Diverging Paths: The Determinants of Neighborhood Change Across Space and Time

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

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2010

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Abstract

The principal research question is "Why do some neighborhoods in U.S. urban areas stay economically healthy and others do not?" This study proposes three hypotheses on diverging paths of neighborhood change: first, neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales; second, "the politics of scale"—city size and the homogeneity level of household interests in a municipality—is an important factor leading to different paths and outcomes of neighborhood change; and third, factors of neighborhood change have altered over time.

The primary data set used in this study is the Neighborhood Change Data Base by GeoLytics that includes the decennial census data across the country from 1970 to 2000 at the census tract level. This study examines the proposed hypotheses with a random sample of 35 metropolitan areas and analyzes the data set using multilevel modeling. Using per capita income and average housing value in neighborhoods, this study develops an index of neighborhood economic condition and uses the change of this index as the dependent variable in the empirical analyses. The explanatory variables included in the model are based on the theories on neighborhood change and the comprehensive model of neighborhood change proposed in this study.

This study finds clear evidence to support the proposed hypotheses. First, neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales. Secondly, the politics of scale matters in

neighborhood change in that neighborhoods are more likely improve economically in smaller and more homogeneous cities. Finally, factors affecting neighborhood change have altered over time.

Based on the findings, this study suggests that it is essential to take metropolitan, municipal, and neighborhood contexts into account together in setting public policies for community development. With regard to the politics of scale, larger and more heterogeneous cities should learn from smaller and more homogeneous cities by, for example, working to increase community interaction, which is positively related to city growth. Finally, because the factors associated with neighborhood change were different in different time periods, local governments should plan in preparation for housing market change.

By taking the municipal and metropolitan contexts as well as the neighborhood context into account, this study helps improve our understanding of diverging paths and determinants of neighborhood change. If we know why neighborhoods undergoing changes move in different directions and how the influences of neighborhood change have altered over time, we can do a better job of designing policies to ameliorate different conditions. In a more theoretical vein, this study contributes to the literature by providing a comprehensive model of neighborhood change over space and time.

Dedication

To my parents and Byungwon

Acknowledgments

I am deeply indebted to my advisor, Professor Hazel Morrow-Jones, who has guided me in each step to complete this dissertation. She helped me to refine my topic, read my theory and empirical analysis carefully, gave me invaluable advice, and was willing to edit my dissertation. I also would like to thank her for providing constant emotional encouragement. She is the role model for me.

I thank Professor Donald Haurin, who generously served as a committee member in my candidacy exam and dissertation committees. His insightful comments and suggestions from an economist's perspective made this dissertation much stronger.

My appreciation also goes to Professor Maria Manta Conroy, who provided me with a research collaboration opportunity. The research opportunity allowed me to be more familiar with sustainable development and small town planning. I would like to extend thanks to Professors Jennifer Evans-Cowley, who was willing to serve on my dissertation committee.

Many thanks also go to my colleagues in the Department of City and Regional Planning, who shared rounds of academic, policy related, and professional discussions with me. I especially thank Moon Jeong Kim and Yanmei Li, who gave me invaluable advice on a variety of topics during my years in the doctoral program.

The research for this dissertation was financially supported by a grant from the Center for Urban and Regional Analysis at the Ohio State University. The research funding allowed me to focus on writing this dissertation for six quarters.

I thank Jamie Greene, the principal of ACP-Visioning and Planning, for generously offering me an internship position from 2005 to 2007. The internship not only provided financial support to me but also gave me a good understanding of practical planning.

I owe many thanks to Mr. Dae Kee Yun and his family, who generously donated for the Dual Degree Program between Chung-Ang University and Cleveland State University. I could not have begun to study abroad without participating in the program. I thank Dr. Richard Bingham, who was my advisor when I was an exchange student at Cleveland State University. His warm-hearted support helped me proceed to the doctoral program. Professor Seong-Kyu Ha was a great advisor when I was an undergraduate and a graduate student at Chung-Ang University. My advisors in my undergraduate and master's programs had made me become interested in housing in planning and without their guidance, the inception of this dissertation would not have been possible.

In a more personal note, I cannot be thankful enough to my parents for all their endurance and love they have offer me over all these years and to all of my friends. I also thank my parents-in-law for their continuous prayers and love.

Special thank is reserved for my husband, Byungwon Woo, who was incredibly supportive in keeping me on doctoral track. His criticisms helped me build a firmer

foundation of this dissertation. At the same time, his constant encouragement and love allowed me to finish this long journey.

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Fields of Study

Major Field: City and Regional Planning

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Chapter 1: Introduction

1. 1. The Nature of the Problem

The filtering model, introduced first by Hoyt (1933), predicts that neighborhoods will decline as housing stocks age. The model dominated the literature on neighborhood change for over a half century and many neighborhoods did indeed decline as their housing stocks aged. However, some older neighborhoods stay economically healthy, while other newer neighborhoods decline. Moreover, we find that once declining neighborhoods turn into economically healthy neighborhoods and economically healthy neighborhoods decline regardless of the age of their housing stocks. Why does this happen?

Neighborhoods are the basic component of the larger socioeconomic systems of municipalities, metropolitan areas, regions and the nation. Thus, neighborhood change not only results from aging of housing stocks and socio-economic characteristics at the neighborhood level but is associated with various factors associated with the larger context, beyond neighborhood boundaries. For instance, in the U.S., racial discrimination and prejudice and the massive suburbanization after WWII affected the decline of inner city neighborhoods. Some neighborhoods remained stable thanks to their strong social structure. However, others declined due to capital flight as financial agencies refused to lend money. Deindustrialization also depressed the economy of midwestern and

northeastern cities. When unemployment rates rose, residents' income and housing prices fell in those cities. The determinants of neighborhood change have also altered over time with changes in housing markets, social values and demographic change. Racial discrimination became illegal and aging baby-boomers and increasing number of childless people and singles are changing U.S. demographic characteristics.

The history of neighborhood change in the U.S. shows that a neighborhood is not an isolated entity but an interactive part of dynamic socio-economic urban systems. These interrelationships imply that we have to take a comprehensive approach across space and time for neighborhood change studies.

1. 2. Objectives of Research

The primary objective of this research is to provide comprehensive explanations about the differences in neighborhood trajectories across space and time. By taking the municipal and metropolitan contexts as well as the neighborhood context into account, this study helps improve our understanding of diverging paths and determinants of neighborhood change. If we know why neighborhoods undergoing changes move in different directions and how the influences of neighborhood change have altered over time, we can do a better job of designing policies to ameliorate different conditions. In a more theoretical vein, this study will contribute to the literature by providing a comprehensive model of neighborhood change over space and time, including issues of scale and homogeneity and political attributes as well.

1. 3. Research Questions

The principal research question in this study is "Why do some neighborhoods in U.S. urban areas stay economically healthy and others do not?" To answer this question, it is necessary to examine other issues:

1) Do larger contexts such as the municipal and metropolitan contexts significantly affect neighborhood change?"

   Whereas most previous studies have focused on the neighborhood context, some scholars (e.g., Baxter and Lauria 2000; Temkin and Rohe 1996) pay attention to macro-economic trends and their effects on neighborhood change. However, there are only a few studies that consider the larger context and the neighborhood context together, and few empirical studies reflect this comprehensiveness.

2) If the municipal context matters in neighborhood change, do city size and the homogeneity level of household interests in a municipality affect neighborhood change?

   While scholars have recently paid increasing attention to the effect of the metropolitan context on neighborhood change, the municipal context has garnered little attention in neighborhood studies. Neighborhoods in smaller and more homogeneous cities may be more likely to be economically healthy because actions for neighborhood stability are more effective in those cities.

3) Have factors influencing neighborhood change altered over time?

The processes associated with neighborhood change may have altered over time, with traditional factors giving way to new issues. For example, reduced racial discrimination, aging baby-boomers and increasing numbers of childless people and singles may be associated with diverging paths of neighborhood change.

1. 4. Research Scope

In Chapter 2, I review previous studies of neighborhood change. The literature review starts by discussing the concept of neighborhood change and introducing the classic models and three major perspectives on neighborhood change. Then I provide a survey of how suburbanization, public policies and macro-economic conditions are associated with neighborhood change and neighborhood issues in the inner cities after WWII in the U.S. Finally, I discuss limitations of the previous studies.

In Chapter 3, I introduce a model of neighborhood change that takes into account the metropolitan, municipal and neighborhood contexts and propose three hypotheses to explain why neighborhoods follow different paths. The model of neighborhood change complements the limitations of the existing literature and serves as the basis for the hypotheses.

In Chapter 4, I describe the data and methods to examine the proposed hypotheses. To test the hypotheses, I analyze the Neighborhood Change Data Base (created by GeoLytics) in 35 Metropolitan Statistical Areas randomly selected from the largest 100 MSAs in the U.S. I develop an index of neighborhood economic condition and use the

change of this index as the dependent variable in the empirical analysis. I analyze the data set with multilevel modeling, as neighborhoods are components in the larger socio-economic systems of municipalities and metropolitan areas and multilevel modeling allows simultaneous estimation of data at different spatial scales.

In Chapter 5, I present the results of the empirical analyses. I discuss the descriptive analysis and statistical models. I conclude the chapter with an interpretation of the results.

In Chapter 6, I conclude the research by suggesting policy implications and future research directions.

Chapter 2: Literature Review

In this section, I review previous studies of neighborhood change. First, I begin by introducing and defining the concepts of neighborhood and neighborhood change. Second, I review the classic models of neighborhood change and three major perspectives on neighborhood change: ecological, sub-cultural and political economy perspectives. Third, I provide a survey of how suburbanization, public policies and macro-economic conditions are associated with neighborhood change and neighborhood issues in the inner cities after WWII in the U.S. Finally, I discuss limitations of the previous studies.

2. 1. Conceptualization of Neighborhood Change

Because housing units in a neighborhood are usually built at around the same time, they have similar lot sizes and locational characteristics (Grigsby *et al.* 1987). This suggests that there are fewer variations in age and physical characteristics of the housing stock within individual neighborhoods than throughout a metropolitan area (Rosenthal 2008). Therefore, price-rent ranges are generally similar, although there are probably different types of dwelling units in a neighborhood (Grigsby *et al.* 1987). Due to these conditions, households in a neighborhood are characterized by similar income, similar life stage, and/or similar life style, which leads to the majority of residents in a neighborhood having similar tastes. Thus, neighborhoods are homogeneous areas sharing

demographic or housing characteristics and having a sense of identity and political or social organization, as defined by Grigsby *et al.* (1987).

Galster (2001) defines neighborhood as "a bundle of spatially based attributes with residential clusters of residences" (p. 2112). He suggests that households take into account the surrounding conditions such as parks, traffic, social characteristics of neighbors, schools, etc. as well as the housing structure itself when they choose a house. Therefore, buying or renting a house is a collective consumption decision, consuming neighborhood related factors as well as the housing structure.

In this study, I collapse some of these notions and define a neighborhood as "a homogeneous area of limited size, sharing demographic, socio-economic, or housing characteristics and having a sense of identity."

Households are one group of the major actors in neighborhoods. Directions of neighborhood change are intimately related with who lives there, who moves in and who moves out. Local businesses, property owners, and local governments are other major actors in neighborhoods. When private investors such as property owners, developers, banks and businesses see potential profits in an area, they will invest money in that area. Property owners will also spend money to maintain and keep up their properties and developers will build housing in the area as well. Banks will lend money to the borrowers who want to buy a house in that area and businesses will move there. Local governments also play an important role in providing public services to households. The major actors' interests in a neighborhood may differ from each other. For instance, some homeowners may be against bringing in big box stores to their neighborhoods due to concerns about

increased traffic and possible decline of housing value. Renters may not be very concerned with that since they can readily move out of a neighborhood. Local governments may prefer bringing the stores in for increased tax revenue. At the same time, local governments need to be attentive to the opinions of the majority of voters for the next election. Depending on business types, some may approve of or disapprove of big box stores.

How well a neighborhood is doing can be measured by looking at changes to opportunities of the major actors. Individuals are the component of households as well as of neighborhood. Some individuals may pursue both psychological and material well-being within a neighborhood (Zielenbach 2000). Neighborhood is also a place where local businesses and property owners want to have profits. Property owners care for physical and socio-economic conditions in part because they are associated with property value. Property value is also a concern of local governments as it is related to the amount of tax revenues collected as well as the level of spending on public goods. Therefore, the opportunity in a neighborhood can be divided into individual and place opportunities and the change of these opportunities is defined as neighborhood change.

2. 2. Theories of Neighborhood Change

The invasion/succession model which was formulated by urban ecologists from the Chicago School in the 1920s is considered the earliest model of neighborhood change. Filtering theories and the life-cycle model succeeded the invasion/succession

model in the ecological perspectives. Sub-cultural and political economy perspectives are two other perspectives in neighborhood change.

2. 2. 1. Classic Models

The Chicago sociologists viewed neighborhood change as a mechanism that a natural area changes and argued that when population grows and new housing units are developed, there are economic competitions among different groups for desirable location (Park and Burgess 1925). The invasion/succession model formulated by Burgess (1925) predicts that urban areas and neighborhoods undergo changes when a more dominant land use or different ethnic or income groups invade a new area. The invasion is followed by succession or replacement of the previous use (Park and Burgess 1925). Burgess (1925) portrays a city consisting of six concentric rings: Central Business District (CBD), the industrial sector, zone in transition being invaded by business and light manufacture, zone of working men's homes, residential zone of high class apartment buildings, and commuters' zone of single-family dwellings. Neighborhood decline occurs when low income people move outward to a zone of higher income dwellings. This may be accompanied by the city's outward expansion and migration of the population. According to this model, neighborhood change is an unavoidable outcome of space competition.

The life-cycle model developed by Hoover and Venon (1959) succeeded the invasion/succession model. Hoover and Vernon (1959) pay attention to individual neighborhoods and posit that neighborhoods have a life-cycle made up of a series of

invasion/succession processes and that they go through roughly five stages: development, transition, downgrading, thinning out, and renewal. Hoover and Vernon (1959) also suggest that neighborhoods can follow different paths depending on the growth rate of both new housing and population, changes of accessibility to employment centers, residents' efforts within neighborhoods, institutional activities and so on. Metzger (2000) later, criticizes that the U.S. Department of Housing and Urban Development (HUD) and local governments that used the life-cycle theory as a basis of "Triage" planning for depressing land values and accelerating neighborhood abandonments to make redevelopment in old neighborhoods easier.

2. 2. 2. Ecological Perspectives

According to ecologists, neighborhood change is a natural and deterministic process, accompanied by economic choice (Temkin and Rohe 1996; Pitkin 2001; Schwirian 1983). Both sociologists and economists have worked in this perspective, having similar underlying assumption (Temkin and Rohe 1996). There are two major types of theories based on ecological perspectives: filtering theories, focusing on households' preferences for physical quality of the dwelling unit, and externality theories, focusing on households' preferences for neighborhood racial composition and socio-economic characteristics.

Filtering Theories

The filtering model, as one of the earliest reformulations of the invasion/succession model, was first explicitly stated by Hoyt (1933) and expanded by other scholars (e.g., Smith 1963). Hoyt (1933) applies economic theory to the invasion/succession model and emphasizes neighborhood age as the driving force of neighborhood change. He portrays a city in sectors rather than a concentric ring structure as in Burgess's model. Additionally, in contrast to the invasion/succession model's idea that the city expands due to the outward push from inner areas, Hoyt argues that cities expand due to the pull from new housing units in outer areas. According to the filtering model, neighborhoods naturally decline as their housing units get older. This is because landlords will decrease investments for maintenance due to increasing maintenance costs over time (Sweeney 1974; Hoyt 1933). Lowered investment leads to further decline of housing quality. Households who can afford to move into newer housing units leave their neighborhoods as the quality of housing units decreases. Then the remaining housing units are occupied by less affluent households. Smith (1963) empirically analyzes Hoyt's model and considers other factors such as mortgage credit assistance and immigration of minority groups as well as aging of housing stocks in neighborhood change.

In recent years, Rosenthal (2008) makes a slightly different argument that neighborhood change runs through cycles of decline and renewal. While newer housing attracts higher income households, middle-aged housing is associated with future decline in economic status. Older housing, however, is a source of gentrification and

redevelopment and so is associated with an increase in economic status. That is, the relationship between neighborhood age and neighborhood change is not linear.

Ratcliffe (1949) added a social value of filtering and argued that filtering provides an opportunity for upward movement for the all households not just the top tier. Thus, the filtering process results in improving the welfare of all residents within a metropolitan area. This benign view was highly influential and the theoretical foundation of much of postwar housing policy (Leven *et al.* 1976) and was demonstrated in the neighborhood life cycle literature (Birch 1971; Hoover and Vernon 1959). However, Lowry (1960) criticizes the benign view by noting that filtering produces at best only temporary improvement for the poor. He argues that as maintenance expenditure is related to income, low income households cannot maintain structural quality.

Externality Theories

Another group of theories in the ecological perspective deals with the social externalities. Social externalities are also distinguished into *social status* and *social capital and cost* (Rosenthal 2008). Social externalities influence residential location decisions, which in turn affect neighborhood change. According to the bid rent model, households make a tradeoff between housing demand and transportation costs in their residential location decisions (Muth 1969; Alonso 1964). The bid rent model predicts that population density is the highest in the center of the city and gets lower with distance from the center. Muth's (1969) model, extending the bid rent model, explains the spatial distribution of households by income. As a household's income increases, the

household's desire for bigger housing increases as well as its transportation costs. Some households that have greater income elasticity for housing demand than income elasticity of transportation live at the edge of the city. By contrast, other households that have greater income elasticity of transportation than income elasticity for housing demand live at the center of the city. His model predicts that higher-income classes will move to outlying areas with a reduction in marginal transport cost and increase in household income and lower-income classes will stay in the center of the city. Although there are many exceptional cases, Muth's (1969) model explains the overall current U.S. urban structure. In the U.S., land prices are cheaper at the edge of the cities and marginal transportation costs have been reduced by constructions of highways and relatively low gasoline costs compared to other countries.

The border model adds neighborhood racial and socio-economic characteristics, which play a role as *social status*, to the bid rent model. According to Bailey's (1959) border model, different racial or class preferences result in neighborhood change. A basic assumption of this model is that blacks want to live close to whites, but whites prefer to live in neighborhoods surrounded by whites. In this regard, the border model predicts that blacks will pay more to live close to white neighborhoods, while whites will pay less near black neighborhoods. Because housing goes to higher bidders, the housing near the border between blacks and whites is occupied by blacks. Then, the boundaries between blacks and whites shift toward white neighborhoods. However, there are a smaller number of middle-income blacks to sustain market values. Therefore, housing prices continue to decline, which induces lower-income blacks to move into the housing units

that were previously occupied by whites (Leven *et al.* 1976). In short, different preferences for racial composition among racial groups result in neighborhood decline. The process often follows the prediction of Schelling's (1971) tipping model that small changes in racial composition lead to rapid tipping of a neighborhood from whites to blacks. However, the border model is often criticized because it was developed to explain inner city neighborhood decline and failed to distinguish the effects of race per se from the effects of racial proxy variables such as crime or poverty and the effect of the lower-income blacks (Leven *et al.* 1976).

Another type of externality is related to *social capital* and *costs*. Certain types of people generate social capital and costs in their neighborhoods, which affects demand for these neighborhoods (Rosenthal 2008). People with education are less likely to commit crimes and more likely to be employed than people without education. Homeowners are often considered better citizens than renters because they are more likely to care about their neighborhoods and participate in community activities (Rohe *et al.* 2000). Thus, the locations of those people who generate social capital or costs in neighborhoods are reflected in neighborhood economic status.

Arbitrage Model and Empirical Studies

Scholars have developed models synthesizing filtering and externality theories and empirically examined the validity of both theories. Leven *et al.* (1976) recognize that housing consumption is collective, consuming neighborhood characteristics as well as housing stock. Thus, they develop the arbitrage model that predicts that housing values

are determined by households' preference for physical characteristics of dwelling units as well as for characteristics of neighborhood population.

Some of the quantitative studies attempt empirical analyses using a hedonic price model to examine both filtering and externality theories. Coulson and Bond (1990) find that housing prices are determined by filtering by size not age and externalities by neighborhood income not racial composition. The development of the Neighborhood Change Data Base (NCDB) has allowed researchers to examine the determinants of neighborhood change over time. Rosenthal (2008) and Ellen and O'Regan (2008) examine the validity of the two theories on housing price and household income change from 1970 to 2000. The common findings are that both theories are valid to explain neighborhood economic change.

Another group of studies focuses on externality theories and examines whether race per se or socio-economic status (SES) matters in neighborhood change. Harris (1999) finds that property values are lower in neighborhoods that are homogeneously blacks and annual housing expenditure is negatively related to percentage black in the model not controlling for SES. However, once neighborhood SES variables are included in the model, the significance of the racial variables is removed and SES variables are statistically significant in housing expenditure. In this regard, he argues that SES is more relevant to housing prices than racial composition is. One more interesting finding is that race per se matters in the submarkets on tenure. While rental property values are not associated with percentage black, owner-occupied property values are negatively associated with percentage black, even after controlling SES variables. That is, race per

se matters only for homeowners. Because owning a home is the largest investment for homeowners, they are more concerned with neighborhood problems affecting housing prices than renters. Farely *et al.* (1994) also find that despite liberal attitudes of homeowners toward blacks in their study, white homeowners are concerned with decline in housing price when blacks move into their neighborhoods

Price-Spratlen and Guest (2002) also focus on the effect of racial composition on neighborhood change and examine differences in old and new neighborhoods. They find that when percentage black increased, population in old neighborhoods significantly declined while population in new neighborhoods did not decline as much. Thus, they conclude that population decline is correlated with loss of housing units in old neighborhoods not with percentage of black. In addition, they argue that post-WWII population decline in black neighborhoods resulted from the spatial intersection between race and socio-economic distress. Because a disproportionate portion of blacks lived in the central cities where manufacturing jobs used to be located, blacks were affected more by the economic restructuring processes in the 1980s than whites were.

Some studies find that the effect of racial composition differs depending on the majority race in neighborhoods. Galster and Mincy (1993) find that large shares of blacks and Hispanics in white neighborhoods are negatively related to neighborhood economic gain (poverty rates increase), while they are positively related to neighborhood economic gain (poverty change decline) in black neighborhoods. They posit that the positive relationship between percentage black in black neighborhoods and neighborhood economic gain results from forming strong community institutions in racially

homogenous neighborhoods. Galster *et al.* (2003) find that percentage minorities are positively associated with neighborhood economic gain (poverty rate decline) in all poor neighborhoods and not associated with neighborhood change in white neighborhoods.

Fogarty (1977) finds that percentage black is associated with economic gain in initially low income neighborhoods in Pittsburgh during the 1960s, while it is associated with economic decline in initially middle-income neighborhoods. In the segregation literature, Emerson *et al.* (2001) find that when neighborhood SES is controlled, percentage Asian or Hispanic in a neighborhood has no independent effect on white's likelihood of buying a house. However, percentage black significantly reduces white's likelihood of buying a house, even after controlling for SES and percentage family without children.

The empirical analyses discusses above to examine the validity of filtering theories and externality theories imply that neighborhood change does not result from a simple process but should be approached in a more comprehensive manner.

2. 2. 3. Sub-cultural Perspectives

Sub-culturalists reject the notion of human ecologists that neighborhood change is a natural and an inevitable process accompanied by rational and economic choices. Firey (1945) criticizes evaluating neighborhoods only with economic factors and argues that symbolic quality and spatially referred sentiments are important elements in shaping a strong community structure. Whereas household movement is the key element in the adaptation of the population in the ecological perspective, neighborhood preservation is

the focus of the sub-culturalists. Ahlbrandt and Cunningham (1979) put an emphasis on the social network within a neighborhood and argue that neighborhoods can remain stable if they have a strong social structure. Sub-culturalists also recognize sub-cultures varying from neighborhood to neighborhood and consider racial and ethnic homogeneity as a key factor in facing neighborhood decline (Gans 1962; Suttles 1972).

In summary, sub-culturalists criticize models in the ecological perspectives because they do not explain why some neighborhoods remain economically healthy while others decline. Instead, they argue that neighborhood decline is not an inevitable process and social relationships, such as social networks, community interactions, and neighborhood organizations in a particular area, can contribute to neighborhood stability. However some critics contend that while sub-culturalists focus on enhancing a sense of place and local attachments, they overlook neighborhood appearances and the dynamics of diversity and conflict within neighborhoods in the local political economy (Temkin and Rohe 1996; Ahlbrandt and Cunningham 1979)

2. 2. 4. Political Economy Perspectives

Growing attention has been paid to neighborhood change in the political economy context in recent decades. The urban growth machine is the most influential theory of neighborhood change in the political economy perspectives. Molotch (1976) describes a city as a "growth machine" through which elite groups of landed interests (e.g., developers, real estate agents, construction interests, property financiers, etc.) compete or make coalitions to enhance their profits by supporting city growth. Logan and Molotch

(1987) further develop the growth machine theory and identify "exchange value"—what other commodities something can be exchanged for—from "use value"—the usefulness of the item to its owner. Growth machines seek constant growth, including population growth and land speculation, so that they maximize the exchange value of urban space and accumulate capital. By contrast, neighborhood residents want to retain their use values, protect their quality of life (e.g., avoiding traffic congestions and pollutions and maintaining social networks and a sense of place) and minimize costs. The conflicts between the pro-growth coalition centering on Mayor Tom Bradley and neighborhood residents' slow growth resistance in Los Angeles between 1975 and 1985 described by Davis (2006) reflect the conflict between pursuing exchange value and use value.

Political economists suggest that neighborhood change is contingent on external and institutional political powers rather than the residents in a neighborhood. The competition and coalitions of the elite groups in exploiting exchange values result in uneven investment across cities and neighborhoods. In the process, certain under-invested neighborhoods decline. Institutional actors such as real estate and insurance agents, bankers and public officials have played a critical role in neighborhood change (Palm 1985; Squires and Velez 1987; Aalbers 2006). In the 1960s and 1970s, when lenders redlined certain areas and refused to provide mortgage loans to individuals in the redlined areas, neighborhood decline was an inevitable outcome. Steering and blockbusting by real estate agents continued to cause neighborhood decline as well even though they were prohibited by the civil rights acts after the 1960s.

To sum up, political economists refuse both the notion that neighborhood change is an inevitable process as human ecologists argue and the notion that neighborhoods can be preserved by a strong social structure as sub-culturalists argue. Instead, political economists contend that neighborhood change results from externalities driven by institutional actors (Pitkin 2001). However, neighborhood change cannot be explained solely by external and institutional political power. Although institutional forces unevenly invest across neighborhoods, the decisions are influenced by physical characteristics of dwelling units and socio-economic and racial characteristics of neighborhood population. Depending on levels of social relationships and sub-cultures, political elites and capital owners make different decisions (Temkin and Rohe 1996).

We need to pay more attention to how citizens are involved in local affairs as they are the major component of localities. Citizens may be more cooperative in smaller and homogeneous cities (Olson 1965; Oliver 2001; Alesina and La Ferrara 2000). Thus, local problems can be solved more effectively in those cities. The growth machine literature focuses on large cities that are presumed to have plurality of interests but the theory may not be very applicable in small and homogenous cities (Oliver 2001). In addition, government reforms have limited the growth machine. In Chapter 3, I raise the politics of scale as one of the determinants of neighborhood change. More specifically, I hypothesize that neighborhoods in smaller and homogeneous cities stay economically healthier than those in larger and heterogeneous cities.

2. 2. 5. Synthetic Approach

Some scholars (Grigsby *et al*. 1987; Galster 1987; Temkin and Rohe 1996; Zielenbach 2000) have attempted to develop a comprehensive model of neighborhood change by synthesizing the three perspectives—ecological, sub-cultural, and political economy—on neighborhood change.

Galster (1987) argues that reinvestment is the key to the question of why some aging neighborhoods do not decline. Dwelling characteristics, owner characteristics, physical and demographic characteristics in neighborhoods, social interaction, and public policies are jointly associated with housing reinvestment decisions, which positively affect neighborhood conditions.

While Galster (1987) focuses on reinvestment decisions at the individual level, Grigsby *et al.*'s (1987) study is approached at the place level. They argue that a metropolitan area consists of different submarkets that provide different combinations of housing services. Each submarket is differently affected by large scale changes (e.g., changes in the number of households, per capita income, transportation cost, and public policies) for those different combinations of housing services. Households make different decisions in a system of housing suppliers and market intermediaries (e.g., developers, brokers, lenders and insurers), which alters housing and neighborhood characteristics.

Tempkin and Rohe (1996) provide another comprehensive model of neighborhood change, taking into account the larger contexts of regional economy and metropolitan characteristics and the three aforementioned perspectives on neighborhood change. They distinguish their model from Grigsby *et al.*'s (1987) by opposing the notion

that neighborhood change results from large scale changes in housing submarkets and neighborhood residents can do little to stop unwanted changes and emphasizing that residents' efforts can prevent neighborhood decline (Temkin and Rohe 1996).

While Tempkin and Rohe (1996) provide a theoretical framework for comprehensive neighborhood change studies, Zielenbach's (2000) study empirically examines a comprehensive framework on neighborhood revitalization quantitatively and qualitatively. He examines why some of the poor neighborhoods in Chicago in the 1970s have been revitalized in recent decades. He cites neighborhood location, physical amenities, local institutions, community organizations, social capital, and local leadership as the main factors for revitalization. Although he does not empirically examine which factors are more important for revitalization due to the insufficient sample size, he puts an emphasis on the role of institutional actors such as banks, community development corporations (CDCs), churches, social service agencies, foundations, and city governments through a comparative study of two neighborhoods in Chicago.

2. 3. Post-WWII Neighborhood Change in the U.S.

The models and theories mentioned in the previous sections emphasize that neighborhoods are not isolated areas but rather components of complex urban systems. Neighborhood change in the U.S. after World War II (WWII) is not a simple process. A variety factors have affected neighborhood change. Previous studies on neighborhood change mostly focused on neighborhood decline in the inner cities. Thus, in this section I review major historical events and factors that are associated with neighborhood decline

in the inner cities after WWII in the U.S. context and how the literature treats these factors in explaining neighborhood change.

2. 3. 1. Suburbanization

Suburbanization has been blamed as the main cause of neighborhood decline in the inner cities in the 1960s and 1970s (Zielenbach 2000). Early economic explanations of suburbanization start with a monocentric model, based on a tradeoff between transportation cost and land price (Muth 1969; Mills 1972; Alonso 1964). As Muth's (1972) model predicts, a large number of people moved to the suburbs with increasing income and declining marginal transportation costs. Extending the logic of Muth's (1969) model, it may be predicted that the inner suburbs will follow the central cities in losing higher-income households when higher-income households move further out to outlying areas. However, in reality there are many cases in which the inner suburbs do not follow this prediction. Some inner suburbs decline as the model predicts, but others remain economically healthy with good school districts. Growing traffic congestions on highways during rush hours also limit people to move further out and so become a factor objecting the prediction.

Bier and Howe (1998) empirically show that the number of households living in the central cities is determined by the number of new housing units supplied in the suburbs. Additionally, Howe *et al.* (1998) argue that the extensive new housing supply in outlying areas and enhancement of regional transportation connections have affected the loss of population in the central cities. In the U.S., it is easier to build new developments

at the edge of the cities than to redevelop old housing in the urban cores and in older neighborhoods. This is because green fields have no former buildings to remove or pollution to clean up, and it is difficult to assemble parcels already occupied by households or businesses. In addition, there are more subsidies and incentives for new developments (Persky and Kurban 2003). Because of these advantages, sprawl (defined as low density development at the edge of the cities without connection with existing developments (Downs 1999) has been prevalent and a critical factor causing neighborhood decline in the inner cities and threatening whole urban systems.

About two decades later since Muth (1969) developed this model, Mieszkowski and Mills (1993) refined the suburbanization models and summarized the patterns of suburbanization in two general terms: "Natural evolution" and "Flight from blight." The natural evolution theory suggests that suburbanization results from an increase in income, filtering, life-cycle effects, and technological advances. In this mechanism, suburbanization is considered to be an efficient response. On the other hand, the flight from blight theory describes the idea that households move to the suburbs in response to fiscal and social problems associated with the central cities (Mieszkowski and Mills 1993; Adams *et al.* 1996). It is known that the development process in the U.S. concentrates the poor in the inner cities (Bier and Howe 1998). As the concentration of poverty is correlated with other social problems such as high crime rates, public schools at poor quality, and fewer fiscal resources (Downs 1999), more and more middle- to upper-income households move to the suburbs. The concentration of the poor also creates a vicious cycle. Poor neighborhoods often receive more subsidized housing and hence

attract even more poor households. In addition, people who are raised in poor neighborhoods may have fewer role models and economic and educational resources (Wilson 1987). Thus, poor people have more difficulty escaping their poor status.

In the mean time, the poverty related problems, which used to be problems only in the central cities, are now expanding out to the inner suburbs and it is predicted that some of the outer suburbs will also be affected by those problems (Lee 2005). In some cases, lower cost development in outer areas fails to acquire adequate taxable resources to pay for schools and other public services (Downs 1999), thereby making these neighborhoods prone to earlier deterioration.

Although useful, the economic models of tradeoffs between space and accessibility are too simplistic (Kim 2010). For one thing, they cannot explain higher income people living in the downtown areas for urban amenities. Some also argue that the poor are concentrated in the central area due to the exclusionary policies in the suburbs rather than due to the tradeoffs between space and accessibility (Downs 1981). Glaeser *et al*. (2008) contend that proximity to public transportation within the central cities attracts the poor, thereby concentrating poverty in the central cities. Furthermore, the economic models ignore the impacts of federal policies in the suburbanization process. The federal government subsidized the post-WWII housing development on a large scale in outlying areas.

2. 3. 2. Federal and Local Policies

Suburbanization and neighborhood decline in the inner cities were also promoted by various public policies. The Housing Act of 1934 was the starting point, followed by subsequent federal policies that supported middle- to upper-income households' movements to the suburbs and trapped low-income and black households in the inner cities. Ultimately, the policies failed to balance between redevelopments of older neighborhoods in the inner cities and newer developments at the urban fringe (Fishman 2000). Many public policy factors in urban areas effectively supported new developments at the urban fringe and disinvestment in the existing older neighborhoods.

FHA Mortgage Insurance Program

In the 1930s, during the Great Depression, the federal government began to work on economic revival using the housing industry (Martinez 2000; Hoffman 2000). The National Housing Act of 1934 established the Federal Housing Administration (FHA). The purpose of the FHA was to provide insurance for residential mortgages and create a secondary market for mortgages through national mortgage associations, so that the federal government could boost the depressed economy (Martinez 2000; Hoffman 2000). However, due to the lack of resources during the war period the federal housing policies had not had much effect until the end of WWII. Since few housing units were constructed during WWII, there was a tremendous housing shortage when veterans returned from the war (Leven *et al.* 1976).

To solve the housing shortage, the Congress passed the Housing Act of 1949 to address the post WWII housing conditions. The FHA mortgage insurance program implemented from the 1940s to the 1970s by the Housing Act of 1949 was one of the critical factors that resulted in serious neighborhood changes in the 1960s and 1970s (Morrow-Jones 1982; Fishman 2000). The FHA mortgage insurance program worked to decrease the risk to lenders, so that more households could get low down payment, fixed interest rates and fully amortized mortgages for long terms. Specifically, the FHA mortgage insurance protects mortgage lenders against loss if homeowners default on their mortgage loans. Until the 1960s, the rules of the FHA program were not fairly implemented. In particular, the FHA had favored insuring mortgages in the suburbs, for whites, and middle and high-income classes over the inner cities, minorities, and lower-income classes (Morrow-Jones 1982; Fishman 2000). This was because of the level of risk they assumed. For instance, because the FHA refused to insure mortgages for old houses in the inner cities, if a household wanted to buy an old house in an inner city neighborhood, the household had to have a conventional mortgage (Morrow-Jones 1982). In addition, black households were refused from FHA mortgages for living in suburban neighborhoods due to racial prejudice as well as their income level. Thus, they were stuck in the inner cities where the residents were excluded from the economic boom and better quality schools (Fishman 2000). In short, the FHA insurance program exerted a big impact in that middle-income white households' movement to the suburbs while the poor, mostly black households were isolated in the inner cities.

After the series of riots in the 1960s and with the enactment of the 1968 Civil Rights Act, the FHA redirected the program to providing homeownership opportunities for low-income households and began to insure mortgage loans for houses that were previously seen as high risk (Carliner 1998). Ironically, however, the attempt to remedy the inequality between the affluent and the less-affluent actually speeded up urban decline (Morrow-Jones 1982). When the FHA decreased the risk to lenders, the lenders were less careful in selecting mortgagors for the FHA insurance. This situation led high-risk mortgagors to default more often on their properties (Morrow-Jones 1982). As a consequence, the increase in the number of defaulted properties decreased the overall quality of the neighborhoods.

Urban Renewal and Public Housing

The Housing Act of 1949 was also intended to eliminate urban blight through clearing the worst slums and rebuilding the central cities. Some of the worst slums were demolished by the act. At the same time, however, many cohesive neighborhoods were destroyed, in what was often called "Negro removal" (Fishman 2000). Urban renewal destroyed many cohesive African-American and ethnic neighborhoods and displaced the poor. The displaced households were then concentrated in low cost, overcrowded areas. This circumstance caused severe social problems such as high crime rates.

An accompanying policy was building public housing. The housing stock removed by urban renewal was planned to be replaced by building public housing. However, public housing was not provided in the same numbers that the housing stock

were removed by urban renewal due to political conflicts (Leven *et al.* 1976). Because the middle- and upper-income classes refused to permit building public housing in their communities, new public housing had to be built in the city centers and at higher density to compensate for high land prices. High-rise public housing concentrated poverty and accordingly neighborhoods declined (Teaford 2000). Scholars (Fishman 2000; Leven *et al.* 1976; Teaford 2000) claim that urban renewal and public housing did not achieve their original goals but rather exacerbated the circumstances of urban neighborhoods.

Highway Policies

Along with the urban renewal campaign, the interstate highway system also contributed to neighborhood decline in the inner cities. The interstate highway system was constructed by the Federal Highway Act of 1956. Constructing the highway system was intended to relieve traffic congestions in the central cities and to facilitate high-speed and long-distance travel from city to city (Fishman 2000). Although it increased mobility, the construction of the highway system also radically transformed the metropolitan system and resulted in some bad consequences such as destroying some of the cohesive neighborhoods. When interstate highways were to penetrate city cores, black neighborhoods were the most often targeted in building the systems (Fishman 2000; Jakle and Wilson 1992; Leven *et al.* 1976). In addition, suburbanization was accelerated when commuting times were significantly decreased by the highway system.

Tax Policies

Traditionally, the federal government has encouraged homeownership over renting (Carliner 1998). Tax policies are the representative policies to provide incentives for homeowners. One of the benefits of owning a home is the deductibility of mortgage interest and local property taxes from income tax. If a household owns a house, mortgage interest and local property taxes that the homeowners owe can be deducted from the household's total income tax. Depending on the amount of income tax that households have to pay, the deduction of mortgage interest and local property taxes can be a significant benefit for homeowners. If we regard homeowners as their own landlords, they are receiving implicit rents from themselves. However, because there is no tax on implicit rental income, this also reduces the effective cost of homeownership (Carliner 1998). Furthermore, because middle- and upper-income households are more likely to own a house and to itemize deductions, these benefits go to more affluent households. Effectively then, more affluent households are more subsidized than less affluent households by these tax policies.

The 1986 Tax Reform Act brought full incentives for homeownership over renting. While preserving the deductibility of mortgage interest and property taxes, the 1986 Tax Reform Act eliminated the previously existing deductions for non-mortgage consumer interest and various state and local taxes and incentives for investment in rental housing (Carliner 1998). Until the Taxpayer Relief Act of 1997 was enacted, homeowners were encouraged to purchase larger homes because capital gains taxes were exempted if homeowners bought another home of equal or greater value. The Taxpayer

Relief Act of 1997 eliminated a disincentive for purchasing lower-priced homes. Capital gains for homeowners who buy another house are tax-exempt up to $500,000 for owners at any age (Carliner 1998). Although the 1997 act eliminated the disincentive for buying lower-priced homes, capital investment had moved to the suburbs already and older neighborhoods were already left behind with low capital reinvestment.

Exclusionary Policies

Zoning can be used as a means to filter out some types of households. When a locality practices exclusionary policies by zoning most of the areas for single-family dwellings on larger lots, construction of multi-family dwellings is limited and only relatively expensive housing can be built. In the U.S., numerous independent jurisdictions have been established because an independent jurisdiction can have its own zoning laws, building codes, and other regulations that increase housing costs and exclude low-income households (Downs 1994). Multi-family housing is often discouraged in the suburbs because it is thought that multi-family housing adds less to the tax base per resident while costing more public services per resident (Cox 2002). While planners have urged that suburban localities should adopt inclusionary zoning, the efforts to relieve exclusionary zoning policies are not often successful (Siskind 2006).

When suburban jurisdictions practice exclusionary policies, low-income households are left only with the option of living in older neighborhoods in the central cities and inner suburbs. As the concentration of poverty usually goes along with various

social problems, exclusionary policies in the suburbs have played a role for neighborhood decline in older and centrally located neighborhoods.

2. 3. 3. Macro-Economic Conditions

Whereas most previous studies have focused on the neighborhood context, some scholars (Grigsby *et al.* 1987; Baxter and Lauria 2000; Lauria and Baxter 1999; Temkin and Rohe 1996; Galster *et al.* 2003; Galster and Mincy 1993) pay attention to macro-economic trends and their effects on neighborhood change. Since the 1960s, the U.S. has deindustrialized and many manufacturing jobs have moved to foreign countries. Lower skilled blacks who once worked in manufacturing industries lost their jobs and were left behind in the inner cities when manufacturing jobs that used to be mostly located in the central cities disappeared. Wilson (1987) finds that the poverty rate in the poor neighborhoods in Chicago dramatically increased during the 1970s. He argues that poverty became concentrated because deindustrialization and suburbanization of employment left lower skilled blacks in the inner cities.

Studies also suggest that it is important to consider overall metropolitan conditions. Galster and Mincy (1993) consider the effect of the change of metropolitan employment level in addition to the effect of the change of manufacturing jobs. Galster *et al.* (2003) control changes in county poverty rate and total population. Baxter and Lauria (2000) and Lauria and Baxter (1999) find that exogenous economic changes at the macro level affect neighborhood change, as represented by racial transition, through the mechanism of residential mortgage foreclosure in New Orleans. Specifically, they show

that when unemployment rates increase due to an economic shock at the macro level, housing values decline in neighborhoods, thereby attracting poorer households. These studies suggest that economic conditions at the metropolitan level should be controlled.

Tempkin and Rohe (1996) frame a comprehensive model of neighborhood change that takes into account the impacts of changes in national conditions and policies and metropolitan economic, social and political characteristics. However, the model is not analyzed empirically.

2. 3. 4. Neighborhood Issues in Inner Cities

Post-WWII inner city decline was also associated with various neighborhood level issues: dual housing markets-racism, redlining, public schools and gentrification. This section describes how those factors affected inner city decline.

Dual Housing Markets: Racism

The role of racial composition on neighborhood change has a long history in U.S. housing markets. During the first half of the 1900s, blacks moved to the southern and northern cities from the southern rural areas when they were evicted from rural areas in order to stabilize farm prices by reducing crops outputs (Price-Spratlen and Guest 2002). During the 1960s and 1970s, urban white households felt threatened by the rapidly increasing population in their neighborhoods and the possibility that housing prices could decline due to this change. As the border model predicts, the boundaries between black

and white neighborhoods moved toward white neighborhoods, followed by decline of the neighborhoods that were previously occupied by whites.

Realtors promoted neighborhood decline through 'blockbusting.' Realtors encouraged white households to sell their housing in inner city neighborhoods at lower prices by telling them that black households would move into their neighborhoods (Jakle and Wilson 1992). Using racial fears, realtors could earn commission fees from the transactions and make money out of the houses sold at lower prices by reselling them at higher prices (Aalbers 2006). The concern with declining housing prices continued to push white households to leave the inner cities. Because the interstate highway systems increased mobility and the federal policies favored suburban living for white households, neighborhood decline in the inner cities was an unavoidable result during the 1960s and 1970s. Additionally, housing price decline caused the central cities to yield less tax revenue and accordingly aggravated neighborhood deterioration.

Racial discrimination practiced in housing markets was challenged by the civil rights movement in the late 1960s. The Fair Housing Act passed by the Congress in 1968 prohibited discrimination based on race as well as sex and other personal characteristics in housing markets. Thanks to the act, middle-income blacks began to leave the central cities to find opportunities for schools and jobs.

However, Yinger (1995) finds that racial discrimination is being informally practiced and continues in mortgage lending. Moreover, racial discrimination indirectly occurs in housing markets through exclusionary zoning regulations in the suburbs. In the U.S., because minority populations are disproportionately represented in lower-income

classes, zoning regulations in the suburbs are often used to segregate minority households from white households. In the meantime, middle-income black families moving to the suburbs still found themselves in racially segregated neighborhoods as white families moved out of the neighborhoods to avoid living with blacks (Keating 1994).

Redlining

As political economists recognize, redlining was one of the greatest contributors to neighborhood decline in the inner cities in the 1960s and 1970s (Aalbers 2006). Redlining describes the process of identifying the areas where mortgage loans will not be granted (Aalbers 2006). Financial agencies such as banks and savings and loans want to minimize risks and maximize profits. The financial agencies consider not only an individual's income sources and credit history but the location of housing. Thus, they would not lend money if a house was located in an area where housing prices might drop and borrowers might choose to default.

The risky areas defined by lenders have usually been some of the inner city neighborhoods and the areas with cheaper housing units (Cox 2002). When an area is redlined, capital is not available in the area. Then, housing prices fall, followed by further demand decrease, which becomes a self-fulfilling prophecy. When property owners in a redlined area cannot sell their properties, they may rent their houses or continue to stay in their houses because no one will buy houses in the area. With disproportionately cheap rental houses, the majority of housing stock in a neighborhood is less likely to be well maintained, thereby causing neighborhood abandonment (Cox 2002).

Loans for home improvement or business, or property insurance were not provided in older neighborhoods as well (Squires and Velez 1987). Businesses could be started or expanded and mortgage or business loans were not provided without property insurance (Squires and Velez 1987). Minority communities were the most severely affected by racially discriminatory mortgage lending although the Fair Housing Act legally prohibited discriminatory practice (Hula 1984; Bradford 1979; Black and Schweitzer 1985; Goodwin 1979; Helper 1969).

In order to prevent discriminatory mortgage lending, the Congress passed the Home Mortgage Disclosure Act (HMDA) in 1975 and the Community Reinvestment Act (CRA) in 1977. The HMDA requires financial institutions to disclose data on home mortgages by census track. The CRA requires financial institutions to be responsive to the credit needs of borrowers in their communities.

While the "flight from blight" theory is based on who moves in and who moves out, some researchers (Aalbers 2006; Smith *et al.* 2001) argue that neighborhood decline is more accurately described by "capital flight." Disinvestments and refusal to invest in certain neighborhoods result in neighborhood decline. Although legally prohibited, discriminatory mortgage lending is still found to be practiced in housing markets. Smith *et al.*'s (2001) study finds that racial and ethnic discrimination and geographical adjacency to the central cities are related to higher rates of mortgage loan rejection, the proxy of disinvestment in their study. They claim that disinvestment results from discrimination and precedes neighborhood decline. Munnell *et al.*'s (1996) study supports the discrimination argument and finds that even after controlling for applicants' credit

history, the mortgage denial rates for black and Hispanic households were 1.8 times greater than those of white households.

Public Schools

Until school busing for racial balance was adopted, white and black students used to go schools which were close to their homes, as housing markets were segregated by different racial groups. In 1971, the U.S. Supreme Court ordered busing white and black students out of their neighborhood schools in the south. School busing sparked a lot of protests but many other states adopted the school busing system (Varady and Raffel 1995). Although there are studies showing that the busing programs helped improve achievement of minority students (Mahard and Crain 1983; Crain 1972), the programs have been criticized because of switching segregation to "between" school districts from "within" school districts (Cox 2002). Black and white students were resegregated because white households moved to the suburbs where they were free from school busing with the majority of white students (Varady and Raffel 1995).

The public schools in the central city school districts are characterized by high dropout rates, lower test scores, and lower college entering rates (Downs 1997). The poor quality of public schools in the central cities is not just from low school expenditure per student. Rather, the poor quality of public schools is because the majority of students in the central city school districts are from poor households. When extremely poor students are concentrated, it is less likely that there is a role model or a positive reinforcing process among students (Downs 1997). Because of the low quality, households with

school aged-children have continued to move out of the central cities to seek better schools. On the other side, Chubb and Moe (1990) point out that the poor quality is related with the size of school districts. They argue that the central city school districts have not been operated by competitive processes that could have maximized the quality of schools because students and their parents are less likely to organize to voice their needs in a larger school district.

Gentrification

While the dual housing markets, redlining and low quality public schools in the central cities have pushed middle- to upper-income households to the suburbs, gentrification pulled them to the areas around the CBD. At the beginning of the 1970s, some adventurous people and young professionals began purchasing inexpensive housing units in old neighborhoods, which are close to downtown and have architectural and historical appeal (Zielenbach 2000). They restored housing stock and attracted retail, thereby increasing property values and attracting more higher-income people.

On the other side, however, gentrification is often criticized for displacing the poor. When middle- to upper-income households and capital flow into some neighborhoods, rents rise in the neighborhoods. However, low-income people who cannot afford rising rents need to leave the neighborhoods. Homeowners who cannot afford increased property tax due to increase in housing price also need to leave the neighborhoods (Lee and Hodge 1984).

"The Flag Wars" (Bryant and Poitras 2003), a documentary film about Olde Town East, an inner city neighborhood in Columbus, Ohio, shows the conflicts between the existing households and the new comers. In the neighborhood, most existing households were poor blacks. When a few young, professional and/or gay households started moving into the neighborhood, other similar households were attracted to the neighborhood as well. This circumstance led to housing price increases in the neighborhood. As housing prices are influenced by surrounding housing units, the new comers formed a residential association and pushed the local government to enforce zoning regulations and historical regulations. The existing poor residents were forced to renovate and maintain their housing structures to a higher standard. However, the existing poor households were already having trouble from rising rents and increased property taxes and could not afford to renovate their housing stocks. Some of them were accused of zoning violations repeatedly and ended up leaving the neighborhood.

Against the negative view of gentrification, Freeman and Braconi (2004) argue that "Gentrification brings neighborhood improvements that are valued by low income households, and they consequently make greater efforts to remain in their dwelling units, even if the proportion of their income devoted to rent rises" (p.51). Because of increased tax revenues and capital inflow to the central cities, gentrification is welcomed by many local governments. The poor in gentrified neighborhoods may not be the majority in the central cities. Thus, displacement of the poor could be neglected in gentrification.

2. 4. Limitations of Previous Studies

In this chapter, I first conceptualized neighborhood change and reviewed the theories of neighborhood change, including the classic models, the three major perspectives on neighborhood change and the synthetic approach. Then, I surveyed the factors and public policies that affected post-WWII neighborhood change in the U.S. context, including suburbanization, public policies, macro-economic conditions, and neighborhood issues in the inner cities.

Although previous studies of neighborhoods have found a variety of factors that influence neighborhood change, these previous studies collectively have several limitations. First, they focus solely on neighborhood characteristics. Some studies (Zielenbach 2000; Galster 1988; Grigsby *et al*. 1987; Temkin and Rohe 1996) suggest taking a comprehensive approach, balancing the three major perspectives on neighborhood change and considering larger contexts in explaining why neighborhoods follow different paths. However, there are only a few studies that consider the larger context and neighborhood context together, and few empirical studies reflect this comprehensiveness. This limitation implies that we need a multilevel model that takes into account the larger context as well as the neighborhood context.

Second, neighborhood change beyond the inner cities has been less studied. Most models of neighborhood change were developed to explain the decline of inner city neighborhoods, but can those same factors and processes necessarily be applied to neighborhood change beyond the inner cities? Although there is a growing literature on suburban decline, especially in inner suburbs (e.g., Lee 2005; Lucy and Phillips 2000;

Anacker 2006), few studies examine suburban neighborhood change and its role in suburban decline. The patterns of neighborhood change in suburban areas may differ from those in the inner cities because physical characteristics, locational characteristics, time period of development, and the rules and political systems are quite different. In addition, it is argued that the growth machine theory is less applicable in the suburbs (Oliver 2001) and growth machines have collapsed in recent decades (Fulton 1997). We may need to pay more attention to how citizens are involved in local affairs as they are the major component of localities. In this study, I focus on the politics of scale to explain different paths of neighborhood change beyond the inner cities. I explain how city size and the homogeneity level of household interests in a municipality are associated with citizens' involvement in local affairs and neighborhood change.

Third, there are few longitudinal analyses of neighborhood change that reflect the changes in housing markets over time. Housing markets have changed over time, and a rigorous model of neighborhood change needs to take this into account, both conceptually and empirically. Due to reduced racial discrimination and prejudice, the effect of racial composition on neighborhood change may have altered over time. Many scholars (e.g., Myers and Gearin 2001; Nelson and Lang 2007) predict that such demographic changes as declining presence of children in a family, aging of baby-boomers, later marriage, more unmarried couples, smaller household size, and increasing minority populations will result in different urban spatial patterns. I expect that these changes will affect neighborhood change.

In Chapter 3, I introduce a model of neighborhood change overcoming the limitations of the previous studies and current literature. I start by proposing hypotheses on my principal research question, why some neighborhoods in U.S. urban areas stay economically healthy, but others do not.

Chapter 3: Model of Neighborhood Change

In the previous section, I examined the theories of neighborhood change by reviewing existing studies of neighborhood change and highlighting the limitations of the literature. In this section, I introduce a model of neighborhood change and propose three hypotheses to explain why neighborhoods follow different paths. The model of neighborhood change complements the limitations of the existing literature and serves as the basis for the hypotheses.

3. 1. Why Do Neighborhood Follow Different Paths?

I first hypothesize that neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales. Neighborhood change results from a neighborhood's own characteristics interacting with characteristics of its metropolitan area and the specific municipality in which the neighborhood is located.

The existing literature has mostly focused on the neighborhood context and pays little attention to the effects of macro-economic and social indicators of a metropolitan area on neighborhood change. In comparison, the municipal context in between neighborhood level and metropolitan level has often been neglected in neighborhood change studies. I argue that this is a major missing part in the current literature. This is especially true if we consider the role of a local government. In providing local public

goods and services to its residents, a local government is intimately related to residents' daily lives as well as neighborhood changes within its boundary.

The municipal context may be even more important in considering how neighborhood change is different between the inner cities and the suburbs. Neighborhood change in the independent suburbs may differ from that in the central cities because the central cities and suburbs have different characteristics that have different effects on their respective neighborhoods. In this study, I focus on the politics of scale–city size and the homogeneity level of household interests in a municipality–as an important mechanism in the process of neighborhood change. Cox (1998) defines the politics of scale as spatial conflicts involving scale. The effectiveness and level of citizens' involvements in local affairs may be differentiated by city size and household homogeneity. In theorizing how the municipal level characteristics affect change of neighborhoods within its municipal boundary, I propose the second hypothesis that the politics of scale affects neighborhood change.

Finally, neighborhoods change differently in different time periods because factors associated with neighborhood change have altered over time. Some traditional factors of neighborhood change may give ways to new issues. For instance, racial dynamics in housing markets have certainly changed since the later half of the 20th century with reduced racial discrimination against minorities but possibly increased discrimination based on income. In this regard, I propose another hypothesis that factors of neighborhood change have altered over time.

Although the three proposed hypotheses are very important in understanding why the paths and the outcomes of neighborhood change diverge, there are few existing studies to provide theoretical underpinnings or to empirically examine these hypotheses. To fill these empirical and theoretical gaps in the literature, I introduce a comprehensive model of neighborhood change. In the next section, I illustrate how neighborhood change beyond the inner cities, housing market fragmentation, and functions of municipal jurisdictions are associated with the politics of scale. Then I explain some mechanisms of neighborhood change based on the politics of scale in detail. I also discuss the major changes in housing markets for the past 50 years. Bringing these parts together, I introduce my model of neighborhood change.

3. 2. Neighborhood Change beyond Inner Cities

Suburban areas have traditionally been considered as desirable places to live in comparison with the inner cities, and often assumed to be immune to decline happening in the inner cities. However, in recent years, we observe some suburban decline beyond the inner cities, especially in the inner suburbs. Although identified differently by various scholars, the inner suburbs are generally low-density, single-family, residential suburban areas that were built between 1945 and 1969 (Green Leigh and Lee 2004; Lucy and Phillips 2000). Because the inner suburbs are located not only close to the central cities but often inside of interstate beltways, they are sometimes called inner-ring suburbs. Attempting to explain the phenomena of suburban change, there is now a growing literature on the beginning of suburban decline in these areas (e.g., Lucy and Phillips

2000; Anacker 2006; Lee 2005). However, few studies examine suburban "neighborhood" change as a building block of suburban decline.

As a primary component of a suburb, suburban neighborhoods influence the overall change in the suburb. According to the classic models of neighborhood change, higher-income households would leave the inner suburbs and the housing stock in the inner suburbs should filter down to less affluent groups. This would then alter the physical and socio-economic characteristics in suburban neighborhoods, generally leading to a decline. Keating's (1994) case studies on racial change in the suburbs of the Cleveland Metropolitan Area reflect what the classic models of neighborhood change describe. When middle-income black households began to move to some of the inner suburbs from the city of Cleveland, white households started moving out of the suburbs. Because there is a relatively smaller number of middle-income black households compared to middle-income white households, housing prices often declined with the white flight, leading in turn, to a further increase in the black population, often at lower socioeconomic levels (Keating 1994). In the end, the suburbs that were once majority-white suburbs became majority-black and poorer suburbs. Housing prices declined and outflows of businesses brought about reduced city revenues, followed by decline in municipal services (Keating 1994).

But to what extent would neighborhood change in the suburbs be similar to or different from neighborhood change in the inner cities? Just borrowing insights from neighborhood change in the inner cities to explain neighborhood change in the suburbs can be problematic. Physical characteristics, locational characteristics, time period of

development, and the rules and political systems of suburbs and inner cities are quite different from each other. For instance, since the suburbs tend to be smaller in size than the central cities, rezoning processes can be more difficult to accomplish. This is simply because a referendum against the rezoning would require fewer signatures on a petition in a suburb than in a central city.

Of the many differences between neighborhoods in the inner cities and suburbs, I suggest that the politics of scale explains different paths of neighborhood change. Specifically, I argue that city size and the homogeneity level of household interests in a municipality are two basic elements of the politics of scale. Before explaining why the politics of scale is important and how the politics of scale affects diverging paths of neighborhood change, we need to discuss housing market fragmentation and functions of municipal jurisdictions, which describe current U.S. urban structure and variations in civic capacity, city size and types of households at the municipal level.

3. 3. Housing Market Fragmentation

The basic principle of all democratic forms of government is that citizens have the right to institute new governments as well as to abolish existing forms of government (Ostrom *et al.* 1988). Because local governments in the U.S. have some control over public goods and services provision and taxation within their localities, relatively like-minded middle- to upper-income households have mobilized to establish legally independent suburbs so that they can block "undesirable" uses or people in their communities and avoid the tax burdens of living with low income families in the same municipality (Hogen-Esch 2001).

Given that in the U.S. citizens have the right to establish new governments and local governments have the power to control public goods, services and taxation, it is very common that a metropolitan area consists of many independent municipal jurisdictions. Tiebout (1956) hypothesizes that "households vote with their feet." That is, households choose a municipal jurisdiction by matching their desires for public services and willingness to pay for public goods. Thus, his model suggests that housing market fragmentation makes organizing local governments more effective because local governments try to deliver public services more efficiently and are more responsive to residents' needs. On the other side, local government formation and fragmentation within a metropolitan area is criticized as it arises from the pursuit of parochial interests (Weiher 1991). Independent suburbs have systematically excluded certain racial and income groups by practicing exclusionary policies (Danielson 1976) and trying to include only desirable residents such as higher-income households and desirable land uses (e.g., office parks) that increase tax revenues and require less public services.

To sum up, housing market fragmentation is the major mechanism of socio-economic segregation/division within a metropolitan area. Furthermore, housing market fragmentation promotes competition among local jurisdictions to retain "desirable" groups and uses. The competition occurs between the central cities and the suburbs, between the inner suburbs and outer suburbs, and among suburbs of the same type. Scholars (e.g., Branfman *et al.* 1973; Vicino 2008) find that competition is more frequent when there are a large number of jurisdictions in a metropolitan area than when there is a

small number. Thus, metropolitan political fragmentation also discourages inter-municipal cooperation (Weiher 1991; Frug 1999; Lewis 1994).

Metropolitan political fragmentation may also be relevant to neighborhood change because of the linkages among metropolitan fragmentation, growth in the central cities and growth in the whole metropolitan area. Metropolitan fragmentation is positively associated with suburbanization. When people continue to move to the suburbs, the central cities become weaker (Bier and Howe 1998; Howe *et al.* 1998). Adams *et al*. (1996) find that there is a complementary relationship between the central cities and their suburbs, suggesting that a strong central city contributes to population growth in both the central city and its suburbs. This finding suggests that the weaker central cities are, the more likely that the whole metropolitan area declines. This relationship allows me to hypothesize that neighborhoods in more fragmented metropolitan areas are more vulnerable.

3. 4. Functions of Municipal Jurisdiction

Local government exerts great impacts on citizens' daily lives by providing local public goods and services (Oliver 2001; Ostrom *et al.* 1988). Municipal boundaries, although often ignored, thus have an important meaning. In order to effectively provide public goods and services to its residents, a local government has to determine who is included in the local boundary and to be aware of its residents' preferences for type and amount of services to be provided (Ostrom *et al.* 1988). Citizens often express their preferences for public expenditure and service level of collectively consumed goods by

voting for representatives who would make decisions about the levels of services to be provided in their jurisdictions (Ostrom *et al.* 1988). Municipal boundaries are also significant because social conflicts that occur among different groups, often divided along racial and class lines, can be transformed into conflicts between local governments when residents are separated by municipal borders (Oliver 2001).

Local government also provides the basic ground of a democratic citizenry (Oliver 2001). Citizens collectively solve social and economic conflicts in their localities by "voting, contacting officials, attending community board meeting, participating in voluntary organizations, and working informally with neighbors" (Oliver 2001 pp.19-20).

3. 5. Politics of Scale

Studies (e.g., Fukuyama 1995; La Porta *et al.* 1997; Putnam 1993; Knack and Keefer 1997; Glaeser *et al.* 1995) find that greater civic capacity is positively related to economic growth. The findings suggest that neighborhoods in localities with greater civic capacity are more likely to economically improve. Then, under what conditions is civic capacity greater?

In this section, I connect city size and household homogeneity in a municipality with the level of civic capacity, which is positively associated with economic growth[1]. By

[1] One might ask why the politics of scale is explained specifically at the municipal level not either at the neighborhood or metropolitan level. This is because a metropolitan government or a neighborhood rarely have any rights or power as arenas for social and political organization in the U.S. (Frug 1999). Voters make many critical decisions about public goods within their municipalities. Besides, in Chapter 2, I conceptualized a neighborhood as a homogeneous area of limited size, sharing demographic, socio-economic, or housing characteristics and having a sense of identity. Levels of civic capacity are differentiated by municipal size and within-municipal homogeneity. Although invisible, the politics of scale should be explained at the municipal level.

making linkages between municipal types and levels of civic capacity, I theorize about how neighborhoods change in municipalities of different sizes and with different types of people[2].

3. 5. 1. Effects of Civic Capacity on Economic Performance

Oliver (2001) defines civic capacity as "the extent to which a community's members are engaged in both political and civic activities" (p.6). He distinguishes civic capacity from Robert Putnam (1995)'s social capital by referring to the community level rather than the individual level and referring to all types of civic and political activities rather than constraining the definition to voluntary, nongovernmental action.

Localities with greater civic capacity provide greater social stability, by having more human resources available to identify and prioritize social problems and lobby for governmental solutions (Oliver 2001). Scholars also put an emphasis on trust. When there is a high level of trust, community members are more likely to cooperate with strangers (La Porta *et al.* 1997). People in a more trusting society do not need to use more resources to protect themselves, and so had lower tax payments or private security services to protect themselves from the illegal behaviors of others (La Porta *et al.* 1997).

[2] One might expect that there is not much variation in size or homogeneity among suburban municipalities. However, not all suburbs are unvaryingly small and homogeneous. Oliver (2001) reports that Garland, Texas and Livonia, Michigan have over 100,000 people each while some hold a few hundred people. Residents in Short Hills, New Jersey are mostly wealthy while residents in Camden, New Jersey are mostly poor. It is often assumed that suburbs are inhabited by whites. However, Cheverly, Maryland contains a large number of middle income minority population (Oliver 2001). Additionally, it might be said that not much variation in household or population type with similar interests exists *within* municipalities because households can "vote with their feet" in balancing between taxes and public services offered (Tiebout 1956). However, households' location decisions are constrained by many other factors such as proximity to employment or family and moving costs, so households are not equally mobile (Oliver 2001). Additionally, there is little evidence that citizens are fully informed about public services offered by each city (Schneider 1987).

Greater trust is also associated with civic activities, where voluntary participations and cooperation among many people are necessary (Putnam 1993).

Several studies (Fukuyama 1995; La Porta *et al.* 1997; Putnam 1993; Knack and Keefer 1997; Glaeser *et al.* 1995) examine the relationship between civic capacity (e.g., social capital, trust and social norms) and economic growth. Fukuyama (1995) finds that the greater trust among citizens is, the greater the performance of all institutions in a society. Knack and Keefer (1997) and La Porta *et al.* (1997) present evidence that greater social capital is positively related to economic growth and government performance (e.g., less corruption and high bureaucratic quality). Putnam (1993) also argues that local governments with greater social capital provide public goods more effectively.

By contrast, localities with low levels of civic capacity are associated with various problems. Civic associations that require voluntary participation and cooperation among group members will not succeed without trust (Porta *et al.* 1997). Low levels of trust may be associated with less efficient judiciaries, more corruption, and lower-quality government bureaucracies (Porta *et al.* 1997). As buying a home also means buying the characteristics of the location, inefficient government bureaucracies that provide public goods of lower quality will not only depress housing values but will increase costs for people who depend on specific public goods (e.g., public transit).

Thus, I hypothesize that neighborhoods in a municipality with greater civic capacity will improve economically, while neighborhoods in a municipality with lower civic capacity will decline. The question then becomes which municipalities possess a

greater level of civic capacity. In the next section, I discuss how city size and household homogeneity are related to levels of civic capacity.

3. 5. 2. City Size

Preventing neighborhood decline and providing public goods require collective actions of residents. Collective actions can be more or less effective depending on city size. According to Olson (1965), a group-oriented action is more effective when the group's size is small. That is mainly because an individual makes up a larger proportion of a smaller group than of a larger group, so an individual's participation in a smaller group makes a noticeable difference, compared to a larger group (Olson 1965).

I apply this logic of collective action to community problems in cities. In a small city, people are more likely to be concerned with their neighborhoods because of their relatively larger role in the community and, accordingly, because their nonparticipation is more noticeable. There may be greater civic norms as individuals are more likely to know each other in a small city. Residents may not litter or care more about littering by others. Opportunity costs for participating in local activities (e.g., participating city council meetings) are also lower in a small city because public officials and the mayor and their offices are relatively closer to each citizen's home in a small city than those in a large city (Olson 1965). Additionally, because there are fewer neighborhoods and the neighborhoods are closely located to each other in a smaller city, decline of one particular neighborhood becomes a collective concern for the rest of the city. Residents in one neighborhood in a smaller city may be concerned with decline of another neighborhood located within the same municipality.

Therefore, municipal governments in small cities have lower costs for monitoring and enforcing regulations. Neighborhoods in the municipality benefit from the reduced costs.

By contrast, people are less likely to be concerned with their neighborhoods and less inclined to participate in community activities in a large city because they expect that others will undertake activities and take care of social problems within the city. Because residents in large cities are surrounded by so many strangers, citizens are psychologically less engaged in their communities. Thus, citizens stay away from primary social relations and contact and participate less in local activities in a large city (Oliver 2001). Also, residents feel little efficacy in participating local activities if the city size is large. Opportunity costs for participating in local activities become higher for residents in large cities because of longer distances between city offices and citizens and complex bureaucracies in large cities (Oliver 2001). Furthermore, decline of a neighborhood in a larger city may not be a concern of households in other neighborhoods that are far away from the declining neighborhood.

In sum, civic capacity is greater in smaller cities because residents in smaller cities feel more efficacious in participating in local activities and are psychologically more engaged to their communities. As discussed in the previous section, greater civic capacity is associated with economic growth. These connections allow me to hypothesize that *neighborhoods in smaller cities stay economically healthier than those in larger cities*, all other things equal.

3. 5. 3. Homogeneity vs. Heterogeneity

I also develop the concept of homogeneity of household interests and hypothesize that greater homogeneity of household interests in a municipality positively affects neighborhood

economic gain. Individuals prefer homogeneity simply because they prefer to interact with people in their own group (Cutler *et al.* 1999). Individuals may also prefer homogeneity because of different preferences over public policies among different groups. Households may have different preferences based on such factors as race/ethnicity, income level, age or family type.

Different ethnic groups have different preference for the use of public resources. Alesina *et al.* (1999) nicely describe conflicts among different ethnic groups on language instruction in public schools in Oakland, California. The Oakland School Board proposed black English (called Ebonics) to be recognized as a separate language. Black parents believe that this is a good program for their needs. However, Hispanic parents are not happy about it due to the lack of public resources for their children to get English as a second language classes or bilingual education. In the mean time, Asian parents complain of more bilingual resources used for Hispanic children. Finally, white parents have objected to using public resources for any nonstandard English instruction.

School quality may not be of concern to the elderly and single people, and higher income households may prefer more exclusionary policies than lower income households. There may be different interests by income level even in the same racial group. For instance, in Prince George's County, Maryland, affluent blacks opposed school busing because they lived in the more racially integrated areas of the county, while poor blacks wanted school busing because they lived in the racially segregated areas of the county (Johnson 2002).

Given that people prefer homogeneity, many scholars have found that there is a negative relationship between group heterogeneity and civic capacity. Alesina and La Ferrara

(2000) find that group participation is lower with race/ethnicity and income heterogeneity. Alesina and La Ferrara (2002) and Glaeser *et al.* (2000) find negative relationships between race/ethnicity and income heterogeneity and trust in communities. Knack and Keefer (1997) find that ethnic and income heterogeneity are negatively related to trust and civic norms while horizontal networks—measured by membership in groups—are not relevant to trust and civic norms contrasting to Putnam's (1993) finding. Although some (e.g., Oliver 2001) argue that civic capacity is dampened in cities that are homogeneous in income and race, the negative relationship between civic capacity and group heterogeneity is a more conventional view[3].

As stated in the previous section, a low level of civic capacity is negatively associated with economic growth, effective spending on public goods, and government performance. Some scholars make a direct linkage between group heterogeneity and economic growth, effective spending on public goods, and government performance. Alesina *et al*. (1999) find that greater race/ethnicity heterogeneity is negatively related to levels of public expenditures on education, roads, and sewerage and trash pickup. Because of different preferences among different groups, there are more people who "have wound up at an unhappy position in the middle" (Alesina *et al.* 1999, p. 1252) in heterogeneous cities. If Group A perceives that Group B mostly benefits from public transit, Group A will oppose assigning more resources for public transit. By contrast,

[3] Oliver (2001) argues that civic participation is negatively related to economic homogeneity. He finds that economic diversity is higher in middle income municipalities than in lower and higher income municipalities. He argues that civic participation declines in affluent communities because low political conflict in affluent municipalities leads community member to be less interested in local politics. It is additionally possible that affluent communities may have residents who have multiple homes so do not engage in that community. In poor communities, not only are there few political conflict, but there is low local capacity to enact change. By contrast, there are more heterogeneous interests in middle income municipalities, so there is more civic participation. It is also possible that affluent communities may have residents who have multiple homes so do not engage in that community.

when Group B perceives that highway construction is enjoyed mostly by Group A, Group B will oppose providing more resources for highway construction (Alesina *et al.* 1999). As a result, a jurisdiction spends less on public goods than it would have with more homogeneous preferences. Cashin (2004) introduces a case in which Prince George's County, Maryland, a majority-black county, rejected increasing property tax rates that would benefit the public schools in which the majority of students are blacks. She supposes that this is because the people who go to the polls are most likely to be affluent blacks and whites who send their children to private schools. The result is that the quality of public schools in the majority-black county gets worse because of the large income gap among blacks. Harris *et al.* (2001) and Poterba (1997) find that the elderly have a negative effect on education spending and the negative effect is greater when the elderly residents and the school-aged children are from different racial groups. Glaeser *et al.* (1995) also directly relate racial homogeneity with city growth (defined as population growth) and racial homogeneity positively affect city growth in cities with largely black.

In addition, when there are more heterogeneous interests in a city (as is usually the case in the central cities), the city's legislative body as a whole may be less dependent on voters in one particular neighborhood because politicians want to maximize the number of votes in the whole municipality rather than in a single neighborhood[4]. In the legislative process, then, some neighborhoods may be left out, especially when their interests do not

[4] The types of electoral systems and institutions of government make a difference. Many suburbs have council-manager governments with at-large representative districts-reform style, while central cities may elect mayors and council members from specific districts—pre-reform style (Oliver 2001). However, not all central cities have pre-reform-style governments (e.g., cities in Sun Belt and western states) and not all suburbs have reform-style governments. Moreover, although each council member may be elected from a specific district, a specific district often includes several neighborhoods. Thus, a single neighborhood's interests cannot dominate in city council.

coincide with those of the majority population of the city. By contrast, when household interests are homogeneous in a city, as is more often the case in smaller cities, a neighborhood's interests are better represented in the city's legislative body. Thus stricter rules can be applied in areas with homogeneous interests, which allow neighborhoods in homogeneous cities more resistance to decline than those in heterogeneous cities.

In sum, civic capacity is greater in homogeneous cities because residents in homogenous cities are more likely to participate in group activities, trust each other, and have greater adherence to common civic norms. As discussed in the previous section, greater civic capacity is positively associated with economic growth. Scholars (Alesina *et al.* 1999; Glaeser *et al.* 1995) also find that group homogeneity is directly and positively related to economic growth. In addition, a neighborhood's interests are better represented in homogeneous cities because the city's legislative body as a whole is very dependent on voters in one particular neighborhood that share common interests with voters in other neighborhoods. These connections allow me to hypothesize that *neighborhoods in homogenous cities stay economically healthier than those in heterogeneous cities*, all other things equal.

3. 6. Changes in Housing Markets and Macro-Economic Conditions

Myers (1995) lists three time dimensions: age (life-cycle), cohort (longitudinal group membership), and period (historical time). These three dimensions can be applied to neighborhood analysis. First of all, age is a temporal dimension that is commonly mentioned in discussing neighborhood change. As Hoyt's (1933) filtering model predicts, older neighborhoods are more likely to suffer from deterioration and housing

obsolescence. The cohort dimension is another temporal dimension, implying longitudinal group membership. The type of housing units built during a particular period, a cohort of units, has unique characteristics such as Victorian-style housing or post-war bungalow style housing. Housing built in the 1960s and 1970s is sometimes considered to be of poor quality compared to housing built before the 1940s. Finally, period is a temporal dimension, implying a certain historical time. Period effects arise from events that affect all age groups at the same time. Housing market conditions such as booming and busting and governmental interventions have changed from period to period. In sum, there are different types of time dimensions bringing out different paths and outcomes of neighborhood change.

Most studies in neighborhood change focus on life-cycle effects or neighborhood age. However, I argue that the three time dimensions interact and may produce different dynamics, thus the other two time dimensions are important in neighborhood change as well and should be taken into account. Considering the three time dimensions together in a neighborhood change study calls for a longitudinal study. In the next section, I discuss trends within period dimension[5] for neighborhood change studies other than housing characteristics: change of housing demography, change in housing market racial dynamics, and economic cycles.

[5] Although the baby-boomers themselves may be considered a cohort having unique characteristics, their group behaviors in residential location decisions, which may result in different urban spatial patterns, have period effects on neighborhood change.

3. 6. 1. Change of Housing Demography

After WWII, the U.S. population sharply increased when veterans who came back from the war formed households and started families. The United States Census Bureau (US Census Bureau) considers people who were born during the post-WWII population boom between 1946 and 1960 as the baby-boom generation. The baby-boomers have aged over time and begun to retire in the recent decade. In addition to continuously increasing minority populations, declining presence of children in families, later marriage, more unmarried couples, and smaller household size also characterize the current housing demography of the U.S. (Myers and Gearin 2001). Many scholars (e.g., Myers and Gearin 2001; Nelson and Lang 2007) predict that those demographic changes will significantly change urban spatial patterns. For example, the elderly often want to live in neighborhoods that are more walkable and houses that can be easily maintained. In general, older neighborhoods are more walkable with sidewalks and have accessibilities to public transit and retail stores. Given that the baby-boomers are aging, older neighborhoods in the central cities and the inner suburbs may become more popular. However, it is also possible that the baby-boomers shun living in those areas because houses in those areas may be older and more difficult to maintain. They may also try to avoid living in those areas due to higher crime.

Demand for multi-family dwelling units may increase as multi-dwelling units are easily maintainable. As multi-dwelling units are often excluded in newer suburbs (not where they are expensive and aimed at the elderly) by exclusionary zoning, older neighborhoods in the central cities or inner suburbs may be better off with the aging of

the baby-boom generation. In addition, unmarried and childless families may want to live in the central cities for urban amenities and short commuting times. Without school-aged children, they will not worry about the poor school quality in the central city school districts, which is one of the main reasons that families with children live in the suburbs (Myers and Gearin 2001). Tax incentives for buying housing in the central cities such as 10 year tax abatement may attract more of those households.

3. 6. 2. Changes in Housing Market Racial Dynamics

The presence of blacks is often cited as a cause of neighborhood decline. Whether or not it is true, recent studies of neighborhoods directly or indirectly imply that the effect of racial composition on neighborhood economic change have altered over time due to various changes in housing market racial dynamics. First of all, institutional racial discrimination in housing markets has become illegal with the civil rights movement, although Yinger (1995) finds that racial discrimination is informally practiced and continues in mortgage lending. Policies such as the Fair Housing Act, the Equal Credit Opportunity Act, the Community Reinvestment Act and the Home Mortgage Disclosure Act have been designed to protect minority populations and provide equal access to mortgage and housing markets (Bostic and Martin 2003). Thanks to the policies to prevent racial discrimination in housing markets, the flows of middle- to upper-income black households into the suburbs have increased since the 1970s. Scholars (Iceland 2004; Cutler *et al.* 1999; Charles 2003) find that black segregation from whites has been falling since the 1970s as a result of the reduced racial discrimination, although it still

persists. Although Hispanic segregation has been increasing with the increasing Hispanic population, the level of Hispanic segregation is lower than black segregation (Cutler *et al.* 1999).

Improvement in minority socio-economic status (SES) may have changed whites' attitudes to minority populations. Clark and Blue (2004) argue that diminished racial tensions, accompanied by increases in black education and income levels, have raised blacks' accessibility to suburban housing. Farley *et al.* (1994) find that whites' attitudes about neighborhood mixing in 1992 are more liberal than in 1976. Also, female, younger and more educated whites have more liberal attitudes to blacks compared to male, older and less educated whites. Even though whites' attitudes to blacks have become more liberal in recent decades, Farley *et al.* (1994) argue that segregation is still persistent due to whites' negative stereotypes about blacks.

3. 6. 3. Economic Cycles

Neighborhood change is intimately related to macro-economic conditions. Economic cycles significantly affect housing construction. During the Great Depression, housing construction was severely reduced. Downs (1977) finds that due to the significant shortage of housing units, some of the existing single-family housing units were converted into multi-dwelling units. In the 1960s, the economies of cities with heavy industries along the Great Lakes began to slump, followed by increased unemployment rates and neighborhood decline in midwestern and northeastern cities. Since the 1960s, U.S. has deindustrialized and many manufacturing jobs have moved to

foreign countries. In recent decades, cities that mainly offer professional/managerial occupations are economically healthier than those that mainly offer manufacturing jobs (Galster and Mincy 1993). Thus, it is predicted that metropolitan areas with a greater decline of manufacturing jobs have been struggle.

In the 1980s, economic recessions combined with high interest rates caused many businesses to go bankrupt. This again increased unemployment and poverty rates, resulting in neighborhood decline (Lauria and Baxter 1999). In the 1990s, both unemployment and poverty rates declined when the U.S. economic conditions improved. In the meantime, homeownership rates had risen thanks to low interest rates since the mid-1990s and innovations (e.g., creating loans with very low down payments and introducing adjustable-rate subprime loans) in the mortgage market (Haurin 2009). In the process, housing prices and homeownership rates had increased. However, in the mid-2000s, when began to reset to higher rates, a significant number of households (mostly the ones with subprime loans) began to default. When mortgage foreclosures are concentrated in certain neighborhoods, neighborhood decline in those areas inevitably follows. The federal government has intervened in housing markets by lowering interest rates and adopting various policies to stabilize the housing market but has not focused on the geographic concentration of the effects.

3. 7. Model of Neighborhood Change

While neighborhood change is natural, it does not occur in the same degree or in the same direction in all places. We often observe older neighborhoods staying

economically healthy but newer neighborhoods declining faster. This is simply because neighborhoods are not isolated but interconnected with larger, complex urban systems.

In addition to the neighborhood and metropolitan contexts that have been studied, I include the municipal context which focuses on the politics of scale and changes in housing markets and macro-economic conditions. I propose three major hypotheses for why neighborhoods follow different paths: First, neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales. Secondly, the politics of scale—city size and the homogeneity level of household interests in a municipality—affects neighborhood change. Lastly, factors of neighborhood change have altered over time.

Figure 1 illustrates my model of neighborhood change that addresses the limitation of previous studies and takes into account the metropolitan, municipal, and neighborhood contexts together across space and time. Regional economies can be partially controlled by including dummy variables indicating each region. Though national conditions and federal policies also influence neighborhood change, I do not focus on specific national conditions and federal policies. While national conditions and federal policies apply to all neighborhoods, this study focuses on spatial variations of factors on neighborhood change at the metropolitan, municipal and neighborhood levels. Of course, the outcomes of national conditions and federal policies vary by metropolitan area, municipality, and neighborhood because of their different spatial characteristics. For example, low-income neighborhoods may benefit more than middle-income neighborhoods when a specific policy targets low income people.

The model captures neighborhood change as the outcome of the dynamic and joint influences of the metropolitan, municipal, and neighborhood contexts. The basic flow of the model is as follows: Most immediately different housing, demographic and socio-economic characteristics and different levels of social networks, civic engagement and community identities are associated with diverging paths of neighborhood change. In a larger context, the politics of scale is also associated with neighborhood change because levels of civic capacity are influenced by city size and the homogeneity level of household interests in a municipality. In the largest context, deindustrialization, macro-economic conditions and levels of housing market fragmentation as well as regional economies are associated with neighborhood change. Along with neighborhood change across space, the impacts of the factors influencing neighborhood change differ with time due to various changes in housing markets such as change of housing demography, racial dynamics and economic conditions. Given that various factors at multiple-levels are related to neighborhood change, neighborhoods economically flourish, decline or stay stable in response to a complex system of effects.

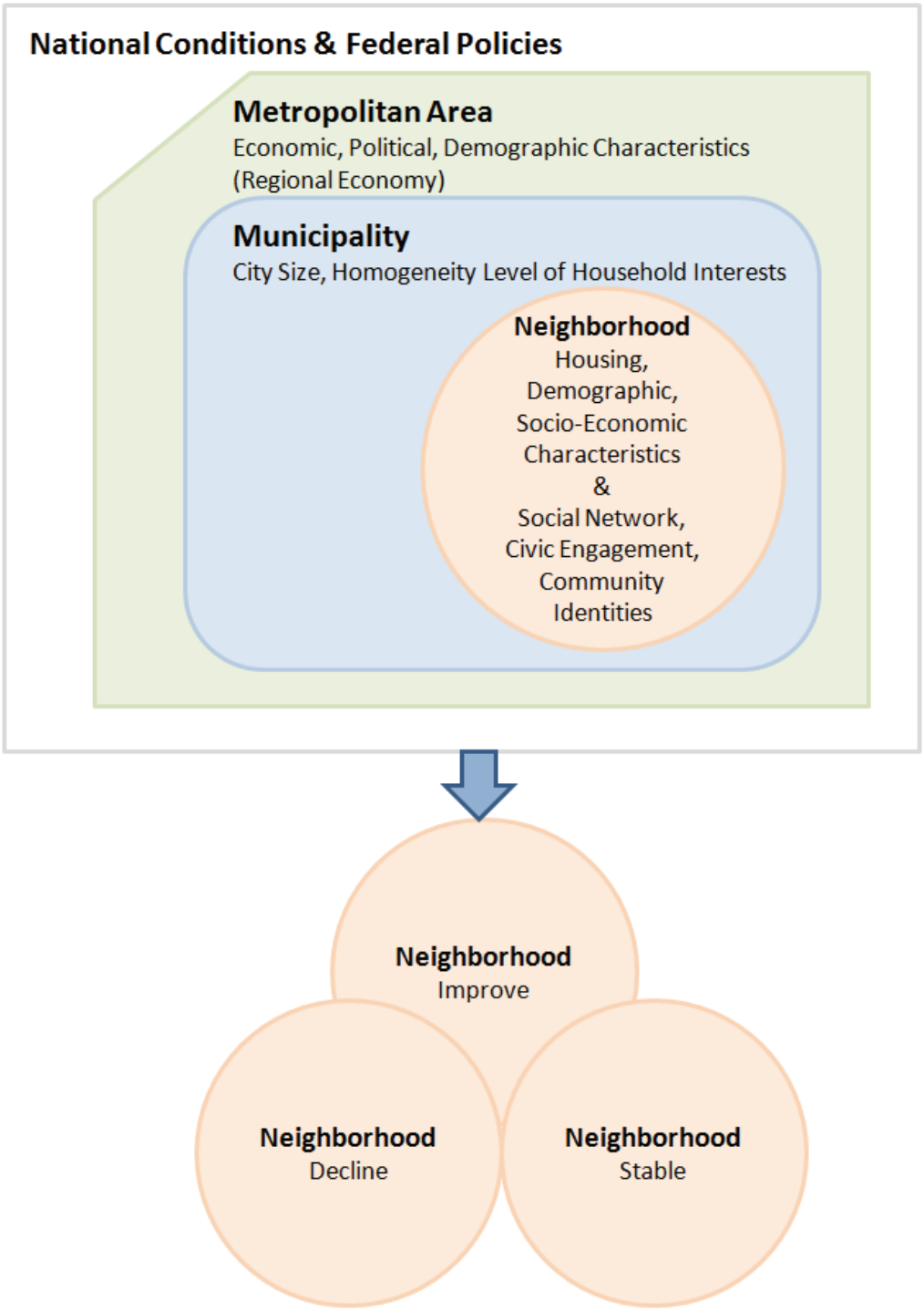

Figure 1 Model of Neighborhood Change

Chapter 4: Methodology

Much of the research on neighborhood economic change has used qualitative case studies. Those papers that use quantitative analysis often focus on only one metropolitan area (Ellen and O'Regan 2008). In addition, few studies have empirically tested the validity of the above theories across multiple metropolitan areas in different parts of the U.S. In this study, by empirically testing using a longitudinal data set from multiple metropolitan areas, I examine the validity of the proposed model of neighborhood change.

4. 1. Data

The primary data set used in this study is the Neighborhood Change Data Base (NCDB) by GeoLytics. The NCDB includes the decennial census data across the country from 1970 to 2000 at the census tract level. A tract typically includes between 2,500 and 8,000 persons (Geolytics 2003). Census tracts are used as the unit of neighborhoods. Not only is the NCDB is a rich source of census tract data but it also has the great advantage that census tract boundaries are normalized into the boundaries of Census 2000. Because the boundaries of census tracts change over time, the normalized tract boundaries to Census 2000 is an essential part of this data set.

Using census tracts as the unit of measurement for neighborhoods can be problematic. Different people define neighborhoods and neighborhood boundaries based

on different criteria such as physical and political characteristics (Sawicki and Flynn 1996). Some may suggest using block group data (e.g., Schuler *et al.* 1992). However, the analysis in this study requires the use of consistent neighborhood boundaries from 1970 to 2000 that can only be met by using census tracts from the NCDB. Additionally, block group data are unavailable prior to 1980 and have limited variables, including some that are very important to this paper. Census tracts are the smallest unit that includes reliable demographic, socio-economic, and housing data (Sawicki and Flynn 1996). Thus, despite the limitations in operationalizing neighborhoods in this way, census tracts seem to be the best operationalization available.

There are several studies on urban change, using the NCDB. For example, Ellen and O'Regan (2008) find that there was a remarkable economic gain in the least affluent neighborhoods during the 1990s compared to the 1970s and the 1980s. They argue that this is because the federal policies targeted people who are disproportionately located in those poor neighborhoods. Booza *et al.* (2006) use the data set to examine the patterns of different income families and different income neighborhoods in large metropolitan areas between 1970 and 2000. They make the interesting observation that "middle-income neighborhoods" are vanishing faster than "middle-income families." One possible reason is that middle-income families do not live in economically homogeneous neighborhoods and rather live in higher- or lower-income neighborhoods. They find that bimodal neighborhoods that include a large share of both very low- and very high-income families are characterized by greater shares of very high-income group, middle-aged persons, and renters and higher racial diversity (Galster and Booza 2007). Lee (2005) and Green

Leigh and Lee (2005) use the data set to examines spatial differentiation in demographic, socio-economic and housing characteristics among CBDs, inner cities, inner suburbs, and outer suburbs. By looking at intra-metropolitan differentiations in those characteristics, they argue that the inner suburbs have declined. Lee (2008) uses the data set to examine racial and socioeconomic characteristics of neighborhoods adjacent to brownfields in the Detroit region from 1960 to 2000. Combining the brownfield locations data set with the NCDB set, he finds that brownfield neighborhoods are associated with a higher concentration of minorities and a lower socio-economic condition than non-brownfield neighborhoods. Dawkins (2007) describes and explains changes in the level of income clustering and centralization during the 1990s, using this data set. He shows that while the spatial patterns of household income were more decentralized and less clustered in the 1990s, they were highly persistent over the decade. The data set is also used to examine the effect of rent control on commuting. Krol and Svorny (2005) find a positive relationship between rent control in New Jersey and commute times in 1980, 1990 and 2000. Although there are many more studies that use the NCDB other than these studies, these studies are ones that make good use of the strength of the NCDB as longitudinal census data.

4. 2. Scope

In order to test the proposed hypotheses, I randomly select 35 metropolitan areas from the largest 100 Metropolitan Statistical Areas (MSAs) and Primary Statistical Areas (PMSAs)

according to the 2000 Census[6]. Both MSAs and PMSAs are referred to as MSAs from here. Since they are randomly selected from the largest 100 MSAs, the 35 MSAs can be representative of the 100 MSAs. The 35 MSAs make up a stratified random sample. The sample is stratified by population size and the shares of the 100 largest MSAs by region – norteast (7 MSAs), west (8 MSAs), midwest (7 MSAs), and south (13 MSAs). The largest MSAs (e.g., New York) in each region were not included in the samples to avoid extreme cases. Appendix A shows the list of the largest 100 MSAs by population size and Figure 2 shows the 35 MSAs selected for the empirical analyses.

I analyze neighborhood changes over three time periods: 1970 to 1980, 1980 to 1990, and 1990 to 2000[7]. In 1970 and 1980, some parts of MSAs did not have census tracts delineated. As I want to include neighborhoods in currently suburban areas (some with no tracts in earlier time periods), I work backward to include those tracts in the largest 100 MSAs as of 2000[8]. Thus the data set is not balanced in different time periods.

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[6] According to the Office of Management and Budget (Office of Management and Budget), a metropolitan area consists of a core city that contains at least 50,000 or a census-defined urbanized area having at least 100,000 people (or 75,000 in New England) and surrounding communities that share socio-economic characteristics with the core city. In the 1990 and 2000 censuses, there are three types of metropolitan areas: Metropolitan Statistical Areas (MSAs), Consolidated Metropolitan Statistical Areas (CMSAs), and Primary Statistical Areas (PMSAs). Metropolitan areas that include less than one million people and are not intimately tied to other MSAs are categorized into MSAs. Metropolitan areas that include over one million people and can be divided into sub-metropolitan areas are categorized into CMSAs. Sub-metropolitan areas in a CMSA are categorized into PMSAs (Geolytics 2003). For instance, the Cleveland-Akron Metropolitan Area is a CMSA because its population is over one million and can be divided into the Cleveland-Lorain-Elyria PMSA and Akron PMSA. Although population in the Columbus Metropolitan Area is over one million, it is not closely tied to other MSAs. Thus, the Columbus Metropolitan Area is a MSA.

[7] The HLM software for multilevel modeling (explained below), does not allow us to examine more than three levels at different spatial scales. The metropolitan, municipal, and neighborhood contexts already form a level-3 multilevel model. Thus, I could not pool the three data sets in each panel because pooling the data sets would need a level-4 multilevel model.

[8] I prefer to include tracts in the largest 100 MSAs as of 2000. This is because not only does including tracts in the largest 100 MSAs as of 1970 exclude currently suburban area but also some of the largest 100 MSAs as of 1970 are no longer among the nation's largest MSAs. I could have included tracts in the largest

Some of the census tracts in the 35 MSAs are excluded from the empirical analysis. First, I exclude tracts that do not have a place code in the 2000 Census[9]. Because the politics of scale are measured at the municipal level, recognizing in which municipality a neighborhood is included is important. Place in census includes city, town, borough, and village, which are incorporated municipalities, and census designated place (CDP), which is unincorporated but delineated for statistical purposes[10]. To distinguish neighborhoods in CDPs from those in incorporated municipalities, a dummy variable indicating a CDP is included[11]. Second, I exclude tracts with less than 200 in the population and those in which populations living in group quarters (e.g., prisoners in jail and students in dormitories) account for more than 50% of the population. The reason for excluding those tracts is that neighborhoods with very small populations and populations in group quarters may show atypical patterns of neighborhood change.

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100 MSAs as of their respective census years. However, as this study is to examine "change" of neighborhood economic status, I needed a data set of consistent boundaries in each panel.

[9] A place is a concentration of population but not everyone live in a place (US Census Bureau). As of 1990, about 66 million people (26%) in the U.S. lived "outside of any place, either in small settlements, in the open countryside, or in the densely settled fringe of large cities in areas that were built-up, but not identifiable as places" (US Census Bureau and United Stated Department of Commerce p.1).

[10] Boundaries of some places, including city, town, borough, village and CDP, may change over time largely because of annexation. Thus some neighborhoods with a place code as of 2000 might not be with the same place code back in the 1970, 1980, and 1990. Consistent place codes in the three panels are required in the empirical analysis because the tract boundaries in the previous censuses were normalized to the neighborhood boundaries in the 2000 Census. In addition, it is also assumed that a neighborhood whose place code was altered by annexation had been influenced by the attributes of the current place even before annexation because it had been located close to the current place. Therefore, despite the possibility that place codes of neighborhoods alter over time, I analyze the data set with place codes of each neighborhood as of 2000.

[11] Census tracts do not necessarily correspond to place boundaries. GeoLytics assigned an identifier of a place that includes the largest share of the population in a tract to each tract.

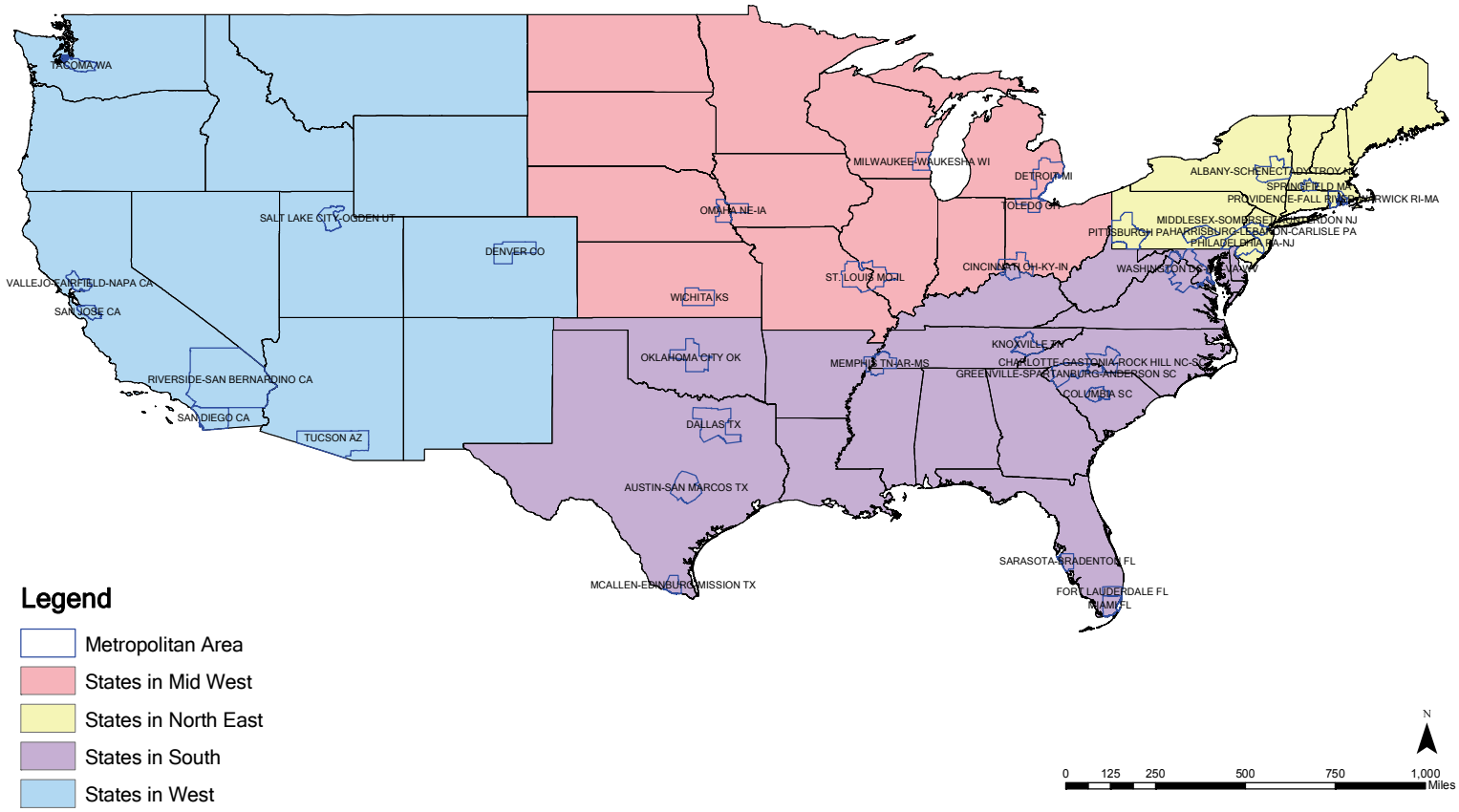

Figure 2 The 35 MSAs among the Largest 100 Metropolitan Areas as of 2000

4. 3. Multilevel Models

Mutlilevel analysis is a methodology for the analysis of nested data sources of variability such as students in classes in schools (Snijders and Bosker 1999). Although cross-level and multilevel data and theories are prevalent in planning scholarship, multilevel modeling has not been widely used in analyzing urban change. As Luke (2004) points out, social scientists often take the disaggregation approach, disaggregating higher level data to the lowest level so that all explanatory variables are attached to the lowest level unit of analysis. This approach leads to serial correlation and heteroskedasticity problems. ANOVA and regression models assume independence of observations [Cov ($\varepsilon_i\varepsilon_j$) = 0]. However, in a nested data structure, because within-unit errors are usually positively correlated—serial correlation [Cov ($\varepsilon_i\varepsilon_j$) $\neq$ 0], standard errors are biased downward, thereby inflating t-value and the risk of Type-I errors. Also, ANOVA and regression models assume constant variance of residuals—homoscedasticity var (ε_i | Xi) = σ^2. In a nested data structure, variance of residuals varies across contextual units—heteroskedasticity var (ε_i | Xi) = σ_i^2. Heteroskedasticity causes a similar problem as serial correlation does, inflating t-value and the risk of Type-I errors. Thus, ignoring multilevel data structures could make coefficients appear to be statistically significant when they are not or significant at higher levels than they are. For example, a housing age coefficient could capture both the true effects of age and other municipal or metropolitan-specific effects (Anderson and Tverdova 2003) and appears to be statistically significant when it is not or significant at higher levels than it is.

By estimating separate variances at different levels, a multilevel model corrects the biases that can occur in a standard Ordinary Least Squares (OLS) regression model. A multilevel model allows us to test the factors that affect neighborhood change at different

scales (e.g., neighborhood, municipal, and metropolitan contexts), while minimizing statistical issues associated with trying to handle all three scales with OLS regression.

I estimate the results using multilevel modeling as the data and hypotheses are multilevel structured—neighborhoods in municipalities in metropolitan areas. I run three level-3 random intercept models, a type of multilevel model, which allows dependence of neighborhoods within municipalities and metropolitan areas for the three panels—the 1970s, 1980s, and 1990s. Neighborhood context, municipal context, and metropolitan context are level-1, level-2, and level-3, respectively, in the random intercept models. As shown in Equations (1), (2), (3), and (4), the level-3 equation is nested in the intercept of the level-2 equation, and the level-2 equation is nested in the level-1 intercept.

$$\text{Level 1: Neighborhood Change } log\,(y_{ijk,\,t} / y_{ijk,\,t-1}) = \boldsymbol{\pi_0} + \pi_i X_{ijk,\,t-1} + e \quad (1)$$

$$\text{Level 2: } \boldsymbol{\pi_0} = \boldsymbol{\beta_{00}} + \beta_{0j} W_{jk,\,t-1} + \beta_{0j} W_{jk} + r_0 \quad (2)[12]$$

$$\text{Level 3: } \boldsymbol{\beta_{00}} = \gamma_{000} + \gamma_{00k} Z_{k,\,\Delta t} + \gamma_{00k} Z_{k,\,t-1} + \gamma_{00k} Z_k + u_{00} \quad (3)[13]$$

$$\text{Mixed Model: } log\,(y_{ijk,\,t} / y_{ijk,\,t-1}) = \gamma_{000} + \gamma_{00k} Z_{k,\,\Delta t} + \gamma_{00k} Z_{k,\,t-1} + \gamma_{00k} Z_k + \beta_{0j} W_{jk,\,t-1} + \beta_{0j} W_{jk} + \pi_i X_{ijk,\,t-1} + u_{00} + r_0 + e \quad (4)$$

y: neighborhood index score; i: neighborhood; j: municipality; k: metropolitan area; and t: time
X: neighborhood characteristics; W: municipal characteristics; and Z: metropolitan characteristics
π_i: level-1 coefficients; β_{0j}: level-2 coefficients; γ_{00k}: level-3 coefficients; and γ_{000}: intercept
e: level-1 residual r_0: level-2 residual; and u_{00}: level-3 residual

To estimate the equations, I use initial values of neighborhood and municipal level variables during one panel. As in other studies on neighborhood economic change (Rosenthal 2008; Galster *et al.* 2003; Ellen and O'Regan 2008), the model indicates that initial conditions

[12] The dummy variable indicating unincorporated places (explained below) is fixed over time because place codes of each neighborhood as of 2000 are used to recognize which municipality a neighborhood is included (see footnote 9). Therefore, the term, $\beta_{0j} W_{jk}$, for the unincorporated place dummy variable is used in addition to the term, $\beta_{0j} W_{jk,\,t-1}$, for the initial values of municipal variables during one panel.

[13] Because levels of metropolitan fragmentation (explained below) do not significantly change over time and are used to predict future changes, I use initial values of the variable during one panel. For this variable, I use the term, $\gamma_{00k} Z_{k,\,t-1}$. In addition, the dummy variables indicating each region is fixed over time, I use the term, $\gamma_{00k} Z_k$.

in neighborhoods and municipalities are predictive of future changes. However, the dynamic changes of metropolitan economic conditions affect all constituent neighborhoods. I do not use time differenced estimators at the neighborhood and municipal levels because the explanatory variables are endogenous. For example, a change in percentage black at the neighborhood level and a change in municipal homogeneity are endogenously associated with neighborhood economic change. However, the change in manufacturing jobs at the metropolitan level is exogenously related to neighborhood economic change. In addition, because households are relatively immobile across metropolitan areas, the explanatory variables at the metropolitan level are exogenously related to neighborhood economic change.

The coefficients of the estimators are based on Full Maximum Likelihood Estimation (FML). In theory, Restricted Maximum Likelihood (REML) leads to better estimates than FML, particularly when the number of groups is small or the number of fixed effects being estimated is large. REML is not available as an option for level-3 multilevel models in HLM, the software for multilevel modeling. However, Rudolph (2008) describes that there is little difference between FML and REML in practice.

4. 4. Regression Models

To highlight the differences between common OLS models and the better specified methods using multilevel modeling, I run OLS regressions, taking a disaggregating approach that separates metropolitan and municipal level data and attaches those variables to the neighborhood level, as shown in Equation (5). To make the comparison simple, I only compare a multilevel model with the OLS regression models for the 1990s.

$$log\ (y_{ijk,\ t} / y_{ijk,\ t-1}) = \alpha + \beta X_{ijk,\ t-1} + \theta W_{jk,\ t-1} + \theta W_{jk} + \varphi Z_{k,\ \Delta t} + \varphi Z_{k,\ t-1} + \varphi Z_k + e \quad (5)$$

y: neighborhood index score; i: neighborhood; j: municipality; k: metropolitan area; and t: time
X: neighborhood characteristics; W: municipal characteristics; and Z: metropolitan characteristics
α: Intercept; β: coefficients of neighborhood characteristics; θ: coefficients of municipal characteristics; φ: coefficients of metropolitan characteristics
e: residual

It is expected that standard errors will be smaller in a regression model than in a multilevel model because the classical assumptions are violated by running a standard OLS model in a nested data structure. Therefore, more variables would be statistically significant in a regression model compared to the more appropriate multilevel model.

4. 5. Measurement of Neighborhood Change: Dependent Variable

Various measures have been used to examine change of neighborhood economic status. Neighborhood economic status or change is often measured by change in poverty rate (e.g., Galster and Mincy 1993; Galster *et al.* 2003). However, poverty rate focuses on low-income families so cannot be a good measurement for middle- and high-income families and neighborhoods. The unemployment rate may not be appropriate as well because it does not consider the individuals who are not in labor markets. Coulson and Bond (1990) and Harris (1999) estimate the factors associated with housing prices using hedonic price models. Changes in the relative income (e.g., Ellen and O'Regan 2008) and change in the relative housing value (e.g., Rosenthal 2008) to the metropolitan average values are also used in a number of studies. Zielanbach (2000) creates an index combining the relative ratios of neighborhood property value, per capita income, and the number of residential loans per housing unit to the metropolitan average values of those

variables to examine the determinants of neighborhood revitalization in Chicago from 1970 to 2000.

As I see neighborhood change as reflecting changes in both individual and place opportunities, I follow Zielanbach's (2000) manner and calculate "neighborhood index scores" to measure neighborhood economic status. I use per capita income as the proxy for an individual's opportunity. Compared to median household or family income, per capita income deals with every individual in a neighborhood, thereby promoting a more comprehensive analysis. However, there is criticism of this variable in that researchers are not able to tell which households change a neighborhood's income (Zielenbach 2000) because census data have no information on the movements of households of different income levels. Moreover, high income does not guarantee an individual's happiness in a neighborhood. Nevertheless, income is not only the most readily available measure but it also estimates individuals' psychological and material well-being. People with higher income can spend more money for recreational and educational opportunities and live and eat at higher quality (Zielenbach 2000).

Similarly to the way that Zielenbach (2000) uses property values as a measure of private investment in computing his index of revitalization, I use average housing value as the proxy of place opportunity. Housing values reflect not only housing structure itself and neighborhood conditions but future expectations to specific neighborhoods. Average housing value of a neighborhood consists of average housing value of owner-occupied housing and capitalized rent. The capitalized rents are computed by dividing yearly rent

by an interest rate of 0.1[14] and are added to consider those neighborhoods with a large share of rental units. There is a positive correlation between change of the capitalized rent and change of owner-occupied housing value. Although using median housing value and rent is more appropriate, there are no such data for 1970 and 1980 in the NCDB because tract boundaries were normalized to tract boundaries in the 2000 Census.

My methodology differs from Zielenbach's (2000) in that I do not include the number of residential loans per housing unit in creating the index. The basic reason for that is that a larger number of mortgage loans per housing unit do not necessarily portray economically healthy neighborhoods. For example, change in a number of residential loans per housing unit in a neighborhood may be low when there is a large share of elderly people that have paid off mortgage loans.

Note that the dependent variable is neighborhood "change." Thus, I first calculate "neighborhood index scores" that measure each neighborhood's economic status. The neighborhood index scores consist of the relative ratios of per capita income and average housing value to *the 35-metropolitan-area average* of per capita income and average housing value, respectively, all equally weighted[15]. In computing the neighborhood index scores, I do not use each individual neighborhoods' own-metropolitan-average of per

[14] Even though interest rates change over time, interest rates to calculate capitalized rents are mostly around 10% in real estate (Milies *et al.* 2000; Brueggeman and Fisher 2002). In addition, using a fixed interest rate in the three panels does not cause a serious problem because the dependent variable measures the change of relative neighborhood economic status to the 35-metropolitan-area average neighborhood economic status not the neighborhood economic status. When an interest rate increases from 10% to 12%, capitalized rents in each neighborhood decline. When capitalized rents in each neighborhood decline, the 35-metropolitan-area average capitalized rent declines as well.

[15] To illustrate the process for calculating neighborhood index scores, let us say that neighborhood A's per capita income is 70 percent of the 35-metropolitan-area average of per capita income in 1970. Its average housing value is 80 percent of the 35-metropolitan-area average of housing value. Because each variable constitutes half of the index, neighborhood A's index score is 75 (=70*.5 + 80*.5) in 1970. If neighborhood A's index score is 85 in 1980, it is considered that neighborhood A improved between 1970 and 1980.

capita income and average housing value unlike Ellen and O'Reagan (2008) and Rosenthal (2008). The most important reason for this is that the relative ratios to a neighborhood's own metropolitan average of per capita income or housing values are likely to understate economic gain in economically growing metropolitan areas and economic loss in economically declining metropolitan areas. Also, how metropolitan characteristics affect neighborhood economic change cannot be examined using that data structure[16].

Table 1 shows the list of the 35 MSAs, the number of tracts included in the analysis, and the mean values of the neighborhood index scores from 1970 and 2000 by regions[17]. As shown in Table 1, the western region has not only had a higher economic status compared to other regions but improved from 1970 to 2000.

[16] One might argue that neighborhood index scores increase without any real improvement when the relative ratio of housing value sharply increased due to real estate speculation in some markets. I neither include dummy variables indicating each metropolitan area nor deflate housing value in specific metropolitan areas to control spatial variations. However, region dummies can partially control those variations among metropolitan areas. Spatial variations in increasing housing value can also be deflated by using the 35-metropolitan-area average housing value. When the relative ratio of housing value in a specific metropolitan areas increase sharply due to real estate speculation, the 35-metropolitan-area average housing value also increases. Recall that my dependent variable is not the relative neighborhood economic status to the 35-metropolitan-area average neighborhood economic status but the change of the relative neighborhood economic status in one panel. In addition, I added the turnover rate variable (the share of occupied housing units where households moved within five years) to the original models (explained later) and ran the models. I found that other variables do not significantly change except for the share of newer housing units (built within preceding 10 years). As the share of newer housing units variables and the turnover rate variables are highly correlated to each other (.69 in 1970, .72 in 1980, and .64 in 1990), I dropped the turnover rate variable in the final models.

[17] Once I remove those tracts that have less than 200 in population and more than 50% in population living in institutions, there are only 32 MSAs in 1970.

Table 1 Means of Neighborhood Index Scores of the 35 MSAs

Region	MSA Name	1970				1980				1990				2000			
		N	Mean	Min	Max	N	Mean	Min	Max	N	Mean	Min	Max	N	Mea	Min	Max
North east	Albany-Schenectady-Troy NY	110	87.9	49.3	167.0	120	73.2	40.2	135.6	120	82.4	40.7	191.3	120	72.3	37.2	194.4
	Harrisburg-Lebanon-Carlisle PA	49	87.9	42.3	161.7	70	81.6	41.5	141.8	70	77.0	37.4	138.9	70	73.5	35.8	130.7
	Middlesex-Somerset-Hunterdon NJ	176	119.4	62.2	213.4	179	116.1	57.7	241.8	180	141.9	59.7	331.8	180	121.5	47.8	338.1
	Philadelphia PA-NJ	259	95.2	47.4	203.3	814	84.8	20.3	493.9	813	94.2	24.9	583.2	813	84.4	26.2	499.8
	Pittsburgh PA	411	93.7	42.2	393.0	504	90.1	24.5	347.5	516	75.4	14.4	406.9	516	75.9	19.0	385.2
	Providence-Fall River-Warwick RI-MA	190	84.5	44.3	244.7	190	78.1	40.8	215.7	190	93.7	34.1	280.5	190	79.3	29.3	267.2
	Springfield MA	87	86.4	45.7	182.9	88	74.1	37.6	156.5	90	92.4	38.8	246.4	90	75.1	31.7	184.9
	Sub-Mean	1282	**95.0**			196	**87.1**			197	**92.2**			1979	**83.5**		
Mid west	Cincinnati OH-KY-IN	271	90.4	29.4	278.5	271	88.7	21.5	366.0	293	80.0	15.3	380.1	293	86.1	22.3	405.9
	Detroit MI	1056	116.4	37.9	450.5	106	103.2	29.6	429.0	106	90.0	23.9	498.8	1063	98.7	19.7	526.3
	Milwaukee-Waukesha WI	377	101.7	34.6	298.7	377	98.6	28.7	332.6	385	80.3	19.6	381.8	385	83.8	24.2	411.7
	Omaha NE-IA	159	94.5	41.6	215.8	172	88.9	28.0	218.9	177	76.6	28.7	216.9	177	81.2	33.5	263.9
	St. Louis MO-IL	375	93.0	29.4	314.4	378	89.5	27.1	345.9	419	84.4	19.7	392.9	419	84.3	24.3	418.5
	Toledo OH	121	99.4	39.4	298.2	124	87.8	27.3	255.2	128	72.4	24.4	271.1	128	72.4	23.8	247.8
	Wichita KS	57	77.0	46.3	162.3	115	99.4	48.7	352.9	120	83.5	38.1	259.6	120	77.3	36.4	255.0
	Sub-Mean	2416	**104.3**			249	**96.9**			258	**84.4**			2585	**89.2**		
West	Denver CO	328	110.8	33.5	283.6	409	124.9	24.6	449.9	447	98.5	19.9	445.1	447	118.0	19.4	551.3
	Riverside-San Bernardino CA	455	95.5	45.8	218.5	484	112.1	43.9	430.6	509	112.9	31.8	285.9	509	87.9	32.8	328.8
	Salt Lake City-Ogden UT	215	91.1	47.3	270.4	253	103.8	45.8	269.6	274	78.2	29.3	246.7	274	101.8	35.6	309.3
	San Diego CA	493	112.2	47.7	282.3	525	129.7	44.5	382.5	556	136.1	41.7	466.7	556	124.9	39.4	623.9
	San Jose CA	310	124.1	59.5	233.1	311	149.8	50.2	839.7	330	184.6	61.0	489.0	330	207.6	54.8	603.7
	Tacoma WA	116	95.9	38.3	162.4	118	96.8	27.3	182.0	121	83.5	20.6	165.1	121	93.1	24.9	191.9
	Tucson AZ	149	107.5	24.2	203.9	178	110.3	26.4	241.8	179	89.2	22.1	200.5	179	90.5	29.4	234.8
	Vallejo-Fairfield-Napa CA	81	95.0	59.1	136.8	84	108.5	43.9	325.1	95	118.5	48.5	260.0	95	110.9	50.7	225.0
	Sub-Mean	2147	**106.2**			236	**121.3**			251	**118.2**			2511	**120.0**		

Region	MSA Name	1970				1980				1990				2000			
		N	Mean	Min	Max	N	Mean	Min	Max	N	Mean	Min	Max	N	Mea	Min	Max
South	Austin-San Marcos TX	145	102.9	38.5	172.1	188	101.1	36.6	225.1	211	84.8	33.1	259.4	211	100.2	36.8	361.3
	Charlotte-Gastonia-Rock Hill NC-SC	196	86.6	32.9	217.8	197	87.8	27.9	223.4	218	88.6	30.7	309.3	218	97.4	30.3	420.2
	Columbia SC	66	91.6	33.2	175.9	67	85.8	31.4	165.4	70	81.2	25.6	181.5	70	80.7	25.3	209.9
	Dallas TX	500	104.8	27.3	341.1	546	110.0	20.7	466.5	630	102.3	14.8	543.6	630	98.8	16.3	692.1
	Fort Lauderdale FL	0	.	.	.	259	127.1	44.8	278.1	266	112.9	35.7	312.2	266	101.5	36.6	369.1
	Greenville-Spartanburg-Anderson SC	83	78.8	35.5	156.8	95	77.3	37.1	186.8	104	71.4	28.1	181.5	104	74.1	28.1	187.4
	Knoxville TN	69	78.2	26.9	205.4	70	77.8	28.0	193.8	77	69.6	21.3	239.6	77	71.4	26.6	236.5
	McAllen-Edinburg-Mission TX	67	46.2	25.4	115.2	67	54.5	29.7	132.0	69	44.1	20.2	136.2	69	46.7	25.5	135.4
	Memphis TN-AR-MX	183	82.2	29.2	242.2	202	79.7	19.2	223.2	214	76.1	17.0	243.1	214	75.9	19.0	272.2
	Miami FL	0	.	.	.	297	105.7	27.3	418.7	323	93.2	27.6	519.5	323	88.4	27.0	571.0
	Oklahoma City OK	251	89.8	30.9	271.4	287	99.4	35.2	308.1	300	74.3	23.8	284.0	300	71.5	21.9	287.8
	Sarasota-Bradenton FL	0	.	.	.	98	107.8	45.6	257.6	105	109.0	42.5	372.2	105	111.4	40.2	427.9
	Washington DC-MD-VA-WV	561	140.6	58.8	286.8	775	135.2	34.1	367.1	817	147.9	21.5	500.9	817	132.8	24.5	518.9
	Sub-Mean	2121	**104.6**			314	**108.9**			340	**104.1**			3404	**99.9**		

Note: N indicates the number of census tracts included for the analysis

Finally, the dependent variable in each analysis is the log ratio of the neighborhood index score at the end to the index score at the beginning of one panel, as shown in Equation (1). I use the log ratio variable as the functional form for the dependent variable because the absolute differences of neighborhood index scores in a low economic status neighborhood and a high economic status neighborhood have a different meaning[18]. In addition, I cannot use absolute differences of neighborhood index scores in a time period because only positive values can take a log. Changes in neighborhood index score indicate whether a neighborhood improved, declined, or remained stable in a time period.

Creating an index for each neighborhood is possible because the relative ratios of per capita income and average housing value are positively related and they move to the same direction. The correlation coefficients between the relative ratios of per capita income and average housing value to the 35-metropolitan-averages are 0.76 in 1970, 0.70 in 1980, 0.79 in 1990, and 0.82 in 2000. Correlation coefficients between the relative per capita income and average housing value to their own-metropolitan-average of per capita income and average housing value are 0.77 in 1970, 0.75 in 1980, 0.88 in 1990, and 0.89 in 2000. That is, housing values are higher in the neighborhoods whose per capita income is high (and vice versa). Furthermore, changes in the relative per capita income and average housing value to the 35-metropolitan-average of per capita income and average housing value are positively correlated (0.35 in the 1970s, 0.38 in the 1980s, and 0.49 in the 1990s).

[18] For example, if Neighborhood A's index score increased 50 to 100, it will be viewed as the neighborhood improved significantly. However, if Neighborhood B's index score increased from 250 to 300, it will not be viewed as significant as Neighborhood A.

One might ask why the relative ratios of per capita income and average housing value are "equally" weighted. Since using an index combining more than one variable has not been commonly used in neighborhood change studies, equally weighting the two indicators of neighborhood economic status may be the best place to start[19].

4. 6. Explanatory Variables at the Neighborhood Level[20]

Filtering theories indicate that a neighborhood declines as its housing stocks grow older. Therefore I include three housing age related variables. Housing age is measured with shares of newer (built within the preceding 10 years), middle-aged (built within the preceding 20 and 30 years), and older (built more than 30 years ago) housing units at the beginning of a panel in the models. The share of housing units built within the preceding 10 and 20 years is omitted in the models.

In addition to the housing age variables, I also include a variable on housing size. Leven *et al.* (1976), Culson and Bond (1990), and Morrow-Jones (2007) find that households move to live in large housing units; Therefore neighborhood change is also related to size of housing units not just to their age. Because the NCDB does not include any housing size variable other than the average number of rooms, I use the average number of rooms as the proxy for housing size.

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[19] In addition, I ran two additional models only using per capita income and average housing value, separately (See Appendix I). As housing value shows larger variation in neighborhood change than per capita income, the Housing Value models are closer to the original models that use both housing value and per capita income for the dependent variable than the Per Capita Income models. See Appendix I for the further explanations on major differences in significant variables and signs of variables resulting from using two parts of the dependent variable separately.

[20] Correlation coefficients show that there are no highly correlated explanatory variables at any of the three levels in any of the three panels. See Appendix C.

From the externality theory I include percentages of blacks and Hispanics and poverty rate at the beginning of a panel in the models as social status measures. As Fogarty (1977) and Ellen and O'Regan (2008) find, the predictors of neighborhood economic change may vary depending on the initial economic status. To control neighborhoods' initial economic conditions, I include a series of dummy variables—Very low level economic status (less than 50% of each neighborhood's own-metropolitan-area average), Low level economic status (between 50% and 80%), Moderate level economic status (80% and 100%), High-moderate level economic status (100% and 120%, but omitted), High economic status (120% and 150%), and Vey high economic status (over 150%)—that indicate the relative ratios of per capita and average housing value to each neighborhood's own-metropolitan-area average of per capita income and average housing value at the beginning of a panel.

Percentage of college-graduates and homeownership rate at the beginning of a panel are included in the models as social capital and costs measures. The 1970 Census does not distinguish non-Hispanic blacks from Hispanic blacks. In order to be consistent in the three panels, I include percentage black consisting of both Hispanic and non-Hispanic blacks in all three panels[21].

One may argue that neighborhood school quality and crime rates are relevant to neighborhood economic change. However, those variables cannot be acquired from census and would be extremely difficult to acquire in other ways. Lucy and Philips (2000) indicate that school conditions are correlated with test scores and free-lunch ratios and those variables are also correlated with the poverty rate. Also, crime rate is known to be correlated with

[21] According to the 2000 Census, Hispanic blacks make up only 2% of total blacks in the U.S. (US Census Bureau).

poverty rate (Geis and Ross 1998; Ross and Mirowsky 2001). Thus, poverty rate is used as the proxy for school conditions and crime rates as well as one of the social status measures.

While sub-culturalists acknowledge the importance of social interactions and the resulting strong social structures within neighborhoods, census data and the NCDB do not have information on levels of social interaction. However, percentage college-graduates and homeownership rate can be used as proxies for the level of social interaction as scholars argue that more educated people and higher homeownership rates contribute to greater social interactions (Putnam 1993, 1995; Temkin and Rohe 1998; Middleton *et al.* 2005).

Housing variables are associated with all three time dimensions (age, cohort, and period). The housing age variables based on Hoyt's (1933) filtering theory are not only associated with age dimension but cohort dimension. Housing units built within the preceding 10 years in the 70s', 80s', and 90s' panels are those built between 1960 and 1970, 1970 and 1980, and 1980 and 1990, respectively. Housing units built within the preceding 20 and 30 years in the 70s', 80s', and 90s' panels are those built between 1940 and 1950, 1950 and 1960, and 1960 and 1970, respectively. Housing units built more than 30 years ago in the 70s', 80s', and 90s' panels are those built before 1940, 1950 and 1960, respectively. Because few housing units were built during WWII, the housing units built more than 30 years ago in the three panels are mostly built before 1940. In general, the neighborhoods dominated by pre-1940 housing have unique characteristics of their structure and proximity for residents' convenience (Lucy and Phillips 2000). On the other hand, the housing units built between 1945 and 1970 are often throughout to have poorer architectural and structural quality.

Housing size variable may be associated with period dimension because households' preference over housing size can change from period to period.

Other variables based on externality theories and proxy variables for the level of social interaction are all associated with period dimension because households' preferences and attitudes over neighborhood social status and social capital and costs, the effect of social interaction on neighborhood economic status, and public policies about racial segregation and poor neighborhoods can alter from period to period.

4. 7. Explanatory Variables at the Municipal Level

Based on the literature about the politics of scale, I hypothesize that neighborhoods in smaller and more homogeneous cities are more likely to improve and less likely to decline. First, to test the effect of city size on neighborhood change, I include the share of metropolitan households in each municipality. I use a relative municipal size measure rather than absolute municipal size in examining the effect of municipal size on neighborhood change because households select a municipality, considering relative attractiveness of the municipality compared to other municipalities within a metropolitan area.

Second, to test how the homogeneity level of household interests is related to neighborhood change, I calculate the Simpson index $H=\frac{\sum_i n_i(n_i-1)}{N(N-1)}$ (Simpson 1949) which was originated as a way to measure biological diversity. There are various measures for diversity such as a GINI coefficient that measures inequality between two groups and dissimilarity and isolation indexes that measure segregation. However, the Simpson index

is relatively easy to calculate and the data structure of the NCDB fits it well[22]. In the index, N is the total number of families or population and n_i is the number of families or population in the i_{th} category, depending on the type of homogeneity. H corresponds to the probability that two randomly chosen individuals in a community belong to the same category and the value of H ranges from 0 to 1. When the index value approaches 1, the area contains only one category, which means high homogeneity.

The index is computed by race/ethnicity, age, family income level, and family type at the municipal level to test the relationship between the homogeneity level of household interests and neighborhood economic change. Talen (2006) argues that diversity (referred to as heterogeneity in this study) is not one dimensional but multi-dimensional. Talen (2006) categorizes two types of social diversity at the neighborhood level: residential and housing diversity. Residential diversity includes another four types of diversity: race/ethnicity, age, family income level and family type that I use to calculate the homogeneity level of household interests at the municipal level. Housing diversity indices are calculated based on physical characteristics of housing units such as year built and unit size. Because this study examines how the homogeneity level of household interests in municipalities is associated with neighborhood economic change, I only use Talen's categories for residential diversity whose types are associated with creating different levels of civic capacity and different interests and preferences over public goods. As discussed in Chapter 3, racial/ethnic types and income levels are the

[22] Maignan *et al.* (2003) discuss the comparability between bio-ecological diversity and socio-economic diversity. Byrne and Flaherty (2004) use the Simpson index to measure the housing market diversity in types of dwellings and types of occupants. Talen (2006) uses the Simpson index to measure residential diversity (e.g., race/ethnicity and age) and housing diversity (e.g., housing tenure and housing value).

most commonly mentioned categories associated with different interests. I also discussed in Chapter 3 that people have different interests in public resources, depending on age and family type (Harris *et al.* 2001; Poterba 1997). The variable categories for household homogeneity in the 2000s and previous panels are shown in Table 2 and Appendix B, respectively[23].

Table 2 Variable Categories Used to Calculate Simpson Index (2000s)

Homogeneity Type	**Categories**
Race/Ethnicity	White alone Black alone Asian alone or Pacific alone Hispanic Others
Age	5 years and under (or 4 years and under) 6 to 18 years (or 5 to 17 years) 19 to 34 years (or 18 to 34) 35 to 64 years (or 35-65) 65 years old and older (or 65+)
Family Income	Various categories of family income for each time period
Family Type	Married, with children under 18 Married, no children under 18 Single, with children under 18 Single, no children under 18 Non-family household

One may ask if neighborhoods in the central cities decline because of their location in the central cities. In general, school quality is often lower and crime rate is higher in the central cities that in the suburbs. However, not only do I already control for poverty rate at the neighborhood level, which is likely to be correlated with school quality and crime rate (Geis and Ross 1998; Ross and Mirowsky 2001), but I also control

[23] The categories of race/ethnicity in the 1970 and 1980 Censuses are different from those in the 1990 and 2000 Censuses: The 1970 Census distinguishes race/ethnicity by White, Black, and Other Races. The 1980 Census distinguishes them by Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian or Pacific Islanders, Non-Hispanic Other Races, and Hispanic.

city size measured by the share of metropolitan households in each municipality. As the central cities are defined as the largest city in a metropolitan area (Office of Management and Budget), the city size variable also controls for the central city locations.

4. 8. Explanatory Variables at the Metropolitan Level

At the metropolitan level, I include the variables that measure the effects of economic restructuring and change in overall metropolitan economic conditions. Unlike the previously introduced explanatory variables whose values indicate initial conditions of neighborhoods and municipalities so predictive of future change, economic restructuring and change in overall metropolitan economic conditions are time differenced value variables. That is, I examine how "changes" in economic conditions at the metropolitan level affect neighborhood change.

As Galster and Mincy (1993) do, I include a decline in the proportion of manufacturing jobs to total jobs variable as the proxy for economic restructuring and a decline in the proportion of jobs to total population variable as the proxy for change in overall economic conditions during one panel. The Bureau of Economic Analysis' Regional Information System (REIS) includes annual data on employment by detailed industry file across all counties and metropolitan areas from 1969 to the present. To illustrate, in the 1970s, a decline of manufacturing jobs to total jobs ratio is measured as follows:

(Manufacturing jobs located in a MSA in 1969/Total jobs in a MSA in 1969) –
(Manufacturing jobs located in a MSA in 1978/ Total jobs in a MSA in 1978)

A decline of jobs to total population ratio is measured as follows:

(Jobs located in a MSA in 1969/Total population in a MSA in 1969) –
(Jobs located in a MSA in 1978/Total population in a MSA in 1978)

I also follow Galster and Mincy's (1993) assumption that a one-year lag of those variables will be reflected in next year's neighborhood change so employ one-year lagged variables (e.g., 1969-78 changes for 1979 neighborhood change values).

I additionally test whether greater metropolitan fragmentation is negatively related to neighborhood economic gain. Levels of metropolitan fragmentation are measured by the Herfindahl index, as suggested by Hoxby (2000). The Herfindahl index ($1 - \sum s_j^2$) is a measure of the probability that two randomly selected households will live in different locations. In the index, s_j indicates shares of total metropolitan area population (omitting CDPs) residing in municipality j. A greater value of the Herfindahl index indicates that a metropolitan area is more fragmented. When a metropolitan area is fragmented, the central city is likely to be weaker. As a weak central city is associated with a weak metropolitan area (Adams *et al.* 1996), it is expected that neighborhoods are more likely to decline in a fragmented metropolitan area, holding other variables constant.

In addition, political, demographic, and socio-economic characteristics may differ in each region. Thus, I include three dummies, indicating the northeastern, midwestern, and western regions, with the southern region as the omitted category.

4. 9. Explanatory Variables for Cross Level Interactions

As a multilevel model allows cross-level interactions, I test whether the interaction between changes of housing demography and an old neighborhood (where over 40% of total housing units in neighborhoods was built before 1949) is positively related to neighborhood economic gain. As mentioned in Chapter 3, singles and childless people are growing and baby-boomers are aging. It is expected that those changes positively affect economic gain of older neighborhoods when old neighborhoods are demanded by those people for walkability and proximity to services and shops and existing multi-dwelling units. The variables regarding changes of housing demography include changes in proportions of singles, married couples without children and people who are 65 years old or older to the total population or total families at the metropolitan level.

Chapter 5: Analysis and Findings

In this chapter, I present the results of the empirical analyses. I start by discussing the descriptive analysis. Next, after introducing ANOVA models, which are used as base line models to compare with full multilevel models, I present the results in the full multilevel models. As I find an interesting result on racial composition, I also discuss the effects and change of the effects of racial composition on neighborhood economic gain over time. Finally, I assess the multilevel models, compare them with OLS regression models and present the results of cross-level interaction models. This is followed by discussions of what the results indicate.

5. 1. Descriptive Analysis

Table 3 shows the descriptive statistics at the neighborhood, municipal, and metropolitan levels. Note that the level-1 (neighborhood) variables are values at the beginning of one panel. At the level-2 (municipality), all variables are values at the beginning of one panel except for the unincorporated place dummy. Of the level-3 (metropolitan area) variables, the decline of manufacturing jobs to total jobs ratio variable and the decline of jobs to total population variable are time differenced values during one panel. The levels of metropolitan fragmentation are values at the beginning of one panel and region dummies are fixed across the panels.

At the neighborhood level, the share of newer housing units (built within the preceding 10 years) has decreased over the three time periods, whereas the share of older housing units (built more than 30 years ago) has increased. Average number of rooms has increased, which implies increasing housing size. Percentage black and percentage Hispanic have increased over time. Poverty rate and percentage college-graduates have also increased, while the average homeownership rate has declined[24].

At the municipal level, race/ethnicity, family income, and family type homogeneity have declined, whereas age homogeneity has remained stable. Thus, we can see that cities become more diverse. At the metropolitan level, the share of manufacturing jobs to total jobs declined in all three panels, which follows from U.S. deindustrialization. The share of jobs to total population increased in all three panels. The level of metropolitan fragmentation has increased over time as more independent suburbs have been developed within metropolitan areas.

[24] This finding goes against the trend that homeownership rate has increased over time in the U.S. (US Census Bureau). It seems that this is because newly developed suburban neighborhoods as of 1989 are included in the 1990s' data set. As mentioned earlier, in 1970 and 1980, some parts of MSAs did not have census tracts delineated. When newly developed suburban neighborhoods that were not occupied or owned by individual households yet were added to the data set, the homeownership rate in the data set declined.

Table 3 Descriptive Statistics

Level	Variables	1970-1980				1980-1990				1990-2000			
		Mean	S.D.	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
Dependent Var.	$log\ (y_{ijk,\ t} / y_{ijk,\ t-1})$	-0.01	0.19	-1.20	1.31	-0.09	0.20	-1.28	1.21	-0.02	0.18	-1.14	1.34
Level 1: Neighborhood	% Housing built within the preceding 10 years	0.34	0.28	0.00	1.00	0.29	0.28	0.00	1.00	0.20	0.23	0.00	1.00
	% Housing built within the preceding 10 to 20 years	0.25	0.18	0.00	0.99	0.20	0.16	0.00	0.98	0.20	0.16	0.00	0.96
	% Housing built within the preceding 20 to 30 years	0.12	0.11	0.00	0.94	0.18	0.16	0.00	0.96	0.16	0.14	0.00	0.97
	% Housing built more than 30 years ago	0.28	0.29	0.00	1.00	0.32	0.31	0.00	1.00	0.44	0.32	0.00	1.00
	Average number of rooms	5.28	0.89	1.50	9.48	5.44	1.02	1.30	9.55	5.44	1.07	1.42	9.45
	% Black	0.09	0.22	0.00	1.00	0.14	0.27	0.00	1.00	0.16	0.28	0.00	1.00
	% Hispanic	0.06	0.12	0.00	1.00	0.07	0.14	0.00	1.00	0.10	0.17	0.00	1.00
	% College graduates	0.13	0.11	0.00	0.66	0.19	0.14	0.00	0.89	0.23	0.17	0.00	0.94
	Poverty rate	0.10	0.10	0.00	0.78	0.11	0.11	0.00	0.75	0.13	0.13	0.00	0.85
	Homeownership rate	0.67	0.22	0.01	1.00	0.65	0.23	0.00	1.00	0.62	0.23	0.00	1.00
	Very low economic status (less than 50%)	0.02	-	0.00	1.00	0.04	-	0.00	1.00	0.08	-	0.00	1.00
	Low economic status (50% to 80%)	0.22	-	0.00	1.00	0.24	-	0.00	1.00	0.28	-	0.00	1.00
	Moderate economic status (80% to 100%)	0.30	-	0.00	1.00	0.25	-	0.00	1.00	0.24	-	0.00	1.00
	High moderate economic status (80% to 100%)	0.23	-	0.00	1.00	0.21	-	0.00	1.00	0.16	-	0.00	1.00
	High economic status (120% to 150%)	0.14	-	0.00	1.00	0.15	-	0.00	1.00	0.12	-	0.00	1.00
	Very high economic status (over 150%)	0.09	-	0.00	1.00	0.11	-	0.00	1.00	0.12	-	0.00	1.00
Level 2: Municipality	% MSA households in each municipality	0.02	0.08	0.00	0.97	0.02	0.07	0.00	0.83	0.02	0.06	0.00	0.79
	Race/ethnicity homogeneity	0.92	0.12	0.49	1.00	0.83	0.16	0.34	1.00	0.78	0.18	0.32	1.00
	Age homogeneity	0.26	0.02	0.22	0.65	0.26	0.03	0.21	0.66	0.26	0.03	0.21	0.68
	Family income homogeneity	0.13	0.05	0.07	0.36	0.08	0.02	0.06	0.32	0.09	0.02	0.06	0.36
	Family type homogeneity	0.35	0.08	0.22	0.82	0.30	0.06	0.20	0.67	0.29	0.05	0.20	0.71
	Dummy unincorporated place	0.32	-	0.00	1.00	0.35	-	0.00	1.00	0.35	-	0.00	1.00
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	0.02	0.02	-0.02	0.06	0.04	0.03	-0.02	0.10	0.02	0.02	-0.01	0.06
	Decline of jobs to total population (change)	-0.06	0.07	-0.37	0.04	-0.06	0.07	-0.41	0.01	-0.02	0.07	-0.08	0.37
	Metropolitan fragmentation	0.70	0.24	0.06	0.96	0.77	0.19	0.36	0.96	0.80	0.17	0.41	0.97
	Dummy Midwest	0.22	-	0.00	1.00	0.20	-	0.00	1.00	0.20	-	0.00	1.00
	Dummy Northeast	0.22	-	0.00	1.00	0.20	-	0.00	1.00	0.20	-	0.00	1.00
	Dummy West	0.25	-	0.00	1.00	0.23	-	0.00	1.00	0.23	-	0.00	1.00
	Dummy South	0.31	-	0.00	1.00	0.37	-	0.00	1.00	0.37	-	0.00	1.00

Level	Variables	1970-1980				1980-1990				1990-2000			
		Mean	S.D.	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.	Min	Max
	Number of observations	Level 1: 7,945 Level 2: 1,395 Level 3: 32				Level 1: 9,935 Level 2: 1,794 Level 3: 35				Level 1: 10,479 Level 2: 1,913 Level 3: 35			

5. 2. ANOVA Models

Table 4 shows the results of one-way ANOVA models with random effects. These are running fully unconditional models without any explanatory variable. Table 4 also includes the shares of variance at each level to total variance. A fully unconditional model is used as the base line model to compare with a full model. According to the shares of variance, we can see that the municipal and metropolitan contexts have to be taken into account in the models. For example, while 54.7% of the variation in neighborhood change in the 1970 is attributed to neighborhood level difference, 24.5% and 20.9% of the variation in neighborhood change in the 1970s is attributed to municipal and metropolitan level differences, respectively. The relatively larger share of variation at the neighborhood level is natural because the dependent variable is measured at the neighborhood level (Steenbergen and Jones 2002).

In the 1980s, the share of variation at the neighborhood (39.9%) and municipality levels decreased (12.7%), while the share of variation at the metropolitan level increased (47.4%). Scholars indicate that there were more metropolitan level variations in the 1980s compared to the 1970s and 1990s. Galster and Mincy (1993) define the 1980s as a period when there were important shifts in the regional distribution—from the northeast region to the south and west regions—of the population in high poverty neighborhoods. Galster *et al*. (2003) also define the 1980s as a period when concentrated poverty rose dramatically in many urban cores. Jargowsky (1994) finds significant variations in increasing poverty by region during the 1980s. The level of ghetto poverty increased in the midwestern region and "oil states" and decreased in the northeast region. In addition, there are variations among metropolitan areas within each region.

In the 1990s, the share of variation at the neighborhood level (55.1%) is back to the level in the 1970s. In the 1990s, while the share of variation at the metropolitan level declined (38.2%) compared to the one in the 1980s, it makes up a larger portion of the total variation than it did in the 1970s. The share of variation at the municipality level in the 1990s declined further to 6.7%. It seems that the emergence of new smaller suburbs (that were more homogeneous) led to the variation at the municipal level to decline over time. As shown in Table 3, the standard deviation of the share of metropolitan households in each municipality—the proxy of city size—has declined over time.

Table 4 Analysis of Variance for Neighborhood Change

	1970 - 1980		**1980 – 1990**		**1990 – 2000**	
Fixed Effects						
Constant	0.038** (0.016)		-0.072*** (0.024)		0.004 (0.019)	
Random Effects						
	Variance Components	% to Total Variance	Variance Components	% to Total Variance	Variance Components	% to Total Variance
Neighborhood Level (δ^2)	0.0205 (0.1432)	54.7%	0.0169 (0.1298)	39.9%	0.0186 (0.1364)	55.1%
Municipal Level (τ_{00})	0.0092*** (0.0958)	24.5%	0.0054*** (0.0733)	12.7%	0.0023*** (0.0474)	6.7%
Metropolitan Level (ω_{00})	0.0078*** (0.0886)	20.9%	0.0200*** (0.1414)	47.4%	0.0129*** (0.1136)	38.2%
-2 x Log Likelihood	-7065.4818		-11027.3653		-11209.1294	

***p<0.01, **p<0.05, *p<0.1

5. 3. Random Intercept Models

Appendix D presents the results of baseline random intercept models for the three panels—the 1970s, 1980s, and 1990s. Interestingly, neither percentage black nor

percentage Hispanic is statistically significant in any panels. As reviewed in Chapter 2, many studies recognize racial composition as an important explanatory variable in neighborhood change. To determine whether there is a nonlinear relationship between racial composition and neighborhood change, the race coefficients were squared and added to the equation.

When the squared terms of the racial variables are additionally included in the multilevel models, I find that the racial variables are statistically significant in the 1980s and 1990s for Hispanics and in the 1990s for blacks as shown in Table 5. That is, there is a nonlinear relationship between racial composition and neighborhood economic change in those time periods. In the next section, I present the results of the enhanced multilevel models at the neighborhood level, municipal and metropolitan levels, respectively. Recall that of the level-3 (metropolitan area) variables, the decline of manufacturing jobs to total jobs ratio variable and the decline of jobs to total population variable are time differenced values during one panel. All other explanatory variables are values at the beginning of one panel except for the unincorporated place and region dummies fixed across the panels. In the later section, I explain the relationship between racial composition and neighborhood economic change in more detail.

Table 5 Multilevel Estimates Including Additional Quadratic Racial Variables

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	B	S.E.	β	S.E.
	Constant	-0.343***	0.093	-0.377***	0.094	-0.188*	0.106
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.036***	0.014	-0.036*	0.021	0.011	0.016
	% Housing built within the preceding 20 to 30 years	-0.092***	0.033	0.014	0.019	-0.056***	0.019
	% Housing built more than 30 years ago	0.053***	0.017	0.075***	0.022	0.060***	0.017
	Average number of rooms	0.065***	0.007	-0.005	0.009	-0.001	0.006
	% Black	-0.003	0.066	-0.015	0.039	-0.117**	0.050
	% Hispanic	-0.186	0.117	-0.147**	0.062	-0.110**	0.052
	% Black^2	-0.022	0.086	-0.005	0.048	0.108**	0.046
	% Hispanic^2	0.193	0.166	0.130**	0.058	0.112**	0.055
	% College-graduates	-0.208**	0.095	0.329***	0.040	0.156***	0.023
	Poverty rate	0.266***	0.077	0.082*	0.046	0.254***	0.044
	Homeownership rate	0.088***	0.028	0.058	0.036	0.079***	0.027
	Very low economic status (less than 50%)	0.028	0.035	0.054*	0.029	0.070***	0.014
	Low economic status (50% to 80%)	0.022	0.014	0.003	0.010	0.019***	0.006
	Moderate economic status (80% to 100%)	0.020**	0.010	0.001	0.005	0.013***	0.004
	High economic status (120% to 150%)	-0.008	0.009	0.005	0.005	-0.014**	0.007
	Very high economic status (over 150%)	-0.032	0.024	-0.022	0.014	-0.033***	0.012
Level 2: Municipality	% MSA households in each municipality	-0.166***	0.029	-0.024	0.022	-0.079***	0.018
	Race/ethnicity homogeneity	0.163***	0.044	0.076**	0.031	0.116***	0.019
	Age homogeneity	-0.238	0.286	-0.103	0.149	0.008	0.151
	Family income homogeneity	-0.240	0.248	0.283	0.317	-0.158	0.182
	Family type homogeneity	0.021	0.133	0.248**	0.108	0.365***	0.113
	Dummy unincorporated place	0.022	0.014	0.006	0.009	-0.018***	0.005

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	-0.439	0.529	0.616	0.966	1.140	0.815
	Decline of jobs to total population ratio (change)	-0.293*	0.147	-0.720**	0.307	-0.251	0.240
	Metropolitan fragmentation	-0.075	0.058	0.020	0.081	-0.156	0.097
	Dummy Midwest	-0.085**	0.035	-0.094**	0.035	0.014	0.032
	Dummy Northeast	-0.160***	0.030	0.081	0.062	-0.103***	0.030
	Dummy West	0.076**	0.036	0.051	0.067	0.064	0.046
Variance Component	Level 1 (δ^2)	0.0183	0.1353	0.0158	0.1257	0.0174	0.1318
	Level 2 (τ_{00})	0.0072***	0.0850	0.0039***	0.0625	0.0015***	0.0388
	Level 3 (ω_{00})	0.0032***	0.0561	0.0129***	0.1135	0.0063***	0.0794
Percent of Variance Explained	Level 1	23.6%		22.8%		25.4%	
	Level 2	34.1%		30.9%		40.8%	
	Level 3	44.3%		31.7%		41.9%	
	-2 x Log Likelihood	-8077.48		-11865.58		-12094.59	
	Number of Parameters	32		32		32	

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03; ***p<0.01, **p<0.05, *p<0.1

5. 3. 1. Neighborhood Context: Level 1

Filtering Theories

At the neighborhood level, I included housing age and size related variables in the connection with filtering theories. The results coincide with those of Rosenthal (2008) and Ellen and O'Regan (2008), both of whom find that older housing and middle-aged housing are positively and negatively related to neighborhood economic gain, respectively. Although newer housing is negatively related to neighborhood economic gain in the 1970s and 1980s and insignificant in the 1990s, I find that housing age is relevant to neighborhood economic change. Housing age variables, however, are associated with cohort time dimension rather than age time dimension. As discussed above, the housing units built more than 30 years ago in the three panels are mostly built before 1940. The neighborhoods dominated by pre-1940 housing have unique characteristics of their structure and proximity for residents' convenience (Lucy and Phillips 2000). With respect to the finding in this study, I come to the conclusion that a neighborhood's performance during these panels depends on whether or not there is a greater share of housing units of better quality rather than whether or not there is a greater share of housing units newly built.

Housing size is positively related to neighborhood economic gain in the 1970s but not relevant in the later panels. That is, housing size is associated with period time dimension. This result may reflect the changing trends, such as increasing single and

childless people, declining household size, and aging of baby-boomers, all of which are likely to be associated with living in smaller homes[25].

Externality Theories

The results of the variables based on externality theories mostly correspond to our common wisdoms except for the racial variables. As stated above, I find that racial composition is non-linearly related to neighborhood economic change. I explain the relationships between racial composition and neighborhood economic change in more detail after presenting the results at the metropolitan level.

Interestingly, as Ellen and O'Regan (2008) find, the poverty rate is positively related to neighborhood economic gain in the 1970s and 1990s. Ellen and O'Regan (2008) suspect that after controlling for relative income levels and socio-economic characteristics of neighborhoods higher poverty may be associated with a wider distribution of income within tracts. Likewise, in this study it seems that after controlling for the initial economic status to the metropolitan averages and other socio-economic characteristics, higher poverty implies a wider distribution of income and housing value within tracts.

In addition to racial composition, poverty rate and social status variables, I examine whether each neighborhood's initial economic conditions are associated with neighborhood change in the subsequent decade. As shown in Table 5, only the moderate

[25] In addition, the correlation between the number of rooms (the proxy of housing size) and homeownership has increased over time (.62 in 1970, .72 in 1980, and .76 in 1990). The housing size variable is statistically significant with a positive sign in the models for the 1970s and 1990s when I exclude the homeownership variable in the models.

economic status (between 80% and 100% of each neighborhood's own-metropolitan-average) variable is significant in the model for the 1970s. This result implies that neighborhoods of moderate economic status improve more than the omitted neighborhoods of high-moderate economic status in the 1970s. In the model for the 1980s, the low economic status (less than 50%) variable is positively related to neighborhood economic gain, meaning that the poorest neighborhoods improved economically more than the neighborhoods of high-moderate economic status in that decade. In the model for the 1990s, all economics status variables are statistically significant. That is, all neighborhoods are different from the experience of the neighborhoods of high-moderate economic status. In particular, the low economic status (less than 50%) variable presents the highest coefficient value among the economic status variables. This may be because of governments' efforts to revitalize poor neighborhoods during that decade and previous one. Ellen and O'Reagan (2008) argue that there was a significant shift of the least affluent neighborhoods during the 1990s. They suggest that this may be because governmental policies, such as welfare reform, the Community Reinvestment Act, the HOPE VI program, and the Low Income Housing Tax Credit program, targeted a population disproportionately located in the least affluent neighborhoods.

Having more educated people in a neighborhood positively affects neighborhood economic gain in the last two panels. Not only do educated people generate social capital, but social interactions are more likely to be promoted in the neighborhoods with a larger share of educated people. The negative relationship between percentage college-

graduates and neighborhood economic gain in the 1970s may be partly because college-graduates moved into poor neighborhoods at the time. At the beginning of the 1970s, some adventurous people and young professionals—probably college-graduates—began purchasing inexpensive housing units in old neighborhoods, which were close to downtowns and possess architectural and historical appeals (Zielenbach 2000). When they restored the housing stock, retails also moved into the neighborhoods. Finally, property values increased, and accordingly more and more higher-income people moved into the neighborhoods. Another possible explanation to the sign change of the education variable is related to increasing income and educational segregation. As the segregation level in income level has increased over time (Dreier *et al.* 2001), it is probable to assume that educational segregation has increased over time as well. That is, some college-graduates who used to live with non college-graduates in poor neighborhoods until the 1970s might have segregated themselves from non college-graduates and to more affluent neighborhoods.

The homeownership rate is also positively related to neighborhood economic gain in the 1970s and 1990s. Because owning a home is the largest investment for homeowners, they are more concerned with neighborhood problems affecting housing prices than renters. Thus, homeowners tend to participate more in community activities to prevent neighborhood decline and are careful in selecting neighborhoods that are less likely to decline than renters. Those efforts bring in a positive outcome to neighborhood economic gain. Economic shocks are often associated with job loss and mortgage

foreclosure (Baxter and Lauria 2000). This may be the reason why the homeownership rate is not statistically significant in the 1980s when there was an economic recession.

5. 3. 2. Municipal Context: Level 2

I link the politics of scale to neighborhood change and hypothesize that neighborhoods stay economically healthier in smaller and homogeneous cities. In this study, the share of metropolitan households in each municipality is used as the proxy of city size, and the Simpson indexes based on race/ethnicity, age, family income level and family type are used as the proxies of homogeneity level of household interests.

The city size variable is statistically significant and negatively related to neighborhood change in the 1970s and 1990s. That is, as city size is smaller, its neighborhoods improve economically, although the relationship is not significant in the 1980s. The fact that there is no statistically significant relationship between city size and neighborhood change in the 1980s may be explained by the economic recessions in the 1980s. It is possible that neighborhoods in large cities could withstand the recessionary pressures better than ones in smaller cities so it made the city size variable insignificant during the recession. Once a neighborhood in a smaller suburb declines, it is likely to have a more negative effect on the whole jurisdiction than one neighborhood in the central city (a large city) would have. The basic reason is that there are smaller numbers of neighborhoods and they are located close to each other in smaller suburbs. By contrast, a central city has a lot more neighborhoods. Thus, decline of a single neighborhood may

not cause decline of other neighborhoods that are located relatively far from the declining neighborhood.

As shown in Table 5, race/ethnicity homogeneity at the municipal level is positively related to neighborhood economic change in all three panels, which corresponds to the proposed hypothesis. One might ask if the effect of race/ethnicity homogeneity is different depending on different racial/ethnic groups. Therefore, I run additional models that include two interaction terms between dummy variables[26], which indicate municipalities where blacks and Hispanics make up over 50% of the total municipal population, separately, and the race/ethnicity homogeneity index. The interaction terms are to differentiate municipalities that are homogenously White (and other races) from municipalities that are homogeneously black and Hispanic. Because the 1970 Census does not distinguish Hispanic from other races, the interaction term for Hispanic is not included in the model for the 1970s. Table 6 shows the results of the models that include two interaction terms.

[26] Several scholars (Galster and Mincy 1993; Galster *et al.* 2003; Galster *et al.* 1997; Jargowsky 1997) group black and Hispanic neighborhoods where blacks and Hispanics make up over 50% of the total neighborhood population, respectively. Similarly, I group black and Hispanic municipalities where blacks and Hispanics make up over 50% of the total municipal population, respectively, and use dummy variables to indicate those municipalities.

Table 6 Multilevel Estimates Including Interaction Terms between Race/Ethnicity Homogeneity and Minority Dummy Variables

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
	Constant	-0.337***	0.092	-0.358***	0.094	-0.189*	0.106
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.035**	0.014	-0.036*	0.021	0.011	0.016
	% Housing built within the preceding 20 to 30 years	-0.092***	0.033	0.014	0.019	-0.056***	0.020
	% Housing built more than 30 years ago	0.053***	0.017	0.074***	0.022	0.060***	0.017
	Average number of rooms	0.065***	0.007	-0.006	0.009	-0.001	0.006
	% Black	-0.003	0.067	-0.013	0.040	-0.117**	0.020
	% Hispanic	-0.186	0.117	-0.156***	0.058	-0.117**	0.050
	% Black2	-0.020	0.087	-0.002	0.048	0.108**	0.047
	% Hispanic2	0.193	0.166	0.161***	0.051	0.131**	0.055
	% College-graduates	-0.208**	0.095	0.332***	0.040	0.157***	0.024
	Poverty rate	0.267***	0.077	0.078*	0.047	0.254***	0.044
	Homeownership rate	0.088***	0.028	0.059*	0.035	0.079***	0.028
	Very low economic status (less than 50%)	0.027	0.035	0.054*	0.028	0.070***	0.014
	Low economic status (50% to 80%)	0.022	0.014	0.003	0.010	0.020***	0.006
	Moderate economic status (80% to 100%)	0.020**	0.010	0.001	0.005	0.013***	0.004
	High economic status (120% to 150%)	-0.008	0.009	0.005	0.005	-0.014**	0.007
	Very high economic status (over 150%)	-0.032	0.024	-0.022	0.014	-0.033***	0.012
Level 2: Municipality	% MSA households in each municipality	-0.168***	0.028	-0.026	0.023	-0.079***	0.018
	Race/ethnicity homogeneity	0.157***	0.041	0.073**	0.030	0.118***	0.020
	Race/ethnicity homogeneity * Black dummy	-0.041	0.062	-0.049	0.034	0.001	0.031
	Race/ethnicity homogeneity * Hispanic dummy	N/A	N/A	-0.125	0.076	-0.038**	0.017
	Age homogeneity	-0.234	0.287	-0.117	0.152	0.004	0.151
	Family income homogeneity	-0.240	0.248	0.310	0.326	-0.170	0.186
	Family type homogeneity	0.020	0.132	0.230**	0.112	0.366***	0.116
	Dummy unincorporated place	0.021	0.014	0.006	0.009	-0.018***	0.005

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	-0.445	0.529	0.318	0.968	1.149	0.814
	Decline of jobs to total population ratio (change)	-0.293*	0.147	-0.639*	0.313	-0.244	0.238
	Metropolitan fragmentation	-0.076	0.058	0.036	0.082	-0.153	0.098
	Dummy Midwest	-0.085**	0.035	-0.090**	0.035	0.012	0.032
	Dummy Northeast	-0.159***	0.030	0.088	0.063	-0.106***	0.030
	Dummy West	0.076**	0.036	0.040	0.066	0.062	0.046
Variance Component	Level 1 (δ^2)	0.0183	0.1353	0.0158	0.1257	0.0174	0.1318
	Level 2 (τ_{00})	0.0072***	0.0850	0.0038***	0.0618	0.0015***	0.0387
	Level 3 (ω_{00})	0.0032***	0.0561	0.0128***	0.1133	0.0063***	0.0794
Percent of Variance Explained	Level 1	23.6%		23.2%		25.5%	
	Level 2	34.1%		31.5%		40.9%	
	Level 3	44.3%		32.1%		41.9%	
	-2 x Log Likelihood	-8078.02		-11875.55		-12096.17	
	Number of Parameters	33		34		34	

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03; ***p<0.01, **p<0.05, *p<0.1

As shown in Table 6, race/ethnicity homogeneity in a municipality where the population is largely black makes no difference in any of the three panels and the Hispanic case is negatively related to neighborhood economic gain in the 1990s. A homogeneous municipality with whites only improves economically. This indicates that there are multiple housing markets among different racial/ethnic groups.

Family type homogeneity in a municipality positively affects neighborhood economic gain only in the last two panels. This may be associated with increasing variability in family type. As shown in Table 3, family type was generally more homogenous in the 1970s and more variability appeared in the 1980s and 1990s. It seems that increasing variability in family type has allowed those remaining homogeneous areas to do better.

As shown in Table 5 income level homogeneity and age homogeneity are not relevant to neighborhood economic change. Race/ethnicity homogeneity and family type homogeneity are associated more with neighborhood economic change.

The dummy variable to distinguish CDPs from incorporated municipalities is negatively related to neighborhood economic gain in the 1990s. This result implies that neighborhoods in unincorporated places are more likely to decline compared to those in incorporated municipalities. This result makes sense because unincorporated places such as townships have limited power to control their neighborhoods compared to incorporated municipalities and possibly more limited city services.

5. 3. 3. Metropolitan Context: Level 3[27]

At the metropolitan level, the midwest dummy in the 1980s and the northeast dummy in the 1990s are negatively related to neighborhood change compared to the omitted south. We can see that the midwestern and northeastern regions have not been as economically healthy as the western and southern regions.

The decline of manufacturing jobs to total jobs ratio variable, indicating economic restructuring is not significant in any panels. The decline of total jobs to population ratio variable, indicating decline of overall economic conditions, is negatively related to neighborhood economic gain in the models for the 1970s and 1980s but the variable is not statistically significant in the 1990s. The results can be also translated as neighborhoods in metropolitan areas of good economic conditions improved economically in the 1970s and 1980s. Finally, I do not find a negative relationship between the level of metropolitan fragmentation and neighborhood economic gain. Although it has negative signs in all three panels, the metropolitan fragmentation variable is not statistically significant in any panels.

However, these effects may be captured by the region dummies. Thus, I run the models, excluding the three region dummy variables. As shown in Appendix E, the

[27] One might ask whether there is a major structural difference among the three data sets in each panel. In other words, changes in coefficient over time may come from a structural difference among the three data sets rather than those changes in coefficient being meaningful because of the small number of samples (six explanatory variables at the metropolitan level and 35 metropolitan areas). Since there is no test to examine a structural difference in multilevel modeling, I ran OLS regression models using the variables at the metropolitan level and undertook Chow tests. A Chow test allows examination of structural differences between two data sets at a time. I separately examined differences between data in the 1970s and 1980s, data in the 1980s and 1990s, and data in the 1970s and 1990s. The tests show that we cannot reject the null hypothesis that there is no structural difference between sets of data at 5% significance level. Therefore I am inclined to view differences in coefficients between time periods as representing actual differences, though this cannot be proven in the multilevel models.

economic restructuring variable is negatively related to neighborhood economic gain in the 1970s and the decline of metropolitan job variable is negatively related to neighborhood economic gain in the 1980s and 1990s. The results show that economic restructuring has been less influential to neighborhood economic change in recent decades. In addition, the metropolitan fragmentation variable is negatively related to neighborhood economic gain in the 1970s and 1990s. This result corresponds to the proposed hypothesis that neighborhoods are more likely to decline in a fragmented metropolitan area.

5. 3. 4. Effect of Racial Composition: Change of Direction

As shown in Table 7, none of the racial variables are statistically significant in the 1970s. In the 1980s, the Hispanic variables are statistically significant. Percentage Hispanic is negatively and its squared term is positively related to neighborhood economic gain. In the 1990s, all racial variables are statistically significant. Percentage black and percentage Hispanic are negatively related to neighborhood economic gain, which coincides with the common wisdom based on externality theories. However, their squared terms are positively related to neighborhood economic gain.

Table 7 Summary of Racial Variables

Variables	**1970 - 1980**	**1980 - 1990**	**1990 - 2000**
% Black			-
% Hispanic		-	-
% Black^2			+
% Hispanic^2		+	+

In order to illustrate the effects of race on neighborhood change, I calculate the predicted values of neighborhood change for every 10% increase of blacks and Hispanics separately, after controlling for the effects of other explanatory variables[28]. Recall that the dependent variable is the change of neighborhood economic status not just neighborhood economic status. As shown in Figure 3 during the 1990s neighborhoods generally improve less when the share of blacks increases until blacks make up 54% of the neighborhood population[29]. When they make up over 54% of the neighborhood population, neighborhoods start to improve more with an increasing share of blacks. Although the slopes are different, a similar story happens for Hispanics (the critical point is at 49%) as shown in Figure 4. Although the value changes of the dependent variable are not very high (within 4% to 5%), we can see that racial composition still matters in neighborhood economic change as opposed to Harris's (1999) finding that SES is more relevant to housing prices than racial composition, but it matters in more complex ways.

Why do the directions change? The directions of neighborhood economic change alter when shares of blacks and Hispanics reach certain levels. These relationships are against our common wisdom that neighborhoods continue to decline with a greater share of minority population. It appears that the negative effects of race on neighborhood economic change are the greatest for integrated neighborhoods. This result suggests that integrated neighborhoods are the most unstable. Externality theories posit that households migrate in or out of a neighborhood based on social status, which includes racial composition. Thus, other racial groups, mostly whites, migrate out when blacks or

[28] I insert the mean values of explanatory variables into the model, except for the racial variables.
[29] Because the dependent variable is the log ratio of the neighborhood index score at the end versus at the beginning of one panel, I translated the log values to the percentage terms.

Hispanics increase in their neighborhoods. Because a disproportionate share of blacks and Hispanics is poor, housing values may not be sustained in the neighborhoods when whites and other racial groups leave. In turn, income succession follows. Squires and Velez's (1987) finding that integrated neighborhoods received the lowest number and dollar amount of mortgage loans in Milwaukee supports the most negative effects of race happening in integrated neighborhoods in this study.

The graphs show however, that once shares of minority population are over certain points in some neighborhoods, the neighborhoods are stabilized in economic status. In regard to the fact that the directions of neighborhood change turn up, Galster and Mincy (1993) argue that economic and political solidarity and stronger community institutions may be formed in racially homogeneous neighborhoods and the factors are reflected in neighborhood economic status. There may be more working relationships and networks that contribute to increase household income and housing values (Galster and Mincy 1993). Those relationships may attract middle- to upper-income minority households to the neighborhoods or contribute to incumbent upgrading.

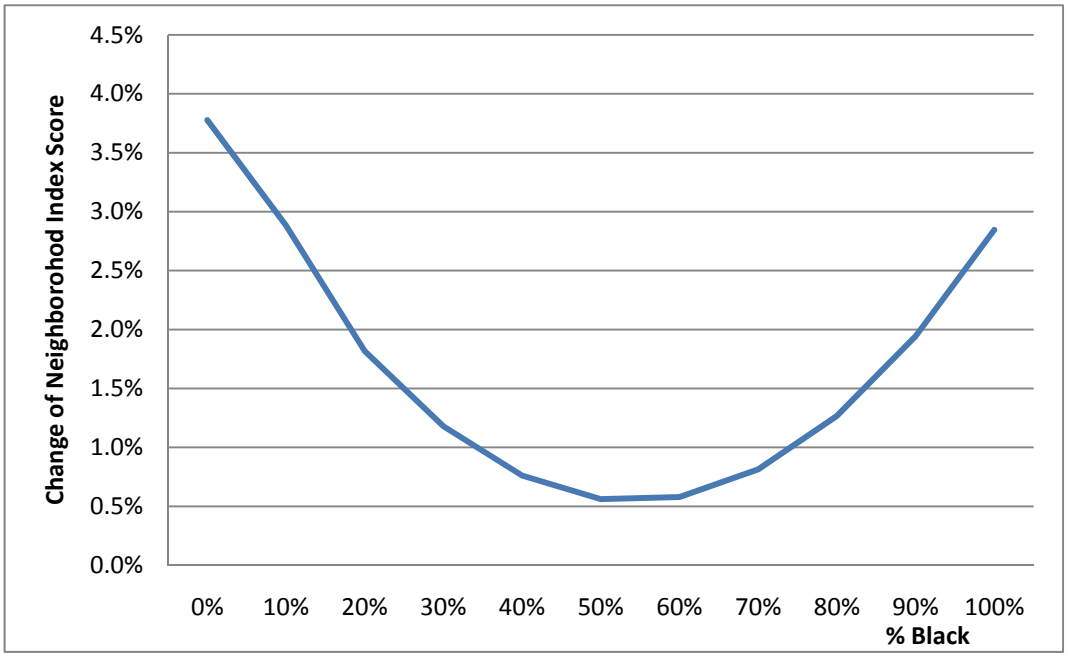

Figure 3 Neighborhood Economic Change by Percent Black in the 1990s

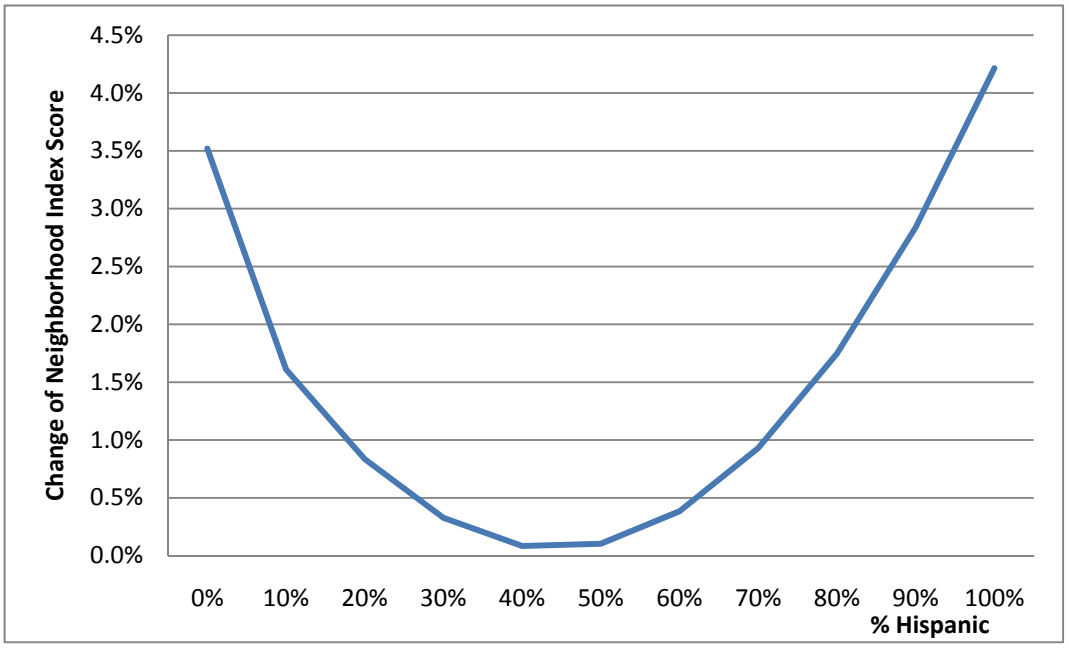

Figure 4 Neighborhood Economic Change by Percent Hispanic in the 1990s

5. 3. 5. Effect of Racial Composition: Change over Time

Previous studies directly and indirectly imply that the effects of racial composition on neighborhood change have differed over time (e.g., Cutler *et al.* 1999; Farley *et al.* 1994; Clark and Blue 2004). The empirical analyses in this study show that the influence of racial composition has increased over time. This is against the expectation that reduced racial discrimination weakens racial effects on neighborhood change. Why has racial composition exert an impact on neighborhood change over time in the 1990s but none in the 1970s and 1980s in black case and in the 1980s and 1990s but not in the 1970s in Hispanic case? I raise three possibilities to explain the reason for the rising influence of racial composition over time.

First, it is possible that the unexpected result is because of the increased mobility of middle-income black households. Pattilo (2005) and Fischer (2008) find that middle-income black households have suburbanized as racial discrimination has declined. Because blacks were previously very segregated from other racial groups, especially whites, middle- to upper-income blacks lived together with low income blacks in the inner cities. That may be why the percentage black is not statistically significant in earlier years because blacks lived in mixed income neighborhoods. However, housing market racial dynamics have altered over time. When racial discrimination became illegal in housing markets, middle-income blacks increasingly moved out of the inner city neighborhoods and relocated in the suburbs. Increased black suburbanization that started in the 1970s initially generated some optimism about racial integration (Schneider and Phelan 1993). However, Stahura (1988) finds that when blacks moved into the suburbs

(mostly inner suburbs) the suburbs were abandoned by whites. That is, if whites still had negative stereo types to blacks, as Farley *et al.* (1994) find, and wanted to avoid living with blacks because they were blacks, housing values would have declined in predominantly white neighborhoods with an increase in the number of blacks. Then, income succession would have been followed. Bostic and Martic (2003) find that a significant numbers of black homeowners have moved to affluent neighborhoods since the 1980s. They interpret this phenomenon as resulting from the impact of anti-discrimination efforts that were started in the 1980s. That is, fair lending and anti-discrimination efforts began in the 1960s may have started to have a measureable impact in the 1980s and resulted in the rising influence of racial composition over time

This logic can be applied to Hispanics as well. However, Hispanics and Asians are less segregated than blacks (Massey and Denton 1988; Cutler *et al.* 1999; Charles 2003). Although middle-income blacks have suburbanized, the segregation levels for blacks are still higher than for Hispanics and Asians at all income levels (Massey and Fischer 1999). Thus, Hispanics might have lived with other racial groups from an earlier time than blacks, thereby negatively affecting neighborhood economic gain from the 1980s, not from the 1990s. Also, Kasarda (1989) argues that Hispanics have more ethnic solidarity and kinship networks that can positively affect neighborhood economic change compared to blacks. That may be why the squared term of percentage Hispanic is positively related to neighborhood economic gain in both the 1980s and 1990s, while that of the percentage black is positively related to neighborhood economic gain only in the 1990s.

Another reason why the racial variables are statistically significant in the recent time periods may be because the negative correlations between percentage minority and housing and socio-economic variables have fallen over time. If there was a strong negative correlation between percentage black and, for instance, percentage college-graduates in neighborhoods, the percentage black could turn out to be insignificant and only the percentage college-graduates turn out to be statistically significant due to multi-colinearity. However, if the negative correlations between percentage black and other housing and socio-economic variables have declined over time, the percentage black could change and become statistically significant if the percentage black independent of those other variables really influences neighborhood change. This may be why the racial variables are statistically significant in the recent panels. In order to examine this possibility, I look at the correlations between racial variables and other housing and socio-economic variables at the neighborhood level and the trend over time. However, as shown in Appendix F the correlations between percentages of blacks and Hispanics and housing and socio-economic variables have not significantly declined over time and the correlations between them are not very strong in any time period.

An alternative way to look at the relationships between race and housing and socio-economic variables is to compare variables based on census tract percent black and Hispanic. To do this, I stratify neighborhoods based on census tract percent black and Hispanic: less than 10%, between 10% and 60% and over 60%. These ranges are used by

other researchers (Kiel and Zabel 1996; Chambers 1992; Harris 1999)[30]. In Appendix G, the results of a descriptive analysis shows that the neighborhoods where blacks make up over 60% of the neighborhood population decline more that the other two groups in the 1970s and 1980s. By contrast, in the 1990s, the neighborhoods where blacks make up less than 10% and over 60% of total population are stable, whereas the others (between 10% and 60%) decline by 7%[31]. In all three panels, old housing units (built more than 30 years ago) are concentrated in the 60% black neighborhoods. The average number of rooms, percentage of college-graduates, and homeownership rates are lower and poverty rates are higher in the same neighborhoods.

Appendix G also shows the descriptive statistics based on census tract percent Hispanic. There are some differences in Hispanic neighborhoods compared to black neighborhoods. For example, the neighborhoods where Hispanics make up over 60% of the neighborhood population improve in the 1970s unlike black neighborhoods. However, the number of those neighborhoods is small (only 1% of total census tracts in the 1970s). In the 1980s, the neighborhoods where Hispanics are less than 10% and over 60% of total population decline, while the other neighborhoods improve in neighborhood index scores. In the 1990s, the pattern is similar to black neighborhoods. Whereas the neighborhoods where Hispanics are less than 10% and over 60% of total populations are more stable than the other neighborhoods (between 10% and 60%), which declined by 9%. While the relationships between the percentage Hispanics and other socio-economic

[30] Additionally, Emerson *et al*. (2001) find that a quarter of their sample of whites responded that they would buy a house when the racial composition in a neighborhood is 15% percent black or less. But, they would not buy a house when blacks make up over 65% of the neighborhood population.
[31] The log value of the dependent variable was translated to a percentage term.

characteristics are similar to blacks' cases, the exception is old housing units. They are more concentrated in the neighborhoods with a lower share of Hispanics (less than 10%).

Briefly, the neighborhoods where blacks and Hispanics make up over 60% of the neighborhood population are more stable than the other neighborhoods (less than 10% and between 10% and 60%) in the 1990s, which coincides with Figure 2. However, correlations between percentage minorities and housing and socio-economic variables do not decline significantly over the time period of this study. In this regard, it does not seem that the significance of the racial variables in the recent panels results from the declining correlations between racial composition and other socio-economic variables.

Finally, gentrification may be the reason why the racial variables are statistically significant in the recent panels. Although gentrification began prior to 1960 in certain cities, the measureable impact on neighborhood economic change might only have been presented in the 1980s. Galster *et al.* (2003) find that a greater share of minorities in minority neighborhoods is associated with a decline in the poverty rate (economic gain) during the 1980s. He interprets this as meaning that gentrifiers are more likely to move into minority neighborhoods, which are often poor. The gentrification explanation implies that in-migration of non-poor households contributed to economic gain in racially homogeneous black or Hispanic neighborhoods and gentrification does not increase affluence of existing residents unlike the community institutions idea would suggest. In order to examine whether gentrifiers moved into minority neighborhoods overall and contributed to neighborhood economic gain, I compare shares of new comers in the neighborhoods where blacks and Hispanics make up over 54% and 49% (the critical

points for blacks and Hispanics, respectively) of the neighborhood population with those in the rest of the neighborhoods and the all neighborhoods in the 1990s through t-tests. Because census data do not include information about what income level people moved into a neighborhood, comparing shares of occupied housing units where households moved within five years is the only way to examine the gentrification hypothesis.

Table 8 Mean Difference of Share of New Comers in Non-Minority Neighborhoods vs. Minority Neighborhoods between 1990 and 2000

In Black Neighborhoods			**In Non-Black Neighborhoods**			t-test
Mean	S.D.	N	Mean	S.D.	N	
0.00871	0.0880	1262	-0.0225	0.1019	9217	-11.57***
In Hispanic Neighborhoods			**In Non-Hispanic Neighborhoods**			t-test
Mean	S.D.	N	Mean	S.D.	N	
-0.0150	0.0933	406	-0.0187	0.1011	10000	-0.79

***p<0.01, **p<0.05, *p<0.1

As shown in Table 8, the share of new comers increased between 1990 and 2000 in black neighborhoods (where blacks make up over 54% of the neighborhood populations), while it declined during the same period in non-black neighborhoods. The difference of the share of new comers in black and non-black neighborhoods is also statistically significant, which corresponds to the gentrification hypothesis. However, the share of new comers declined between 1990 and 2000 both in Hispanic neighborhoods (where Hispanics make up over 49% of the neighborhood populations) and non-Hispanic neighborhoods, which does not corresponds to the gentrification hypothesis. That is, the gentrification hypothesis to the extent that this simple test illustrates is only applicable to black neighborhoods. However, considering the fact that not so many of black and

Hispanic neighborhoods are gentrified, it seems that gentrification is not the main cause of the increasing influence of racial composition over time.

To sum up, it seems that of the possible ideas considered here the suburbanization of middle-income minorities is the most likely explanation for the rising influence of racial composition on neighborhood change.

5. 4. Assessing Model Fit-Deviance and R^2

In a multilevel analysis, the traditional approach for calculating explained variances is checking the proportional reduction in residual variance brought about by adding variables. However, explained variance can be negative, in cases where the variance at the higher levels is increased by adding variables at the lower level (Luke 2004). I find that variances at the metropolitan levels are increased when variables at the neighborhood level are added in the multilevel models. Thus, I use another method for calculating explained variances that Snijders and Bosker (1994; 1999) suggest for calculating R^2. According to their work, R^2 in a multilevel model is interpreted as the proportional reduction of prediction error rather than a simple percentage of variance accounted for. The proportional reduction of prediction error for each level is calculated as shown in Equations (6), (7), and (8):

Level-1 residual variance: var $(\text{residuals})_1 = \delta^2 + \tau_{00} + \omega_{00}$

$$R_1^2 = 1 - \frac{(\delta^2 + \tau_{00} + \omega_{00}) \text{ Comparison}}{(\delta^2 + \tau_{00} + \omega_{00}) \text{ Baseline}} \qquad (6)$$

Level-2 residual variance: var (residuals)$_2$ = $\delta^2/n_1 + \tau_{00} + \omega_{00}$

$$R_2^2 = 1 - \frac{(\delta^2/n_1 + \tau_{00} + \omega_{00}) \text{ Comparison}}{(\delta^2/n_1 + \tau_{00} + \omega_{00}) \text{ Baseline}} \quad (7)$$

Level-3 residual variance: var (residuals)$_3$ = $\delta^2/n_1 + \tau_{00}/n_2 + \omega_{00}$

$$R_3^2 = 1 - \frac{(\delta^2/n_1 + \tau_{00}/n_2 + \omega_{00}) \text{ Comparison}}{(\delta^2/n_1 + \tau_{00}/n_2 + \omega_{00}) \text{ Baseline}} \quad (8)$$

where δ^2 is level-1 residual variance, τ_{00} is level-2 residual variance, ω_{00} is level-3 residual variance, and n is group size that is the number of census tract in a municipality (n_1) and a metropolitan area (n_2). In my data set, group sizes, at each level vary, which means the data set in this study is not balanced across groups. Thus, I apply the mean value of group sizes to calculate R^2 as Luke (2004) suggests for unbalanced data. Table 9 shows the mean group sizes for calculating R^2 at the levels 2 and 3, using Equations (7) and (8).

Table 9 Means of Group Sizes at the Levels 2 and 3

	1970 - 1980	**1980 - 1990**	**1990 - 2000**
Number of level-1 units at the level-2	5.71	5.55	5.48
Number of level-2 units at the level-3	248.94	284.97	299.40

The HLM software produces deviance which is "a measure of the lack of fit between the data and the model" (Luke 2004, p. 34). It is obtained by multiplying the natural log of the likelihood by minus two (-2LL). The deviance in a model can be used to compare the model with other models. In general, lower deviance implies a better fit.

However, because deviance always decreases as more explanatory variables are added, two alternative methods can be used to evaluate model fit: the Akaike Information Criterion (AIC) and Schwarz's Bayesian Information Criterion (BIC)

AIC = deviance + 2*p*
BIC = deviance +*p*ln(N)

where *p* is the number of parameters in the model and N is the sample size. As Singer and Willett (2003) suggest, level-1 sample size is used for N. AIC and BIC penalize including a greater number of parameters in the model.

As shown in Table 10, deviances in the multilevel models without the two squared racial variables are lower than those in the one-way ANOVA models, not including any explanatory variable, in the all three panels. Given that the models with the squared racial variables have the lowest value of AIC in the all three panels and of BIC in the 1990s, I use the multilevel models with the squared racial variables as the final models.

Table 10 Comparison of Model Fit

		1970 - 1980	**1980 - 1990**	**1990 - 2000**
ANOVA	Deviance	-7065.48	-11027.37	-11209.13
	Parameters	4	4	4
Without Squared Racial Variables	Deviance	-8070.1276	-11859.202	-12067.627
	Parameters	30	30	30
	AIC	-8010.13	-11799.2	-12007.6
	BIC	-7800.72	-11583.1	-11789.9
With Squared Racial Variables	Deviance	-8077.48	-11865.58	-12094.59
	Parameters	32	32	32
	AIC	-8013.48	-11801.6	-12030.6
	BIC	-7790.11	-11571.1	-11798.4

5. 5. Comparison of Regression Model with Multilevel Model

As stated above, running a standard OLS model in a nested data structure causes statistical problems. To make the explanation simple, I compare the OLS regression model that takes the disaggregation approach and the multilevel model only for the 1990s. As shown in Table 11, standard errors are lower and more variables are statistically significant in the regression model compared with those in the multilevel model. This is because running a standard OLS model in a nested data structure leads standard errors to be biased downwards, thereby inflating t-values and the risk of Type I errors (Steenbergen and Jones 2002). Using OLS regression would lead to important statistical problems and thus to errors of interpretation.

Table 12 shows the summary of racial variables in the different statistical models. The squared percentage black and Hispanic variables that are statistically significant in the OLS regression model for the 1970s are not statistically significant in the multilevel model. The percentage Hispanic variable is not statistically significant and its squared value is negatively related to neighborhood economic gain in the OLS model for the 1980s, whereas the percentage Hispanic variable is statistically significant with a negative sign and its squared term is positively related to neighborhood economic gain in the multilevel model. As standard errors are biased downward in an OLS regression model, one would have expected the opposite result. The fact that none of the racial variables is statistically significant in the 1970s and Hispanic variables are significant with an opposite sign in the 1980s in the more reliable model offers evidence of their important role in explaining neighborhood decline.

Table 11 Regression Estimates and Multilevel Estimates in the 1990s

Level	Explanatory Variables	Regression Model		Multilevel Model	
		β	S.E.	β	S.E.
Level 1: Neighborhood	Constant	-0.561***	0.033	-0.188*	0.106
	% Housing built within the preceding 10 years	-0.045***	0.015	0.011	0.016
	% Housing built within the preceding 20 to 30 years	-0.087***	0.017	-0.056***	0.019
	% Housing built more than 30 years ago	0.037***	0.011	0.060***	0.017
	Average number of rooms	0.017***	0.003	-0.001	0.006
	% Black	-0.106***	0.028	-0.117**	0.050
	% Hispanic	-0.214***	0.036	-0.110**	0.052
	% Black^2	0.088***	0.028	0.108**	0.046
	% Hispanic^2	0.236***	0.044	0.112**	0.055
	% College graduates	0.270***	0.019	0.156***	0.023
	Poverty rate	0.304***	0.023	0.254***	0.044
	Homeownership rate	0.061***	0.014	0.079***	0.027
	Very low (less than 50%)	0.100***	0.011	0.070***	0.014
	Low (50% to 80%)	0.051***	0.006	0.019***	0.006
	Moderate (80% to 100%)	0.026***	0.005	0.013***	0.004
	High (120% to 150%)	-0.039***	0.006	-0.014**	0.007
	Very high (over 150%)	-0.086***	0.007	-0.033***	0.012
Level 2: Municipality	% MSA households in each municipality	0.019*	0.012	-0.079***	0.018
	Race/ethnicity homogeneity	0.250***	0.015	0.116***	0.019
	Age homogeneity	0.322***	0.092	0.008	0.151
	Family income homogeneity	-0.393***	0.120	-0.158	0.182
	Family type homogeneity	0.588***	0.057	0.365***	0.113
	Dummy unincorporated place	-0.023***	0.005	-0.018***	0.005

Level	Explanatory Variables	Regression Model		Multilevel Model	
		β	S.E.	β	S.E.
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	2.043***	0.112	1.140	0.815
	Decline of jobs to total population ratio (change)	-0.306***	0.033	-0.251	0.240
	Metropolitan fragmentation	-0.120***	0.015	-0.156	0.097
	Dummy Midwest	0.024***	0.005	0.014	0.032
	Dummy Northeast	-0.092***	0.006	-0.103***	0.030
	Dummy West	0.064***	0.005	0.064	0.046
		R^2	27.6%	Level 1	25.4%
		Adj R^2	27.4%	Level 2	40.8%
				Level 3	41.9%

***p<0.01, **p<0.05, *p<0.1

Table 12 Summary of Racial Variables in Regression Model and Multilevel Model

	1970 - 1980		1980 - 1990		1990 - 2000	
Variables	Regression Model	Multilevel Model	Regression Model	Multilevel Model	Regression Model	Multilevel Model
% Black					-	-
% Hispanic				-	-	-
% Black^2	-				+	+
% Hispanic^2	-		-	+	+	+

5. 6. Cross-Level Interactions

As a multilevel analysis allows cross-level interactions, I test whether cross-level interactions between changes of housing demography (changes in proportion of married couples without children, the elderly-65 years old and older, and singles) and an old neighborhood dummy variable are positively related to neighborhood economic gain. The HLM software computes robust standard errors as well as regular standard errors. Robust standard errors for a multilevel model are relatively insensitive to model misspecifications, while regular standard errors for a multilevel model are model-based, and therefore sensitive to model misspecifications. However, the HLM software cannot compute a final estimation of fixed effect with robust standard errors for the model in the 1970s due to the smaller number of samples (32 at level 3), while it can compute a final estimation of fixed effect with robust standard errors for the model in the 1980s and 1990s (35 at level 3). Thus, I report the multilevel model estimates for the 1980s and 1990s.

Appendix H shows the multilevel models, including the cross-level interaction terms: old neighborhood*change in proportion of singles, old neighborhood*change in proportion of married couples without children, and old neighborhood*change in proportion of the elderly. As shown in Appendix H, the relationships are statistically significant only for the interaction terms between the older neighborhood dummy and the change of the elderly variables in the 1980 and 1990s. However, the interaction term is negatively related to neighborhood economic gain as opposed to the expected positive relationship. According to the models, it seems that increasing singles, childless couples, and elderly people do not positively influence neighborhood change up to 2000. The oldest baby-boomers were 54 years old in 2000. Once we get the 2010 Census, we may find a different relationship between those variables and neighborhood change as the baby-boomers will be older.

5. 7. Interpretation of the Results

At the beginning of this study, I asked "Why do some neighborhoods in U.S. urban areas stay economically healthy and others do not?" I proposed three hypotheses for diverging paths of neighborhood change: 1) Neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales; 2) the politics of scale—city size and the homogeneity level of household interests in a municipality—affects neighborhood change; and 3) factors of neighborhood change have changed over time. From the empirical analyses, I find clear evidence to support these arguments.

1) **Neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales.**

My first hypothesis is empirically demonstrated by running the fully unconditional models and by comparing them with the level-3 random intercept models. In the fully unconditional models, the moderate shares of variance at the municipal and metropolitan levels to the total variance suggest that we need to consider the municipal and metropolitan contexts as well as the neighborhood context in neighborhood change studies.

I also find statistically significant variables based on the proposed hypotheses in each of the three contexts. As opposed to Hoyt's (1933) filtering model, older neighborhoods (having a greater share of housing units built more than 30 years ago) are positively associated with neighborhood economic gain in all three panels. As stated above, the older neighborhoods are dominated by pre-1940 housing units, which have unique characteristics associated with the structures and with their locations (proximity to downtown for residents' convenience) (Lucy and Phillips 2000). However, the effect of this variable may not be persistent over time. For example, housing units built 30 years ago in the 2020 Census will be ones built before 1990. Old neighborhoods in 2020 might be dominated by housing units built in the 1960s and 1970s, which are not considered as good as pre-1940 housing units and may not have the architectural character of the pre-war housing. On the other hand, the middle-aged neighborhoods that are dominated by housing units built between 1945 and 1970 possess poorer architectural quality, low levels of walkability and accessibility to services, stores, and public transportation. Based on the findings on the relationship between housing age and neighborhood economic

change, I come to the conclusion that neighborhoods' futures depends on whether or not there is a large share of housing units of better quality rather than whether or not there is a large share of newer housing units. The fact that housing size is not relevant to neighborhood economic change also supports the significant of housing quality on neighborhood change.

One of the interesting findings in this study is the non-linear relationship between racial composition and neighborhood change showing that a greater share of minority population is negatively related to neighborhood economic gain until certain critical points but is positively related to neighborhood economic gain after the critical points. This result is in opposition to what is predicted from Bailey's (1959) boarder model and Schelling's (1971) tipping model. Why do the directions change? I conclude that racially integrated neighborhoods are the most vulnerable to neighborhood decline. Also, racially homogeneous minority neighborhoods may form strong community institutions, which is positively associated with economic gain, although economic status in those neighborhoods is lower than that in integrated neighborhoods.

The non-linear relationship between racial composition and neighborhood change also suggests that public policies aimed at encouraging racial integration could slow or stop those improvements. Some downsides of racial integration are introduced in Cashin's (2004) book. She describes black people who miss pre-integration black communities, "They are animated by a love and longing for a vibrant, stable, healthy, and nurturing black community……I sense a nostalgic cry for an intact, pre-integration black community……" (p.21). In her book, an urban planner as well as a long-time resident in

Prince George's County, Maryland, a majority-black county at the highest-income in the U.S. also rejects the notion of racial integration. Other black interviewees in her book feel more comfortable in black communities because they can socialize with other black people, are not stared at by whites, and can be more politically involved in black communities. When black communities become integrated, those comforts may disappear. Therefore, racial composition and its effects on neighborhood economic conditions need to be studied much more carefully as the empirical analysis contradicts commonly assumed relationships.

Other variables based on externality theories mostly correspond to our expectations. As more educated people and homeowners create social capital for a neighborhood, they positively affect neighborhood economic gain. Unexpectedly, however, poverty rate is positively related to neighborhood economic gain. As Ellen and O'Regan (2008) suppose, it seems there are wider variations in per capita income and housing value in the neighborhoods with higher poverty rates, holding other things constant.

I also controlled for neighborhoods' initial economic status to each neighborhood's-own-metropolitan-area average economic status. The neighborhood initial status variables became more significant in the later panels. More interestingly, the least affluent neighborhoods are most likely to improve compared to more affluent neighborhoods. I suggest that this is because federal policies in the 1990s mostly targeted people who live in less affluent neighborhoods. This finding suggests that less affluent neighborhoods can be improved with public policies.

At the municipal and metropolitan levels, I find that city size and the homogeneity level of household interests in a municipality and metropolitan and regional economic conditions are relevant to neighborhood change. This finding suggests that planning and policies for neighborhood stabilization and community development should not just focus on neighborhood characteristics but pay attention to larger contexts.

2) The politics of scale—city size and the homogeneity level of household interests in a municipality—affects neighborhood change

The results at the municipal level demonstrate the linkages between city size and municipal homogeneity and neighborhood economic gain. As those relationships have been totally neglected in the neighborhood change literature, the results that neighborhoods improve economically in a smaller city and in a more homogeneous city may be the most critical finding of this study.

As discussed in Chapter 3, civic capacity is greater in smaller cities because citizens in smaller cities are psychologically more engaged to their communities and have less opportunity costs in participating in local activities. Municipal governments with great civic capacity perform better, provide public goods more effectively and eventually grow economically. However, this finding does not endorse housing market fragmentation. When people segregate themselves in small suburbs, the central cities become weaker (Bier and Howe 1998; Howe *et al.* 1998) and the weak central cities lead the whole metropolitan area to decline (Adams *et al.* 1996). I find that the level of metropolitan fragmentation in 1970 is negatively correlated with neighborhood economic gain during the 1990s. This relationship supports the possibility that metropolitan

fragmentation is negatively associated with neighborhood economic gain in the long term.

In regard to the homogeneity level of household interests in a municipality, I find that race/ethnicity homogeneity and family type homogeneity at the municipal level positively affect neighborhood economic gain. Civic capacity is greater in homogeneous cities as well because people trust each other more and civic norms are greater. Spending on public goods is also more effective and each neighborhood's interests are better represented in the city's legislative body in homogeneous cities, thereby positively affecting neighborhood economic gain. However, while this finding describes what seems to have happened during the time periods under study, it should not be read as endorsing racial segregation Because of dual housing markets among different racial/ethnic groups, race/ethnicity homogeneity at the municipal level positively affects neighborhood economic gain only when the municipality is homogeneously white. Race/ethnicity homogeneity at the municipality level when the municipality is homogeneously black is not relevant neighborhood change and when the municipality is homogeneously Hispanic negatively affects neighborhood economic gain in the 1990s.

The short run benefits of homogeneously white municipalities may come at the price of long run costs for both white and minority people. One of those costs is that both minority people and whites bear the burden of concentrated poverty. Cashin (2004) discusses the dilemma of middle-income blacks. Middle-income blacks have continued to escape from poverty areas. However, racial discrimination and prejudice leads blacks to live separately from whites. When middle-income blacks move to white communities,

white households start leaving communities. When whites leave the neighborhood, poor blacks can afford housing in the communities. Because the number of middle-income blacks is relatively fewer than middle-income whites, outflows of middle–income whites lead housing prices to decline. In addition, as a disproportionate numbers of blacks are poor, increasing blacks in a community is often associated with increasing social distress such as increasing crime and lowering school quality (Cashin 2004). These conditions also lead retail businesses to leave black communities. In the end, middle-income blacks can find themselves in concentrated poverty. They bear a heavy burden of concentrated poverty by paying more taxes but receiving public services of low quality, sending children to private schools, facing longer commutes and making longer trips to stores (Cashin 2004).

On whites' side, while it appears that whites benefit from racial segregation, they also pay costs for racial segregation. They have to pay more for housing to live in homogeneous communities. Thus, housing gets less affordable in a segregated housing market than it would have been in an integrated housing market (Cashin 2004). A second cost is that an increase of within-municipal homogeneity is associated with an increase of between-municipal heterogeneity. As racial and class lines cannot be clearly divided (Cashin 2004), income segregation between municipalities increases when racial segregation continues. Scholars also find that an increase of between-municipal heterogeneity reduces economic efficiency in the long run by increasing redistributive tax pressures and political instability, which are detrimental to growth and investment (Bénabou 1996; Alesina and Rodrik 1994; Persson and Tabellini 1994).

3) Factors of neighborhood change have changed over time.

The third argument is examined by comparing the models for the 1970s, 1980s, and 1990s. As expected, many explanatory variables on neighborhood change have changed over time. An example of that is housing size. Housing size is positively related to neighborhood economic gain in the 1970s but is not relevant in the later panels. I also find that the least affluent neighborhoods are more likely to improve in the 1980s and 1990s but not in the 1970s. The midwest dummy variable that is negatively related to neighborhood economic gain in the 1970s and 1980s is not relevant in the 1990s. The changes of factors associated with neighborhood change in different time periods suggest that community development policy needs to change over time as well.

Most interestingly, I find that the effect of racial composition on neighborhood change has increased over time probably because of the suburbanization of middle-income minorities. It is expected that middle-income minority people will continue to suburbanize. However, if racial prejudice of other racial/ethnic groups, especially whites, about blacks and Hispanics, is still pertinent, white neighborhoods will decline economically due to the outflows of white households and inflows of poor minority households. That is, unless racial prejudice and informal racial discrimination disappear and SES of minority people significantly improves, neighborhoods in the suburbs may continue to decline when middle-income minority households suburbanize.

Chapter 6: Summary, Conclusions, Policy Implications and Future Research Directions

The principal research question in this study is "Why do some neighborhoods in the U.S. urban areas stay economically healthy and others do not?" There are numerous studies of neighborhood change that find factors influencing neighborhood change. After reviewing previous studies in neighborhood change, however, I found that previous studies on neighborhood change have the limitations that they focus solely on neighborhood level characteristics, neighborhood change beyond the inner cities has been less studied and there are few longitudinal analyses of neighborhood change. I introduce a model of neighborhood change that addresses the limitations of the existing literature and serves as the basis for the proposed hypotheses to explain why neighborhoods follow different paths.

Based on my model of neighborhood change, I proposed three hypotheses: 1) Neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales; 2) The politics of scale is an important factor that leads to different paths and outcomes of neighborhood change; and 3) Factors of neighborhood change have altered over time.

In order to empirically test the hypotheses, I randomly selected 35 metropolitan areas among the largest 100 MSAs in the U.S. and analyzed the Neighborhood Change Data Base (NCDB) using multilevel modeling. Using per capita income and average housing value in neighborhoods, I developed an index of neighborhood economic

condition and used the change of this index as the dependent variable in the empirical analyses. I included the explanatory variables at the neighborhood, municipal, and metropolitan levels based on the theories on neighborhood change and my model of neighborhood change.

Through the empirical analyses, I found clear evidence to support the proposed hypotheses. First, neighborhood change is produced by interactions of factors at the metropolitan, municipal, and neighborhood scales. Secondly, the politics of scale matters in neighborhood change in that neighborhoods are more likely improve economically in smaller and more homogeneous cities in race/ethnicity (if white) and family type. Finally, factors affecting neighborhood change have altered over time.

I demonstrated that neighborhoods are not independent but interconnected with the dynamic and broader urban contexts of municipalities and metropolitan areas. Most importantly, I have shown that neighborhood change is affected by interactions of factors at the metropolitan, municipal and neighborhood levels. This finding suggests that sustainable municipalities and municipalities lead to sustainable neighborhoods.

Policy Implications

With regard to the findings, this study suggests several policy implications. First, it is essential to take metropolitan, municipal, and neighborhood contexts into account together in setting public policies for community development. Neighborhood stabilization policies and community development corporations (CDCs) often focus on the conditions at the neighborhood level (Randy 1997). However, neighborhood

economic change is contingent on interactions of factors at the municipal and metropolitan levels as well as at the neighborhood level. Compared to an average neighborhood[32], a neighborhood in a larger city and a neighborhood in a city with more heterogeneous family types (calculated by inserting values of two standard deviation difference) declined by 4.5%. Another neighborhood in a metropolitan area where jobs declined between 1990 and 2000 (calculated by including a value of two standard deviation difference) declined by 4.6% in the 1990s. Therefore, community development practitioners and policy makers should consider both larger contexts and factors at the neighborhood level. For example, community development practitioners must recognize existing housing, demographic, and socio-economic characteristics and initial economic conditions at the neighborhood level for a specific declining neighborhood. They also have to consider the municipal context. If a neighborhood is located in a large city or heterogeneity city, the future of the neighborhood may be even worse. It is also important to look at the metropolitan context, since metropolitan economic conditions are associated with neighborhood change. Thus, community development practitioners have to not only be prepared for the effect of change in metropolitan economic conditions but consider the regional economy.

At the neighborhood level, I find some results that differ from the expected relationships. One of the unexpected findings is that neighborhoods with a larger share of older housing units (built more than 30 years ago) are more likely to improve. Those

[32] Theoretically, the average value of the dependent variable (log ratio of the neighborhood index score at the end to the index score at the beginning of one panel) is 0, which means an average neighborhood does not change in economic status in one panel. However, the computed value, by inserting the mean values of the explanatory variables into the equation for the 1990s, is 0.028 due to rounding.

housing units built more than 30 years ago are mostly built before 1940 and considered better (initial) quality housing. This finding suggests that having housing units of good quality matters in creating economically healthy neighborhoods more than simply having newer housing. Thus, local governments should focus on regulations that lead to the construction of housing of good quality. Also, the federal government should provide more incentives for the development of affordable housing of better quality (e.g., green building).

I also find other socio-economic variables at the neighborhood level are related to neighborhood change. A larger share of college-graduates and a higher homeownership rate that are used as social capital and social interaction measures positively affect neighborhood economic gain. This finding suggests that there should be public policies, supporting for increasing social capital and social interactions among residents.

This study also finds that racial composition is related to neighborhood change in a more complex way. Once share of blacks and Hispanics in neighborhoods are over their critical points, neighborhoods are stabilized and show improvement. It seems that forming strong community institutions in racially homogeneous neighborhoods is the most likely explanation for this finding. This explanation implies that public policies aimed at encouraging racial integration could slow or stop those improvements. Thus, redevelopment of neighborhoods that are homogeneously blacks and Hispanics should be undertaken in the way that existing residents prefer rather than simply promoting gentrification by attracting new comers.

With regard to the politics of scale, this study suggests that larger and more heterogeneous cities learn from smaller and more homogeneous cities by, for example, working to increase community interaction, which is positively related to city growth. When community members interact and participate in community activities more often, collective action problems will occurs less. Some may ask if increasing civic capacity is possible in large and heterogeneous cities. Since the focus of urban problem-solving shifted from the federal government to local municipalities, there have been growing efforts to build community capacity for planning and its implementation, advocacy, and service delivery, an effect known as community-building initiative (CCIs) (Chaskin and Abunimah 1999). Numerous neighborhood-based institutions have been developed within jurisdictions by CCIs. Berry *et al.* (1993) argue that smaller, neighborhood-based institutions are effective in bringing citizens' community participation. In Chaskin and Abunimah's (1999) study, officials interviewed emphasized the need for local government to have a partnership with neighborhoods. Because neighborhood-based actors are familiar with neighborhood circumstances, neighborhood-based institutions can play a role as advisers, make clear residents' concerns and helping to set priorities in planning. Presence of the neighborhood-based institutions raises neighborhood residents' accessibility to the public agenda that requires collective actions. Thus various programs such as neighborhood-based planning commissions, improvement zones, crime watch programs, or representative boards should be considered in order to empower residents in larger and heterogeneous municipalities to help increase community interaction.

In addition, local governments should encourage community leaders to create and enhancing a sense of place. In particular, because many central city neighborhoods have historical significance, they may be readily able to create or introduce community identities. Neighborhoods possessing culture and heritage and a sense of place become secure places where residents interact and communicate each other (Gumpert and Drucker 2008).

In addition, more metropolitan areas should consider adopting regionalism such as the Minneapolis-St. Paul's Metropolitan Council or the Metro in Portland, OR. An increase in between-municipal heterogeneity comes at a long-run cost. Under regionalism, middle- to higher-income people and white households would not be able to segregate themselves into smaller municipalities to maintain their distance from low-income people and minority households in large cities (Pendall and Carruthers 2003). Thus, regionalism will limit the "parochial interest" of independent suburbs (Powell 2000) and promote the development for the whole metropolitan areas, which is more desirable from society's perspective.

Finally, because the factors associated with neighborhood change were different in different time periods, I suggest that local governments should plan in preparation for housing market change. In particular, flight of middle-income minority people to the suburbs may cause further decline of minority neighborhoods by concentrating the poor in the inner cities and decline of suburban neighborhoods if whites do not choose to stay. In recent decades, more local governments have been pushed to adopt inclusionary zoning for racial integration. However, changing whites' preferences about racial

integration may be the priority, requiring further study of the ideologies, practices, and cultures of white neighborhoods (Pattillo 2005). A significant increase in overall socio-economic status of minority people should be also accompanied by racial integration. Without changing of whites' preference for racial integration, decline of suburban neighborhoods due to racial change may continue.

Future Research Directions

Understanding the mechanism of neighborhood change is central to gaining greater insight into both theory and practice around the issue. I have shown that neighborhoods are not isolated but rather are components of complex socio-economic and political urban systems. Future research should examine and further develop the comprehensive model of neighborhood change introduced in this study.

A good starting point would be to examine spatial dependency of neighborhood change. Few studies consider spatial dependency and its role in neighborhood change. As Tobler's Law states, "Everything is related to everything else, but near things are more related than distant things." Then, what determines the nearness? A neighborhood may decline because of a geographically proximate neighborhood's decline; alternatively, a neighborhood may decline because of other neighborhoods' decline within the same political boundary. By analyzing the same data used in this study with spatial modeling, a study could be undertaken to examine whether geographic proximity to a certain neighborhood or the status of other neighborhoods within the political boundary is more relevant in spatial dependency in neighborhood change.

Another direction for future research can be defining the patterns of neighborhood change and the relationship between the metropolitan, municipal, and neighborhood contexts and neighborhood change in metropolitan areas of different size, and comparing those patterns. Relatively little attention has been paid to neighborhood change in smaller metropolitan areas (and this dissertation focused only on large metropolitan areas). But because smaller metropolitan areas have fewer resources and receive less attention, they may be more vulnerable to decline. Moreover, they may face qualitatively distinctive challenges from bigger metropolitan areas. I conjecture that the logic of politics of scale should be relevant for these communities as well.

Defining the relationship between neighborhood change and municipal change can be another direction for future research. While this study finds that neighborhoods in smaller and more homogeneous cities are more resistant to neighborhood decline, neighborhood change may be more contagious in those cities. Once a neighborhood in a smaller and homogeneous suburb declines, it is likely to have a more negative effect on the whole jurisdiction than one neighborhood in a central city would have. The basic reason is that there are smaller numbers of neighborhoods and they are located close to each other in smaller and homogeneous suburbs. Schools may be a big factor causing contagious decline of neighborhoods. For example, when there is only one high school in a small suburb and every student goes to the same school, students of distressed households in a declining neighborhood can affect other students by the peer effect (Cox 2002). By contrast, a central city has a lot more neighborhoods. Thus, decline of a single neighborhood may not cause decline of other neighborhoods that are located relatively far

from the declining neighborhood. There are many more neighborhood schools compared to suburban school districts and so they may help isolate the contagious neighborhood decline to some degree, at least for some time. In addition, there are more resources in the central cities than in the suburbs. City neighborhoods possess government centers, cultural facilities, interesting architecture, mixed-uses, walkability, and connectivity (Lucy and Phillips 2000). Thus, city neighborhoods or suburban neighborhoods closer to downtown areas are more apt to redevelop around some of these advantages; while more outlying bedroom suburbs may have little to work with (Lucy and Phillips 2000). This logic allows me to propose the possibility that neighborhood change brings about jurisdictional decline in suburban communities, but in urban centers, the jurisdiction's decline (e.g., in terms of job loss or the loss of major shopping areas) may precede the decline of most neighborhoods. Because there are very different policy implications in these two situations, we need further investigation of the relationship between neighborhood change and municipal change.

Potential confounding factors and qualitative insights can be investigated from selected neighborhood case studies. As census data do not include levels of social interactions or attachment to neighborhoods to measure sub-cultures within neighborhoods, I used percentage college-graduates and homeownership rate as the proxies of the levels of social interaction. Thus, integrating survey data on social interaction to the NCDB may improve the validity of the model of neighborhood change proposed in this study. Additionally, case studies may cover the limitation of using census tracts as neighborhood units. I used census tracts as the unit of neighborhood in

this study. As population in a census tract is about 4,000, a census tract may be too large to be a neighborhood. Block groups are smaller than census tracts but do not include sufficient information for neighborhood studies. Researchers can be flexible in neighborhood boundary when doing selected neighborhood case studies

Finally, the upcoming 2010 Census will allow researchers to do investigation of the relationship between changes of housing demography and neighborhood change. While many scholars argue that changes of housing demography are related to neighborhood change, we have not had clear evidence to support the arguments. Given that baby-boomers have begun to retire, neighborhoods, especially those with walkability and accessibility to stores and services, may follow different paths and outcomes.

This study is the first systemic study that takes into account the larger context as well as the neighborhood context and balances the three major theories of neighborhood change. As sustainable neighborhoods are the basis for sustainable metropolitan areas and sustainable nations, this study as well as future research extending this study will significantly contribute to sustainable development. I also hope that policy makers and planning practitioners will be able to ameliorate the different conditions in neighborhoods that follow different paths and outcomes using the information from this study.

RERERENCES

Aalbers, Manuel B. 2006. 'When the banks withdraw, slum landlords take over': The structuration of neighbourhood decline through redlining, drug dealing, speculation and immigrant exploitation. *Urban Studies* 43 (7):1061-1086.

Adams, Charles F., Howard B. Fleeter, Yul Kim, Mark Freeman, and Imgon Cho. 1996. Flight from blight and metropolitan suburbanization revisited. *Urban Affairs Review* 31 (4):529-543.

Ahlbrandt, Roger S., and James V. Cunningham. 1979. *A New Public Policy for Neighborhood Preservation*. New York, NY: Praeger.

Alesina, Alberto, Reza Baqir, and William Easterly. 1999. Public goods and ethnic divisions. *Quarterly Journal of Economics* 124 (4):1243-1284.

Alesina, Alberto, and Eliana La Ferrara. 2000. Participation in heterogeneous communities. *Quarterly Journal of Economics* 115 (3):847-904.

———. 2002. Who trusts others? *Journal of Public Economics* 85 (2):207-234.

Alesina, Alberto, and Dani Rodrik. 1994. Distributive politics and economic growth. *The Quarterly Journal of Economics* 109 (2):465-490.

Alonso, William. 1964. *Location and Land Use*. Cambridge, MA: Harvard University Press.

Anacker, Katrin B. 2006. Analyzing Mature Suburbs Through Property Values. Ph.D. Dissertation, City and Regional Planning, The Ohio State University, Columbus, OH.

Anderson, Christopher J., and Yuliya V. Tverdova. 2003. Corruption, political allegiances, and attitudes toward government in contemporary democracies. *American Journal of Political Science* 47 (1):91-109.

Bailey, Martin J. 1959. Note on the economics of residential zoning and urban renewal. *Land Economics* 35 (3):288-292.

Baxter, Vern, and Mickey Lauria. 2000. Residential mortgage foreclosure and neighborhood change. *Housing Policy Debate* 11 (3):675-699.

Bénabou, Roland. 1996. Heterogeneity, stratification, and growth: Macroeconomic implications of community structure and school finance. *The American Economic Review* 86 (3):584-609.

Berry, Jeffrey M., Kent E. Portney, and Ken Thomson. 1993. *The Rebirth of Urban Democracy*. Washington, DC: The Brooking Institution.

Bier, Thomas, and Steven R. Howe. 1998. Dynamics of suburbanization in Ohio metropolitan areas. *Urban Geography* 19 (8):695-713.

Birch, David L. 1971. Toward a stage theory of urban growth. *Journal of the American Planning Association* 37 (2):78-87.

Black, Harold A., and Robert L. Schweitzer. 1985. A canonical analysis of mortgage lending terms: Testing for lending discrimination at a commercial bank. *Urban Studies* 22 (1):13-19.

Booza, Jason C., Jackie Cutsinger, and George Galster. 2006. *Where Did They Go?: The Decline of Middle- Income Neighborhood in Metropolitan America*. Washington, DC: The Brookings Institution.

Bostic, Raphael W., and Richard W. Martin. 2003. Black home-owners as a gentrifying force? Neighbourhood dynamics in the context of minority home-ownership. *Urban Studies* 40 (12):2427-2449.

Bradford, Calvin. 1979. Financing home ownership: The federal role In neighborhood decline. *Urban Affairs Review* 14 (3):313-335.

Branfman, Eric J., Benjamin. I. Cohen, and David M. Turbek. 1973. Measuring the invisible wall: Land use controls and the residential patterns of the poor. *The Yale Law Journal* 82 (3):483-508.

Brueggeman, William B., and Jeffrey D. Fisher. 2002. *Real Estate Finance and Investments*. Boston, MA: McGraw-Hill/Irwin.

Bryant, Linda Goode, and Laura Poitras. 2003. The Flag Wars.

Byrne, John, and John Flaherty. 2004. Measuring diversity in Australian residential property. In *The Pacific Rim Real Estate Society Tenth Annual Conference*. Bangkok, Thailand.

Carliner, Michael S. 1998. Development of federal homeownership "policy". *Housing Policy Debate* 9 (2):299-321.

Cashin, Sheryll. 2004. *Failures of Integration: How Race and Class are Undermining the American Dream*. New York, NY: Public Affairs.

Chambers, Daniel N. 1992. The racial housing price differential and racially transitional neighborhoods. *Journal of Urban Economics* 32 (2):214-232.

Charles, Camille Zubrinsky. 2003. The dynamics of racial residential segregation. *Annual Review of Sociology* 29 (1):167–207.

Chaskin, Robert J., and Ali Abunimah. 1999. A view from the city: Local government perspectives on neighborhood-based governance in community-building initiatives. *Journal of Urban Affairs* 21 (1):57-78.

Chubb, John E., and Terry M. Moe. 1990. *Politics, Markets, and America's Schools*. Washington DC: The Brookings Institution.

Clark, William A. V., and Sarah A. Blue. 2004. Race, class, and segregation patterns in US immigrant gateway cities. *Urban Affairs Review* 39 (6):667-688.

Couldson, N. Edward, and Eric W. Bond. 1990. A hedonic approach to residential succession. *Review of Economic and Statistics* 72 (3):433-444.

Coulson, N. Edward, and Eric W. Bond. 1990. A hedonic approach to residential succession. *Review of Economic and Statistics* 72 (3):433-444.

Cox, Kevin R. 1998. Spaces of dependence, spaces of engagement and the politics of scale, or: Looking local politics. *Political Geography Quarterly* 17 (1):1-23.

———. 2002. *Political Geography Territory, State and Society*. Malden, MA: Blackwell Publisher.

Crain, Robert L. 1972. *Discriminations, Personality, and Achievement: A Survey of Northern Black*. New York, NY: Seminar Press.

Cutler, David M., Edward L. Glaeser, and Jacob L. Vigdor. 1999. The rise and decline of the American ghetto. *Journal of Political Economy* 107 (3):455-506.

Danielson, Michael N. 1976. *The Politics of Exclusion*. New York, NY: Columbia University Press.

Davis, Mike. 2006. *City of Quartz: Excavating the Future in Los Angeles*. London; New York: Verso.

Dawkins, Casey J. 2007. Exploring changes in income clustering and centralization during the 1990s. *Journal of Planning Education and Research* 26 (4):404-414.
Downs, Anthony. 1977. The impact of housing policies on family life in the United States since World War II. *Daedalus* (106):163-180.
———. 1981. *Neighborhoods and Urban Development*. Washington, DC: The Brookings Institution. .
———. 1994. *New Visions for Metropolitan America*. Washington, DC: The Brookings Institution; Cambridge, MA: Lincoln Institute of Land Policy.
———. 1997. The challenge of our declining big cities. *Housing Policy Debate* 8 (2):359-408.
———. 1999. Some realities about sprawl and urban decline. *Housing Policy Debate* 10 (4):955-974.
Ellen, Ingrid Gould , and Katherine O'Regan. 2008. Reversal of fortunes? Lower-income urban neighbourhoods in the US in the 1990s. *Urban Studies* 45 (4):845-869.
Emerson, Michael O., George Yancey, and Karen J. Chai. 2001. Does race matter in residential segregation? Exploring the preferences of white Americans. *American Sociological Review* 66:922-935.
Farley, Reynolds, Charlotte Steeh, Maria Krysan, Tara Jackson, and Keith Reeves. 1994. Stereotypes and segregation: Neighborhoods in the Detroit area. *The American Journal of Sociology* 100 (3):750-780.
Firey, Walter. 1945. Sentiment and symbolism as ecological variables. *American Sociological Review* 10 (2):140-148.
Fischer, Mary J. 2008. Shifting geographies: Examining the role of suburbanization in blacks' declining segregation. *Urban Affairs Review* 43 (4):475-496.
Fishman, Robert. 2000. The American Metropolis at century's end: Past and future influences. *Housing Policy Debate* 11 (1):199-213.
Fogarty, M. S. 1977. Predicting neighborhood decline within a large central city: An application of discriminant analysis. *Environment and Planning A* 9 (5):579-584.
Freeman, Lance, and Frank Braconi. 2004. Gentrification and displacement New York City in the 1990s. *Journal of the American Planning Association* 70 (1):39-52.
Frug, Gerald E. 1999. *City Making*. Princeton, NJ: Princeton University Press.
Fukuyama, Francis. 1995. *Trust: The Social Virtues and the Creation of Prosperity*. New York, NY: Free Press.
Fulton, William. 1997. *The Reluctant Metropolis: The Politics of Urban Growth in Los Angeles*. Point Area, CA: Solano Press Books.
Galster, George. 1987. *Homeowners and Neighborhood Reinvestment*. Durham, NC: Duke University Press.
———. 1988. Residential segregation in American cities: A contrary review. *Population Research and Policy Review* 7 (2):93-112.
Galster, George, and Jason C. Booza. 2007. The rise of the bipolar neighborhood. *Journal of the American Planning Association* 73 (4):421-435.
Galster, George C. 2001. On the nature of neighborhood. *Urban Studies* 38 (12):2111-2124.
Galster, George C., and Ronald B. Mincy. 1993. Understanding the changing fortunes of metropolitan neighborhoods, 1980 to 1990. *Housing Policy Debate* 4 (3):303-352.

Galster, George C., Roberto G. Quercia, Alvaro Cortes, and Ron Malega. 2003. The fortunes of poor neighborhoods. *Urban Affairs Review* 39 (2):205-227.

Galster, George, and Heather Keeney. 1993. Subsidized housing and racial change in Yonkers, New York. *Journal of the American Planning Association* 59 (2):172-181.

Galster, George, Ronald Mincy, and Mitchell Tobin. 1997. The disparate racial neighborhood impacts of metropolitan economic restructuring. *Urban Affairs Review* 32 (6):797-824.

Gans, Herbert J. 1962. *The Urban Villagers: Group and Class Life of Italian Americans*. New York, NY: The Free Press.

Geis, Karlyn J., and Catherine E. Ross. 1998. A new look at urban alienation: The effect of neighborhood disorder on perceived powerlessness. *Social Psychology Quarterly* 61 (3):232-246.

Geolytics. 2003. Census CD Neighborhood Change Database (NCDB) 1970–2000 Tract Data Users' Guide. Place Published: Washington, DC: The Urban Institute (accessed.

Glaeser, Edward L., Matthew E. Kahn, and Jordan Rappaport. 2008. Why do the poor live in cities The role of public transportation. *Journal of Urban Economics* 63 (1):1-24.

Glaeser, Edward L., David I. Laibson, and Jose A. Scheinkman. 2000. Measuring trust. *Quarterly Journal of Economics* 115 (3):811-846.

Glaeser, Edward L., JoséA Scheinkman, and Andrei Shleifer. 1995. Economic growth in a cross-section of cities. *Journal of Monetary Economics* 36 (1):117-143.

Goodwin, Carole. 1979. *The Oak Park Strategy: Community Control of Racial Change*. Chicago, IL: University of Chicago Press.

Green Leigh, Nancey, and Sugie Lee. 2004. Philadelphia's Space In Between: Inner-Ring Suburb Evolution. *Opolis* 1 (1).

———. 2005. Philadelphia' space in between: Inner-ring suburb evolution. *Opolis* 1 (1):13-32.

Grigsby, William, G. Baratz, George C. Galster, and D. Maclennan. 1987. *The Dynamics of Neighbourhood Change and Decline*. London, England: Pergamon.

Gumpert, Gary, and Susan J. Drucker. 2008. Communicative Cities. *The International Communication Gazette* 70 (3-4):195-208.

Harris, Amy Rehder, William N. Evans, and Robert M. Schwab. 2001. Education spending in an aging America. *Journal of Public Economics* 81 (3):449-472.

Harris, David R. 1999. "Property values drop when blacks move in, because...": Racial and socioeconomic determinants of neighborhood desirability. *American Sociological Review* 64 (3):461-479.

Haurin, Donald. 2009. Ask the Expert: What Caused the Boom in Housing Prices from 1996-2006 and How Did It Crash? *On Campus: The Ohio State University Faculty and Staff Newspaper*.

Helper, Rose. 1969. *Racial Policies and Practices of Real Estate Brokers*. Minneapolis, MN: University of Minnesota Press.

Hoffman, Alexander Von. 2000. A Study in contradictions: The origins and legacy of the Housing Act of 1949. *Housing Policy Debate* 11 (2):299-326.

Hogen-Esch, Tom. 2001. Urban secession and the politics of growth: The case of Los Angeles. *Urban Affairs Review* 36 (6):783-809.

Hoover, Edgar M., and Raymond Vernon. 1959. *Anatomy of a Metropolis*. Cambridge, MA: Havard University Press.

Howe, Steven R., David Allor, Thomas Bier, Thomas Finnerty, and Phyllis Green. 1998. The shrinking central city amidst growing suburbs: Case studies of Ohio's inelastic cities. *Urban Geography* 19 (8):714-734.

Hoxby, Caroline M. 2000. Does competition among public schools benefit students and taxpayers? *The American Economic Review* 90 (5):1209-1238.

Hoyt, Homer. 1933. *One Hundred Years of Land Values in Chicago*. Chicago, IL: University of Chicago Press.

Hula, Richard. 1984. The allocation of house credit: Market vs. non-market factors. *Journal of Urban Affairs* 6:151-165.

Iceland, John. 2004. Beyond black and white: Metropolitan residential segregation in multi-ethnic America. *Social Science Research* 33 (2):248-271.

Jakle, John, and David Wilson. 1992. *Derelict Landscapes: The Wasting of America's Built Environment*. Savage, MD: Rowman and Littlefield.

Jargowsky, Paul A. 1997. *Poverty and Place: Ghettos, Barrios and the American City*. New York, NY: Russell Sage Foundation.

Johnson, Valerie C. 2002. *Black Power in the Suburbs: The Myth or Reality of African American Suburban Political Incorporation*. Albany, NY: State University of New York Press.

Kasarda, John D. 1989. Urban Industrial Transition and the Underclass. *Annals of the American Academy of Political and Social Science* 501:26-47.

Keating, W. Dennis 1994. *The Suburban Racial Dilemma: Housing and Neighborhoods*. Philadelphia, PA: Temple University Press.

Kiel, Katherine A., and Jeffrey E. Zabel. 1996. House price differentials in U.S. cities: Household and neighborhood racial effects. *Journal of Housing Economics* 5 (2):143-165.

Kim, Moon Jeong. 2010. Residential Location Decisions: Diversity and the Trade-off between Location and Housing Quality Ph.D. Dissertation, City and Regional Planning, The Ohio State University, Columbus, OH.

Knack, Stephen, and Philip Keefer. 1997. Does social capital have an economic payoff? A cross-country investigation. *Quarterly Journal of Economics* 112 (4):1251-1288.

Krol, Robert, and Shirley Svorny. 2005. The effect of rent control on commute times. *Journal of Urban Economics* 58 (3):421-436.

La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. Trust in large organizations. *The American Economic Review* 87 (2):333-338.

Lauria, Mickey, and Vern Baxter. 1999. Residential mortgage foreclosure and racial transition in New Orleans. *Urban Affairs Review* 34 (6):757-786.

Lee, Barret A., and David C. Hodge. 1984. Social Differentials in Metropolitan Residential Displacement. In *Gentrification, Displacement, and Neighborhood Revitalization*, edited by J. J. Palen and B. London. Albany, NY: State University of New York Press.

Lee, Sangyun. 2008. Hopes and Opportunities for Inner City Residents: Temporal and Spatial Assessment of Racial and Socioeconomic Conditions of Neighborhoods Adjacent to

Brownfields in the Detroit Metropolitan Area. Ph.D. Dissertation, Natural Resources and Environment, University of Michigan, Ann Arbor, MI.

Lee, Sugie. 2005. Metropolitan Growth Patterns' Impact on Intra-Regional Spatial Differentiation and Inner-Ring Suburban Decline: Insights for Smart Growth Ph.D. Dissertation, City and Regional Planning, Georgia Institute of Technology, Atlanta, GA.

Leven, Charles L., James T. Little, Hugh O. Nourse, and R. B. Read. 1976. *Neighborhood Change: Lessons in the Dynamics of Urban Decay*. New York, NY: Praeger.

Lewis, Paul. 1994. *Shaping Suburbia: How Political Institutions Organize Urban Development*. Pittsburgh, PA: University Pittsburgh Press.

Logan, John R., and Harvey L. Molotch. 1987. *Urban Fortunes : The Political Economy of Place*. Berkeley, CA: University of California Press.

Lowry, Ira S. 1960. Filtering and housing standards: A conceptual analysis. *Land Economics* 36 (4):362-370.

Lucy, William H., and David L. Phillips. 2000. *Confronting Suburban Decline: Strategic Planning for Metropolitan Renewal*: Washington, D.C.: Island Press.

Luke, Douglas A. 2004. *Multilevel Modeling*. Vol. 143, *Quantitative Applications in the Social Science*. Thousand Oaks, CA: Sage Publications.

Mahard, Rita E., and Robert L. Crain. 1983. Research on minority achievement in desegregated school. In *The Consequence of School Desegregation*, edited by C. H. Rossell and W. D. Hawley. Philadelphia, PA: Temple University Press.

Maignan, Carole, Gianmarco Ottaviano, Dino Pinelli, and Francesco Rullani. 2010. *Bio-ecological diversity vs. socio-economic diversity: A comparison of existing measures*. Fondazione Eni Enrico Mattei 2003 [cited January 30 2010].

Martinez, Sylvia C. 2000. The Housing Act of 1949: Its place in the realization of the American dream of homeownership. *Housing Policy Debate* 11 (2):467-488.

Massey, Douglas S., and Nancy A. Denton. 1988. The dimension of residential segregation. *Social Forces* 67:281-315.

Massey, Douglas S., and Mary J. Fischer. 1999. Does rising income bring integration? New results for Blacks, Hispanics, and Asians in 1990. *Social Science Research* 28 (3):316-326.

Metzger, John T. 2000. Planned abandonment: The neighborhood life-cycle theory and national urban policy. *Housing Policy Debate* 11 (1):7-40.

Middleton, Alan, Alan Murie, and Rick Groves. 2005. Social capital and neighbourhoods that work. *Urban Studies* 42 (10):1711-1738.

Mieszkowski, Peter , and Edwin S. Mills. 1993. The causes of metropolitan suburbanization. *Journal of Economic Perspectives* 7 (3):135-147.

Milies, Mike E., Gayle Berens, and Marc A. Weiss. 2000. *Real Estate Development: Principles and Process*. Washington, DC: Urban Land Institute.

Mills, Edwin S. 1972. *Studies in the Structure of the Urban Economy*. Washington, DC: The Johns Hopkins Press.

Molotch, Harvey. 1976. The city as a growth machine: Toward a political economy of place. *American Journal of Sociology* 82 (2):309-331.

Morrow-Jones, Hazel. 2007. Why do homeowners move? Push and pull factors in the movement of repeat home buyers. *Housing and Society* 34 (2).

Morrow-Jones, Hazel A. 1982. Federal Housing Policy, Neighborhood Change and Policy Reform in the American City. In *Conflict Politics and the Urban Scene*, edited by K. R.Cox and R. J. Johnston. London, England: Longman.

Munnell, Alicia H., Geoffrey M. B. Tootell, Lynn E. Browne, and James McEneaney. 1996. Mortgage lending in Boston: Interpreting HMDA data. *The American Economic Review* 86 (1):25-53.

Muth, Richard F. 1969. *Cities and Housing*. Chicago, IL: University of Chicago Press.

Myers, Dowell. 1995. *Housing Demography: Linking Demographic Structure and Housing Markets*. Madison, WI: University of Wisconsin Press.

Myers, Dowell, and Elizabeth Gearin. 2001. Current preference and future demand for denser residential environments. *Housing Policy Debate* 12 (4):633- 659.

Nelson, Arthur C., and Robert E. Lang. 2007. The next 100 million. *Planning* 73 (1):4-6.

Office of Management and Budget http://www.whitehouse.gov/omb/.

Oliver, J. Eric. 2001. *Democracy in Suburbia*. Princeton, NJ: Princeton University Press.

Olson, Mancur. 1965. *The Logic of Collective Action: Public Goods and the Theory of Groups*. New York, NY: Schocken Books.

Ostrom, Vincent, Robert Bish, and Elinor Ostrom. 1988. *Local government in the United States*. San Francisco, CA: Institute for Contemporary Studies.

Palm, Risa. 1985. Ethnic segmentation of real estate agent practice in the urban housing market. *Annals of the Association of American Geographers* 75 (1):58-68.

Park, Robert E., and Ernest W. Burgess. 1925. *The City: Suggestions for Investigation of Human Behavior in the Urban Environment*. Chicago, IL: University of Chicago Press.

Pattillo, Mary. 2005. Black middle-class neighborhoods. *Annual Review of Sociology* 31 (1):305-329.

Pendall, Rolf, and John I. Carruthers. 2003. Does density exacerbate income segregation?: Evidence from U.S. metropolitan area; 1980 to 2000. *Housing Policy Debate* 14 (4):541-589.

Persky, Joseph, and Haydar Kurban. 2003. Do federal spending and tax policies build cities or promote sprawl? *Regional Science and Urban Economics* 33 (3):361-378.

Persson, Torsten, and Guido Tabellini. 1994. Is inequality harmful for growth? *The American Economic Review* 84 (3):600-621.

Pitkin, Bill. 2001. Theories of Neighborhood Change: Implications for Community Development Policy and Practice: University of Californa, Los Angeles (UCLA) Advanced Policy Institute.

Porta, Rafael La, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. Trust in large organizations. *The American Economic Review* 87 (2):333-338.

Poterba, James M. 1997. Demographic structure and the political economy of public education. *Journal of Policy Analysis and Management* 16 (1):48-66.

Powell, John A. 2000. Addressing Regional Dilemmas for Minority Communities. In *Reflections on Regionalism*, edited by B. Katz. Washington, DC: Brookings Institution Press.

Price-Spratlen, Townsand, and Avery M. Guest. 2002. Race and population change: A longitudinal look at Cleveland neighborhoods. *Sociological Forum* 17 (1):105-136.

Putnam, Robert D. 1993. *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton, NJ: Princeton University Press.

———. 1993. The prosperous community: Social capital and economic growth. *The American Prospect* Spring:35-44.

———. 1995. Bowling alone: America's declining social capital. *Journal of Democracy* 6 (1):65-78.

Randy, Stoecker. 1997. The CDC Model of urban redevelopment: A critique and an alternative. *Journal of Urban Affairs* 19 (1):1-22.

Ratcliffe, Richard A. 1949. *Urban Land Economics*. New York, NY: McGraw-Hill.

Roger S. Ahlbrandt, Jr., James V. Cunningham. 1979. *A New Public Policy for Neighborhood Preservation*. New York, NY: Praeger.

Rohe, William M, Shannon Van Zandt, and George McCarthy. 2000. *The Social Benefits and Costs of Homeownership: A Critical Assessment of the Research*: Working paper No. 00-01. Research Institute for Housing America.

Rosenthal, Stuart S. 2008. Old homes, externalities, and poor neighborhoods: A model of urban decline and renewal. *Journal of Urban Economics* 63 (3):816-840.

Ross, Catherine E., and John Mirowsky. 2001. Neighborhood disadvantage, disorder, and health. *Journal of Health and Social Behavior* 42 (3):258-276.

Rudolph, Thomas. 2008. Class note of ITV Course, Multilevel Modeling. Urbana-Champaign, IL: University of Illinois at Urbana-Champaign.

Sawicki, David S., and Patrice Flynn. 1996. Neighborhood indicators. *Journal of the American Planning Association* 62 (2):165-184.

Schelling, Thomas. 1971. Dynamic models of segregation. *Journal of Mathematical Sociology* 1:143-186.

Schneider, Mark. 1987. *The Competitive City: The Political Economy of Suburbia*. Pittsburgh, PA: University of Pittsburgh Press.

Schneider, Mark, and Thomas Phelan. 1993. Black suburbanization in the 1980s. *Demography* 30 (2):269-279.

Schuler, J., R. Kent, and B. Monroe. 1992. Neighborhood gentrification: A discriminant analysis of a historic district in Cleveland, Ohio. *Urban geography* 13:49-67.

Schwirian, K. P. 1983. Models of neighborhood change. *Annual Review of Sociology* 9 (1):83-102.

Simpson, Edward H. 1949. Measurement of diversity. *Nature* (163):688-688.

Singer, Judith D., and John B. Willett. 2003. *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. Oxford ; New York Oxford University Press.

Siskind, Perter, ed. 2006. *Suburban Growth and Its Discontents: The Logic and Limits of Reform on the Postwar Northeast Corridor*. Edited by K. M. Kruse and T. J. Sugrue, *The New Suburban History*. Chicago, IL: University of Chicago Press.

Smith, Neil, Paul Caris, and Elvin Wyly. 2001. The "Camden Syndrome" and the menace of suburban decline: Residential decline and its disinvestments in Camden County, New Jersey. *Urban Affairs Review* 36 (4):497-531.

Smith, Wallace F. 1963. Forecasting Neighborhood Change. *Land Economics* 39 (3):292-297.

Snijders, Tom, and Roel Bosker. 1994. Modeled variation in two-level models. *Sociological Methods & Research* 22:342-363.
———. 1999. *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. London, England: Sage Publications.
Squires, Gregory D., and William Velez. 1987. Insurance redlining and the transformation of an urban metropolis. *Urban Affairs Review* 23 (1):63-83.
———. 1987. Neighborhood Racial Composition and Mortgage Lending: City and Suburban Differences. *Journal of Urban Affairs* 9 (3):217-232.
Stahura, John M. 1988. Changing patterns of suburban racial composition, 1970-1980. *Urban Affairs Review* 23 (3):448-460.
Steenbergen, Marco R., and Bradford S. Jones. 2002. Modeling multilevel data structures. *American journal of Political Science* 1:218-237.
Suttles, Gerald D. 1972. *The Social Construction of Communities*. Chicago, IL: University of Chicago Press.
Sweeney, James L. 1974. A commodity hierarchy model of the rental housing market. *Journal of Urban Economics* 1 (3):288-323.
Talen, Emily. 2006. Neighborhood-level social diversity. *Journal of the American Planning Association* 72 (4):431-446.
Teaford, Jon C. 2000. Urban renewal and its aftermath. *Housing Policy Debate* 11 (2):443-466.
Temkin, Kenneth, and William Rohe. 1996. Neighborhood change and urban policy. *Journal of Planning Education and Research* 15 (3):159-170.
———. 1998. Social capital and neighborhood stability: An empirical investigation. *Housing Policy Debate* 9 (1):61-88.
Tiebout, Charles M. 1956. A pure theory of local expenditures. *The Journal of Political Economy* 64 (5):416-424.
US Census Bureau. http://www.census.gov/.
US Census Bureau, and United Stated Department of Commerce. *Geographic Areas Reference Manual, Chapter 9 Places* [cited. Available from http://www.census.gov/geo/www/GARM/Ch9GARM.pdf.
Varady, David R., and Jeffrey A. Raffel. 1995. *Selling Cities: Attracting Homebuyers Through Schools and Housing Programs*. Albany, NY: State University of New York Press.
Vicino, Thomas J. 2008. The quest to confront suburban decline: Political realities and lessons. *Urban Affairs Review* 43 (4):553-581.
Weiher, Gregory. 1991. *The Fractured Metropolis*. New York, NY: State University of New York Press.
Wilson, William Julius. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago, IL and London, England: The University of Chicago Press.
Yinger, John. 1995. *Closed Doors, Opportunities Lost: The Continuing Costs of Housing Discrimination*. New York, NY: Sage.
Zielenbach, Sean. 2000. *The Art of Revitalization: Improving Conditions in Distressed Inner-City Neighborhoods*. New York, NY: Garland Publishing.

Appendix A: The Largest 100 Metropolitan Statistical Areas (MSAs) and Their Populations Based on Year 2000 Census Data

Rank	Code	Metropolitan Area Name	Region	Population
1	4480	Los Angeles-Long Beach CA	West	9,519,338
2	5600	New York NY	Northeast	9,314,235
3	1600	Chicago IL	Midwest	8,272,768
4	6160	Philadelphia PA-NJ	Northeast	5,100,931
5	8840	Washington DC-MD-VA-WV	South	4,923,153
6	2160	Detroit MI	Midwest	4,441,551
7	3360	Houston TX	South	4,177,646
8	520	Atlanta GA	South	4,112,198
9	1920	Dallas TX	South	3,519,176
10	1120	Boston MA-NH	Northeast	3,405,985
11	6780	Riverside-San Bernardino CA	West	3,254,821
12	6200	Phoenix-Mesa AZ	West	3,251,876
13	5120	Minneapolis-St. Paul MN-WI	Midwest	2,968,806
14	5945	Orange County CA	West	2,846,289
15	7320	San Diego CA	West	2,813,833
16	5380	Nassau-Suffolk NY	Northeast	2,753,913
17	7040	St. Louis MO-IL	Midwest	2,603,607
18	720	Baltimore MD	South	2,552,994
19	7600	Seattle-Bellevue-Everett WA	West	2,414,616
20	8280	Tampa-St. Petersburg-Clearwater FL	South	2,395,997
21	5775	Oakland CA	West	2,392,557
22	6280	Pittsburgh PA	Northeast	2,358,695
23	5000	Miami FL	South	2,253,362
24	1680	Cleveland-Lorain-Elyria OH	Midwest	2,250,871
25	2080	Denver CO	West	2,109,282
26	5640	Newark NJ	Northeast	2,032,989
27	6440	Portland-Vancouver OR-WA	West	1,918,009
28	3760	Kansas City MO-KS	Midwest	1,776,062
29	7360	San Francisco CA	West	1,731,183
30	2800	Fort Worth-Arlington TX	South	1,702,625
31	7400	San Jose CA	West	1,682,585
32	1640	Cincinnati OH-KY-IN	Midwest	1,646,395
33	5960	Orlando FL	South	1,644,561
34	6920	Sacramento CA	West	1,628,197
35	2680	Fort Lauderdale FL	South	1,623,018
36	3480	Indianapolis IN	Midwest	1,607,486
37	7240	San Antonio TX	South	1,592,383
38	5720	Norfolk-Virginia Beach-Newport News VA-NC	South	1,569,541
39	4120	Las Vegas NV-AZ	West	1,563,282
40	1840	Columbus OH	Midwest	1,540,157
41	5080	Milwaukee-Waukesha WI	Midwest	1,500,741
42	1520	Charlotte-Gastonia-Rock Hill NC-SC	South	1,499,293
43	875	Bergen-Passaic NJ	Northeast	1,373,167
44	5560	New Orleans LA	South	1,337,726
45	7160	Salt Lake City-Ogden UT	West	1,333,914
46	3120	Greensboro-Winston-Salem-High Point NC	South	1,251,509

Rank	Code	Metropolitan Area Name	Region	Population
47	640	Austin-San Marcos TX	South	1,249,763
48	5360	Nashville TN	South	1,231,311
49	6480	Providence-Fall River-Warwick RI-MA	Northeast	1,188,613
50	6640	Raleigh-Durham-Chapel Hill NC	South	1,187,941
51	3280	Hartford CT	Northeast	1,183,803
52	1280	Buffalo-Niagara Falls NY	Northeast	1,170,111
53	5015	Middlesex-Somerset-Hunterdon NJ	Northeast	1,169,641
54	4920	Memphis TN-AR-MS	South	1,135,614
55	8960	West Palm Beach-Boca Raton FL	South	1,131,184
56	5190	Monmouth-Ocean NJ	Northeast	1,126,217
57	3600	Jacksonville FL	South	1,100,491
58	6840	Rochester NY	Northeast	1,098,201
59	3000	Grand Rapids-Muskegon-Holland MI	Midwest	1,088,514
60	5880	Oklahoma City OK	South	1,083,346
61	4520	Louisville KY-IN	South	1,025,598
62	6760	Richmond-Petersburg VA	South	996,512
63	3160	Greenville-Spartanburg-Anderson SC	South	962,441
64	2000	Dayton-Springfield OH	Midwest	950,558
65	2840	Fresno CA	West	922,516
66	1000	Birmingham AL	South	921,106
67	3320	Honolulu HI	West	876,156
68	160	Albany-Schenectady-Troy NY	Northeast	875,583
69	8520	Tucson AZ	West	843,746
70	8560	Tulsa OK	South	803,235
71	8735	Ventura CA	West	753,197
72	8160	Syracuse NY	Northeast	732,117
73	5920	Omaha Ne-IA	Midwest	716,998
74	200	Albuquerque NM	West	712,738
75	8200	Tacoma WA	West	700,820
76	80	Akron OH	Midwest	694,960
77	3840	Knoxville TN	South	687,249
78	2320	El Paso TX	South	679,622
79	680	Bakersfield CA	West	661,645
80	240	Allentown-Bethlehem-Easton PA	Northeast	637,958
81	2960	Gary IN	Midwest	631,362
82	3240	Harrisburg-Lebanon-Carlisle PA	Northeast	629,401
83	7560	Scranton--Wilkes-Barre--Hazleton PA	Northeast	624,776
84	8400	Toledo OH	Midwest	618,203
85	3640	Jersey City NJ	Northeast	608,975
86	760	Baton Rouge LA	South	602,894
87	8000	Springfield MA	Northeast	594,784
88	9320	Youngstown-Warren OH	Midwest	594,746
89	7510	Sarasota-Bradenton FL	South	589,959
90	9160	Wilmington-Newark DE-MD	South	586,216
91	4400	Little Rock-North Little Rock AR	South	583,845
92	440	Ann Arbor MI	Midwest	578,736

Rank	Code	Metropolitan Area Name	Region	Population
93	4880	McAllen-Edinburg-Mission TX	South	569,463
94	8120	Stockton-Lodi CA	West	563,598
95	1440	Charleston-North Charleston SC	South	549,033
96	9040	Wichita KS	Midwest	545,220
97	5480	New Haven-Meriden CT	Northeast	542,069
98	5160	Mobile AL	South	540,258
99	1760	Columbia SC	South	536,691
100	8720	Vallejo-Fairfield-Napa CA	West	518,821

Source: The Federal Communications Commission

Appendix B: Variable Categories Used to Calculate Simpson Index in the 1970s

Variable Categories Used to Calculate Simpson Index in the 1970s

Homogeneity Type	Categories
Race/Ethnicity	White population Black population Other race population
Age	Under 5 years old 5 to 17 years old 18 to 34 years old 35 to 64 years old 65 years old and older
Family Income	Families with under $1000 inc. last year Families with under $1000-1999 inc. last year Families with under $2000-2999 inc. last year Families with under $3000-3999 inc. last year Families with under $4000-4999 inc. last year Families with under $5000-5999 inc. last year Families with under $6000-6999 inc. last year Families with under $7000-7999 inc. last year Families with under $8000-8999 inc. last year Families with under $9000-9999 inc. last year Families with under $10000-11999 inc. last year Families with under $12000-14999 inc. last year Families with under $15000-24999 inc. last year Families with under $25000-49999 inc. last year Families with under $50000 + inc. last year
Family Type	Married, with children under 18 Married, no children under 18 Single, with children under 18 Single, no children under 18 Non-family household

Variable Categories Used to Calculate Simpson Index in the 1980s

Homogeneity Variable	Categories
Race/Ethnicity	Non-Hispanic White population Non-Hispanic Black population Hispanic/Latino population Non-Hispanic other race population
Age	Under 5 years old 5 to 17 years old 18 to 34 years old 35 to 64 years old 65 years old and older
Family Income	Families with under $2500 inc. last year Families with under $2500-4999 inc. last year Families with under $5000-7499 inc. last year Families with under $7500-9999 inc. last year Families with under $10000-12499 inc. last year Families with under $125000-14999 inc. last year Families with under $15000-17499 inc. last year Families with under $17500-19999 inc. last year Families with under $20000-24999 inc. last year Families with under $25000-27499 inc. last year Families with under $27500-29999 inc. last year Families with under $30000-34999 inc. last year Families with under $35000-39999 inc. last year Families with under $40000-49999 inc. last year Families with under $50000-74999 inc. last year Families with under $75000 + inc. last year
Family Type	Married, with children under 18 Married, no children under 18 Single, with children under 18 Single, no children under 18 Non-family household

Variable Categories Used to Calculate Simpson Index in the 1990s

Homogeneity Variable	Categories
Race/Ethnicity	Non-Hispanic White population Non-Hispanic Black population Hispanic/Latino population Non-Hispanic/Latino Asian, Native Hawaiian and other Pacific Islander population Non-Hispanic other race population
Age	Under 5 years old 5 to 17 years old 18 to 34 years old 35 to 64 years old 65 years old and older
Family Income	Families with under $5000 inc. last year Families with under $5000-9999 inc. last year Families with under $10000-12499 inc. last year Families with under $12500-14999 inc. last year Families with under $15000-17499 inc. last year Families with under $17500-19999 inc. last year Families with under $20000-22499 inc. last year Families with under $22500-24999 inc. last year Families with under $25000-27499 inc. last year Families with under $27500-29999 inc. last year Families with under $30000-34999 inc. last year Families with under $35000-39999 inc. last year Families with under $40000-49999 inc. last year Families with under $50000-59999 inc. last year Families with under $60000-74999 inc. last year Families with under $75000 + inc. last year
Family Type	Married, with children under 18 Married, no children under 18 Single, with children under 18 Single, no children under 18 Non-family household

Appendix C: Correlation Coefficients

Correlation Coefficients at the Neighborhood Level (1970s)

	0-10 yrs	20-30 yrs	30+ yrs	Room	%black	%His panic	%College	Poverty	%Owner	Very low	Low	Moderate	High	Very high
0-10 yrs	1.00000													
20-30 yrs	-0.50559 <.0001	1.00000												
30+ yrs	-0.69153 <.0001	0.04507 <.0001	1.00000											
Room	0.30793 <.0001	-0.22393 <.0001	-0.28497 <.0001	1.00000										
%black	-0.25364 <.0001	0.17898 <.0001	0.27578 <.0001	-0.19507 <.0001	1.00000									
%Hispanic	0.03626 0.0012	0.07662 <.0001	-0.10024 <.0001	-0.23494 <.0001	-0.08117 <.0001	1.00000								
%College	0.41945 <.0001	-0.19612 <.0001	-0.34393 <.0001	0.56089 <.0001	-0.24071 <.0001	-0.14130 <.0001	1.00000							
Poverty	-0.32586 <.0001	0.21768 <.0001	0.37929 <.0001	-0.53088 <.0001	0.57457 <.0001	0.39848 <.0001	-0.37911 <.0001	1.00000						
Home-ownership	0.27301 <.0001	-0.07037 <.0001	-0.43954 <.0001	0.64160 <.0001	-0.31993 <.0001	-0.10978 <.0001	0.17656 <.0001	-0.51027 <.0001	1.00000					
Very low	-0.12967 <.0001	0.11098 <.0001	0.13758 <.0001	-0.16601 <.0001	0.40300 <.0001	0.06449 <.0001	-0.14299 <.0001	0.49507 <.0001	-0.22783 <.0001	1.00000				
Low	-0.34152 <.0001	0.10173 <.0001	0.41851 <.0001	-0.33929 <.0001	0.36528 <.0001	0.20655 <.0001	-0.39409 <.0001	0.45890 <.0001	-0.37413 <.0001	-0.07713 <.0001	1.00000			
Moderate	-0.06391 <.0001	0.06945 <.0001	-0.01160 0.3012	-0.15131 <.0001	-0.13408 <.0001	-0.00448 0.6899	-0.27187 <.0001	-0.08860 <.0001	0.01259 0.2617	-0.09477 <.0001	-0.34683 <.0001	1.00000		
High	0.22433 <.0001	-0.11609 <.0001	-0.18207 <.0001	0.22471 <.0001	-0.13351 <.0001	-0.08145 <.0001	0.32153 <.0001	-0.20043 <.0001	0.16005 <.0001	-0.05805 <.0001	-0.21242 <.0001	-0.26100 <.0001	1.00000	
Very high	0.18544 <.0001	-0.10330 <.0001	-0.15676 <.0001	0.44734 <.0001	-0.11182 <.0001	-0.07102 <.0001	0.59987 <.0001	-0.18831 <.0001	0.21062 <.0001	-0.04513 <.0001	-0.16515 <.0001	-0.20291 <.0001	-0.12428 <.0001	1.00000

Correlation Coefficients at the Neighborhood Level (1980s)

	0-10 yrs	20-30 yrs	30+ yrs	Room	%black	%His panic	%College	Poverty	%Owner	Very low	Low	Moderate	High	Very high
0-10 yrs	1.00000													
20-30 yrs	-0.47918 <.0001	1.00000												
30+ yrs	-0.68328 <.0001	-0.12166 <.0001	1.00000											
Room	0.23012 <.0001	-0.00787 0.4331	-0.24170 <.0001	1.00000										
%black	-0.27631 <.0001	0.00636 0.5259	0.32021 <.0001	-0.19371 <.0001	1.00000									
%Hispanic	0.05325 <.0001	0.00938 0.3501	-0.07102 <.0001	-0.26904 <.0001	-0.10441 <.0001	1.00000								
%College	0.30475 <.0001	-0.10561 <.0001	-0.30437 <.0001	0.46926 <.0001	-0.28249 <.0001	-0.16004 <.0001	1.00000							
Poverty	-0.30851 <.0001	-0.09165 <.0001	0.44901 <.0001	-0.51692 <.0001	0.63249 <.0001	0.27722 <.0001	-0.41896 <.0001	1.00000						
Homeown-ership	0.27909 <.0001	0.12754 <.0001	-0.34706 <.0001	0.72924 <.0001	-0.33541 <.0001	-0.14840 <.0001	0.15144 <.0001	-0.59792 <.0001	1.00000					
Very low	-0.13357 <.0001	-0.01078 0.2828	0.17534 <.0001	-0.21794 <.0001	0.39659 <.0001	0.11157 <.0001	-0.19826 <.0001	0.57223 <.0001	-0.32084 <.0001	1.00000				
Low	-0.30700 <.0001	-0.02605 0.0094	0.38617 <.0001	-0.35513 <.0001	0.36850 <.0001	0.18746 <.0001	-0.39759 <.0001	0.45695 <.0001	-0.34344 <.0001	-0.11890 <.0001	1.00000			
Moderate	-0.05520 <.0001	0.06535 <.0001	0.00486 0.6278	-0.13833 <.0001	-0.12502 <.0001	-0.00932 0.3530	-0.19469 <.0001	-0.11540 <.0001	-0.00353 0.7248	-0.12109 <.0001	-0.32455 <.0001	1.00000		
High	0.25980 <.0001	-0.09576 <.0001	-0.22343 <.0001	0.24530 <.0001	-0.17193 <.0001	-0.08770 <.0001	0.28547 <.0001	-0.24721 <.0001	0.21389 <.0001	-0.08843 <.0001	-0.23703 <.0001	-0.24139 <.0001	1.00000	
Very high	0.16329 <.0001	-0.03371 0.0008	-0.16426 <.0001	0.45445 <.0001	-0.15459 <.0001	-0.09747 <.0001	0.56347 <.0001	-0.23983 <.0001	0.25669 <.0001	-0.07279 <.0001	-0.19510 <.0001	-0.19869 <.0001	-0.14511 <.0001	1.00000

Correlation Coefficients at the Neighborhood Level (1990s)

	0- 10 yrs	20-30 yrs	30+ yrs	Room	%black	%His-panic	%College	Poverty	%Owner	Very low	Low	Moderate	High	Very high
0-10 yrs	1.00000													
20-30 yrs	-0.29619 <.0001	1.00000												
30+ yrs	-0.72036 <.0001	-0.26716 <.0001	1.00000											
Room	0.10383 <.0001	0.01995 0.0412	-0.11742 <.0001	1.00000										
%black	-0.23513 <.0001	-0.01736 0.0756	0.28368 <.0001	-0.19182 <.0001	1.00000									
%Hispanic	0.11205 <.0001	0.00026 0.9791	-0.11815 <.0001	-0.35230 <.0001	-0.13052 <.0001	1.00000								
%College	0.24861 <.0001	0.03155 0.0012	-0.26520 <.0001	0.43791 <.0001	-0.30361 <.0001	-0.20244 <.0001	1.00000							
Poverty	-0.24867 <.0001	-0.11018 <.0001	0.33588 <.0001	-0.51295 <.0001	0.58870 <.0001	0.27119 <.0001	-0.46699 <.0001	1.00000						
Homeown-ership	0.13637 <.0001	0.03133 0.0013	-0.15895 <.0001	0.76048 <.0001	-0.33014 <.0001	-0.19512 <.0001	0.17020 <.0001	-0.59176 <.0001	1.00000					
Very low	-0.14890 <.0001	-0.05471 <.0001	0.19937 <.0001	-0.24644 <.0001	0.47621 <.0001	0.14296 <.0001	-0.29064 <.0001	0.65350 <.0001	-0.36103 <.0001	1.00000				
Low	-0.21878 <.0001	-0.05223 <.0001	0.26300 <.0001	-0.32602 <.0001	0.23019 <.0001	0.17138 <.0001	-0.41718 <.0001	0.30923 <.0001	-0.25483 <.0001	-0.18229 <.0001	1.00000			
Moderate	0.00194 0.8427	0.04077 <.0001	-0.04029 <.0001	-0.07437 <.0001	-0.12910 <.0001	-0.03824 <.0001	-0.11956 <.0001	-0.16320 <.0001	0.03490 0.0004	-0.16129 <.0001	-0.34817 <.0001	1.00000		
High	0.18142 <.0001	0.00707 0.4691	-0.18678 <.0001	0.21700 <.0001	-0.16932 <.0001	-0.08427 <.0001	0.28224 <.0001	-0.23774 <.0001	0.19318 <.0001	-0.10898 <.0001	-0.23524 <.0001	-0.20815 <.0001	1.00000	
Very high	0.12965 <.0001	0.00465 0.6343	-0.12962 <.0001	0.44624 <.0001	-0.17740 <.0001	-0.11329 <.0001	0.57789 <.0001	-0.25078 <.0001	0.26752 <.0001	-0.10534 <.0001	-0.22738 <.0001	-0.20120 <.0001	-0.13594 <.0001	1.00000

Correlation Coefficients at the Municipal Level (1970s)

	Racial Homogeneity	Age Homogeneity	Income Homogeneity	Family Type Homogeneity	% MSA households in	Unincorporated
Racial Homogeneity	1.00000					
Age Homogeneity	0.08092 0.0025	1.00000				
Income Homogeneity	0.29271 <.0001	0.36890 <.0001	1.00000			
Family Type Homogeneity	0.27035 <.0001	0.44703 <.0001	0.58401 <.0001	1.00000		
% MSA households	-0.20251 <.0001	-0.10524 <.0001	-0.14776 <.0001	-0.17522 <.0001	1.00000	
Unincorporated	0.02344 0.3817	0.21790 <.0001	0.24103 <.0001	0.33422 <.0001	-0.12121 <.0001	1.00000

Correlation Coefficients at the Municipal Level (1980s)

	Racial Homogeneity	Age Homogeneity	Income Homogeneity	Family Type Homogeneity	% MSA households in	Unincorporated
Racial Homogeneity	1.00000					
Age Homogeneity	-0.01338 0.5712	1.00000				
Income Homogeneity	0.09849 <.0001	0.26435 <.0001	1.00000			
Family Type Homogeneity	0.16339 <.0001	0.49092 <.0001	0.33711 <.0001	1.00000		
% MSA households	-0.21833 <.0001	-0.04560 0.0535	-0.13074 <.0001	-0.11598 <.0001	1.00000	
Unincorporated	-0.08721 0.0002	0.22104 <.0001	0.12890 <.0001	0.22932 <.0001	-0.12298 <.0001	1.00000

Correlation Coefficients at the Municipal Level (1990s)

	Racial Homogeneity	Age Homogeneity	Income Homogeneity	Family Type Homogeneity	% MSA households in	Unincorporated
Racial Homogeneity	1.00000					
Age Homogeneity	-0.02374 0.2995	1.00000				
Income Homogeneity	0.16835 <.0001	0.26046 <.0001	1.00000			
Family Type Homogeneity	0.17167 <.0001	0.58076 <.0001	0.29345 <.0001	1.00000		
% MSA households	-0.20134 <.0001	-0.04546 0.0468	-0.16341 <.0001	-0.07368 0.0013	1.00000	
Unincorporated	-0.10548 <.0001	0.24455 <.0001	0.18194 <.0001	0.16951 <.0001	-0.11379 <.0001	1.00000

Correlation Coefficients at the Metropolitan Level (1970s)

	Decline of manufacturing jobs to total jobs ratio	Decline of jobs to total population ratio	Metropolitan Fragmentation	Dummy Midwest	Dummy Northeast	Dummy West
Decline of manufacturing jobs to total jobs ratio	1.00000					
Decline of jobs to total population ratio	0.07598 0.6644	1.00000				
Metropolitan Fragmentation	0.12757 0.4652	-0.04735 0.7871	1.00000			
Dummy Midwest	0.33051 0.0525	-0.02840 0.8714	-0.18805 0.2793	1.00000		
Dummy Northeast	0.29151 0.0893	-0.19874 0.2524	0.31281 0.0673	-0.25000 0.1475	1.00000	
Dummy West	-0.45707 0.0058	0.19849 0.2530	0.05057 0.7730	-0.27217 0.1137	-0.27217 0.1137	1.00000

Correlation Coefficients at the Metropolitan Level (1980s)

	Decline of manufacturing jobs to total jobs ratio	Decline of jobs to total population ratio	Metropolitan Fragmentation	Dummy Midwest	Dummy Northeast	Dummy West
Decline of manufacturing jobs to total jobs	1.00000					
Decline of jobs to total population ratio	0.11998 0.4924	1.00000				
Metropolitan Fragmentation	0.12402 0.4778	-0.11357 0.5160	1.00000			
Dummy Midwest	0.21623 0.2122	-0.57694 0.0003	0.08877 0.6121	1.00000		
Dummy Northeast	0.33885 0.0465	0.11145 0.5239	-0.21343 0.2183	-0.13202 0.4497	1.00000	
Dummy West	0.46744 0.0046	-0.39863 0.0177	0.30571 0.0741	0.45215 0.0064	-0.25000 0.1475	1.00000

Correlation Coefficients at the Metropolitan Level (1990s)

	Decline of manufacturing jobs to total jobs ratio	Decline of jobs to total population ratio	Metropolitan Fragmentation	Dummy Midwest	Dummy Northeast	Dummy West
Decline of manufacturing jobs to total jobs ratio	1.00000					
Decline of jobs to total population ratio	-0.11709 0.5029	1.00000				
Metropolitan Fragmentation	0.16225 0.3517	0.29536 0.0850	1.00000			
Dummy Midwest	-0.04457 0.7993	-0.20582 0.2355	-0.24443 0.1570	1.00000		
Dummy Northeast	0.10659 0.5422	0.38906 0.0209	0.28660 0.0951	-0.25000 0.1475	1.00000	
Dummy West	-0.27109 0.1152	-0.06064 0.7293	0.02696 0.8778	-0.27217 0.1137	-0.27217 0.1137	1.00000

Appendix D: Multilevel Estimates without Squared Racial Variables

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
	Constant	-0.350***	0.094	-0.385***	0.091	-0.227**	0.107
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.035**	0.014	-0.036*	0.021	0.012	0.016
	% Housing built within the preceding 20 to 30 years	-0.091***	0.032	0.014	0.019	-0.054***	0.019
	% Housing built more than 30 years ago	0.052***	0.017	0.074***	0.022	0.063***	0.018
	Average number of rooms	0.066***	0.007	-0.006	0.008	-0.001	0.006
	% Black	-0.023	0.031	-0.016	0.019	-0.014	0.021
	% Hispanic	-0.055	0.048	-0.052	0.032	-0.026	0.020
	% College graduates	-0.198**	0.098	0.333***	0.038	0.156***	0.023
	Poverty rate	0.285***	0.078	0.078*	0.046	0.250***	0.045
	Homeownership rate	0.092***	0.027	0.060*	0.036	0.085***	0.028
	Very low economic status (less than 50%)	0.025	0.036	0.054*	0.029	0.072***	0.014
	Low economic status (50% to 80%)	0.020	0.014	0.002	0.010	0.017***	0.006
	Moderate economic status (80% to 100%)	0.019**	0.010	0.001	0.005	0.012***	0.004
	High economic status (120% to 150%)	-0.008	0.010	0.005	0.005	-0.013*	0.007
	Very high economic status (over 150%)	-0.034	0.025	-0.021	0.014	-0.031***	0.012
Level 2: Municipality	% MSA households in each municipality	-0.167***	0.030	-0.022	0.021	-0.067***	0.017
	Race/ethnicity homogeneity	0.160***	0.049	0.084***	0.025	0.153***	0.019
	Age homogeneity	-0.230	0.282	-0.102	0.149	0.012	0.151
	Family income homogeneity	-0.251	0.249	0.281	0.316	-0.211	0.173
	Family type homogeneity	0.021	0.131	0.246**	0.107	0.359***	0.114
	Dummy unincorporated place	0.021	0.014	0.006	0.009	-0.018***	0.005
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio	-0.495	0.527	0.580	0.958	1.158	0.825
	Decline of jobs to total population ratio	-0.276*	0.141	-0.706**	0.306	-0.243	0.238
	Metropolitan fragmentation	-0.066	0.057	0.024	0.081	-0.152	0.098
	Dummy Midwest	-0.085**	0.035	-0.094**	0.035	0.012	0.032
	Dummy Northeast	-0.160***	0.030	0.082	0.063	-0.106***	0.030
	Dummy West	0.064*	0.036	0.046	0.067	0.064	0.046
Variance Component	Level 1 (δ^2)	0.0183	0.1354	0.0158	0.1258	0.0174	0.1320
	Level 2 (τ_{00})	0.0072	0.0850	0.0039	0.0621	0.0015	0.0390
	Level 3 (ω_{00})	0.0031	0.0555	0.0128	0.1131	0.0063	0.0795
Percent of Variance Explained	Level 1	23.7%		23.1%		25.4%	
	Level 2	34.5%		31.4%		40.9%	
	Level 3	44.9%		32.1%		41.9%	
	-2 x Log Likelihood	-8070.13		-11859.20		-12067.63	
	Number of Parameters	30		30		30	

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03. ***<0.01, **<0.05, and *p<0.1

Appendix E: Multilevel Estimates without Region Dummy Variables

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
	Constant	-0.281***	0.096	-0.445***	0.091	-0.155	0.097
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.034**	0.014	-0.035*	0.021	0.011	0.016
	% Housing built within the preceding 20 to 30 years	-0.090***	0.033	0.015	0.019	-0.056***	0.020
	% Housing built more than 30 years ago	0.052***	0.017	0.075***	0.022	0.059***	0.017
	Average number of rooms	0.065***	0.007	-0.005	0.009	-0.002	0.006
	% Black	-0.003	0.066	-0.015	0.039	-0.119**	0.050
	% Hispanic	-0.179	0.118	-0.146**	0.062	-0.106**	0.052
	% Black^2	-0.022	0.086	-0.005	0.048	0.110**	0.046
	% Hispanic^2	0.181	0.166	0.129**	0.058	0.109**	0.055
	% College-graduates	-0.203**	0.095	0.329***	0.040	0.157***	0.023
	Poverty rate	0.266***	0.077	0.082*	0.047	0.255***	0.044
	Homeownership rate	0.089***	0.028	0.058	0.036	0.080***	0.027
	Very low economic status (less than 50%)	0.029	0.035	0.054*	0.029	0.070***	0.014
	Low economic status (50% to 80%)	0.023	0.014	0.003	0.010	0.020***	0.006
	Moderate economic status (80% to 100%)	0.020**	0.010	0.001	0.005	0.013***	0.004
	High economic status (120% to 150%)	-0.008	0.009	0.005	0.005	-0.014*	0.007
	Very high economic status (over 150%)	-0.033	0.024	-0.022	0.014	-0.032***	0.012
Level 2: Municipality	% MSA households in each municipality	-0.172***	0.029	-0.024	0.022	-0.081***	0.017
	Race/ethnicity homogeneity	0.150***	0.044	0.075**	0.031	0.113***	0.018
	Age homogeneity	-0.236	0.290	-0.103	0.148	0.008	0.151
	Family income homogeneity	-0.238	0.254	0.278	0.318	-0.154	0.182
	Family type homogeneity	0.033	0.139	0.249**	0.108	0.365***	0.113
	Dummy unincorporated place	0.022	0.014	0.006	0.009	-0.018***	0.005
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	-2.489***	0.719	0.370	0.859	0.371	0.963
	Decline of jobs to total population ratio (change)	0.068	0.220	-0.880***	0.244	-0.523**	0.243
	Metropolitan fragmentation	-0.107*	0.058	0.120	0.093	-0.184*	0.100
Variance Component	Level 1 (δ^2)	0.0183	0.1353	0.0158	0.1257	0.0174	0.1318
	Level 2 (τ_{00})	0.0072	0.0850	0.0039	0.0624	0.0015	0.0387
	Level 3 (ω_{00})	0.0079	0.0888	0.0159	0.1261	0.0088	0.0937
Percent of Variance Explained	Level 1	11.0%		15.7%		18.1%	
	Level 2	11.2%		20.3%		27.5%	
	Level 3	3.1%		18.6%		26.7%	
	-2 x Log Likelihood	-8052.81		-11858.28		-12083.24	
	Number of Parameters	29		29		29	

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03. ***<0.01, **<0.05, and *p<0.1

Appendix F: Correlations between Neighborhood Level Variables and Racial Composition

	Year	Dep. Var.	0-10 yrs	20-30 yrs	30+ yrs	Room	%Colle-ge	Poverty	%Owner	Very low	Low	Mode-rate	High	Very high
% Black	1970 - 1980	-0.14014 <.0001	-0.25364 <.0001	0.17898 <.0001	0.27578 <.0001	-0.19507 <.0001	-0.24071 <.0001	0.57457 <.0001	-0.31993 <.0001	0.40300 <.0001	0.36528 <.0001	-0.13408 <.0001	-0.13351 <.0001	-0.11182 <.0001
	1980 - 1990	-0.06565 <.0001	-0.27631 <.0001	0.00636 0.5259	0.32021 <.0001	-0.19371 <.0001	-0.28249 <.0001	0.63249 <.0001	-0.33541 <.0001	0.39659 <.0001	0.36850 <.0001	-0.12502 <.0001	-0.17193 <.0001	-0.15459 <.0001
	1990 - 2000	0.01670 0.0873	-0.23513 <.0001	-0.01736 0.0756	0.28368 <.0001	-0.19182 <.0001	-0.30361 <.0001	0.58870 <.0001	-0.33014 <.0001	0.47621 <.0001	0.23019 <.0001	-0.12910 <.0001	-0.16932 <.0001	-0.17740 <.0001
% Hispanic	1970 - 1980	0.19521 <.0001	0.03626 0.0012	0.07662 <.0001	-0.10024 <.0001	-0.23494 <.0001	-0.14130 <.0001	0.39848 <.0001	-0.10978 <.0001	0.06449 <.0001	0.20655 <.0001	-0.00448 0.6899	-0.08145 <.0001	-0.07102 <.0001
	1980 - 1990	-0.04003 <.0001	0.05325 <.0001	0.00938 0.3501	-0.07102 <.0001	-0.26904 <.0001	-0.16004 <.0001	0.27722 <.0001	-0.14840 <.0001	0.11157 <.0001	0.18746 <.0001	-0.00932 0.3530	-0.08770 <.0001	-0.09747 <.0001
	1990 - 2000	-0.09062 <.0001	0.11205 <.0001	0.00026 0.9791	-0.11815 <.0001	-0.35230 <.0001	-0.20244 <.0001	0.27119 <.0001	-0.19512 <.0001	0.14296 <.0001	0.17138 <.0001	-0.03824 <.0001	-0.08427 <.0001	-0.11329 <.0001

Appendix G: Descriptive Statistics Based on Census-Tract Percent

Descriptive Statistics Based on Census-Tract Percent Black

Variables	Less than 10%			10 to 60 %			Over 60%		
	1970s	1980s	1990s	1970s	1980s	1990s	1970s	1980s	1990s
log ($y_{ijk,\ t}$ / $y_{ijk,\ t-1}$)	-0.00	-0.08	-0.01	-0.03	-0.08	-0.07	-0.11	-0.13	0.01
$y_{ijk,\ t-1}$	109.80	114.83	112.87	81.35	83.62	81.99	58.60	59.19	54.44
$y_{ijk,\ t}$	111.42	109.97	112.56	81.23	79.99	76.22	52.70	53.24	54.27
% Housing built within the preceding 10 years	0.37	0.33	0.23	0.25	0.22	0.19	0.12	0.09	0.06
% Housing built within the preceding 10 to 20 years	0.26	0.21	0.22	0.20	0.20	0.19	0.16	0.14	0.10
% Housing built within the preceding 20 to 30 years	0.12	0.18	0.16	0.15	0.18	0.17	0.19	0.19	0.15
% Housing built more than 30 years ago	0.25	0.27	0.39	0.41	0.40	0.45	0.53	0.58	0.68
Average number of rooms	5.35	5.57	5.61	4.99	5.08	5.02	4.77	5.02	5.08
% Black	0.01	0.02	0.03	0.25	0.26	0.25	0.86	0.87	0.88
% Hispanic	0.06	0.07	0.10	0.06	0.08	0.12	0.02	0.02	0.03
% College graduated	0.14	0.21	0.25	0.08	0.16	0.20	0.05	0.08	0.10
Poverty rate	0.08	0.08	0.09	0.16	0.16	0.17	0.29	0.29	0.32
Homeownership rate	0.70	0.70	0.68	0.57	0.53	0.51	0.46	0.47	0.47
Number of Tracks (proportion to total tracks)	6560 (.83)	7478 (0.75)	7267 (0.69)	903 (.11)	1465 (.15)	2059 (0.20)	482 (.06)	992 (0.10)	1153 (0.11)

Descriptive Statistics Based on Census-Tract Percent Hispanic

Variables	Less than 10%			10 to 60 %			Over 60%		
	1970s	1980s	1990s	1970s	1980s	1990s	1970s	1980s	1990s
log ($y_{ijk,\ t}$ / $y_{ijk,\ t-1}$)	-0.03	-0.09	-0.00	0.07	0.07	-0.08	0.14	-0.17	-0.02
$y_{ijk,\ t-1}$	106.02	107.01	102.91	92.87	98.15	97.93	43.37	63.27	59.07
$y_{ijk,\ t}$	105.41	101.99	102.97	103.21	95.20	91.75	42.29	53.70	57.61
% Housing built within the preceding 10 years	0.34	0.28	0.18	0.39	0.34	0.26	0.23	0.27	0.24
% Housing built within the preceding 10 to 20 years	0.24	0.20	0.19	0.28	0.21	0.23	0.26	0.22	0.20
% Housing built within the preceding 20 to 30 years	0.12	0.18	0.16	0.13	0.18	0.17	0.23	0.20	0.15
% Housing built more than 30 years ago	0.30	0.34	0.47	0.20	0.26	0.34	0.27	0.30	0.41
Average number of rooms	5.36	5.56	5.64	4.84	4.97	4.91	4.28	4.35	4.23
% Black	0.10	0.15	0.18	0.06	0.10	0.12	0.02	0.03	0.05
% Hispanic	0.02	0.02	0.03	0.21	0.22	0.23	0.81	0.78	0.79
% College graduated	0.14	0.20	0.24	0.10	0.15	0.19	0.03	0.08	0.09
Poverty rate	0.09	0.10	0.12	0.13	0.14	0.15	0.44	0.26	0.29
Homeownership rate	0.68	0.67	0.65	0.61	0.58	0.54	0.62	0.54	0.51
Number of Tracks (proportion to total tracks)	6752 (0.85)	8176 (0.82)	7822 (0.75)	1098 (0.14)	1541 (0.16)	2313 (0.22)	95 (0.01)	218 (0.02)	344 (0.03)

Appendix H: Multilevel Estimates with Cross Level Interactions

Level	Explanatory Variables	1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.
	Constant	-0.375***	0.092	-0.192*	0.105
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.034*	0.020	0.013	0.016
	% Housing built within the preceding 20 to 30 years	0.007	0.018	-0.052***	0.019
	% Housing built more than 30 years ago	0.098***	0.027	0.057***	0.015
	Average number of rooms	-0.004	0.009	-0.002	0.006
	% Black	-0.014	0.039	-0.116**	0.050
	% Hispanic	-0.163***	0.060	-0.111**	0.050
	% Black^2	-0.008	0.048	0.105**	0.045
	% Hispanic^2	0.139**	0.058	0.110**	0.053
	% College graduates	0.328***	0.040	0.155***	0.023
	Poverty rate	0.081*	0.047	0.258***	0.045
	Homeownership rate	0.058	0.036	0.080***	0.028
	N1 (less than 50%)	0.055*	0.028	0.070***	0.014
	N2 (50% to 80%)	0.004	0.010	0.020***	0.006
	N3 (80% to 100%)	0.004	0.004	0.013***	0.005
	N5 (120% to 150%)	0.004	0.005	-0.014**	0.007
	N6 (over 150%)	-0.022	0.014	-0.033***	0.012
	Old neighborhood	0.031	0.027	-0.004	0.008
	Old neighborhood*Increase of Singles(change)	-0.361	0.680	-0.428	0.848
	Old neighborhood*Increase of Couple w/o children(change)	0.640	0.463	-0.820	0.587
	Old neighborhood*Increase of elderly(change)	-3.382***	1.124	-2.786*	1.690
Level 2: Municipality	% MSA households in each municipality	-0.028	0.021	-0.077***	0.019
	Race/ethnicity homogeneity	0.075**	0.030	0.117***	0.019
	Age homogeneity	-0.102	0.143	0.008	0.149
	Family income homogeneity	0.274	0.302	-0.165	0.178
	Family type homogeneity	0.217**	0.102	0.367***	0.110
	Dummy unincorporated place	0.003	0.009	-0.017***	0.005
Level 3: Metropolitan Area	Change of manufacturing jobs to total jobs ratio(change)	0.733	0.929	1.063	0.820
	Change of jobs to total population ratio(change)	-0.713**	0.299	-0.285	0.251
	Metropolitan fragmentation	0.020	0.078	-0.150	0.097
	Dummy Midwest	-0.097***	0.033	0.015	0.032
	Dummy Northeast	0.088	0.060	-0.102***	0.032
	Dummy West	0.053	0.066	0.063	0.046
Variance Component	Level 1 (δ^2)	0.0157	0.1255	0.0174	0.1317
	Level 2 (τ_{00})	0.0038	0.0613	0.0015	0.0383
	Level 3 (ω_{00})	0.0120	0.1096	0.0065	0.0808
Percent of Variance Explained	Level 1	25.4%		25.0%	
	Level 2	34.5%		39.9%	
	Level 3	35.5%		40.5%	
	-2 x Log Likelihood	-11925.02		-12112.08	
	Parameters	36		36	

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03
***<0.01, **<0.05, and *p<0.1

Appendix I: Sensitivity Analysis

Multilevel Estimates Based on Change of Housing Value

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
	Constant	-0.433***	0.093	-0.450***	0.116	-0.160	0.139
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.082***	0.020	-0.069**	0.034	0.009	0.020
	% Housing built within the preceding 20 to 30 years	-0.091*	0.049	0.060***	0.022	-0.025*	0.015
	% Housing built more than 30 years ago	0.191***	0.023	0.127***	0.018	0.080***	0.020
	Average number of rooms	0.084***	0.008	-0.006	0.009	-0.011*	0.006
	% Black	0.086	0.055	0.091**	0.036	-0.029	0.055
	% Hispanic	-0.135	0.184	-0.060	0.103	0.006	0.065
	% Black^2	-0.102	0.079	-0.121**	0.048	0.014	0.039
	% Hispanic^2	0.104	0.284	0.082	0.107	0.023	0.076
	% College-graduates	-0.232***	0.074	0.250***	0.060	0.170***	0.048
	Poverty rate	0.127	0.097	0.036	0.040	-0.004	0.064
	Homeownership rate	0.057	0.048	-0.081*	0.043	0.071	0.053
	Very low housing value status (less than 50%)	0.108***	0.029	0.073**	0.029	0.105***	0.020
	Low housing value status (50% to 80%)	0.033*	0.019	0.015	0.011	0.033**	0.013
	Moderate housing value status (80% to 100%)	0.006	0.012	-0.006	0.007	0.014**	0.005
	High housing value status (120% to 150%)	-0.006	0.010	-0.006	0.009	-0.010	0.006
	Very high housing value status (over 150%)	-0.048**	0.023	-0.025	0.019	-0.014	0.015
Level 2: Municipality	% MSA households in each municipality	-0.231***	0.033	0.008	0.030	-0.097***	0.023
	Race/ethnicity homogeneity	0.254***	0.055	0.097**	0.040	0.122***	0.029
	Age homogeneity	-0.337	0.296	-0.002	0.178	0.023	0.148
	Family income homogeneity	-0.350	0.306	0.745*	0.421	-0.053	0.212
	Family type homogeneity	0.128	0.184	0.217	0.140	0.315***	0.112
	Dummy unincorporated place	0.025	0.017	0.021**	0.010	-0.025***	0.007
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	-0.955	0.873	0.387	1.349	1.590	1.122
	Decline of jobs to total population ratio (change)	-0.281	0.227	-0.879**	0.419	-0.458	0.368
	Metropolitan fragmentation	-0.131	0.089	0.071	0.109	-0.143	0.132
	Dummy Midwest	-0.129**	0.062	-0.133**	0.052	0.034	0.042
	Dummy Northeast	-0.227***	0.046	0.154	0.093	-0.173***	0.052
	Dummy West	0.124**	0.059	0.078	0.090	0.083	0.066

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03; ***p<0.01, **p<0.05, *p<0.1

Multilevel Estimates Based on Change of Per Capita Income

Level	Explanatory Variables	1970 - 1980		1980 - 1990		1990 - 2000	
		β	S.E.	β	S.E.	β	S.E.
	Constant	-0.324***	0.113	-0.174*	0.101	-0.223**	0.082
Level 1: Neighborhood	% Housing built within the preceding 10 years	-0.008	0.491	-0.006	0.016	0.015	0.019
	% Housing built within the preceding 20 to 30 years	-0.180***	0.093	-0.091***	0.020	-0.078***	0.025
	% Housing built more than 30 years ago	-0.011***	0.047	0.006	0.027	0.037*	0.022
	Average number of rooms	-0.042***	0.025	-0.049***	0.014	0.008	0.005
	% Black	-0.054	0.027	-0.122*	0.074	-0.233***	0.070
	% Hispanic	0.022***	0.027	-0.249**	0.126	-0.280***	0.056
	% Black^2	-0.055	0.045	0.084	0.076	0.211***	0.077
	% Hispanic^2	0.047***	0.077	0.036	0.170	0.233***	0.060
	% College-graduates	0.074	0.270	0.832***	0.105	0.285***	0.032
	Poverty rate	0.045**	0.210	-0.385***	0.122	0.359***	0.060
	Homeownership rate	-0.164***	0.095	0.395***	0.066	0.094***	0.029
	Very low per capita income status (less than 50%)	0.024**	0.015	0.480***	0.079	0.146***	0.017
	Low per capita income status (50% to 80%)	0.006***	0.023	0.140***	0.022	0.047***	0.010
	Moderate per capita income status (80% to 100%)	-0.087***	0.029	0.052***	0.007	0.021***	0.005
	High per capita income status (120% to 150%)	-0.083***	0.029	-0.050***	0.009	-0.039***	0.007
	Very high per capita income status (over 150%)	0.053***	0.009	-0.107***	0.020	-0.112***	0.013
Level 2: Municipality	% MSA households in each municipality	-0.124	0.102	-0.065**	0.026	-0.061***	0.019
	Race/ethnicity homogeneity	-0.326	0.123	0.082**	0.040	0.105***	0.019
	Age homogeneity	0.050	0.120	0.037	0.059	0.016	0.167
	Family income homogeneity	0.410	0.144	-0.031	0.113	-0.336*	0.177
	Family type homogeneity	0.038*	0.125	-0.456*	0.240	0.379***	0.108
	Dummy unincorporated place	0.193*	0.076	-0.121	0.253	-0.010*	0.006
Level 3: Metropolitan Area	Decline of manufacturing jobs to total jobs ratio (change)	0.096	0.028	0.254*	0.143	0.799	0.606
	Decline of jobs to total population ratio (change)	0.100*	0.046	-0.014	0.011	-0.004	0.105
	Metropolitan fragmentation	0.070	0.017	0.358	0.778	-0.168**	0.069
	Dummy Midwest	0.035	0.009	-0.336	0.238	-0.005	0.027
	Dummy Northeast	-0.051*	0.016	0.006	0.073	-0.042***	0.014
	Dummy West	-0.112	0.027	-0.052	0.033	0.041	0.030

Note: Entries are full maximum likelihood coefficients and unstandardized coefficients estimated with HLM 6.03; ***p<0.01, **p<0.05, *p<0.1

Both the Housing Value and Per Capita Income models include the same explanatory variables except for the five initial economic status variables. The initial economic status variables are replaced by the five initial housing value status variables in the Housing Value models and the five initial per capita income status variables in the Per Capita Income models.

There are some changes in statistical significance of coefficients for a few explanatory variables. Signs of some coefficients also vary among the Housing Value, Per Capita Income, and original models. The differences are discussed below:

Level 1: Neighborhood Level

Housing Characteristics

Although there are minor differences in statistical significance and signs of variables, both Per Capita Income and Housing Value models conform that a great share of old housing units are positively related to economic gain as in the original models.

Demographic Characteristics

The result on the racial composition variables in the Per Capita Income models is closer to the one in the original models. Percentage black and percentage Hispanic variables are negatively related to economic gain in the 1980s as in the original models. However, their squared values are not statistically significant unlike the original models. The racial composition variables and their squared values are negatively and positively related to economic gain in the 1990s, respectively, as in the original models. In the

Housing Value models, only percentage black and its squared value in the 1980s are positively and negatively related to economic gain respectively, which slightly deviates from the original model for the 1980s.

Socio-Economic Characteristics

The share of college-graduates variable is positively related to economic gain in the 1980s and 1990s in both models as in the original models. In the Housing Value models, poverty rate is positively related to neighborhood economic gain in the 1970s and 1990s but negatively related to neighborhood economic gain in the 1980s. Poverty rate is not statistically significant in the Per Capita Income model in any panels. In the Per Capita Income model, homeownership rate is negatively related to neighborhood economic gain in the 1970s but turns to be positive in later panels, while it is not statistically significant in the Housing Value model. Although more initial economic status variables are statistically significant in the Per Capita Income models, the models overall conform that neighborhoods at lower economic status are more likely to improve economically.

Level2: Municipal Level

While there are some changes in sign and statistical significance, both models conform that city size is negatively related to neighborhood economic gain. Race/ethnicity and family type homogeneities are positively related to neighborhood economic gain as in the original models.

Level3: Metropolitan Level

As in the original models, both models show that metropolitan economic conditions and regional differences exert statistically significant influence to neighborhood economic gain.