-3.36
Cleveland	-0.070**	-4.0	0.094*	2.14	0.009	0.23	-0.007	-0.18
Philadelphia	-0.703**	-39.7	0.153**	3.86	0.083*	2.54	0.014	0.41
Constant	1.141**	63.30	0.964**	23.16	0.994**	29.16	0.973**	27.25
Model	N=	1451	N=	2726	N=	2774	N=	2781
Summary	F(5, 1445)=	464.84	F(6, 2719)=	77.17	F(6, 2767)=	90.44	F(6, 2774)=	51.74
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.6166	R ² =	0.1455	R ² =	0.1640	R ² =	0.1007

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

In contrast to Table 4.16 of relative average housing values, Table 4.17 is an OLS analysis for the relative average housing value in each subarea, controlling for each region. Table 4.17 confirmed the general pattern of rebounding housing values in the downtown and the continuous recovery of housing values in the inner city. In contrast, housing value in the inner-ring suburbs experienced a gradual decline over time.

Table 4.18 lists the changes in the proportion of overcrowded housing units in subareas and regions. The regional proportion showed that overcrowded housing

reemerged in the 1990s after experiencing significant decreases from 1970 to 1980. In particular, the fast-growing metropolitan regions (Atlanta and Portland) showed a higher proportion of overcrowded housing than the slow-growing metropolitan regions (Cleveland and Philadelphia).

Table 4.18. Change in the Proportion of Overcrowded Housing Units

Region	Subarea	Proportion of Overcrowded Housing (%)				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	15.36	8.09	9.22	7.15	-47.3	13.9	-22.4	-53.5
	Inner City	11.75	5.23	5.27	5.63	-55.5	0.9	6.8	-52.1
	Inner Ring	6.07	3.98	5.28	8.37	-34.4	32.7	58.5	38.0
	Outer Ring	5.64	2.09	2.18	4.49	-63.0	4.4	105.8	-20.5
	Region	7.04	3.05	3.11	5.25	-56.7	1.8	68.9	-25.5
Cleveland	Downtown	6.48	2.83	3.36	3.45	-56.3	18.7	2.6	-46.8
	Inner City	5.64	2.37	2.29	2.45	-58.0	-3.2	6.6	-56.6
	Inner Ring	4.50	1.36	0.94	1.23	-69.8	-30.9	31.0	-72.6
	Outer Ring	5.60	1.43	1.02	1.03	-74.5	-28.3	0.9	-81.5
	Region	5.24	1.81	1.49	1.61	-65.5	-17.6	8.1	-69.3
Philadelphia	Downtown	4.64	2.42	2.15	2.40	-47.7	-11.2	11.4	-48.3
	Inner City	5.83	3.81	4.65	5.47	-34.7	22.3	17.6	-6.1
	Inner Ring	4.56	1.80	1.70	2.43	-60.5	-5.7	43.5	-46.6
	Outer Ring	4.36	1.60	1.22	1.47	-63.4	-23.6	20.1	-66.4
	Region	5.12	2.56	2.61	3.07	-50.0	1.7	17.6	-40.2
Portland	Downtown	2.00	4.86	4.68	5.29	143.2	-3.8	13.0	164.4
	Inner City	3.30	2.31	3.22	5.08	-30.0	39.3	58.0	54.1
	Inner Ring	3.56	1.29	2.62	5.87	-63.8	103.4	124.2	64.9
	Outer Ring	5.30	1.81	2.81	4.57	-65.9	55.2	62.9	-13.7
	Region	3.95	1.89	2.90	4.94	-52.3	53.9	70.2	25.0

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

The proportion of overcrowded housing is still higher in the downtown and the inner city, but it increased significantly in the inner-ring suburbs from 1970 to 2000. In particular, the inner-ring suburbs in the Atlanta and Portland regions showed the highest proportions (8.37% in Atlanta and 5.87% in Portland) in overcrowded housing in 2000. In addition, the inner-ring suburbs in the slow-growing areas showed the fast increases in overcrowded housing during the 1990s.

Table 4.19. OLS Analysis for the Proportion of Overcrowded Housing Units

Dummy Variables	1970		1980		1990		2000	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Downtown	0.017**	2.81	0.016**	4.03	0.025**	5.14	0.007	1.26
Inner City	0.013**	6.48	0.015**	11.18	0.019**	11.61	0.015**	7.69
Outer Ring	0.002	0.86	-0.006**	-4.62	-0.011**	-7.02	-0.015**	-8.07
Atlanta	0.023**	8.40	0.014**	7.73	0.012**	5.27	0.014**	5.21
Cleveland	0.010**	3.64	-0.003	-1.44	-0.018**	-8.14	-0.038**	-13.91
Philadelphia	0.004	1.81	0.003	1.72	-0.006**	-3.20	-0.024**	-9.75
Constant	0.038**	14.81	0.018**	10.28	0.029**	13.96	0.054**	21.06
Model	N= 2728		N= 2810		N= 2816		N= 2812	
Summary	F(6, 2721)=	24.01	F(6, 2803)=	56.64	F(6, 2809)=	84.01	F(6, 2805)=	110.58
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.0503	R ² =	0.1081	R ² =	0.1521	R ² =	0.1913

**p<0.01; *p<0.05. The constant is the inner-ring suburbs of the Portland metropolitan area.

Table 4.19 confirms previous findings regarding the changes in overcrowded housing with OLS analyses. Overcrowded housing increased continuously in the inner-ring suburbs over time, but it decreased in the outer-ring suburbs after regional variations were controlled for. The continuous increases in overcrowded housing in the inner-ring suburbs can be associated with outdated housing size and the stagnant housing market in the inner-ring suburbs. By contrast, housing redevelopment in the downtown and inner city and the continuous supply of new housing in the outer-ring suburbs contributed to a reduction in the amount of overcrowded housing.

4.2.4. Intra- and Inter-Regional Spatial Differentiations and the Decline of Inner-Ring Suburbs

Using factor analysis and advanced regression analyses, this research selected twelve variables pertaining to demographic, socioeconomic, and housing characteristics for analyzing intra- and inter-regional spatial differentiations and the decline of the inner-ring suburbs. Due to the high correlations between the variables, only representative variables were selected by a data reduction method using the factor analysis, which identified three factors with eigenvalues greater than 1.0.

Table 4.20. Rotated Factor Loadings with Demographic, Socioeconomic, and Housing Variables

Variables	1	2	3	Uniqueness
Minority Proportion	0.736	-0.292	0.007	0.373
Young Proportion	0.198	-0.008	0.854	0.231
Elderly Proportion	0.204	0.138	-0.748	0.380
Unemployment Rate	0.767	-0.307	-0.034	0.316
Public-Assisted Household Prop.	0.818	-0.375	-0.113	0.177
Poverty Rate	0.857	-0.359	0.009	0.136
College Degree Population Prop.	-0.077	0.904	0.047	0.176
Relative Per Capita Income	-0.301	0.854	-0.136	0.161
Relative Average Housing Value	-0.379	0.780	-0.059	0.244
Housing Ownership	-0.764	0.036	-0.303	0.323
Vacant Housing Proportion	0.786	-0.027	0.146	0.360
Overcrowded Housing Proportion	0.366	-0.537	0.231	0.524
Eigenvalue	5.627	1.548	1.424	
Proportion (%)	0.469	0.129	0.119	
Cumulative (%)	0.469	0.598	0.717	
Model Summary	Number of observations: 11,105			
	Factor estimation method: principle component factors			
	Factor rotation method: varimax			

* Bold faces: factor loadings greater than .5.

Table 4.20 provides rotated factor loadings in each factor after the varimax rotation. The lower values of uniqueness (less than .5) indicate that most variables are valid for the factor analysis. The scores of rotated factor loadings greater than .5 provide the characteristics of each factor. Factor one is an integrated variable that represents the deterioration of neighborhoods because it reflects higher poverty and unemployment rates, a higher proportion in public-assisted households and vacant housing, a higher proportion in minorities, and lower housing ownership. Alone, factor one explained 46.9 percent of the twelve original variables.

In contrast, factor two, a combined variable of a higher proportion in college-educated population, a higher per capita income, higher housing values, and a lower proportion in overcrowded housing, represents prosperous neighborhoods. Finally, factor three is a combined variable that represents demographic characteristics such as a lower proportion in the young population and a higher proportion in the elderly population.

This research reaggregated factor scores (i.e., factors one to three) by the subareas (i.e., the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs), times (i.e., 1970, 1980, 1990, and 2000), and regions (i.e., Atlanta, Cleveland, Philadelphia, and Portland). Figures 4.1 and 4.2 show the changing patterns of the deterioration factor, while Table 4.21 provides the output of the random-effect GLS regression that tests intra-regional spatial differentiation and the general decline of the inner-ring suburbs. In the model, the dependent variable is the deterioration factor (Factor 1 in Table 4.20) and the independent variables are spatial dummies and time dummies for each subarea and interaction dummies between subareas and time variables.

Overall, the levels of deterioration are higher in the downtown and the inner city than in the inner- and outer-ring suburbs. In the Atlanta metropolitan area, while the gap between the downtown and the inner city is already significant, the gap between the inner-ring suburbs and the outer-ring suburbs increased over time (See Figure 4.1). In other words, the level of deterioration is stratified from the downtown (highest) to the outer-ring suburbs (lowest). In the other three metropolitan areas (Cleveland, Philadelphia, and Portland), intra-regional spatial differentiations are also clear among the downtown, the inner city, the inner-ring suburbs, and the outer-ring suburbs. Furthermore, these three metropolitan areas show the distinct pattern of emerging intra-regional spatial differentiation between the inner-ring suburbs and the outer-ring suburbs, increasing deterioration in the inner-ring suburbs.

In Table 4.21, coefficients of the downtown, the inner city, and the outer-ring suburbs for the four metropolitan areas confirm that intra-regional spatial differentiation exist among the subareas: between the downtown and the inner city in the central city as well as between the inner-ring suburbs and the outer-ring suburbs in the suburbs. A positive sign of a coefficient on the downtown and the inner city indicates that the level of deterioration in the downtown and the inner city is higher than that of the inner-ring suburbs. A negative sign of a coefficient on the outer-ring suburbs indicates that the level of deterioration in the outer-ring suburbs is lower than that of the inner-ring suburbs.

The Atlanta region shows the highest level of intra-regional differentiation between subareas in terms of the deterioration score (See Graph A in Figure 4.1). In Table 4.21, the coefficient of -1.157 for the outer-ring suburbs indicates that the level of deterioration in the inner-ring suburbs is 1.157 points higher in terms of the standard

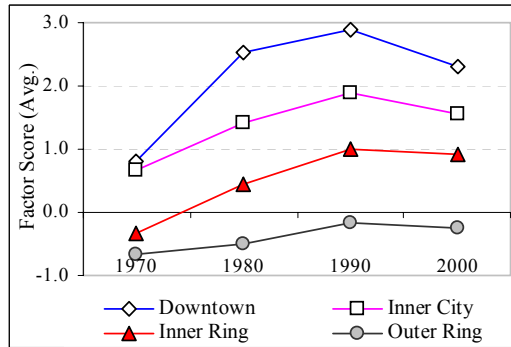
deviation than that in the outer-ring suburbs. The coefficient of -1.157 also indicates that inter-regional spatial differentiation between the inner-ring suburbs and the outer-ring suburbs in Atlanta is significantly higher than in Cleveland ($-.176$), Philadelphia ($-.146$), and Portland ($-.223$).

In contrast, the Portland region shows the smallest level of intra-regional differentiation among subareas (See Graph D in Figure 4.1). In particular, the levels of intra-regional differentiation among the inner city, the inner-ring suburbs, and the outer-ring suburbs are smaller than those found in Atlanta, Cleveland, and Philadelphia. The Portland region also shows the lowest level in deterioration in the inner city, but this region also showed a relatively higher level of deterioration in the inner- and outer-ring suburbs (See Figure 4.2).

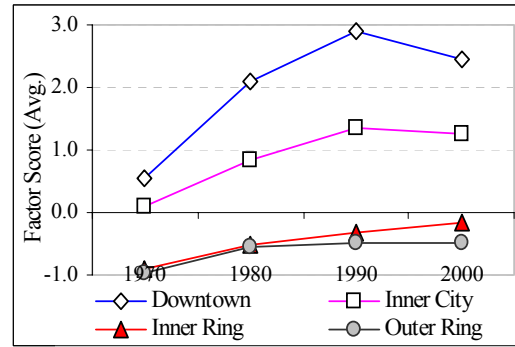
In Table 4.21, the coefficients of time dummies (1970, 1980, and 2000) provide dynamic changes in the level of deterioration in the inner-ring suburbs. From 1970 to 2000, time dummies in the four metropolitan areas experienced continuous increases in coefficients, indicating that the level of deterioration in the inner-ring suburbs has increased over time, confirming the findings in Figures 4.1 and 4.2.

The interaction variables between the subareas and time in Table 4.21 also show trends of growth and decline in the downtown, the inner city, and the outer-ring suburbs. Interaction variables of the downtown indicate that the level of deterioration decreased in the 1980s and the 1990s after experiencing a significant increase in the 1970s. This pattern is clear in the Atlanta and Philadelphia metropolitan areas, while the coefficients are not statistically significant in the Cleveland and Portland metropolitan areas over time. In the interaction variables of the inner city, the coefficients of the fast-growing areas

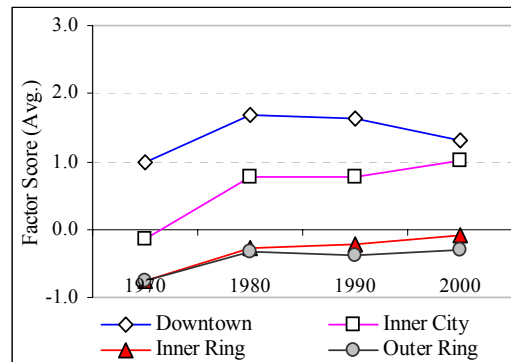
(Atlanta and Portland) indicate decreases in the level of deterioration over time, while the slow-growing regions (Cleveland and Philadelphia) show slight increases in the level of deterioration over time. Finally, the coefficients on interaction variables of the outer-ring suburbs indicate that the level of deterioration in the outer-ring suburbs decreased continuously.



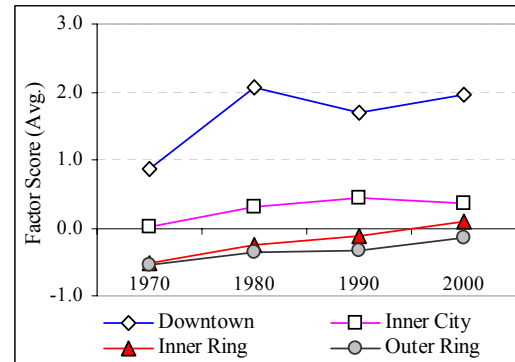
(A) Metro Atlanta Region



(B) Metro Cleveland Region

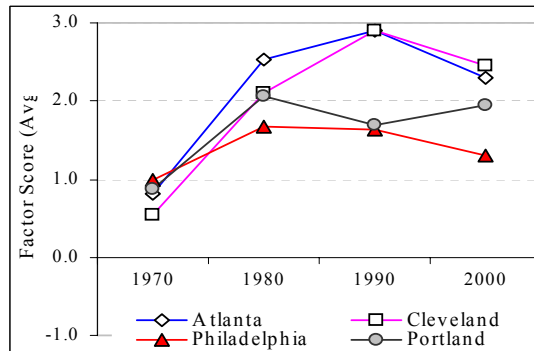


(C) Metro Philadelphia Region

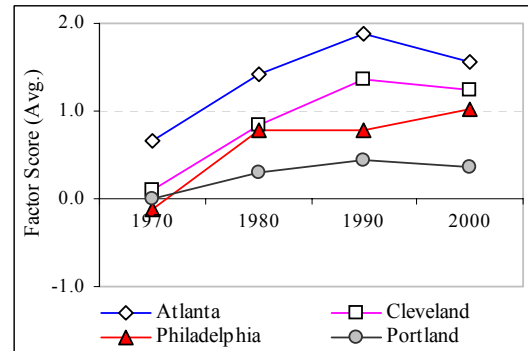


(D) Metro Portland Region

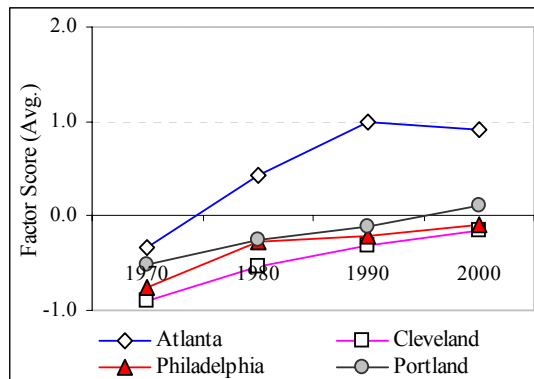
Figure 4.1. Changes in the Deterioration Factor Score by Subarea in Each Region



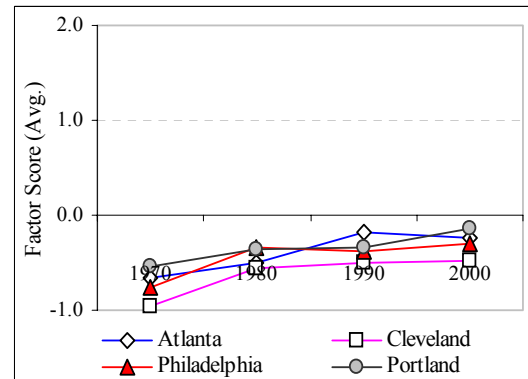
(A) Downtown



(B) Inner City



(C) Inner-Ring Suburbs



(D) Outer-Ring Suburbs

Figure 4.2. Changes in the Deterioration Factor Score by Region in Each Subarea

Table 4.21. Random-Effect GLS Regression with the Deterioration Factor Score

Dummy	Atlanta		Cleveland		Philadelphia		Portland	
Variables	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Dtown	1.854**	8.79	3.369**	10.34	1.851**	10.70	2.084**	8.45
Icity	0.899**	9.24	1.687**	20.54	0.985**	17.59	0.561**	7.27
Oring	-1.157**	-18.33	-0.176	-1.84	-0.146**	-2.65	-0.223**	-3.19
1970	-1.314**	-28.71	-0.582**	-15.49	-0.555**	-23.36	-0.398**	-8.98
1980	-0.548**	-12.00	-0.211**	-5.61	-0.044	-1.85	-0.137**	-3.09
2000	-0.084	-1.84	0.155**	4.12	0.128**	5.37	0.218**	4.92
Dtown*1970	-0.722**	-4.05	-2.107**	-8.93	-0.083	-0.80	-0.692**	-3.49
Dtown*1980	0.126	0.67	-1.030**	-4.34	0.097	0.93	0.262	1.31
Dtown*2000	-0.454*	-2.55	0.063	0.22	-0.462**	-4.45	-0.205	-1.02
Icity*1970	0.084	1.05	-0.688**	-14.05	-0.356**	-10.76	-0.040	-0.70
Icity*1980	0.132	1.64	-0.295**	-6.03	0.051	1.55	-0.002	-0.04
Icity*2000	-0.192*	-2.37	-0.240**	-4.90	0.112**	3.37	-0.300**	-5.20
Oring*1970	0.770**	14.49	0.123*	2.15	0.164**	5.04	0.192**	3.64
Orig*1980	0.209**	3.99	0.151**	2.64	0.073*	2.24	0.119*	2.29
Oring*2000	0.010	0.20	-0.132*	-2.32	-0.068*	-2.10	-0.025	-0.49
Const.	0.987**	17.87	-0.318**	-5.03	-0.213**	-5.29	-0.116	-1.96
Sigma_u	0.486		0.779		0.724		0.403	
Sigma_e	0.350		0.361		0.331		0.251	
Rho	0.659		0.823		0.827		0.721	
Num. of obs.	2268		2426		5122		1289	
Num. of group	588		614		1295		327	
R-sq: Within	0.568		0.615		0.543		0.398	
Between	0.577		0.439		0.307		0.393	
Overall	0.577		0.469		0.362		0.382	
Wald chi2(15)	2993.1		3320.6		5096.5		833.7	
Prob>chi2	0.0000		0.0000		0.0000		0.0000	

**p<0.01; *p<0.05. The constant is the inner-ring suburbs in 1990.

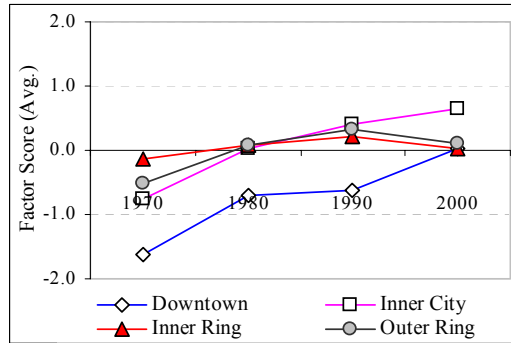
4.2.5. Intra- and Inter-Regional Spatial Differentiations and Revitalization Trends in the Downtown and the Inner City

This dissertation examines revitalization trends in the downtown and the inner city using the prosperity factor (factor 2) identified in Table 4.20. Figures 4.3 and 4.4 exhibit changing patterns in the prosperity factor score for each of the metropolitan regions. Whereas the downtowns in each of the four metropolitan areas experienced an increase in the prosperity factor score between 1980 and 2000, their inner cities showed mixed results: while the prosperity factor score increased in the fast-growing regions (Atlanta and Portland), it decreased in the slow-growing regions (Cleveland and Philadelphia). The inner-ring suburbs exhibit similar patterns in all regions: a stagnant or declining prosperity factor score after a steady increase from 1970 to 1990 (See Graph C in Figure 4.4). In contrast, the outer-ring suburbs in the slow-growing regions experienced continuous increases in the prosperity factor score from 1970 to 2000, but not the fast-growing regions (Atlanta and Portland). In the Atlanta region, the outer-ring suburbs experienced a decrease in the prosperity factor score in the 1990s after substantial increases in the 1970s.

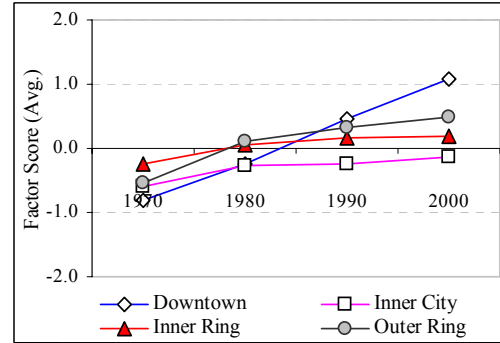
The changing patterns of the prosperity factor score indicate that intra-regional spatial differentiation increases in the slow-growing regions (Cleveland and Philadelphia) while it decreases in the fast-growing regions (Atlanta and Portland). In fact, the Portland region shows the smallest intra-regional spatial differentiation among the four subareas over the three decades (See Graph D in Figure 4.3).

Revitalization trends in the central city (the downtown and the inner city) relative to the inner-ring suburbs are examined by random-effect GLS regression with the dependent variable of the prosperity factor score (See Table 4.22). The coefficients of the interaction dummies provide significant evidence on revitalization trends in the downtown and the inner city relative to the inner-ring suburbs. Although the downtown experienced increases in the prosperity factor score over time in all the regions, the coefficients of Cleveland and Portland are not statistically significant in 2000. In the inner city, revitalization trends are more significant in the all the regions except Philadelphia. In contrast, the coefficients on the interaction variables of the outer-ring suburbs and time show that the outer-ring suburbs experienced continuous increases in the prosperity score over time an insignificant coefficient in Atlanta in 2000.

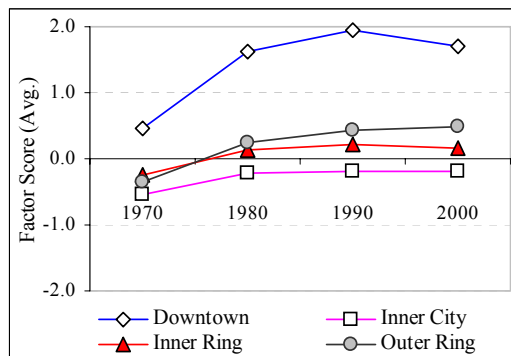
The negative coefficients of the time dummy variables in Table 4.22 indicate that the inner-ring suburbs experienced increases in the prosperity indicator from 1970 to 1990, and then a decrease between 1990 and 2000. This trend is particularly clear in the fast-growing regions (Atlanta and Portland).



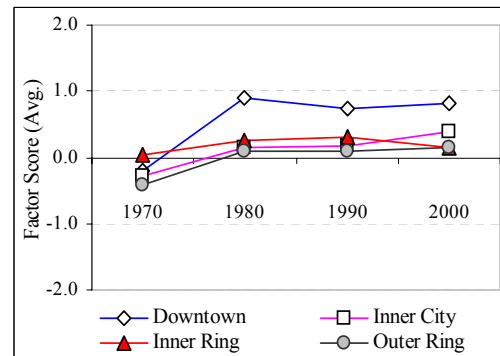
(A) Metro Atlanta Region



(B) Metro Cleveland Region

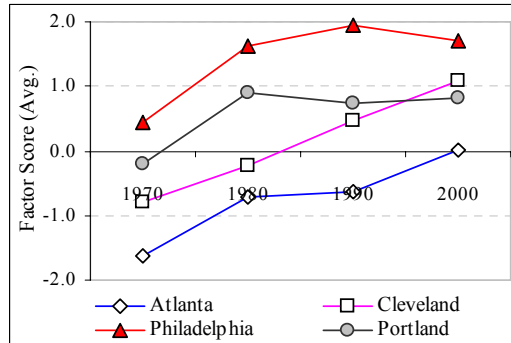


(C) Metro Philadelphia Region

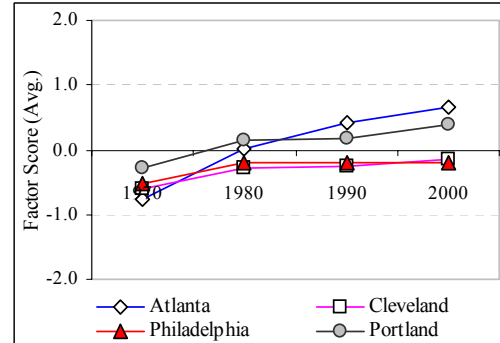


(D) Metro Portland Region

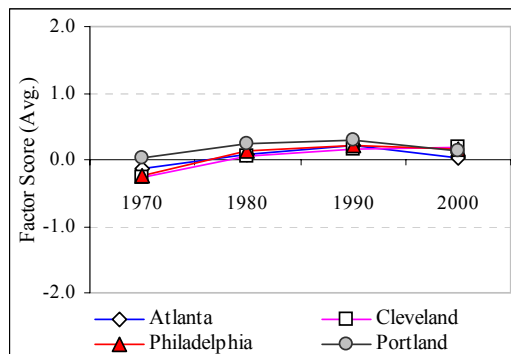
Figure 4.3. Changes in the Prosperity Factor Score by Subarea in Each Region



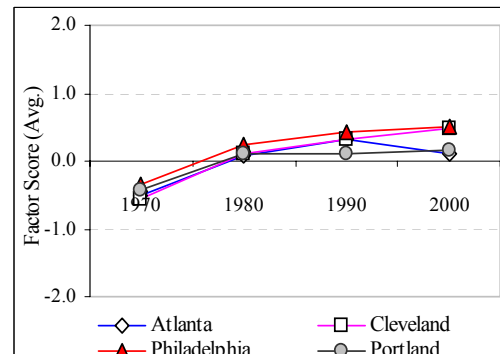
(A) Downtown



(B) Inner City



(C) Inner-Ring Suburbs



(D) Outer-Ring Suburbs

Figure 4.4. Changes in the Prosperity Factor Score by Region in Each Subarea

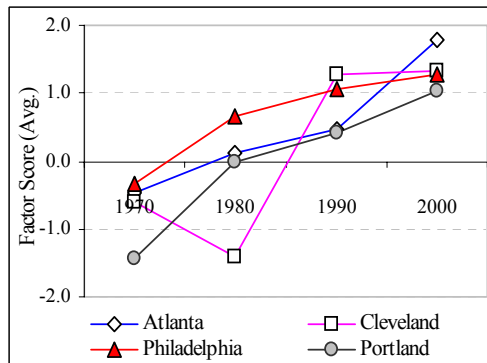
Table 4.22. Random-Effect GLS Regression with the Prosperity Factor Score

Dummy	Atlanta		Cleveland		Philadelphia		Portland	
Variables	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Dtown	-0.791*	-2.25	0.363	1.13	1.744**	8.53	0.114	0.27
Icity	0.197	1.19	-0.430**	-5.18	-0.396**	-5.96	-0.127	-0.96
Oring	0.119	1.11	0.148	1.53	0.225**	3.45	-0.198	-1.64
1970	-0.357**	-6.05	-0.422**	-13.09	-0.453**	-20.28	-0.270**	-4.22
1980	-0.137*	-2.32	-0.109**	-3.38	-0.079**	-3.51	-0.045	-0.71
2000	-0.180**	-3.06	0.010	0.31	-0.041	-1.82	-0.153*	-2.39
Dtown*1970	-0.693**	-3.01	-0.923**	-4.54	-1.044**	-10.70	-0.355	-1.23
Dtown*1980	0.071	0.29	-0.540**	-2.64	-0.261**	-2.66	0.362	1.25
Dtown*2000	0.778**	3.38	0.441	1.83	-0.198*	-2.03	0.387	1.34
Icity*1970	-0.800**	-7.71	0.084*	2.00	0.117**	3.75	-0.180*	-2.17
Icity*1980	-0.253*	-2.43	0.073	1.75	0.065*	2.11	0.020	0.24
Icity*2000	0.416**	4.00	0.085*	2.02	0.046	1.49	0.366**	4.41
Oring*1970	-0.557**	-8.13	-0.443**	-9.04	-0.340**	-11.14	-0.304**	-3.99
Oring*1980	-0.133*	-1.98	-0.098*	-1.99	-0.100**	-3.26	0.051	0.67
Oring*2000	-0.035	-0.51	0.150**	3.05	0.099**	3.25	0.203**	2.70
Const.	0.209*	2.22	0.168**	2.63	0.200**	4.19	0.297**	2.91
Sigma_u	0.927		0.817		0.894		0.731	
Sigma_e	0.458		0.312		0.312		0.361	
Rho	0.804		0.873		0.892		0.805	
Num. of obs.	2268		2426		5122		1289	
Num. of group	588		614		1295		327	
R-sq: Within	0.412		0.452		0.464		0.352	
Between	0.001		0.060		0.084		0.007	
Overall	0.088		0.113		0.135		0.076	
Wald chi2(15)	1157.7		1516.6		3418.2		512.8	
Prob>chi2	0.0000		0.0000		0.0000		0.0000	

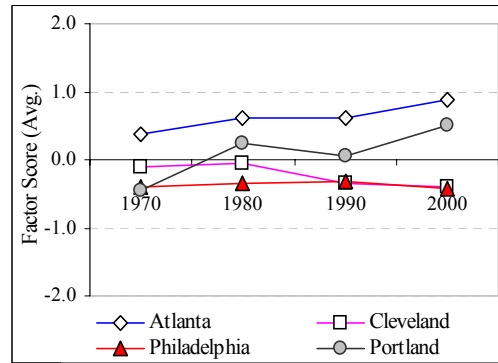
**p<0.01; *p<0.05. The constant is the inner-ring suburbs in 1990.

This research averaged a score of factor three (i.e., a higher proportion in the young population with a lower proportion in the elderly population) by each subarea, which shows demographic characteristics in revitalization trends in the downtown and the inner city. As shown in Graph A in Figure 4.5, all downtowns experienced significant increases in the young population, regardless of their growth patterns and policies. In contrast, the inner cities show a different pattern—increases in the fast-growing regions and slight decreases in the slow-growing regions, indicating that metropolitan growth patterns are critical indicators for increases in the young population in the inner cities. The young population in the inner- and outer-ring suburbs decreased in the four metropolitan regions over the decades. Decreases in the young population with increases in the elderly population are more significant in the inner-ring suburbs in the slow-growing regions.

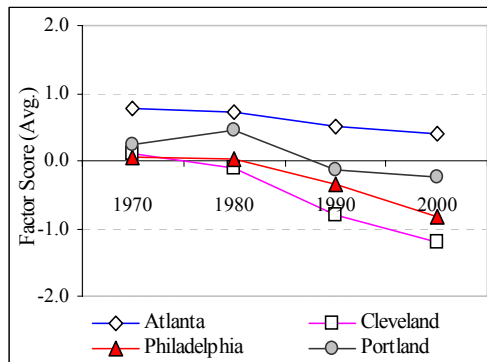
This research also conducted random-effect GLS regression with a factor three to confirm the general findings found in Figure 4.5. As shown in the coefficients of 1970, 1980, and 2000 in Table 4.23, the factor score of the inner-ring suburbs decreased from 1970 to 2000. Although the coefficient of 2000 is not statistically significant (except in the Philadelphia region), the changes in the signs of the coefficients indicate decreases in the young population and increases in the elderly population in the inner-ring suburbs. In contrast, the coefficients of the interaction variables between the subareas and times indicate that the young population in the downtown and the inner city increased over time. The sizes in the regression coefficients in Table 4.23 also confirmed inter-regional differences in the growth patterns of increases in the young population in the downtown and the inner cities.



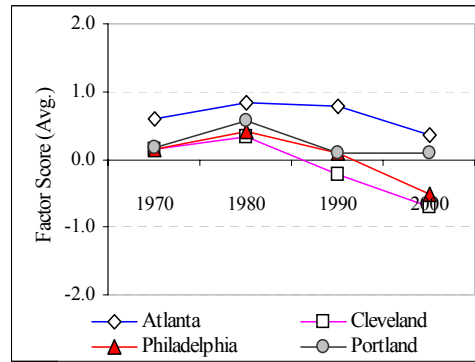
(A) Downtown



(B) Inner City



(C) Inner-Ring Suburbs



(D) Outer-Ring Suburbs

Figure 4.5. Changes in the Demographic Factor Score by Region in Each Subarea

Table 4.23. Random-Effect GLS Regression with the Demographic Factor Score

Dummy	Atlanta		Cleveland		Philadelphia		Portland	
Variables	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Dtown	-0.105	-0.33	0.363	1.13	1.432**	6.89	0.041	0.10
Icity	0.104	0.72	-0.430**	-5.18	0.054	0.81	0.186	1.56
Oring	0.264**	2.82	0.148	1.53	0.443**	6.77	0.224*	2.07
1970	0.271**	3.47	-0.422**	-13.09	0.408**	9.65	0.394**	4.67
1980	0.213**	2.73	-0.109**	-3.38	0.391**	9.23	0.595**	7.04
2000	-0.109	-1.40	0.010	0.31	-0.486**	-11.46	-0.112	-1.32
Dtown*1970	-1.142**	-3.76	-0.923**	-4.54	-1.818**	-9.86	-1.733**	-4.62
Dtown*1980	-0.543	-1.70	-0.540**	-2.64	-0.823**	-4.44	-0.782*	-2.05
Dtown*2000	1.479**	4.87	0.441	1.83	0.697**	3.78	0.983**	2.58
Icity*1970	-0.497**	-3.61	0.084*	2.00	-0.496**	-8.44	-0.900**	-8.20
Icity*1980	-0.224	-1.62	0.073	1.75	-0.427**	-7.26	-0.407**	-3.70
Icity*2000	0.361**	2.62	0.085*	2.02	0.380**	6.46	0.561**	5.11
Oring*1970	-0.501**	-5.53	-0.443**	-9.04	-0.339**	-5.88	-0.334**	-3.32
Oring*1980	-0.163	-1.83	-0.098*	-1.99	-0.057	-0.99	-0.112	-1.12
Oring*2000	-0.311**	-3.49	0.150**	3.05	-0.073	-1.26	0.134	1.34
Const.	0.507**	6.19	0.168**	2.63	-0.359**	-7.49	-0.141	-1.54
Sigma_u	0.666		0.586		0.730		0.557	
Sigma_e	0.606		0.510		0.581		0.476	
Rho	0.547		0.569		0.612		0.578	
Num. of obs.	2268		2426		5122		1289	
Num. of group	588		614		1295		327	
R-sq: Within	0.141		0.412		0.249		0.318	
Between	0.001		0.089		0.076		0.081	
Overall	0.050		0.218		0.131		0.141	
Wald chi2(15)	271.7		1290.1		1335.2		459.0	
Prob>chi2	0.0000		0.0000		0.0000		0.0000	

**p<0.01; *p<0.05. The constant is the inner-ring suburbs in 1990.

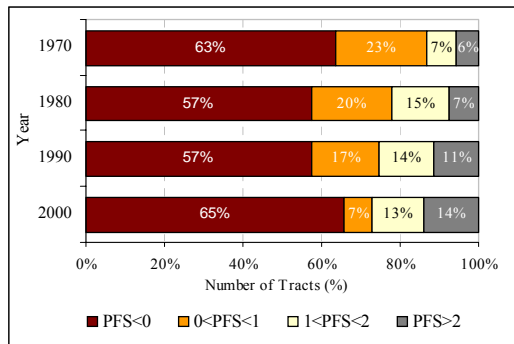
4.3. Selective Decline of the Inner-Ring Suburbs and Key Variables for Neighborhood Prosperity

The general decline model of the inner-ring suburbs showed that the inner-ring suburbs declined over time, and this trend is more likely to continue in future. However, some inner-ring suburban neighborhoods can be prosperous due to spatial differentiation within the inner-ring suburbs. This section of the dissertation explores the selective decline model of the inner-ring suburbs and examines key variables for the establishments of prosperous inner-ring suburban neighborhoods.

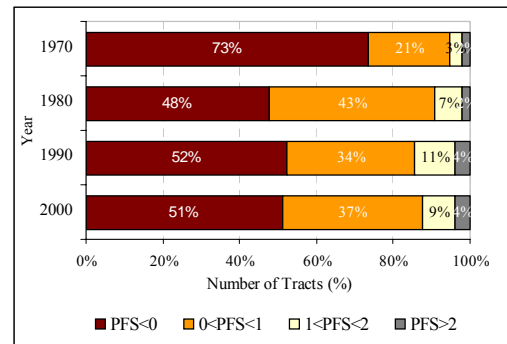
As a simple approach, this research examined the distribution of tracts by a prosperous factor score (PFS). This research aggregated the number of tracts for each subarea based on four categories of PFS: $PFS < 0$, $0 < PFS < 1$, $1 < PFS < 2$, and $PFS > 2$ (See Appendix Tables A-7 and A-8). Higher PFS ranges ($1 < PFS < 2$ and $PFS > 2$) indicate prosperous neighborhoods with higher incomes and housing values, a higher college-educated population, and a lower housing problem (less crowding). The four metropolitan areas experienced significant decreases in declining tracts ($PFS < 0$) in the downtown (See Appendix Table A-7). The Philadelphia region showed the most dramatic increase in prosperous downtown tracts from 1970 (8 tracts of $PFS > 1$) to 2000 (17 tracts of $PFS > 1$). The four metropolitan areas also experienced reduced declining tracts ($PFS < 0$) in the inner cities. In particular, the Portland region experienced the most substantial increase in prosperous inner city tracts. In the outer-ring suburbs, the four metropolitan areas continuously experienced an increase in prosperous tracts from 1970 to 2000 (See Appendix Table A-8). Finally, with regard to the inner-ring suburbs, the

four metropolitan areas showed that the prosperous inner-ring suburban tracts ($PFS > 1$) increased from 1970 to 2000 (See Appendix Table A-8). Figure 4.6 clearly showed the existence of prosperous tracts within the inner-ring suburbs because the distribution of higher PFS ranges has been consistent over time in the four metropolitan areas.

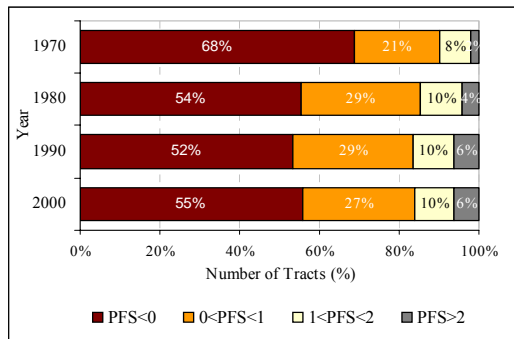
The higher PFS ranges in the Atlanta and Portland areas, in particular, increased more than in the Philadelphia and Cleveland areas. The Atlanta region increased 17 tracts ($PFS > 1$), from 16 tracts in 1970 to 33 tracts in 2000, while the Portland region increased 5 tracts, from 11 tracts in 1970 to 16 tracts in 2000 (See Appendix Table A-8). On the other hand, these two regions also increased in the number of tracts of lower PFS ($PFS < 0$), which indicates an increase in inner-ring suburban neighborhood decline. A moderate range of PFS ($0 < PFS < 1$) significantly decreased in the Atlanta and Portland areas from 1970 to 2000. That is, spatial polarization within the inner-ring suburbs significantly increased more in the fast-growing regions (Atlanta and Portland) than in the slow-growing regions (Cleveland and Philadelphia). By contrast, Figure 4.6 also showed that prosperous inner-ring suburban tracts exist in the slow-growing areas of Cleveland and Philadelphia without significant changes over time. While prosperous inner-ring suburban tracts increased in the fast-growing regions, they were stable in the slow-growing regions over time. These findings from Figure 4.6 indicate that the inner-ring suburbs contain a number of prosperous tracts in the four case study metropolitan areas although a majority of inner-ring suburban tracts experienced deterioration.



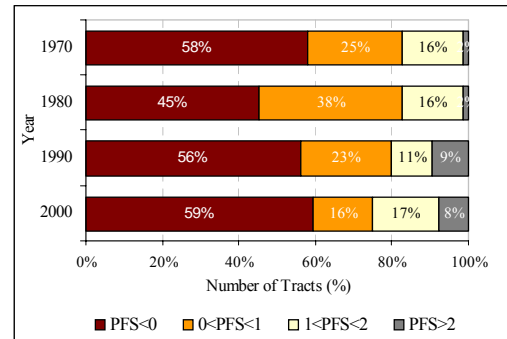
(A) Metro Atlanta Region



(B) Metro Cleveland Region



(C) Metro Philadelphia Region



(D) Metro Portland Region

Figure 4.6. Distribution of Tracts by Prosperity Factor Score in the Inner-Ring Suburbs

The existence of prosperous tracts in the inner-ring suburbs can be identified by mapping PSF for each metropolitan area. PFS maps identify the spatial clusters of the prosperous inner-ring suburbs within the inner-ring suburbs. Figures 4.7 and 4.8 provide each region's spatial distributions of PFS, which confirmed the existence of prosperous sectors from the downtown to the outer-ring suburbs: in the northern direction in Atlanta, the eastern and western directions in Cleveland, the northwestern direction in Philadelphia, and the southwestern direction in Portland.

The Atlanta region illustrates a clearly prosperous sector along Georgia highway 400. The inner-ring suburbs located within this sector show high levels of PFS, indicating extremely prosperous neighborhoods. The Cleveland region also showed a clearly prosperous sector in an eastern direction and prosperous inner-ring suburbs within this sector. In the Philadelphia region, extremely prosperous neighborhoods are within the inner city and the inner-ring suburbs in the northwestern sectors. The inner city, in contrast, shows a relatively lower level of PFS. The Portland region showed a sector of prosperous neighborhoods toward the southwestern direction along Interstate Highway 5. By contrast, the eastern and southeastern directions of the inner-ring suburbs show a lower level of PFS, which indicates the clear pattern of inner-ring suburban decline in these directions.

Hence, Figures 4.7 and 4.8 exhibit the spatial distribution of prosperous tracts in the inner-ring suburbs as well as the other subareas. The prosperous tracts in the inner-ring suburbs were spatially clustered within the regional growth sectors and did not show socioeconomic deterioration. Rather, they experienced continuous prosperity over time.

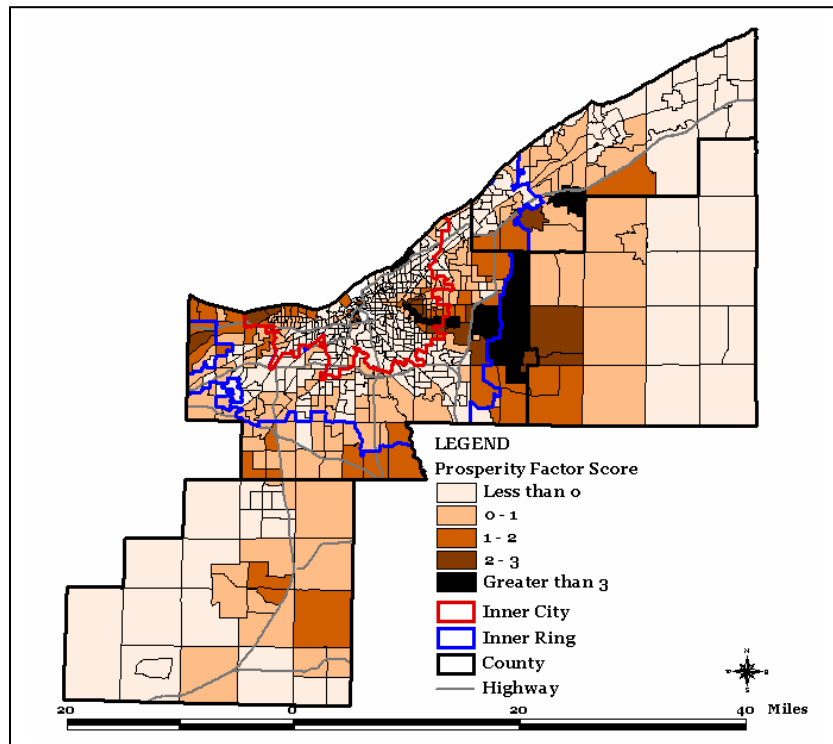
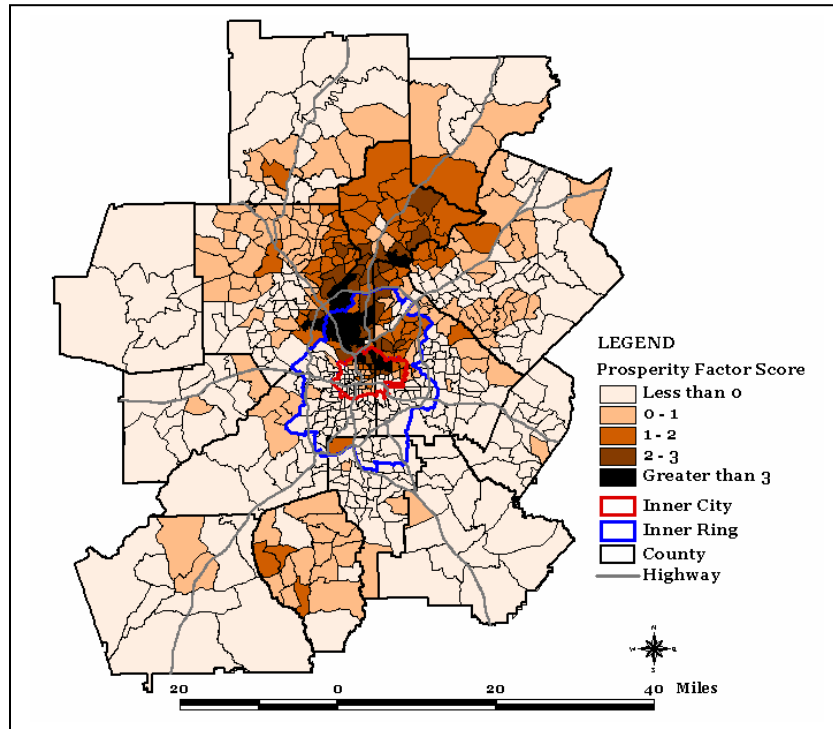


Figure 4.7. Prosperous Neighborhoods (Atlanta and Cleveland Regions)

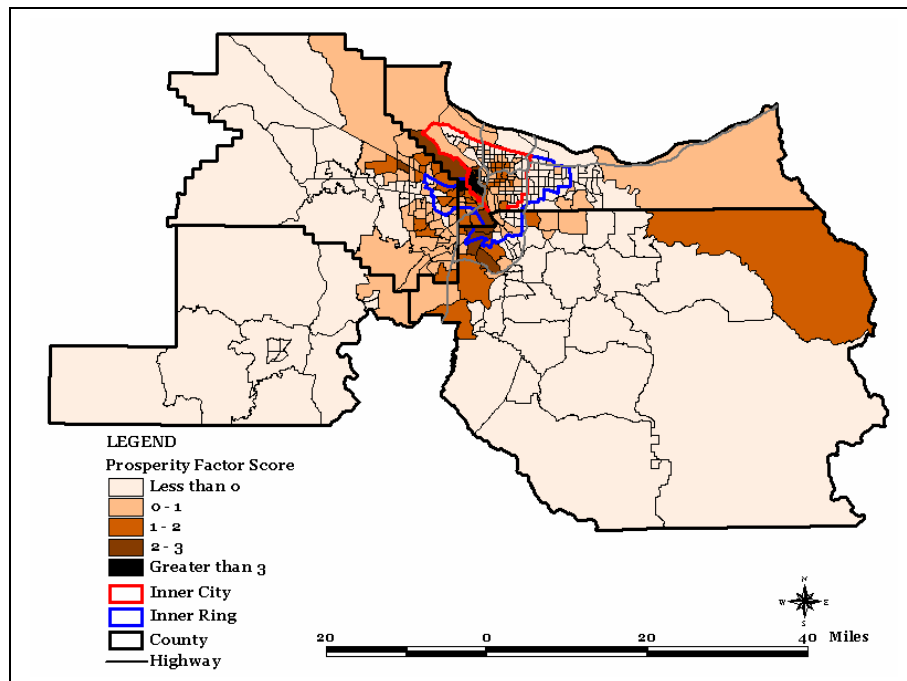
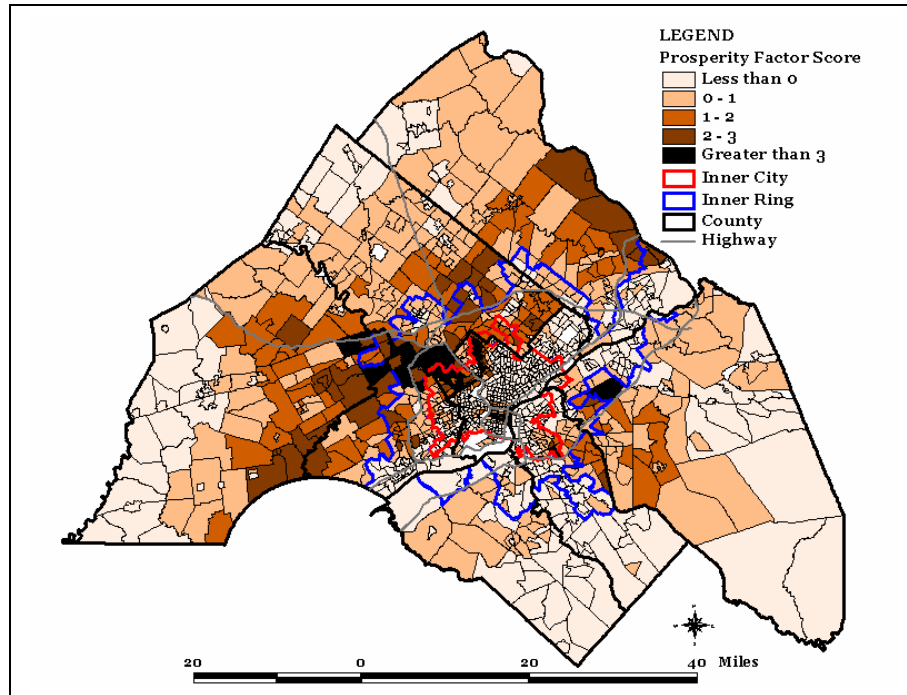


Figure 4.8. Prosperous Neighborhoods (Philadelphia and Portland Regions)

This research conducts OLS analyses that examine the key factors of neighborhood prosperity for the region and the inner-ring suburbs. The four OLS models in Table 4.24 indicate that the growth rate in population, median built year, and commuting time are all significant factors in the four metropolitan areas after subareas are controlled for. That is, neighborhoods with new housing stocks and spatial proximity to job markets are less likely to experience decline.

However, the change rates in the white population, the poverty rate, and overcrowded housing do not show a uniform pattern in the four metropolitan regions. For instance, while the change rate in poverty between 1980 and 2000 is a significant factor in the Atlanta and Portland regions, it is not a significant factor in the Cleveland and Philadelphia regions.

Table 4.24. OLS Analysis for the Prosperity Factor Score

	Atlanta		Cleveland		Philadelphia		Portland	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Popch80-00	0.084**	3.68	0.459**	3.31	0.188**	3.26	0.050*	2.05
Wpopch80-00	-0.000	-0.01	0.062	1.48	0.138*	2.38	0.354	1.55
Povch80-00	-0.269**	-4.91	0.012	0.52	-0.018	-0.56	-0.288**	-3.68
Overrch80-00	0.006	0.84	0.004	0.23	-0.043**	-2.93	-0.034**	-3.05
Mbuilt00	0.018**	2.96	0.027**	5.91	0.017**	5.82	0.015**	2.85
Ctime00	-0.120**	-16.63	-0.032**	-4.54	-0.024**	-4.72	-0.099**	-8.48
Downtown	-0.455	-1.36	0.759	1.52	1.602**	8.39	0.114	0.30
Inner City	0.644**	3.77	0.290**	2.76	-0.022	-0.26	0.237	1.45
Outer Ring	-0.175	-1.32	-0.255*	-2.43	0.024	0.32	-0.149	-1.10
Constant	-31.234**	-2.65	-52.267**	-5.82	-32.378**	-5.72	-27.286**	-2.60
Model	N=	529	N=	534	N=	1102	N=	303
Summary	F(9, 519)=	40.52	F(9, 524)=	16.86	F(9, 1092)=	39.78	F(9, 293)=	15.56
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.4127	R ² =	0.2245	R ² =	0.2469	R ² =	0.3234

**p<0.01; *p<0.05. The constant is the inner-ring suburbs.

Table 4.25 is a result of the OLS analysis for the inner-ring suburbs in each region. Unlike the results of the OLS analysis for an entire region, the four regions show different significant variables. The population growth rate in the inner-ring suburbs is only significant in the slow-growing metropolitan areas of Cleveland and Philadelphia. In other words, while the population growth rate in the slow-growing areas is a key factor for neighborhood prosperity in the inner-ring suburbs, that in the fast-growing metropolitan areas is not a critical factor to neighborhood prosperity in the inner-ring suburbs.

Table 4.25. OLS Analysis for the Prosperity Factor Score in the Inner-Ring Suburbs

	Atlanta		Cleveland		Philadelphia		Portland	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Popch80-00	0.691	1.83	1.874**	5.96	0.598**	3.11	0.671	0.97
Wpopch80-00	0.099	1.75	0.210	1.28	0.437*	2.39	5.355**	3.36
Povch80-00	-0.311*	-2.10	-0.080	-1.69	0.064	1.19	-0.311	-1.93
Overcch80-00	-0.027	-1.12	0.039	1.59	-0.033	-1.40	0.006	0.45
Mbuilt00	0.007	0.52	0.021**	3.00	0.013*	2.20	0.012	0.78
Ctime00	-0.144**	-10.42	-0.008	-0.48	0.002	0.16	-0.191**	-6.16
Constant	-10.203	-0.36	-40.035**	-2.97	-25.157*	-2.22	-18.796	-0.61
Model	N=	107	N=	175	N=	334	N=	55
Summary	F(6, 100)=	24.99	F(6, 168)=	14.24	F(6, 327)=	5.15	F(6, 48)=	19.40
	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000	Prob > F=	0.0000
	R ² =	0.5999	R ² =	0.3371	R ² =	0.0864	R ² =	0.7080

**p<0.01; *p<0.05.

Similar to the population growth rate, median built year is also a significant variable for the slow-growing regions. This finding indicates that housing reinvestment or the supply of new housing is associated with the level of prosperity in the inner-ring suburbs in the slow-growing regions.

By contrast, commuting time, a proxy variable of proximity to job markets, is only a significant variable in the inner-ring suburbs for the fast-growing regions of Atlanta and Portland. That is, the prosperity level in the inner-ring suburbs in the fast-growing regions is highly correlated with locational characteristics to job markets.

4.4. Impact of Metropolitan Growth Patterns and Policies on Intra- and Inter-Regional Socioeconomic Disparities

Previous sections addressed intra- and inter-regional disparities in the context of metropolitan growth patterns and policies using integrated factor scores from factor analyses. Rather than using integrated variables, this section examined intra- and inter-regional socioeconomic disparities using the relative per capita income (RPCI), the GINI income inequality index, the dissimilarity index, and the GINI racial segregation index.

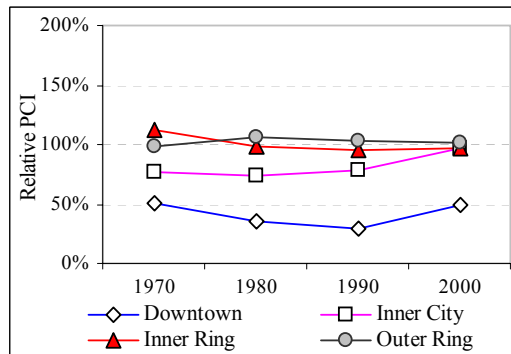
Figures 4.9 and 4.10 provide changes in the RPCI in each metropolitan region from 1970 to 2000 (Also See Table 4.14). Compared to other metropolitan areas, the Portland region showed the least income disparity among its subareas, and this pattern remains consistent over time. While the Atlanta region showed gradual increases in income disparities among the subareas from 1970 to 1990, this region experienced a decrease in income disparity in 2000, regardless of its strong decentralization. In contrast, the Cleveland and Philadelphia regions, the slow-growing metropolitan areas, showed gradual increases in income disparities among the subareas.

These findings indicate that metropolitan growth patterns and policies are associated with the extent of intra-regional economic disparity. Since the outer-ring suburbs in the slow-growing regions tend to attract higher proportions of upper-class households and well-paid jobs relative to the other subareas than the outer-ring suburbs in the fast-growing regions, the gap of income inequality between the subareas in the slow-growing regions increased between 1970 and 2000, indicating an increase in intra-regional economic segregation. However, the increases in income inequality in the

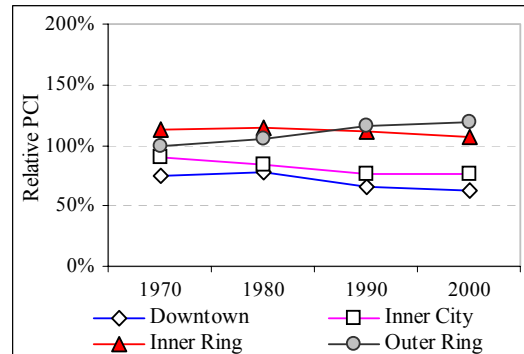
Cleveland and Philadelphia regions might be affected by other regional factors such as industrial restructuring. Graph D in Figure 4.9 shows the least inequality among the subareas in the Portland region relative to other metropolitan regions, indicating that Portland's regional growth management strategies might be strongly associated with the lower level of intra-regional economic inequality because the urban growth boundary controls for continuous decentralization of the population and employment.

However, regardless of regional growth patterns and policies, the inner-ring suburbs showed the same pattern of income decline from 1970 to 2000 in the four metropolitan areas (See Graph C in Figure 4.10). In contrast, the inner cities in the fast-growing regions experienced an increase in the RPCI in the 1990s, reversing the continuous decline in the RPCI from 1970 to 1990, while those in the slow-growing regions experienced a continuous decline in the RPCI.

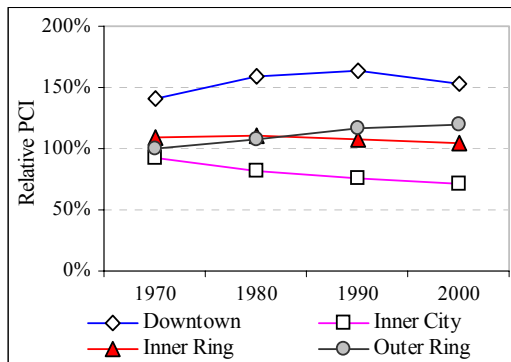
The outer-ring suburbs also exhibited a different pattern in the RPCI. While the slow-growing regions increased the level of the RPCI in the outer-ring suburbs, the fast-growing regions showed a constant pattern over time. This pattern indicates that while the outer-ring suburbs in the slow-growing regions attract high-income households, suburbs in the fast-growing regions attract both high- and low-income households.



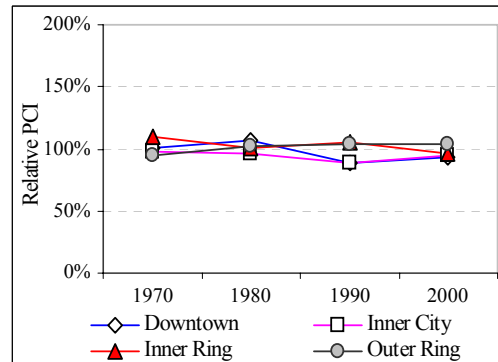
(A) Metro Atlanta Region



(B) Metro Cleveland Region

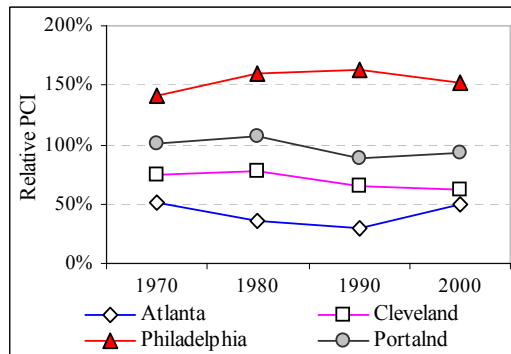


(C) Metro Philadelphia Region

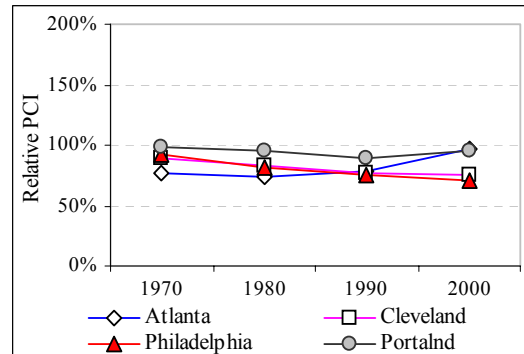


(D) Metro Portland Region

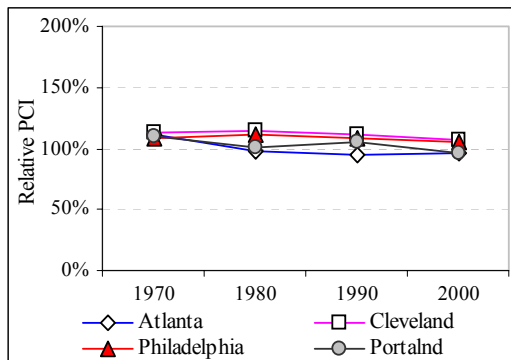
Figure 4.9. Changes in Relative Per Capita Income by Subarea in Each Region



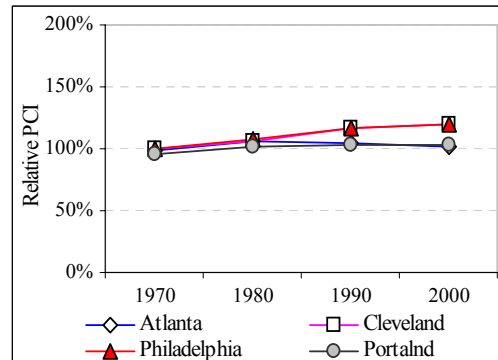
(A) Downtown



(B) Inner City



(C) Inner-Ring Suburbs



(D) Outer-Ring Suburbs

Figure 4.10. Changes in Relative Per Capita Income by Region in Each Subarea

Since the RPCI is an averaged value in each subarea, it does not address income disparities at the tract level in each subarea. This research calculated the GINI income inequality index, which covers limitations in the concept of the RPCI (See Table 4.26).

Table 4.26. Changes in the GINI Income Inequality Index

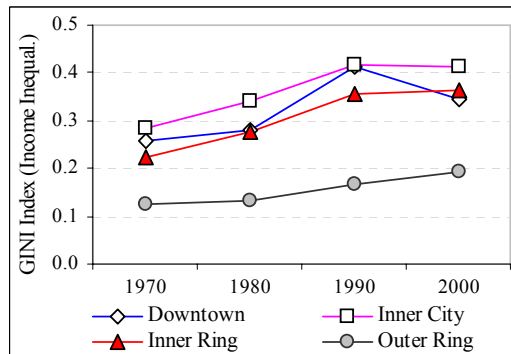
Region	Subarea	GINI Coefficient				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	0.258	0.281	0.413	0.345	8.8	46.8	-16.4	33.6
	Inner City	0.283	0.340	0.416	0.412	19.9	22.6	-1.2	45.3
	Inner Ring	0.224	0.278	0.358	0.365	24.2	28.7	2.0	63.2
	Outer Ring	0.124	0.134	0.166	0.193	8.2	23.6	16.5	55.9
	Total	0.183	0.206	0.251	0.265	12.6	21.7	5.7	44.9
Cleveland	Downtown	0.199	0.328	0.424	0.371	64.7	29.3	-12.5	86.5
	Inner City	0.214	0.224	0.299	0.273	4.4	33.6	-8.8	27.3
	Inner Ring	0.117	0.113	0.167	0.151	-3.3	48.0	-9.7	29.3
	Outer Ring	0.156	0.170	0.208	0.216	8.5	22.7	3.8	38.3
	Total	0.183	0.204	0.272	0.259	11.3	33.5	-4.9	41.2
Philadelphia	Downtown	0.289	0.232	0.252	0.286	-19.6	8.5	13.5	-1.0
	Inner City	0.226	0.251	0.300	0.311	10.9	19.5	3.6	37.4
	Inner Ring	0.154	0.153	0.196	0.190	-0.8	28.4	-3.3	23.2
	Outer Ring	0.119	0.142	0.179	0.180	19.1	26.6	0.5	51.6
	Total	0.175	0.194	0.241	0.249	11.0	24.2	3.5	42.8
Portland	Downtown	0.283	0.370	0.389	0.419	30.9	5.2	7.6	48.2
	Inner City	0.133	0.136	0.223	0.204	2.4	63.7	-8.3	53.8
	Inner Ring	0.146	0.143	0.210	0.223	-1.9	46.6	5.9	52.2
	Outer Ring	0.099	0.111	0.150	0.160	11.5	35.4	6.7	61.0
	Total	0.128	0.137	0.193	0.193	7.0	41.5	-0.3	51.0

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

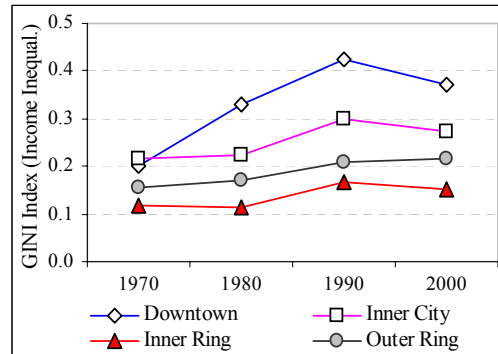
Regional GINI indices revealed that income inequalities increased in each region from 1970 to 2000, except the Cleveland region in the 1990s. The Atlanta region showed the highest income inequality at the regional level, while the Portland region showed the lowest. In particular, the Atlanta region showed high levels in income inequality in the downtown, the inner city, and the inner-ring suburbs relative to the other regions. In contrast, the Portland region showed lower levels in income inequality in the inner city, the inner-ring suburbs, and the outer-ring suburbs. Despite the higher change rate in the

GINI index between 1970 and 2000, the Portland region showed the lowest level in income inequality relative to the other regions.

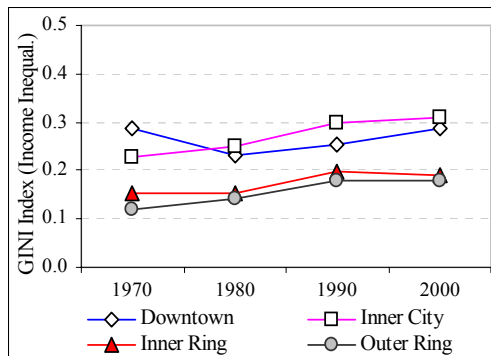
These findings need to be cross-checked with changes in the RPCI of Table 4.14. Although the Atlanta region showed decreasing income inequality among the subareas in the 1990s, the GINI income inequality index indicated that the income inequality in each subarea was significant, compared with that in the other regions. That is, the strong regional economy and decentralization trends in the Atlanta region increased the economic disparities among subareas. In contrast, the least economic disparities among subareas in the Portland region can be associated with the urban containment policies.



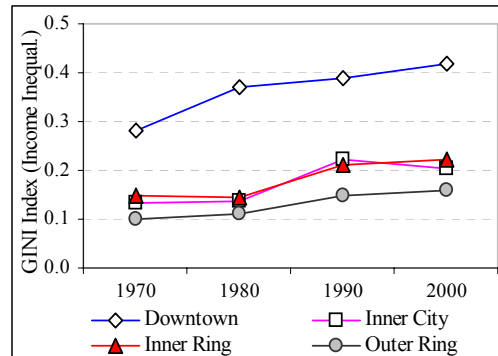
(A) Metro Atlanta Region



(B) Metro Cleveland Region



(C) Metro Philadelphia Region



(D) Metro Portland Region

Figure 4.11. Trends in the GINI Income Inequality Index by Subarea in Each Region

This research also examines the impact of metropolitan growth patterns and policies on intra-regional racial integration using the dissimilarity index, the isolation index, and the GINI racial segregation index. Tables 4.27 and 4.28 provided the dissimilarity and isolation indices of blacks to whites. In the four metropolitan regions, regional segregation levels decreased over time, indicating that metropolitan regions evolved into racially diverse areas.

Table 4.27. Changes in the Dissimilarity Index

Region	Subarea	Dissimilarity Index*				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	0.693	0.530	0.457	0.374	-23.5	-13.8	-18.1	-46.0
	Inner City	0.781	0.793	0.765	0.688	1.5	-3.6	-10.1	-11.9
	Inner Ring	0.826	0.753	0.708	0.667	-8.7	-6.0	-5.8	-19.2
	Outer Ring	0.574	0.548	0.524	0.511	-4.5	-4.5	-2.4	-11.0
	Total	0.788	0.759	0.759	0.566	-3.7	0.0	-25.4	-28.1
Cleveland	Downtown	0.386	0.392	0.395	0.259	1.5	0.7	-34.5	-33.0
	Inner City	0.845	0.821	0.801	0.715	-2.9	-2.5	-10.7	-15.4
	Inner Ring	0.800	0.725	0.695	0.648	-9.4	-4.2	-6.9	-19.1
	Outer Ring	0.662	0.470	0.428	0.388	-29.0	-9.1	-9.3	-41.4
	Total	0.885	0.828	0.789	0.723	-6.5	-4.6	-8.4	-18.3
Philadelphia	Downtown	0.634	0.603	0.482	0.350	-4.8	-20.1	-27.5	-44.8
	Inner City	0.767	0.792	0.762	0.657	3.1	-3.7	-13.8	-14.4
	Inner Ring	0.682	0.605	0.577	0.520	-11.4	-4.5	-9.9	-23.7
	Outer Ring	0.604	0.509	0.443	0.409	-15.8	-13.0	-7.5	-32.3
	Total	0.765	0.738	0.702	0.626	-3.5	-5.0	-10.8	-18.2
Portland	Downtown	0.326	0.179	0.154	0.206	-45.0	-13.8	33.2	-36.9
	Inner City	0.620	0.481	0.400	0.345	-22.4	-17.0	-13.7	-44.4
	Inner Ring	0.278	0.201	0.197	0.247	-27.6	-2.0	25.6	-11.0
	Outer Ring	0.344	0.228	0.245	0.264	-33.6	7.4	7.8	-23.1
	Total	0.595	0.421	0.365	0.304	-29.4	-13.2	-16.8	-49.0

* Dissimilarity index of blacks to whites.

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

The decreasing pattern in racial segregation differs among the metropolitan areas. Of the four metropolitan regions, analyses showed that the Cleveland region was the most segregated area in terms of the dissimilarity and isolation indices between blacks and

whites. However, while the gaps among Cleveland, Atlanta, and Philadelphia are not significant, the levels of segregation are significantly lower in the Portland region. The dissimilarity score of the Portland region decreased 49 percent, from .595 in 1970 to .304 in 2000, and the isolation score of 58.9 percent, from .428 in 1970 to .176 in 2000. The lowest level in segregation and its continuous decline in the Portland region are dramatic, compared with those of the other metropolitan areas.

Table 4.28. Changes in the Isolation Index

Region	Subarea	Isolation Index*				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	0.821	0.823	0.893	0.787	0.2	8.6	-12.0	-4.2
	Inner City	0.868	0.876	0.855	0.794	1.0	-2.4	-7.0	-8.4
	Inner Ring	0.790	0.816	0.815	0.811	3.2	-0.1	-0.4	2.7
	Outer Ring	0.335	0.373	0.450	0.538	11.6	20.6	19.4	60.8
	Total	0.758	0.741	0.741	0.639	-2.2	0.0	-13.8	-15.7
Cleveland	Downtown	0.386	0.599	0.687	0.678	55.2	14.7	-1.3	75.7
	Inner City	0.840	0.862	0.864	0.814	2.6	0.1	-5.7	-3.1
	Inner Ring	0.649	0.584	0.604	0.606	-10.0	3.5	0.3	-6.6
	Outer Ring	0.123	0.085	0.078	0.069	-30.9	-8.6	-11.8	-44.3
	Total	0.815	0.810	0.801	0.745	-0.6	-1.2	-7.0	-8.6
Philadelphia	Downtown	0.611	0.564	0.443	0.363	-7.6	-21.5	-18.1	-40.5
	Inner City	0.757	0.806	0.805	0.751	6.5	-0.2	-6.7	-0.8
	Inner Ring	0.412	0.452	0.480	0.480	9.8	6.1	0.1	16.6
	Outer Ring	0.219	0.213	0.206	0.215	-2.6	-3.1	4.4	-1.5
	Total	0.679	0.697	0.681	0.629	2.6	-2.2	-7.7	-7.3
Portland	Downtown	0.052	0.051	0.077	0.119	-2.7	52.0	55.0	129.2
	Inner City	0.456	0.387	0.358	0.264	-15.1	-7.4	-26.1	-42.0
	Inner Ring	0.007	0.016	0.019	0.046	109.5	20.6	143.3	514.9
	Outer Ring	0.014	0.010	0.015	0.027	-32.1	53.7	86.3	94.3
	Total	0.428	0.334	0.298	0.176	-22.0	-10.8	-40.9	-58.9

* Isolation index of blacks to whites.

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

This research also measured the GINI racial segregation index for three racial groups: blacks, whites, and other minority races (See Table 4.29 and Figure 4.12). As shown in Figure 4.12, three metropolitan regions, except Portland, showed similar

patterns of a decrease in the GINI index in each subarea. However, the gaps among the subareas did not narrow over time. Rather, they increased over time in spite of an overall decline in the GINI index. In contrast, the gaps among the subareas narrowed in the Portland region with a significant decrease in the inner city and a constant pattern at a lower GINI index in the downtown, the inner-ring suburbs, and the outer-ring suburbs.

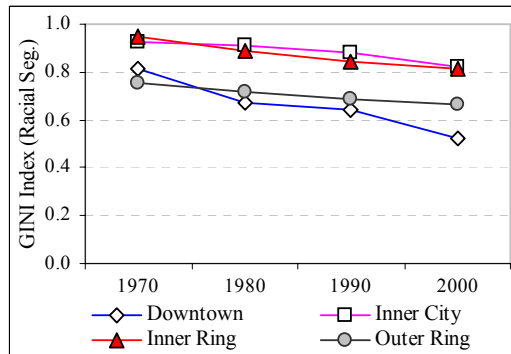
Table 4.29. Changes in the GINI Racial Segregation Index

Region	Subarea	GINI Coefficient*				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	0.816	0.675	0.643	0.526	-17.3	-4.8	-18.2	-35.6
	Inner City	0.926	0.911	0.879	0.819	-1.6	-3.5	-6.9	-11.5
	Inner Ring	0.947	0.888	0.845	0.811	-6.2	-4.8	-4.0	-14.3
	Outer Ring	0.755	0.718	0.690	0.666	-4.8	-4.0	-3.5	-11.8
	Total	0.926	0.883	0.883	0.724	-4.6	0.0	-18.0	-21.8
Cleveland	Downtown	0.522	0.498	0.512	0.327	-4.5	2.8	-36.1	-37.3
	Inner City	0.953	0.933	0.916	0.856	-2.1	-1.8	-6.6	-10.2
	Inner Ring	0.909	0.841	0.831	0.794	-7.5	-1.2	-4.4	-12.7
	Outer Ring	0.814	0.628	0.575	0.524	-22.9	-8.4	-9.0	-35.7
	Total	0.964	0.930	0.911	0.865	-3.4	-2.1	-5.0	-10.3
Philadelphia	Downtown	0.758	0.708	0.601	0.481	-6.7	-15.1	-20.0	-36.6
	Inner City	0.909	0.916	0.898	0.817	0.7	-1.9	-9.1	-10.2
	Inner Ring	0.837	0.767	0.735	0.677	-8.3	-4.3	-7.9	-19.2
	Outer Ring	0.753	0.671	0.599	0.551	-10.9	-10.8	-8.0	-26.9
	Total	0.909	0.882	0.847	0.781	-2.9	-4.0	-7.8	-14.0
Portland	Downtown	0.366	0.216	0.194	0.258	-41.1	-10.0	33.0	-29.5
	Inner City	0.754	0.612	0.520	0.457	-18.9	-15.0	-12.2	-39.4
	Inner Ring	0.385	0.285	0.280	0.328	-25.9	-1.9	17.1	-15.0
	Outer Ring	0.476	0.316	0.344	0.365	-33.6	8.7	6.2	-23.3
	Total	0.739	0.551	0.487	0.415	-25.4	-11.6	-14.9	-43.9

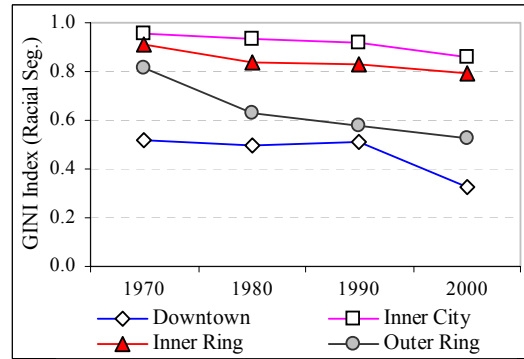
* GINI racial segregation index among blacks, whites, and others.

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

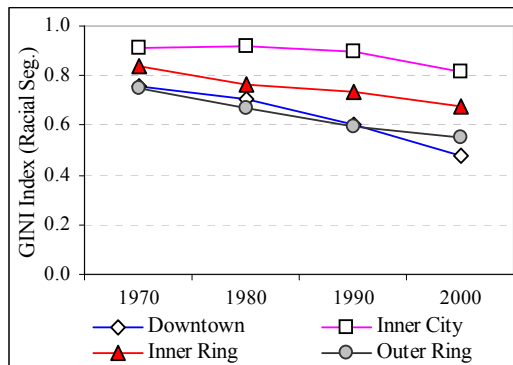
These findings indicate that urban containment policies in Portland are associated with reducing racial segregation within a metropolitan region. However, urban containment policies at the regional level might be limited in their capacity to reduce social inequalities within a metropolitan region without local initiatives such as mixed-income and mixed-use development strategies.



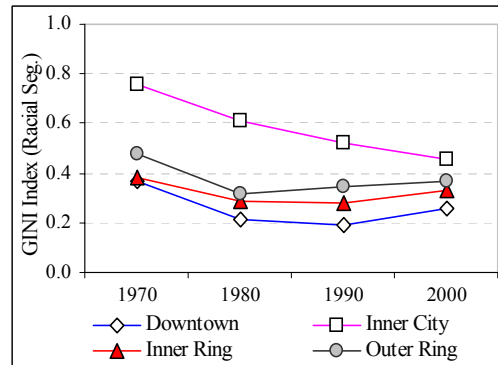
(A) Metro Atlanta Region



(B) Metro Cleveland Region



(C) Metro Philadelphia Region



(D) Metro Portland Region

Figure 4.12. Trends in the GINI Racial Segregation Index by Subarea in Each Region

CHAPTER 5

CONCLUSIONS AND POLICY DISCUSSION

5.1. Conclusions

This dissertation confirmed increases in intra-regional spatial differentiation over time, and thus, the dichotomous structure of the central city and the suburbs is not appropriate for intra-metropolitan analyses and policy implications. That is, policy makers need to be cognizant of the significant differences between the downtown and the inner city as well as between the inner-ring suburbs and the outer-ring suburbs.

In the four metropolitan areas analyzed in this research, although some parts of inner-ring suburbs were prosperous, most inner-ring suburban areas were shown to be increasingly vulnerable to socioeconomic decline regardless of their growth patterns and policies. In contrast, the downtowns and some inner city areas showed gradual recovery from the deterioration patterns of the last several decades. The outer-ring suburbs continued to thrive, drawing most of the new population and housing development. However, this trend slowed over time.

The inner-ring suburbs showed a loss in population in the slow-growing areas (Cleveland and Philadelphia) and a very slow growth in population in the fast-growing areas (Atlanta and Portland). Furthermore, the inner-ring suburbs experienced significant increases in the level of poverty from 1970 to 2000, and these patterns were uniform for the four metropolitan regions. The inner-ring suburbs also showed gradual increases in

overcrowded housing and stagnant housing values relative to the downtown, the inner-city suburbs, and the outer-ring suburbs.

This dissertation developed three integrated indicators from the factor analysis and demonstrated the extent of spatial differentiation and socioeconomic disparity among the subareas, using random-effect GLS models with these indicators. Analyses using the deterioration factor score showed that the Atlanta region experienced the highest spatial differentiation among the subareas, while the Portland region experienced the lowest. Analyses found that strong decentralization trends are associated with intra-regional spatial differentiation and inner-ring suburban decline, while urban containment policies are associated with their reduction. However, despite its strong urban containment policies, the Portland region exhibited a clear pattern of inner-ring suburban decline, which suggests the need of local initiatives for inner-ring suburban revitalization.

Analyses using the prosperity factor score indicated that the fast-growing regions (Atlanta and Portland) have mixed results with regard to spatial differentiation and socioeconomic disparity among the subareas. The disparity between the Atlanta subareas narrowed, as indicated by simultaneous increases in the prosperity factor score for the downtown and the inner city and decreases in the prosperity factor score for the inner- and outer-ring suburbs. The changes in the prosperity factor score for the subareas of Atlanta reflect the fact that the Atlanta region overall gained a significant number of lower-income households over the 1990s. In contrast, the slow-growing regions of Cleveland and Philadelphia experienced increased spatial differentiation and socioeconomic disparity among the subareas from 1970 to 2000. In these two metropolitan regions, the prosperity factor score increased in the downtown and the

outer-ring suburbs compared with that in the inner city and the inner-ring suburbs, indicating that the economic gap between the inner-ring suburbs and the outer-ring suburbs increased in the slow-growing regions.

Finally, analyses using the demographic factor score, the indicator representing a higher proportion in the young population along with a lower proportion of the elderly population, confirmed that the inner-ring suburbs experienced continuous increases in the proportion of elderly population, indicating outmigration of the young population from the inner-ring suburbs without compensating for immigration from other subareas. In addition, the elderly population in the inner-ring suburbs probably does not consist of affluent retirees, as the inner-ring suburbs experienced continuous increases in the level of poverty. Therefore, the significant increase in the proportion of the elderly population in the inner-ring suburbs may suggest economic stagnation followed by the decline of inner-ring suburban neighborhoods.

For all the metropolitan regions, this research confirmed the existence of prosperous inner-ring suburban neighborhoods and analyzed their spatial patterns and key factors for neighborhood prosperity. Analyses showed that prosperous inner-ring suburbs were not only spatially clustering but also located within the regional growth sectors in the metropolitan regions. In addition, this study also identified spatial polarization in the inner-ring suburbs in the fast-growing regions of Atlanta and Portland. In these regions, the numbers of prosperous neighborhoods and declining neighborhoods in the inner-ring suburbs increased simultaneously over time, leading to a decrease in the number of moderate level neighborhoods in the inner-ring suburbs. The key factors for inner-ring suburban prosperity in the fast-growing regions differ from those in the slow-growing

regions. For the fast-growing regions of Atlanta and Portland, the locational proximity of inner-ring suburbs to job markets was the most critical indicator of inner-ring suburban prosperity. In contrast, for the slow-growing regions of Cleveland and Philadelphia, the population growth rate and increases in the median housing age were the indicators most strongly associated with the level of prosperity in the inner-ring suburbs.

This dissertation also provides evidence that metropolitan growth patterns and policies are significantly associated with intra-regional spatial differentiation and socioeconomic disparity within the metropolitan areas. For the four metropolitan areas, the Portland region, with a strong urban containment policy (i.e., urban growth boundary), showed the lowest intra-regional spatial differentiation as well as the lowest incomes and racial segregation. By contrast, the Atlanta region, with a strong decentralization pattern, showed the highest levels of intra-regional spatial differentiation and socioeconomic segregation relative to the other three metropolitan areas. These findings indicate that urban containment policies against suburban sprawl can be considered a useful tool to reduce intra-regional spatial differentiation and socioeconomic disparity within the metropolitan areas. However, this regional approach alone can be limited to reduce intra-regional socioeconomic disparity and polarization without specific local initiatives such as mixed-use and mixed-income development strategies. Finally, this dissertation has shown that excessive development at the urban fringe is associated with the abandonment of the blighted inner city and more importantly, in the decline of the inner-ring suburbs. The inner-ring suburbs, with their existing valuable assets, should be fertile grounds for smart growth strategies.

5.2. Policy Implications and Directions for Future Research

5.2.1. Policy Implications²⁰

Very little of the existing literature and research on inner-ring suburbs acknowledges the potential role that inner-ring suburbs can assume in the metropolitan smart growth movement. The inner-ring suburbs can be significant assets for developing the alternative models of growth required to achieve more sustainable and smart growth metropolitan development. Many inner-ring suburbs, with their previously developed infrastructure built with a greater density and more on a pedestrian friendly scale, are ideal for retrofitting to mixed-use, live-work-play areas that are sought after in smart growth development and new urbanism models (Hudnut 2003). Furthermore, recently, research has identified significant buildable lands in existing urbanized areas such as the inner city and the inner-ring suburbs, which are ripe for smart growth redevelopment (Moudon 2001; Goldstein et al. 2001). Buildable lands in the inner city and the inner-ring suburbs can be categorized by several classes: abandoned properties, under-utilized properties, vacant lands, and environmentally contaminated brownfields.

However, only a few researchers (Fitzgerald and Leigh 2002; Hudnut 2003; NAHB 2002) mention the opportunities of inner-ring suburbs for smart growth strategies. Furthermore, the inner-ring suburbs have different physical and socioeconomic conditions from those of the inner-city neighborhoods. In other words, the programs and techniques implemented for inner-city revitalization over the past several decades may

²⁰ This section is an updated version of the policy discussion section in the author's article "the role of inner-ring suburbs in metropolitan smart growth strategies" (Lee and Leigh 2005).

not be cases for inner-ring suburban revitalization. For example, extensive redevelopment strategies that require the demolition of existing constructions for the purpose of inner-city revitalization may not be considered for inner-ring suburban revitalization because the physical and socioeconomic conditions in the inner-ring suburbs are still much better than the blighted inner-city areas. These large-scale efforts of redevelopment, moreover, may prove to be inefficient revitalization strategies in the inner-ring suburbs, which consist of dispersed single-family residential areas. Hence, a more effective strategy might be retrofitting or remodeling strategies. Although specific retrofitting or remodeling strategies and relevant programs could be used to revitalize not only the inner-ring suburbs but also declining strip malls and former industrial sites within these suburbs, neither the literature nor government planning practices have sufficiently addressed this issue.

Numerous policies, programs, and initiatives at the federal, state, regional, and local levels have been implemented in the last several decades to promote the revitalization of downtowns and inner cities.²¹ However, these policies have had little effect at countering the decline of the inner-ring suburbs, as these areas are often not separate political, administrative jurisdictions that qualify for state and federal monies targeted to deprived communities (Fitzgerald and Leigh 2002). In other words, the inner-ring suburbs have been a “policy blindspot” (Puentes and Orfield 2002). Thus, a smart growth policy for the inner-ring suburbs should be formulated on different government levels such as federal, state, regional, and local levels.

²¹ The federal initiatives include programs such as Model Cities, the Office of Economic Opportunity, the CDBG Program, Urban Development Action Grants, Empowerment Zone, HOPE VI (Persky and Wiewel 2000, 124).

To facilitate such a goal, policies at the federal and state levels need to redirect public investments to the inner-ring suburbs as well as the downtowns and the inner cities, curbing sprawl to the metropolitan periphery. Despite better socioeconomic conditions in the inner-ring suburbs than in the inner cities, this research provides evidence of deteriorating conditions in the inner-ring suburbs as opposed to improved conditions in the inner cities. Thus, a challenge for policymakers is to prevent further decline in the inner-ring suburbs. The scope of this challenge includes aging housing stock, increasing poverty, a deteriorating infrastructure, and low-quality public schools. Such widespread problems cannot be handled at the local level, but demand action and investment by state and federal governments. If the inner-ring suburbs are to attract residents and redirect investment, federal and state funds must be allocated for new constructions of roads, schools, water, and sewer projects. That is, the inner-ring suburbs must become the priority for investment, which, until now, has benefited the outer-ring suburbs.

Wiewel and Persky (1994, 473) pointed out that public investment in urban neighborhoods such as central cities and aging suburbs can be more efficient than in green field developments because these areas have “existing infrastructure, a large labor force, proximity to downtowns, local entrepreneurs, and the enduring advantages of density.” Porter (1997, 150) emphasized this point, stating that: “the grand strategies of growth management such as growth boundaries, conservation of rural land, coordinated provision of infrastructure, and promotion of infill and redevelopment can succeed only if detailed attention is paid to maintaining and enhancing the quality of existing and emerging neighborhoods and community centers.” According to a review of state programs by the National Governors Association (NGA 2004), several states have

launched infrastructure funding programs called “fix-it-first” strategies, which enhance existing communities by redirecting public investments into these areas.²² The fix-it-first strategies focus on three main issues: (1) funding efficiency, (2) economic and community development potentials in existing communities, and (3) quality of life, including preserving the existing housing stock in the core and the inner-ring suburbs (NGA 2004). In 1997, the State of Maryland enacted “smart growth” legislation that designated “priority funding areas” for infrastructures to revitalize existing communities. According to Puentes and Orfield (2002), Illinois and New Jersey also passed similar bills: Illinois FIRST (Fund for Infrastructure, Roads, Schools, and Transit) in 1999 and New Jersey’s “fix-it-first” transportation policy in 2000.

Due to their established physical and social infrastructures, the inner-ring suburbs have a strong advantage in policy decisions related to housing development. According to the analysis on housing construction costs in the Chicago region by the Center for Neighborhood Technology, the marginal infrastructure cost of housing development in the inner-ring suburbs is one-sixth as much as in undeveloped areas (Progressive Policy Institute 2004). The Location Efficient Mortgage (LEM) program developed by the Center for Neighborhood Technology and the Fannie Mae Foundation should be considered as an alternative strategy for the revitalization of inner-ring suburbs that have easy accessibility to mass transit systems (Hudnut 2003, 234).²³ The LEM is a type of

²² “Fix-it-first is a term used to describe a wide range of state investment strategies that utilize planning, development incentives, and other tools to better leverage limited state funds. The explicit goal of these strategies is to build upon and maintain previous asset investments before building new” (NGA 2004, 1).

²³ The Location Efficient Mortgage (LEM) program is available in Seattle, San Francisco, Los Angeles, and Chicago. See official websites for location efficient mortgage, <http://www.locationefficiency.com> (accessed on July 7, 2004).

Transit Supportive Home Loan that provides financial incentives for homeowners who want to live in the neighborhood near transit stations (Krizek 2003). However, this program can only be applied to inner-ring suburbs that have transit stations.

Rather than new housing development in the inner-ring suburbs, housing renovation and remodeling can be a more efficient strategy for community revitalization in the inner cities and the inner-ring suburbs (Carmon 2002). Most housing stocks in the inner-ring suburbs have disadvantages in current housing markets in terms of size, floor design, and style. Kelly (1993) introduced housing improvement strategies for mass-produced houses of a post-WWII community, Levittown at Island Trees in New York. In particular, she emphasized owner-generated redesign strategies in Levittown, stating that “the houses of Levittown did not remain as they had been designed and delivered in 1947. Indeed, by the end of its first decades, the visual landscape of Levittown—both interior and exterior—had been almost totally redesigned, not by the builder, but by the homeowners” (Kelly 1993, 6).

Carmon (2002) also introduced a similar concept of the “Phoenix” (a symbolized term of sustainable housing transformation) strategy for updating housing stock, indicating that housing updating includes significant changes in housing size and design without demolishing original housing. She also emphasized the importance of financial incentives and appropriate neighborhoods for this strategy. Appropriate neighborhoods are not the most distressed areas, but lower- or moderate-income neighborhoods, including those common in the inner-ring suburbs. As she mentioned, the most distressed areas require economic development and welfare that promote secure jobs, adequate household income, and social services, rather than housing updating.

A few states have already launched statewide renovation or incentive programs for older housing stock. These programs are the “This Old House” program in Minnesota, the “Neighborhood Preservation Act (NPA)” in Missouri, and older housing renovation incentives in Michigan (Progressive Policy Institute 2004). The “This Old House” program established in 1993 provides homeowners in Minneapolis and Hennepin County (an inner-ring suburban county) financial incentives to rehabilitate their deteriorated and outdated residential properties. Similarly, the NPA provides tax credit programs for residential rehabilitation in distressed communities, including the inner-ring suburbs in St. Louis County.²⁴

However, housing updating alone may not be an effective tool for inner-ring suburban revitalization. Hudnut (2003, 412) provided key factors for successful inner-ring suburban revitalization (e.g., political leadership, human and social capital, public participation, education, and social services), emphasizing the planning process and a socioeconomic perspective. In addition, reinvestments for deteriorating infrastructure and public school systems are also critical factors for inner-ring suburban revitalization.

Second, revitalization strategies for the inner-ring suburbs should be considered in the context of inter-governmental coalitions and regional planning approaches. Unlike the central cities, inner-ring suburban communities include small, old towns and unincorporated suburban areas with political minorities. Among the few regional coalitions for inner-ring suburban revitalization, the best examples of inter-governmental organizations are the First Tier Suburbs (FTS) Council of the National League of Cities

²⁴ The State of Missouri’s Department of Economic Development: Neighborhood Preservation Act, <http://www.ded.mo.gov/communities/communitydevelopment/npa/> (accessed on December 21, 2004).

(NLC), the First Suburbs Consortium (FSC) in Ohio, the Mid-America Regional Council (MARC) First Suburbs Coalition (FSC), and the Michigan Suburbs Alliance (MSA).²⁵

Established in 2002, the FTS Council, a nationwide networking council of cities and towns outside the central cities and within the outer-ring suburbs, addresses the unique challenges and opportunities in the first-tier suburbs.²⁶ The FSC in Ohio, originally established in Cleveland in 1996 and expanded to the Columbus and Cincinnati areas to redirect public investments into the first suburbs, renovate aging housing stock and revitalize deteriorated commercial districts. To renovate deteriorated housing stock, for example, the Cleveland FSC administers the Home Enhancement Loan Program (HELP), a form of public-private partnership in which residents of the first suburbs are able to remodel their houses at cheaper interest rates (Rokakis and Katz 2001). The HELP program has made over 4,950 loans totaling more than 59 million dollars so far.²⁷ The FSC of the MARC in the bi-state Kansas City metropolitan area is also a local government-led coalition that addresses emerging problems in the first suburbs. This organization established three objectives for the first suburbs: (1) modernizing housing stock, (2) attracting and retaining businesses, and (3) maintaining and upgrading an aging

²⁵ Orfield (2002, 175) provided similar organizations: the North Metro Mayors Association in the Twin Cities, the South Suburban Mayors and Managers Association in Chicago, the Gateway Cities in Los Angeles.

²⁶ The National League of Cities: The First Tier Suburbs Council, http://nlc.org.nile.doceus.com/inside_nlc/committees_councils/465.cfm (accessed on December 22, 2004).

²⁷ The HELP program is “a cooperative effort between the County Treasurer, the County Commissioners, 33 eligible communities and the six participating banks,” The Treasurer’s Office of Cuyahoga County, <http://www.cuyahoga.oh.us/treasurer/homeimprove/HELP.htm> (accessed on July 7, 2004).

public infrastructure.²⁸ Finally, the Michigan Suburbs Alliance (MSA) was formed by the local governmental officials of older suburban communities in the metropolitan Detroit area in 2002. The alliance focuses on how to deal with the emerging challenges of infrastructure deterioration, fiscal stress, and socioeconomic decline in the inner-ring suburbs.²⁹

Regional growth management programs and urban containment policies must also target and strengthen established neighborhoods (Calthorpe and Fulton 2001; Dawkins and Nelson 2003; Freilich 1999; Johnson 2001; Orfield 1997, 2002; Powell 2000; Rusk 1993, 1999). Several researchers have provided observable evidence of the positive impact of statewide growth management systems and regional and local urban containment policies on central-city revitalization (Dawkins and Nelson 2003; Nelson et al. 2004). While no specific empirical studies examine the effect of growth management on the revitalization of the inner-ring suburbs, Johnson (2001, 719) has argued that growth management policies such as an Urban Growth Boundary (UGB) can help encourage infill development in the inner-ring suburbs. However, urban containment policies at the regional level may revitalize the downtowns and the outer-ring suburbs within the growth boundaries at the expense of the inner-ring suburbs. Although Nelson et al. (2004) argued that urban containment shifted development from rural and exurban areas to city and suburban areas, this shift may concentrate in the downtowns and the outer-ring suburbs of the spatially differentiated metropolitan region.

²⁸ The Mid-America Regional Council: Community Development, First Suburbs Coalition, <http://www.marc.org/firstsuburbs> (accessed on December 22, 2004).

²⁹ The Michigan Suburbs Alliance (MSA), <http://www.michigansuburbsalliance.org/mission.htm> (accessed on December 22, 2004).

Rather than a single urban growth boundary, the tier system can be an effective tool that deals with the issue of decline in the inner-ring suburbs. Freilich (1999, 7) suggested an “Urbanizing Tier System” (UTS), a more sophisticated application of the UGB approach developed in Ramapo in the 1960s emphasizes timing and sequence in urban development.³⁰ Using UTS, Freilich suggested that a planning area could be separated into several tiers according to geographic location and function and that different policies and strategies would be developed for each tier. He states that “growth management techniques can be used to provide incentives for growth in the central cities, maintain and strengthen the first-ring suburbs, and organize development and prevent sprawl in the urbanizing tiers through the Ramapo timing and phasing program linked to adequate public facilities” (Freilich 1999, 108). As it requires different policy applications for each subarea, the UTS approach can be more effective for the inner-ring suburbs than the UGB.

Other approaches related to (though not necessarily originating in) the smart-growth movement, such as the fair-share housing and regional tax-sharing program, can be useful for revitalizing the inner-ring suburbs. Orfield (1997, 2002) referred to this approach as “Metropolitics,” which are regional politics that reduce inequalities between urban and suburban areas. That is, reinvestment efforts for the inner-ring suburbs can be expedited by several strategies of metropolitics. Powell (2000) noted the problem of the unfair distribution of public resources to the older inner-ring suburbs and outer-ring suburbs, stating:

³⁰ The concept of “Urbanizing Tiers System” has been implemented in several cities, counties, and states across the country (Freilich 1999, 107-238).

One of the problems facing central cities and older, inner-ring suburbs is the constant pulling of resources away from the region's core toward the outer edges of the metropolitan area; it is not just the population exodus from the urban core that makes this problem so difficult to remedy; it is the removal of resources from the core and the subsequent refusal of the suburbs to share, or fairly distribute, the benefits (Powell 2000, 218-19).

Hudnut (2003, 263) considered the inner-ring suburbs, with established infrastructures and available lands for infill development, as a valuable asset that could mitigate or even solve the dearth of affordable housing in the metropolitan areas. The fair-sharing housing program has been successfully implemented in Montgomery County, Maryland, since the "Moderately Priced Housing Law" was enacted in 1974 (Walljasper 1999). Researchers argued that the fair-share housing program at the regional level could reduce socioeconomic inequalities between the inner cities and the suburbs (Orfield 1997; Rusk 1999).

Since the tax base has declined with the out-migration of people and jobs to the outer-ring suburbs, the inner cities and the inner-ring suburbs have struggled with basic public services for their residents. Walljasper (2000) argued that the tax-base sharing program in the Minneapolis-St. Paul region has prevented the inner cities and the inner-ring suburbs from further deterioration by insuring adequate levels of public services. The tax-base sharing program, therefore, can provide significant incentives for inner-ring suburban revitalization efforts. Orfield (2002, 107) showed that a tax-base sharing program reduced local tax-based disparities by 20 percent in the Twin Cities.

During the past several decades, inner city neighborhoods have consisted of political minorities limited to redirected public investments to the metropolitan periphery into the built-up areas. However, the population of the inner-ring suburbs, outer low-tax capacity suburbs, and the central cities roughly holds 60 to 75 percent of the total population in every metropolitan area across the country (Richmond 2000, 21). Although the political barriers are significant for the coalitions between the inner-ring suburbs and the central cities, these coalition efforts may lead state legislators to consider reinvesting in the built-up areas such as the inner-ring suburbs and the inner cities in the metropolitan areas.

Finally, local- and community-based initiatives for revitalization can be extremely important to the inner-ring suburban neighborhoods. Despite the regional urban growth boundary, the inner-ring suburbs in the Portland region have exhibited the same patterns of decline as those in other three areas. This finding indicates that regional growth management policies for revitalizing the inner-ring suburbs are limited, which calls for stronger local- and community-based initiatives. Such initiatives are critical because local governments control land use planning and local public investments. However, historic lessons from planning practices applied in the inner cities have shown that government-oriented policies that improve socioeconomic conditions in urban neighborhoods are limited, so the role of community organizations and coalitions in revitalizing inner-ring suburbs should also be emphasized. After examining the successful revitalizations in the blighted neighborhoods, both Hoffman (2003) and Birch (2002) concluded that locally-based community organizations and smaller-scale public-private partnerships have collaborated successfully in efforts to revitalize the inner city.

Local governments also have control over land use regulations that contribute to the revitalization of the inner-ring suburbs. One example is the Livability Centers Initiative (LCI), a local initiative supported by the “Atlanta Regional Commission (ARC),” the regional government. The LCI is an infill and redevelopment effort of urban and suburban activity centers. Since the first LCI was established in 2000, ARC has supported the revitalization of several activity centers across the metropolitan region, including deteriorated commercial districts in the inner-ring suburbs.³¹

Another planning approach used in the Atlanta metropolitan area, “overlay district zoning,” has proved successful in unincorporated inner-ring suburban neighborhoods (Fitzgerald and Leigh 2002). Established in 1994, the overlay district has been successful in Sandy Springs, an unincorporated older suburban community, in revitalizing main streets and older commercial strips. Fitzgerald and Leigh (2002) conducted a case study of this area and showed the effectiveness of the overlay district zoning as a planning method for revitalizing the inner-ring suburbs. However, they added that the success of this method depends on consensus building among residents, property owners, and business owners. In addition to overlay district zoning, the “transfer of development right” (TDR) can be used to increase density in the activity centers of the inner-ring suburbs. Increased density can help revitalize town centers and commercial centers within the inner-ring suburbs. However, according to TDR strategy, regional or inter-governmental coalitions must actively take part in designating inner-ring suburbs as “receiving areas.”

³¹ Quality Growth: Livable Center Initiatives. Atlanta: Atlanta Regional Commission (ARC), <http://www.atlantaregional.com/qualitygrowth/lci> (accessed on July 7, 2004).

In conclusion, excessive development at the urban fringe has resulted in the abandonment of the blighted inner city and the decline of the inner-ring suburbs. This dissertation has shown that the inner-ring suburbs, in general, struggle with decline. At the same time, the inner-ring suburbs, with their existing valuable assets, are fertile grounds for smart growth strategies. This dissertation also discussed policy applications for attracting residents and redirecting investment to inner-ring suburbs at various government and organization levels. Hudnut (2003) poignantly described as follows:

.....regional pivot points, centrally located in the metropolitan mosaic, halfway to everywhere. If they allow deterioration to continue, it will gradually infect other nodes of development in the region. But if they can stem the flight of blight by becoming stronger and healthier through the practice of urban acupuncture, if public policies can focus resources on their redevelopment, they will become brighter lights on the regional horizon and show others how renewal can be accomplished (Hudnut 2003, 419).

In other words, the central city and the outer-ring suburbs have a vital mission to save and invigorate the inner-ring suburbs, as they represent the primary link and conduit to all the surrounding areas of a metropolitan region. Only by recognizing the interdependence of all the areas and by applying sound, holistic policies can the decision-making entities of the government ensure the survival and future stability of large cities in the United States.

5.2.2. Study Limitations and Directions for Future Research

While this dissertation showed the impact of metropolitan growth patterns and policies on intra- and inter-regional spatial differentiations, socioeconomic disparities, and inner-ring suburban decline among the subareas from the four metropolitan regions using longitudinal census data from 1970 to 2000, the research has a number of limitations in terms of case study areas, unit of analysis, variables, and analyses.

Despite the various growth patterns and policies in the four metropolitan areas, they may not sufficiently represent all the metropolitan areas in the country. For example, this research included the metropolitan Portland area in its examination of the impact of urban containment policies on intra-regional spatial differentiation and inner-ring suburban decline. However, specific findings, such as that in which Portland was found to have the lowest intra-regional spatial differentiation, do not necessarily indicate any direct impact of urban containment policies. A broader analysis of urban containment policies and their causal relationships would have to include more case study areas that have similar urban containment policies. Another limitation is that any change in an outer boundary of a metropolitan region would affect these results. For example, in this research, the metropolitan Atlanta area included only 13 counties of the official 28-county Atlanta metropolitan statistical area (MSA). Thus, any analysis that added more counties to this 13-county region could change the results.

This research is also limited due to its unit of analysis (i.e., census tracts) and variables. Although a tract-level analysis has significant advantages over a municipal-level analysis for inner-ring suburban research, it may limit some variables associated

with government policies at the local level. In addition, the proxy variable (i.e., the median built year of housing for housing reinvestments) might be limited in an analysis of prosperous inner-ring suburbs and their key variables because the median built year of housing does not take into consideration housing remodeling or renovation in a tract. Housing remodeling data and a number of building permits in each tract might be better indicators of housing reinvestment if such data are available. Omitted variables that may have a more significant impact on inner-ring suburban prosperity include land use policies, taxation, school systems, crime rates, and public investment (e.g., transportation, infrastructure reinvestments). However, data collection for such variables would be extremely difficult if a research requires cross-sectional and longitudinal data. Another limitation of this research is that it did not include subcenters and exurban areas in the multi-ring polycentric metropolitan concept due to methodological difficulties in identifying these subareas.

Finally, this research could not identify specific characteristics in the inner-ring suburbs (e.g., land use, housing types and sizes, infrastructure deterioration, and availability of developable land) that would be useful for policy development and priorities in smart growth strategies.

Future research should include more metropolitan areas in the country that have different regional growth patterns and policies. The expansion of case study areas may show a causal relationship between regional growth patterns and the policies of intra-regional spatial differentiation and inner-ring suburban decline. Another direction in future research is to develop the complete multi-ring polycentric metropolitan model that includes the subcenters and the exurbs as well as the downtown, the inner city, the inner-

ring suburbs, and the outer-ring suburbs. With additional identification for the subcenters and exurbs, the multi-ring polycentric metropolitan structure can serve as a comprehensive model for metropolitan research and analysis. This new model could also provide a basis for an analysis of intra-regional interdependency and its dynamic changes over time. Finally, future research should include an evaluation of existing state, local initiatives for inner-ring suburban revitalization and the development of more efficient, effective strategies for inner-ring suburban revitalization. This research would focus on local- and regional-level housing and land use policies that enhance the vitality of the inner-ring suburbs and reduce intra-regional spatial differentiation and socioeconomic disparity.

APPENDIX

Table A-1. Selected Downtown Population Change (1990 – 2000)

Central City	1990			2000			Change (1990-2000)		
	Down town	City	MSA	Down town	City	MSA	Down town	City	MSA
Atlanta	19,763	394,017	2,959,950	24,731	416,474	4,112,198	4,968	22,457	1,152,248
Baltimore	28,597	736,014	2,382,172	30,067	651,154	2,552,994	1,470	-84,860	170,822
Boston	75,823	574,283	3,227,707	79,251	589,141	3,406,829	3,428	14,858	179,122
Charlotte	6,370	395,934	1,162,093	6,327	540,828	1,499,293	-43	144,894	337,200
Chicago	27,760	2,783,726	7,410,858	42,039	2,896,016	8,272,768	14,279	112,290	861,910
Cincinnati	3,838	364,040	1,526,092	3,189	331,285	1,646,395	-649	-32,755	120,303
Cleveland	7,261	505,616	2,202,069	9,599	478,403	2,250,871	2,338	-27,213	48,802
Colorado Springs	13,412	281,140	397,014	14,377	360,890	516,929	965	79,750	119,915
Denver	2,794	467,610	1,622,980	4,230	554,636	2,109,282	1,436	87,026	486,302
Des Moines	4,190	193,187	392,928	4,204	198,682	456,022	14	5,495	63,094
Detroit	5,970	1,027,974	4,266,654	6,141	951,270	4,441,551	171	-76,704	174,897
Houston	7,029	1,630,553	3,322,025	11,882	1,953,631	4,177,646	4,853	323,078	855,621
Lexington, KY	5,212	225,366	405,936	4,894	260,512	479,198	-318	35,146	73,262
Los Angeles	34,655	3,485,398	8,863,164	36,630	3,694,820	9,519,338	1,975	209,422	656,174
Memphis	7,606	610,337	1,007,306	8,994	650,100	1,135,614	1,388	39,763	128,308
Milwaukee	10,973	628,088	1,432,149	11,243	596,974	1,500,741	270	-31,114	68,592
Norfolk, VA	2,390	261,229	1,443,244	2,881	234,403	1,569,541	491	-26,826	126,297
Philadelphia	74,655	1,585,577	4,922,175	78,349	1,517,550	5,100,931	3,694	-68,027	178,756
Phoenix	6,517	983,403	2,238,480	5,925	1,321,045	3,251,876	-592	337,642	1,013,396
Portland, OR	9,528	437,319	1,515,452	12,902	529,121	1,918,009	3,374	91,802	402,557
San Antonio	23,588	935,933	1,324,749	22,206	1,144,646	1,592,383	-1,382	208,713	267,634
San Diego	15,417	1,110,549	2,498,016	17,894	1,223,400	2,813,833	2,477	112,851	315,817
Seattle	9,824	516,259	2,033,156	16,443	563,374	2,414,616	6,619	47,115	381,460
St. Louis	9,109	396,685	2,492,525	7,511	348,189	2,603,607	-1,598	-48,496	111,082

Sources: Sohmer and Lang (2001, 3), Authors' original source: The University of Pennsylvania, Department of City and Regional Planning; U.S. Bureau of the Census 1990 and 2000.

Table A-2. Smart Growth Principles and 100 Policies for Implementation

Smart Growth Principles	100 Policies for Implementation
Mix land uses	<ul style="list-style-type: none"> • Provide incentives through state funds to encourage residents to live near where they work • Adopt smart growth codes to parallel existing conventional development codes • Use innovative zoning tools to encourage mixed-use communities and buildings • Facilitate financing of mixed-use properties • Zone areas by building type, not by use • Use flex zoning to allow developers to easily supply space in response to market demands • Convert declining shopping malls and strip commercial streets into mixed-use developments • Provide examples of mixed-use development at scales that are appropriate to your community • Create opportunities to retrofit single-use commercial and retail developments into walkable, mixed-use communities • Reward communities that create a balance between jobs and housing
Take advantage of compact building design	<ul style="list-style-type: none"> • Use public meetings about development options to educate community members on density and compact building options • Ensure ready access to open space in compactly developed places • Encourage developers to reduce off-street surface parking • Match building scale to street type in zoning and permit approval processes • Establish model state-level design standards and codes to encourage compact building design that can be adopted by local communities • Use density bonuses to encourage developers to increase floor-to-area ratio (FAR) • Ensure a sense of privacy through the design of homes and yards • Employ a design review board to ensure that compact buildings reflect desirable design standards • Offer incentives that encourage local communities to increase density • Support regional planning efforts to encourage compact communities
Create a range of housing opportunities and choices	<ul style="list-style-type: none"> • Enact an inclusionary zoning ordinance for new housing developments • Provide home buyers assistance through support to community land trusts • Revise zoning and building codes to permit a wider variety of housing types • Plan and zone for affordable and manufactured housing development in rural areas • Educate developers of multifamily housing units and nonprofits on the use of limited-equity components • Educate realtors, lenders, and home buyers on the use of resource-efficient mortgages • Implement a program to identify and dispose of vacant and abandoned buildings • Adopt special rehabilitation building codes to regulate the renovation of existing structures • Enlist local jurisdictions in implementing a regional fair-share housing allocation plan across metropolitan areas • Give priority to smart growth projects and programs that foster smart growth in the allocation of federal housing and community development block grant (and other) funds

Table A-2. Smart Growth Principles and 100 Policies for Implementation (Cont.)

Smart Growth Principles	100 Policies for Implementation
Create walkable neighborhoods	<ul style="list-style-type: none"> • Provide grants or other financial assistance to local communities to retrofit existing streets and sidewalks to promote more walkable communities • Concentrate critical services near homes, jobs, and transit • Require building design that makes commercial areas more walkable • Adopt design standards for streets that ensure safety and mobility for pedestrian and nonmotorized modes of transport • Adopt design standards for sidewalks • Require traffic-calming techniques where traffic speed through residential and urban neighborhoods is excessive • Beautify and maintain existing and future walkways • Provide Americans with disabilities easy access to sidewalks, streets, parks, and other public and private services • Connect walkways, parking lots, greenways, and developments • Identify economic opportunities that stimulate pedestrian activity
Foster distinctive, attractive communities with as strong sense of place	<ul style="list-style-type: none"> • Modify state funding processes and school siting standards to preserve neighborhood schools and build new schools to a community level • Create a state tax credit to encourage adaptive reuse of historic and architecturally significant buildings • Plant trees throughout communities and preserve existing trees during new construction • Create active and secure open spaces • Simplify and expedite permitting regulations to allow vendors to offer sidewalk services • Create special improvement districts for focused investment • Define communities and neighborhoods with visual cues • Preserve scenic vistas through the appropriate location of telecommunication towers, and through improved control of billboards • Create opportunities for community interaction • Enact clear design guidelines so that streets, buildings, and public space work together to create a sense of place
Preserve open space, farmland, natural beauty, and critical environmental areas	<ul style="list-style-type: none"> • Use transfer of development rights purchase of development rights, and other market mechanisms to conserve private lands • Coordinate and link local, state, and federal planning on land conservation and development • Expand use of innovative financing tools to facilitate open space acquisition and preservation • Employ regional development strategies that better protect and preserve open space in edge areas • Adopt a green infrastructure plan • Create a network of trails and greenways • Design and implement an information-gathering and education program • Design and implement zoning tools that preserve open space • Provide mechanisms for preserving working lands • Partner with nongovernmental organizations to acquire and protect land

Table A-2. Smart Growth Principles and 100 Policies for Implementation (Cont.)

Smart Growth Principles	100 Policies for Implementation
Strengthen and direct developed towards existing communities	<ul style="list-style-type: none"> • Strengthen state or local brownfields programs • Adopt a ‘fix-it-first’ policy that sets priorities for upgrading existing facilities • Institute regional tax-base sharing to limit regional competition and to support schools and infrastructure throughout the region • Use the split-rate property tax to encourage development on vacant or blighted pieces of land in existing communities • Locate civic buildings in existing communities rather than in greenfields areas • Conduct an ‘infill checkup’ to evaluate and prioritize infill and brownfields sites for redevelopment • Facilitate programs to encourage home renovation and rehabilitation in existing neighborhoods • Support community-based organizations involved in revitalizing neighborhoods • Create economic incentives for businesses and home owners to locate in areas with existing infrastructure • Modify average cost-pricing practices in utilities to better account for costs of expanding infrastructure in greenfield areas
Provide a variety of transportation choices	<ul style="list-style-type: none"> • Finance and provide incentives for multimodal transportation system that include supportive land use and development • Modify roadway level-of-service standards in areas served by transit • Plan and permit road networks of neighborhood-scaled streets with high levels of connectivity and short blocks • Connect transportation modes to one another • Zone for concentrated activity centers around transit services • Require sidewalks in all new developments • Address parking needs and opportunities • Collaborate with employers and provide information and incentives for programs to minimize or decrease rush-hour congestion impacts • Adjust existing transit services to take full advantages of transit-supportive neighborhoods and developments • Cluster freight facilities near ports, airports, and rail terminals
Make development decisions predictable, fair and cost effective	<ul style="list-style-type: none"> • Provide financial incentives to aid the development of smart growth projects • Conduct smart growth audits • Implement a process to expedite plan and permit approval for smart growth projects • Engage political support for improved coordination on approval of smart growth projects • Use a point-based evaluation system to encourage smart growth projects • Remove parking from the development equation through public-private partnerships to build community parking facilities • Encourage demand for smart growth through consumer incentives • Display zoning regulations and design goals in pictorial fashion to better illustrate development goals • Maximize the values of transit agency property through joint development of transit-oriented development • Incorporate by-right growth redevelopment into existing communities’ master plans

Table A-2. Smart Growth Principles and 100 Policies for Implementation (Cont.)

Smart Growth Principles	100 Policies for Implementation
Encourage community and stakeholder collaboration in development decisions	<ul style="list-style-type: none">• Seek technical assistance to develop a public participation process• Use unconventional methods and forums to educate nontraditional, as well as traditional, stakeholders about the development and decision-making processes• Conduct community visioning exercises to determine how and where the neighborhood will grow• Require communities to create public access to tax and lien information on all properties to facilitate the rehabilitation of distressed properties• Incorporate opinions and interests often and routinely into the planning process• Work with the media to disseminate planning and development information on a consistent basis• Engage children through education and outreach• Cultivate relationships with schools, universities, and colleges• Bring developers and the development community into the visioning process• Hold a design charrette to resolve problematic development decisions

Source: Smart Growth Network and International City/County Management Association (ICMA). 2002. *Getting to smart growth: 100 policies for implementation*.

Table A-3. White Population Change by the Subareas

Region	Subarea	Population				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	7,460	3,775	2,346	4,560	-49.4	-37.9	94.4	-38.9
	Inner City	104,199	68,587	63,900	75,208	-34.2	-6.8	17.7	-27.8
	Inner Ring	465,701	312,324	243,209	241,272	-32.9	-22.1	-0.8	-48.2
	Outer Ring	557,448	1,066,969	1,574,571	1,962,065	91.4	47.6	24.6	252.0
	Total	1,134,808	1,451,655	1,884,026	2,283,105	27.9	29.8	21.2	101.2
Cleveland	Downtown	6,444	4,165	2,547	2,878	-35.4	-38.8	13.0	-55.3
	Inner City	649,151	455,616	380,984	322,512	-29.8	-16.4	-15.3	-50.3
	Inner Ring	724,150	640,950	579,344	533,191	-11.5	-9.6	-8.0	-26.4
	Outer Ring	342,000	424,514	472,662	545,202	24.1	11.3	15.3	59.4
	Total	1,721,745	1,525,245	1,435,537	1,403,783	-11.4	-5.9	-2.2	-18.5
Philadelphia	Downtown	62,375	59,456	60,092	61,024	-4.7	1.1	1.6	-2.2
	Inner City	1,460,174	1,092,610	929,842	764,754	-25.2	-14.9	-17.8	-47.6
	Inner Ring	1,469,136	1,363,670	1,276,534	1,179,546	-7.2	-6.4	-7.6	-19.7
	Outer Ring	958,718	1,196,758	1,452,079	1,652,874	24.8	21.3	13.8	72.4
	Total	3,950,403	3,712,494	3,718,547	3,658,198	-6.0	0.2	-1.6	-7.4
Portland	Downtown	7,530	7,242	8,003	10,265	-3.8	10.5	28.3	36.3
	Inner City	320,334	275,905	261,249	256,597	-13.9	-5.3	-1.8	-19.9
	Inner Ring	227,254	228,428	232,981	232,787	0.5	2.0	-0.1	2.4
	Outer Ring	289,600	519,266	624,509	796,732	79.3	20.3	27.6	175.1
	Total	844,718	1,030,841	1,126,742	1,296,381	22.0	9.3	15.1	53.5

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Table A-4. Minority Population Change by the Subareas

Region	Subarea	Minority Population*				Change Rate (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	12,787	12,212	15,147	17,773	-4.5	24.0	17.3	39.0
	Inner City	130,101	105,008	94,857	89,629	-19.3	-9.7	-5.5	-31.1
	Inner Ring	136,096	273,970	316,073	378,481	101.3	15.4	19.7	178.1
	Outer Ring	46,878	107,158	343,513	929,691	128.6	220.6	170.6	1,883.2
	Total	325,862	498,348	769,590	1,415,574	52.9	54.4	83.9	334.4
Cleveland	Downtown	2,251	4,574	4,585	6,610	103.2	0.2	44.2	193.6
	Inner City	307,461	305,217	302,477	319,532	-0.7	-0.9	5.6	3.9
	Inner Ring	26,865	54,560	76,124	110,946	103.1	39.5	45.7	313.0
	Outer Ring	4,775	8,520	12,242	22,608	78.4	43.7	84.7	373.5
	Total	341,352	372,871	395,428	459,696	9.2	6.0	16.3	34.7
Philadelphia	Downtown	24,904	18,379	19,113	21,735	-26.2	4.0	13.7	-12.7
	Inner City	681,332	727,413	780,483	876,493	6.8	7.3	12.3	28.6
	Inner Ring	101,742	158,937	200,521	270,228	56.2	26.2	34.8	165.6
	Outer Ring	58,390	98,458	138,301	209,992	68.6	40.5	51.8	259.6
	Total	866,368	1,003,187	1,138,418	1,378,448	15.8	13.5	21.1	59.1
Portland	Downtown	770	951	1,565	2,729	23.5	64.6	74.4	254.4
	Inner City	28,183	44,653	56,941	73,781	58.4	27.5	29.6	161.8
	Inner Ring	3,479	10,280	16,331	43,446	195.5	58.9	166.0	1,148.8
	Outer Ring	3,304	18,402	38,262	112,874	457.0	107.9	195.0	3,316.3
	Total	35,736	74,286	113,099	232,830	107.9	52.2	105.9	551.5

* Minority population = total population – white population

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Table A-5. Change in White Poverty Rate by the Subareas

Region	Subarea	Poverty Rate (%)				Change (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	42.3	37.4	28.4	14.7	-4.9	-9.0	-13.7	-27.6
	Inner City	12.9	11.2	8.7	6.4	-1.7	-2.5	-2.4	-6.5
	Inner Ring	5.7	7.4	7.8	8.4	1.7	0.5	0.6	2.8
	Outer Ring	6.3	5.5	4.5	4.6	-0.8	-1.1	0.1	-1.7
	Total	6.9	6.3	5.1	5.1	-0.6	-1.2	0.0	-1.8
Cleveland	Downtown	28.6	23.7	18.1	13.4	-4.9	-5.6	-4.7	-15.2
	Inner City	9.1	10.2	13.8	12.3	1.1	3.6	-1.4	3.2
	Inner Ring	3.4	3.3	3.8	4.5	-0.1	0.5	0.7	1.2
	Outer Ring	4.5	3.0	4.4	3.8	-1.5	1.4	-0.6	-0.6
	Total	5.8	5.3	6.7	6.1	-0.5	1.3	-0.6	0.2
Philadelphia	Downtown	16.8	13.0	11.3	12.1	-3.9	-1.6	0.8	-4.7
	Inner City	9.4	10.1	9.8	11.7	0.7	-0.2	1.9	2.4
	Inner Ring	4.4	4.9	4.5	5.3	0.4	-0.4	0.8	0.9
	Outer Ring	5.5	4.8	3.3	3.6	-0.7	-1.5	0.3	-1.8
	Total	6.7	6.5	5.5	6.0	-0.2	-1.0	0.5	-0.7
Portland	Downtown	34.3	30.8	33.7	28.0	-3.5	2.9	-5.7	-6.3
	Inner City	11.6	10.6	12.7	10.5	-1.0	2.1	-2.2	-1.1
	Inner Ring	6.5	6.8	8.4	8.6	0.3	1.6	0.2	2.1
	Outer Ring	7.7	5.9	6.5	6.0	-1.7	0.6	-0.5	-1.7
	Total	9.1	7.6	8.5	7.5	-1.5	1.0	-1.0	-1.6

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Table A-6. Change in Minority Poverty Rate by the Subareas

Region	Subarea	Poverty Rate (%)				Change (%)			
		1970	1980	1990	2000	'70-'80	'80-'90	'90-'00	'70-'00
Atlanta	Downtown	43.3	59.7	50.8	34.2	16.3	-8.9	-16.6	-9.1
	Inner City	32.7	37.8	37.9	31.2	5.1	0.1	-6.7	-1.5
	Inner Ring	23.2	26.0	23.9	23.7	2.8	-2.0	-0.2	0.6
	Outer Ring	29.7	20.7	11.4	10.3	-9.0	-9.3	-1.1	-19.5
	Total	28.7	28.2	20.6	15.5	-0.5	-7.6	-5.1	-13.2
Cleveland	Downtown	36.6	49.4	47.9	46.9	12.8	-1.5	-1.0	10.3
	Inner City	26.1	30.2	34.7	30.9	4.1	4.6	-3.8	4.9
	Inner Ring	7.2	10.7	10.9	10.8	3.5	0.2	0.0	3.7
	Outer Ring	17.5	50.8	11.2	10.4	33.3	-39.6	-0.7	-7.1
	Total	24.5	28.0	29.6	25.3	3.5	1.5	-4.2	0.8
Philadelphia	Downtown	32.5	38.8	40.8	28.8	6.3	2.0	-12.0	-3.7
	Inner City	25.1	34.7	30.7	29.8	9.5	-3.9	-0.9	4.7
	Inner Ring	19.4	20.1	14.6	14.1	0.8	-5.5	-0.5	-5.3
	Outer Ring	15.3	17.7	9.2	9.8	2.5	-8.5	0.6	-5.5
	Total	24.0	30.8	25.5	23.7	6.8	-5.3	-1.8	-0.3
Portland	Downtown	32.6	44.7	43.2	38.4	12.1	-1.5	-4.8	5.8
	Inner City	25.1	27.7	28.4	22.7	2.7	0.7	-5.7	-2.4
	Inner Ring	9.7	22.5	16.2	22.9	12.8	-6.3	6.7	13.2
	Outer Ring	14.3	22.2	15.6	15.9	7.9	-6.6	0.3	1.7
	Total	22.7	25.9	22.5	19.6	3.1	-3.3	-2.9	-3.1

Source: Author's Calculations from U.S. Census 1970, 1980, 1990, and 2000.

Table A-7. Number of Tracts by the Prosperity Factor Score

Subarea	Region	Year	PFS<0		0<PFS<1		1<PFS<2		2<PFS	
			Num.	Percent	Num.	Percent	Num.	Percent	Num.	Percent
Downtown	Atlanta	1970	10	100%	0	0%	0	0%	0	0%
		1980	7	70%	1	10%	0	0%	0	0%
		1990	7	70%	1	10%	0	0%	0	0%
		2000	6	60%	3	30%	1	10%	0	0%
	Cleveland	1970	6	50%	2	17%	0	0%	0	0%
		1980	6	50%	0	0%	1	8%	0	0%
		1990	2	17%	1	8%	2	17%	0	0%
		2000	1	8%	0	0%	1	8%	1	8%
	Philadelphia	1970	10	43%	5	22%	6	26%	2	9%
		1980	2	9%	4	17%	7	30%	9	39%
		1990	3	13%	1	4%	6	26%	11	48%
		2000	1	4%	5	22%	7	30%	10	43%
	Portland	1970	4	80%	0	0%	1	20%	0	0%
		1980	0	0%	3	60%	0	0%	1	20%
		1990	1	20%	1	20%	1	20%	0	0%
		2000	1	20%	2	40%	0	0%	1	20%
Inner City	Atlanta	1970	44	76%	10	17%	3	5%	1	2%
		1980	35	60%	7	12%	13	22%	2	3%
		1990	33	57%	5	9%	9	16%	11	19%
		2000	28	48%	6	10%	8	14%	15	26%
	Cleveland	1970	226	82%	31	11%	12	4%	4	1%
		1980	206	74%	41	15%	19	7%	3	1%
		1990	207	75%	39	14%	13	5%	11	4%
		2000	187	68%	53	19%	15	5%	12	4%
	Philadelphia	1970	332	78%	50	12%	22	5%	13	3%
		1980	301	71%	71	17%	24	6%	21	5%
		1990	295	69%	65	15%	33	8%	27	6%
		2000	294	69%	69	16%	30	7%	22	5%
	Portland	1970	72	77%	15	16%	4	4%	2	2%
		1980	45	48%	37	40%	7	8%	3	3%
		1990	50	54%	32	34%	5	5%	6	6%
		2000	37	40%	30	32%	20	22%	6	6%

* PFS: Prosperity Factor Score.

Table A-8. Number of Tracts by the Prosperity Factor Score (Cont.)

Subarea	Region	Year	PFS<0		0<PFS<1		1<PFS<2		2<PFS	
			Num.	Percent	Num.	Percent	Num.	Percent	Num.	Percent
Inner Ring	Atlanta	1970	77	63%	28	23%	9	7%	7	6%
		1980	70	57%	25	20%	18	15%	9	7%
		1990	70	57%	21	17%	17	14%	14	11%
		2000	80	65%	9	7%	16	13%	17	14%
	Cleveland	1970	138	73%	40	21%	6	3%	4	2%
		1980	90	48%	81	43%	13	7%	4	2%
		1990	98	52%	63	34%	20	11%	7	4%
		2000	96	51%	69	37%	16	9%	7	4%
	Philadelphia	1970	270	68%	83	21%	31	8%	8	2%
		1980	216	54%	115	29%	41	10%	17	4%
		1990	208	52%	117	29%	39	10%	25	6%
		2000	217	55%	108	27%	38	10%	25	6%
	Portland	1970	37	58%	16	25%	10	16%	1	2%
		1980	29	45%	24	38%	10	16%	1	2%
		1990	36	56%	15	23%	7	11%	6	9%
		2000	38	59%	10	16%	11	17%	5	8%
Outer Ring	Atlanta	1970	262	66%	49	12%	19	5%	1	0%
		1980	205	52%	118	30%	47	12%	18	5%
		1990	168	42%	159	40%	47	12%	24	6%
		2000	218	55%	112	28%	47	12%	21	5%
	Cleveland	1970	121	85%	17	12%	2	1%	3	2%
		1980	75	52%	58	41%	4	3%	6	4%
		1990	73	51%	47	33%	11	8%	12	8%
		2000	59	41%	54	38%	19	13%	11	8%
	Philadelphia	1970	336	73%	94	21%	19	4%	2	0%
		1980	197	43%	185	40%	62	14%	10	2%
		1990	164	36%	173	38%	94	21%	20	4%
		2000	150	33%	192	42%	77	17%	31	7%
	Portland	1970	112	68%	39	24%	0	0%	0	0%
		1980	69	42%	81	49%	15	9%	0	0%
		1990	95	58%	45	27%	20	12%	5	3%
		2000	90	55%	52	32%	18	11%	5	3%

* PFS: Prosperity Factor Score.

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