

GENTRIFICATION AND RESIDENTIAL HOUSING VALUE: AN EXAMPLE OF
SPILLOVER EFFECTS IN ATLANTA, GEORGIA FROM 2000 TO 2009

by

MARK ALLEN WEAVER

(Under the Direction of Steven Holloway)

ABSTRACT

Gentrification research for the past 50 years is determined to lack analysis of the holistic effects of gentrification. Atlanta, GA is used as a study area to examine how proximity to gentrification has spillover effects based on the surrounding housing market. Median home value is analyzed to be positively affected by gentrification in nearby areas after accounting for changes in housing, socioeconomic, and spatial variables from 2000-2009. This finding is careful to point out what issues future research needs to address, but establishes the need for debates on gentrification to include effects beyond the borders of gentrified neighborhoods. Overall, gentrification research is prompted to incorporate more comprehensive information into current and past debates on issues such as government sponsored gentrification and displacement.

INDEX WORDS: Gentrification, Spillover effects, Housing value, Atlanta

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DEDICATION

I would like to take a moment to credit all the support I have had in my process of learning and dedicate this to my friends, family, and loved ones that have helped me through the years. With the help of many, I was able to undertake a journey consisting of most of my life. You all have instilled the desire to keep learning, and I thank you.

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CHAPTER 1

INTRODUCTION

Gentrification and Housing Value: Reason to Look Farther Away

“In that sense, demographers say, the shift [in gentrification] is driven by class rather than race. In 1990, the per capita income in the city of Atlanta was below that of the metropolitan area as a whole, but in 2004 it was 28 percent higher, the largest such shift in the country, according to a University of Virginia urban planning study” (Dewan and Goodman 2006).

Gentrification research has largely focused on displacement, race relations, economic development, mixed use living, and increased local property tax revenue for the past 50 years (Slater 2006). The missing link in scholarly work on gentrification is a lack of attention to how gentrification affects neighborhoods adjacent to the areas under study. Specifically, gentrification research lacks a comprehensive examination of how gentrification influences real estate housing values and demographic changes in proximate residential neighborhoods. As a result, this research asks if a quantifiable externality (either positive or negative) is provided by gentrified (gentrifying) neighborhoods to proximate non-gentrified neighborhoods. An approach combining land market theory with traditional gentrification research is necessary. By creating a statistical model using socioeconomic and spatial data, I seek to understand how gentrification during the 1990's caused spillover effects on residential housing value changes within Fulton, DeKalb, Cobb, and Clayton Counties of Atlanta, GA from 2000 to 2009.

The scholarship of gentrification began in 1964 when Ruth Glass described an urban process in London “by which working class residential neighborhoods are rehabilitated by middle class homebuyers, landlords, and professional developers...” through a “rehabilitation of old structures” in a city (Glass 1964, Smith 1982, Smith 2002). The description of gentrification incorporates discussions of socioeconomic struggles in real estate markets within larger cities such as London, New York, Chicago, Atlanta, and Sydney (Smith 1996, Bridge 2001, Betancur 2002, Hamnett 2003, Immergluck 2009). Recent publications have identified gentrification in newer land markets such as Seoul and Shanghai (Ha 2004, He 2007). While gentrification research has identified unique attributes of gentrification in different cities, emphases on race, class, political structure, and transportation present in literature fail to look farther than the scope of the neighborhood, district, or community that is being gentrified (Smith 1979, Ley 1996, Lees 2000, Betancur 2002, Kahn 2007). Furthermore, gentrification in established city neighborhoods has a common structure beginning with housing stock devalorization, eventual disrepair, and a rehabilitation effort for the purpose of recapturing potential lost value. Because gentrification is tied to processes affecting housing value, it is through the real estate market that gentrification’s true effects need to be analyzed (Smith 1996).

In urban economics, land market theory implies property values are homogenous across small distances of land (Alonso 1964). If the measurement of land values across a land market is influenced by each part of the land within it, then it is argued that the study of gentrification (rehabilitated urban housing on urban land) should go beyond previous research that limits its effects to a single neighborhood.

Instead, analysis should consist of areas beyond neighborhood boundaries and estimate potential holistic effects of gentrification on the urban space. In addition to real estate land theory, Tobler's first law of geography explains, "everything is related to everything else, but near things are more related than distant things" (1970). Tobler's law and land theory form the basis for models depicting housing attributes effect on overall housing values over time (Tobler 1970, Fingleton 2006). This research looks at the real estate housing market in Atlanta, Georgia and its relationship to gentrification using a spatial model constructed to account for block group home value variations.

Research Purpose

Literature on land markets, hedonic modeling, and gentrification have all led this research to focus on different variables that affect housing values in gentrified neighborhoods in addition to proximate U.S. Census block groups. Specifically, this thesis attempts to correlate gentrification with spillover effects on median home value change within the parameters of Atlanta, Georgia. The vast amount of literature covering gentrification looks at neighborhood-specific instances where housing values skyrocket due to an inflow of middle to upper-class residents willing to reinvest in an area that has previously been in decline due to changes in demographic patterns within inner-city life (Ley 1996, Smith 1996, Freeman 2006). As stated earlier, urban economics uses interconnected land markets to understand how property appraisal from one observation to the next is accurate. Using the rationale from real estate market theory and Tobler's law, the author argues that homes in areas close to established gentrified neighborhoods are enhanced by a positive externality (1970). As

most gentrification literature points to large increases in housing value typical of gentrification, block groups very close to the phenomenon would be expected to rise in value quicker than other non-gentrified block groups not proximate to gentrification. A rationale can be made that gentrification affects the housing market as a whole if a variable explaining gentrification's effect on nearby areas is significant to the analysis and shows an observable change. One block group increasing in investment, infrastructure, and housing values seems likely to affect neighborhoods across the street, highway, park, or commercial zone. Therefore, as gentrification has been found to increase any and all of these factors, it would plausibly also have effects on the rest of the local housing market. Since these effects can be measured and accounted for as individual variables in a study area, I propose a thorough statistical and spatial analysis will make it possible to see correlations between gentrifying census block groups in one decade and spillover effects on adjoining non-gentrified block groups in the next decade.

Current gentrification research fails to examine the effect that gentrification has beyond gentrified or gentrifying neighborhood borders. With further potentially glaring problems, current gentrification research does not take into account possible spillover effects. If these effects are present, they potentially hinder the completeness of research necessary to make proper policy decisions and develop scholarly work that analyzes the true net effect (positive and negative) of this urban phenomenon. Through statistical and spatial analysis of Atlanta, GA using established gentrification data from the mid-1990's to compare observed home value change between 2000 and 2009, this research examines the following question:

Do gentrified census block groups in Atlanta, Georgia during the mid-1990's create a quantifiable spillover effect (positive or negative) on median housing value in non-gentrified block groups between 2000 and 2009 based on vicinity to gentrified U.S. Census block groups after accounting for socioeconomic factors, transportation access, and proximity to the central business district?

Examining the effects of gentrification on housing values, social and racial compositions, and residential incomes of nearby neighborhoods will hopefully prompt further research to adequately understand the broader scale of gentrification's effect. While the concern of this research is not to clarify a better definition of gentrification or displacement's consequences, it is important to note that the social justice and moral implications of gentrification within this study area are not analyzed. Instead, this research will look at block groups recognized as gentrified through published peer-reviewed papers by use of demographic and real estate data to understand whether or not gentrification's effects spread beyond gentrified neighborhoods (Hammel and Wyly 1996, Wyly and Hammel 1998, Bostic and Martin 2003). Through a study of Fulton, DeKalb, Cobb, and Clayton County block groups within Atlanta's I-285 Interstate loop (hereafter, Atlanta perimeter), this paper will attempt to show any effect gentrification's movement through space and time has beyond the traditional borders of gentrified neighborhoods.

This research looks to determine if gentrification's effects transcend traditional borders of gentrified neighborhoods for important reasons. First, if gentrification's effect on housing values extends beyond gentrified space, this research should prompt additional research into proximity effects of other ills and benefits associated with gentrification. Gentrification's correlation with rising housing values cannot be

considered isolated. Instead, each advantage and disadvantage of gentrification will need to be evaluated as it relates to other individual urban land markets. Second, the ability to show that gentrification extends beyond neighborhood boundaries encourages even more critical discussion of public policies promoting gentrification. With public policy encouraging public-private partnerships creating gentrified space, it will be necessary that future research on these initiatives is evaluated for its true effect on the entire housing market instead of marginalizing effects to individual neighborhoods. Finally, with any research showing spillover effects of gentrification, a change in scholarship will need to reinterpret a standing mindset that gentrification's spread is both random and semi-isolated. A large part of early gentrification research discusses individual investors that gentrified to be closer to city amenities and employment opportunities. Certain neighborhoods garnered added attention as the number of gentrifiers increased. With this analysis of gentrification in Atlanta, the author points to considerable significance that the spread housing variables associated with gentrification is not random. This research points to distance decay model representing gentrification's effects has on an urban housing market and implores future research to determine even more accurate estimations. These reasons all make the implications of this research extend well beyond analyzing whether gentrified census block groups correlate with spillover effects resulting in increased residential housing values in non-gentrified census block groups within the Atlanta, GA study area.

Multivariate regression models allow the researcher to identify possible home value changes over time correlating with gentrification's spillover effects from the

previous decade. This estimation will allow the author the ability to determine if gentrification has an effect in space greater than what has been previously studied. In addition to strictly econometric attributes, demographic and locational variables used in gentrification literature will represent control variables to hopefully better isolate the effects attributable to gentrification. Specifically, race, class, transportation preference, and home value data will be included in the analysis pursuant to United States Census Bureau block group summary files. Also, geographic information systems (hereafter GIS) will be used to find spatial distances (through geocoding) of employment accessibility and Metropolitan Atlanta Rapid Transit Authority (hereafter MARTA) rail stations. Most importantly, the gentrification variable will be created to model any positive or negative effect that being closer to gentrified areas has beyond the boundaries of currently gentrified neighborhoods. While no researcher has looked at how gentrification affects housing values, the relationship between housing values and economic, demographic, and locational characteristics is evidenced in various urban housing value studies (Benjamin and Sirmans 1996, Haider, Miller and Trb 2000, Song and Knaap 2003, Fingleton 2006, Hess and Almeida 2007, Cohen and Coughlin 2009, among many others). With all of these variables joined in a single dataset, regression modeling allows analysis on each variable's impact with median home value acting as an independent variable.

Thesis Design

In the following chapters, the author will summarize relevant scholarly work, describe the study area used in the project, detail the methodology to acquire the results, explain the findings, and conclude with the implications of this work. Chapter

2 reviews literature relevant to gentrification, housing value, and hedonic modeling to summarize relevant past and current analysis on gentrification, land market theory, and regression methods to capture relevant attribute effects on housing. Chapter 3 presents a basis for studying Fulton and DeKalb counties in Atlanta, Georgia, along with descriptive figures showing temporal change that occurred between the beginning and end of the study period. Also in Chapter 3, a full methodology will demonstrate how the final results are obtained. It will include base model explanation coupled with regression diagnostics. Chapter 4 will include descriptives of the study area and present key insights into the individual variables and overall data. Chapter 5 contains a thorough analysis of the results of the model and individual variables. An entire section will be devoted to the analysis of the gentrification variable. Finally, Chapter 6 is devoted to how the results found implore further research into the relationship between gentrified and non-gentrified areas based on housing value but extending to various topics such as displacement, redevelopment, and public policies promoting gentrification.

CHAPTER 2

LITERATURE REVIEW

Gentrification's Origins, Extent, and Characteristics

Gentrification's origins, attributes, and implications must be considered before an analysis of its effects can be understood. The beginnings of gentrification trace back to the post-World War II era as a shift in employment started occurring in the United States from primary and secondary sectors (agriculture, manufacturing, and light industrialization) to quaternary services (finance, real estate, education, and insurance) (Ley 1996). Growing wages and an increasing household income gap contributed to a new process of suburbanization. This began a progression of inner-city decline and disinvestment as tax dollars flowed outside city limits. A lack of resources in central cities continued causing a downward spiral of decline and disinvestment. With this process, housing values began to plummet within city limits of many major United States cities. Infrastructure deterioration became a problem as fewer tax dollars were available to downtown areas as population levels dropped and property tax dollars went to the suburbs. This caused home prices to decrease well-below potential value (creating short-term opportunities for low-income urban residents) forming "rent gaps" where home values are potentially greater because of previously observed values or proximity to the CBD (Smith 1996). This disinvestment induced decline in values is what investors use when analyzing the profit potential of rehabilitating homes in gentrifying areas. Disinvestment can be a result of owners not

maintaining their property due to decreasing property values in an area or local governments lacking the infrastructure improvements that keep an area of the city desirable.

Gentrification occurs as lower housing prices enabled new investors to take advantage of potential “rent gaps” caused by disinvestment (Smith 1996). Investors rehabilitate housing to capture the value between actual depressed values and potential values due to proximity to the CBD (Alonso 1964, Smith 1996). The desire to revalorize the housing stock and find further rent gaps led to more displacement as other investors saw the opportunity to make money by rehabilitating homes. This form of displacement was the removal either directly or indirectly of citizens in a neighborhood due to inability to pay increased rent (due to reinvestment and soaring property values) or increased property taxes (Smith 1996).

While gentrification is the movement of money and affluent people back into the city’s housing stock, the urban change can be thought of in “three waves” (Hackworth and Smith 2001). During the 1960’s, concentrations of counterculture groups emerged in inner cities such as gays, musicians, and artists etc. who were interested in rehabilitating older style architecture forms and lofts to enjoy inner-city amenities for lower costs (Ley 1996). Classified as first wave gentrification, individual investors returned to the city with private budgets to work on their personal investments. Such groups sought an alternative to “cookie-cutter” suburbs, and realized housing and property values were much cheaper in the city (Ley 1996). Along with the creation of a rent gap between actual values (post-decline) versus potential value (based on pre-decline values), certain neighborhoods after years of decline

became seen as “urban frontiers” to renovate based on proximity to the central business district and other city attractions (Smith 1979). The decline that characterizes those urban frontiers is attributed in research to the suburbanization (white flight) of the city (Smith 1979). Through this frontier myth that “roughness and rawness” of a neighborhood turned positive, the spark needed for gentrification ignited (Ley 1996). As more investors and gentrifiers sought to capitalize on the value of city amenities and closer proximity to work, the second wave of gentrification began (Ley 1996). This next phase is characterized by a disproportionate increase in the number of neighborhood residents who are college educated and employed in quaternary service work (professional fields such as management, finance, real estate, law, medicine, etc.) (Ley 1996). Finally, “third-wave” gentrification occurs when government incentives promote gentrification for the purpose of higher property tax dollars (Ley 1996, Hackworth and Smith 2001). This final reason for gentrification’s growth includes local governments directly seeking public-private partnerships to redevelop inner city housing or indirectly proposing policies that push enforcement in order to reduce poverty and crime associated with their city. The removal of cheaper housing within the city is socially constructed to promote gentrification as positive by policymakers. This project will hope to show that these characteristics viewed as positive by some people in a community have farther reaching effects on other neighborhoods nearby.

While each of these waves of gentrification typically have ruinous effects on the urban poor, infrastructure degradation over the course of the disinvestment cycle leads to a lower standard of living in the city. As gentrification becomes more

prevalent, those communities fight for more tax dollars to improve the infrastructure in place. This leaves other areas still in decline worse off as the wealthy households living in gentrified areas enjoy greater services provided by local government officials (Redfern 2003). Thus, urban poor are left with their space in the city and lack the financial means to combat a worsening education system and face an even higher reliance on public assistance programs (Smith 1979, Ley 1996, Smith 1996, Ley 2003, Redfern 2003). While these misfortunes can be quantitatively observed through demographic variables, statistical research can offer no claims of true feelings experienced by those displaced and living with a continued lack of proper infrastructure and business improvements. Location within the city is an important factor in how far a neighborhood progresses along this three step process. It is essential to understand how location, design, and demographic information alert gentrification scholars to a changing landscape. Because research has cited multiple examples of infrastructure degradation and disinvestment occurring very close to gentrified areas, it is important to seek the net effect of housing valorization from gentrification. Land market theory will better describe how the decline in value next to gentrified areas could be cancelled out due to the increase in property value occurring nearby in gentrified areas. Understanding if gentrification has a net effect is what makes this research valuable.

David Ley outlined five distinct characteristics that differentiate areas undergoing gentrification from those that are not (Ley 1996). These five central “tenets” of gentrification will later be used to support variable decisions of the regression model used to differentiate census block groups in Atlanta (Ley 1996).

While the past decade has seen an increase in gentrification studies focused on rural areas and studentification, the vast majority of scholarship focuses on gentrification's effect on high-population urban areas. Therefore, the first central tenet of gentrification is a focus on proximity to the CBD where large employment has traditionally been located. While Atlanta's CBD is not as centralized, the intersection of Five Points, located in Fulton County of the study area, will be used in the analysis because of its location both relative to business development and within Atlanta's Interstate 285 perimeter loop. Second, the area should be proximate to established middle and upper-class areas. This is mainly due to the spatial clustering of residential home values as well as the presence of desirable older home structures that gentrifiers renovate. Leading into the third central characteristic, gentrification typically occurs in areas associated with "distinctive older architectural forms" (Ley 1996). The counties of Fulton and DeKalb have the greatest amount of older buildings which were built for the middle- and upper- classes during Atlanta's formation. As Fulton and DeKalb counties were areas where Atlanta's elite formally resided, the older forms of architecture are still common in these areas, while Cobb and Clayton Counties will be used for comparison based on their location within the Atlanta perimeter and their proximity to employment accessibility. Fourth, gentrified neighborhoods are close to a chain of public institutions (governmental, educational, etc.). As most of Atlanta's attractions are in Fulton and DeKalb counties within the Atlanta Perimeter (Interstate 285), they form a natural study area to have concentrated results. Fifth, some contemporary cases of gentrification include communities that are reinvesting because of public initiative or subsidies (Ley 1996, Hackworth and Smith 2001). While the

discussion of gentrification has helped understand the relevant actors and locations, it is important to recognize the main arguments for and against gentrification.

The Battle for the City Continues

Gentrification is a hotly contested topic in academic, political, and cultural media. It is necessary to now look the views of those who oppose and advocate the urban process. Displacement and long standing opposition to racial integration in residential neighborhoods garner advocacy for residents by academics. Higher property taxes to support infrastructure development and reduced costs associated with “moving back” to the city are indicative of gentrification’s support by city boosters, developers, and citizens looking for better proximity to city amenities.

Gentrification is opposed on two grounds: displacement and race relations. First, there must be open homes for the initial gentrifiers to move into. In many cases, this desire to find homes after gentrification begins has led to multiple cited examples of displacement as more people and investors wish to move back to the city. Vacancies either exist in a neighborhood where gentrifiers or investors wish to move, or vacancies must be made available. Those displaced are most commonly “tenants, the poor, and female headed families” (Ley 1996,65). Because the issue of gentrification is poised between scholars viewing gentrification as “the potential to revitalize depressed central city neighborhoods” against those scrutinizing “the threat of displacement... whereby current residents are forced to move because they can no longer afford to reside” it is important that displacement has been examined critically (Freeman and Braconi 2004, Freeman 2005, 463, Slater 2006). The costs of displacement are difficult to quantify, and displacement research calls for better

techniques differentiating between displacement and residential mobility (Millard-Ball 2002). As such, this research will not attempt to quantify displacement or threats of displacement. The research on residential mobility will be a topic requiring further analysis than this paper will provide. Second, a main issue contested by gentrification scholars points back to race-relations. Neighborhood race relations are an important aspect of how residents view their surroundings. Racial changes that factor in gentrification processes will be important in the analysis of gentrification changing the residential home market in Atlanta.

Despite the social problems connected with displacement and race relations, many academics argue in favor of gentrification's benefits. First, gentrification's main economic advantage is in the form of higher property taxes a city will receive through escalating housing values. Thus, gentrification garners support of city boosters and many local governments. In addition, housing is initially cheaper to be rehabilitated than built anew in the suburb, so gentrification has a cost benefit to the investor (Smith 1996). After gentrification begins, housing values start to rise as the area becomes more desirable. Thus, areas already gentrified will be location-specific for investors deciding between housing rehabilitation versus new development on higher valued homes. This happens because areas that are already experiencing gentrification have higher home costs. A vital point of this project is the exploration of whether developers or investors move on to areas proximate to gentrification to capture perceived future "rent gaps" (Smith 1987a). If an analysis of spillover effects finds proximity to gentrification correlating with increased housing values in block groups not gentrified, it will be indicative of an even greater incentive for local governments

to encourage gentrification on the basis of property taxes alone. Second, proximity to city venues such as theaters, sporting events, museums, and quicker commute times all factor into the desire of certain families willing to pay a premium in neighborhoods (Ley 1996, Freeman 2006). City planners have highlighted these amenities, and it has been shown to increase the desire to return to the city (Zimmerman 2008). Additionally, research has pointed to cultural flair of a neighborhood, architectural design desires, and revanchist desires to “take back the city” have all contributed to middle to upper-class households being enticed by local governments and developers to continue moving back to the city (Smith 1987b, Slater 2004, Dostrovsky and Harris 2008).

The complex relationship between the advantages and disadvantages of gentrification cause different stakeholders to view gentrification differently. While the majority of research in academia is focused on its negative aspects (Slater 2006, Smith 2008, among others), some researchers instead promote the advantages of gentrification by attempting to dismiss the disadvantages of gentrification’s displacement (Freeman 2005, Freeman 2008, McKinnish, Walsh and White 2010, among others). With the complexity of gentrification exemplified by the wide variety of those affected, the purpose of this project intends to engender a better debate with a more holistic awareness of how far gentrification’s effects reach.

Housing Value and the Effect on Gentrification

Because a multitude of variables affect the way that land is valued between investors, developers, home-owners, and governments, it is necessary to understand

how land value is ascertained before understanding why scholars, planners, government officials, and the media argue for or against gentrification.

Land is monopolistic in that space may only be used for one activity at a time and, consequently, price is controlled by a relationship of use values and exchange values (Logan and Molotch 1987). Scarcity occurs because land cannot be used for more than one use at a time. This monopolistic characteristic of land, coupled with a property's changing value of location, creates the framework for rising and falling prices (Logan and Molotch 1987). Understanding land value can then be used to explain how gentrification affects the desirability of nearby neighborhoods (in terms of price) and if any housing value change should be ascribed to the process of gentrification. An understanding of housing value change allows the researcher to analyze how various microeconomic processes interact. A way to understand individual variables that comprise housing value is hedonic modeling.

A process known as "hedonic pricing" was developed by Rosen to quantify how composite goods, like housing, can be broken up into individual components priced through a summation of their individual characteristic's value (Rosen 1974, Witte, Sumka and Erekson 1979). This hedonic derivation of the regression model has become the most widely used method for analyzing localized urban housing markets (Mikelbank 2004). The vast majority of literature on hedonic housing theory stems from econometrics and deals with individual home values based on such variables as square footage, number of bedrooms, number of bathrooms, and housing age regressed with other locational variables such as distance to employment accessibility and distance to the nearest transportation stop (Witte et al. 1979, Haider et al. 2000,

Mikelbank 2004, Hess and Almeida 2007). More recently, other variables have been added to the literature examining housing value determination: neighborhood dynamics, new urbanism features, schooling, and public service infrastructure (Can 1990, Cheshire and Sheppard 1998, Song and Knaap 2003, Fingleton 2006, Ryan and Weber 2007). While hedonic research has considered socioeconomic factors affecting the value of the immediate housing stock, research has failed to consider gentrification as a value or detriment to neighborhood value.

Hedonic modeling research relies on a large sample size of parcel-level residential housing transactions occurring within a small timeframe paired with data of the sale and housing condition typically received from a local county tax assessor (in the United States). While hedonic research is valuable for understanding urban economic structures, this research will highlight previously unknown effects as a proof of concept. Future research using various other methodologies will hopefully continue to expound upon the farther reaching effects of gentrification on the city. This project will be focused on aggregating neighborhood data to examine gentrification on a neighborhood scale. As such, block group data will represent neighborhoods with the intent of limiting the analysis to only considering how groups of individual residential units are affected by gentrification. This research is optimistic that neighborhood-wide changes will be more efficiently estimated using this methodology. In addition to the typical hedonic model using variables discussed in the preceding sections, other influences to the Atlanta real estate market need to be discussed along with their effects on local housing values before addressing the study area and methodology used in this research.

Other Factors Possibly Influencing Housing Value

While gentrification research looks at all of the previously discussed variables and interactions within the urban environment, it is important to note other potentially influential variables needing to be discussed in the Atlanta, GA area. First, the history of public housing deep rooted in Atlanta's history is considered. Second, a brief examination of how different centers of employment within the Atlanta Interstate 285 perimeter loop potentially affect the final model will be analyzed. Third, the influence public housing policies and housing empowerment zones have had on the redevelopment in the city will be discussed.

Public Housing: Atlanta's Past and Present

Public housing in Atlanta has a tremendous impact on the historical and present space, demographics, and politics of the city. As such, the author seeks to capture as much of the impact of public housing on the housing value without going beyond the natural scope of this research. The discussion of the public housing variable will consist of three sections. First, important events relating to public housing before the 1990's in Atlanta are discussed. Second, the change in policy initiatives from the Olympics to present-day will highlight changes and difficulties in measuring public housing's influence on residential home values. Third, the an introduction to the public housing variable will be rationalized and its later creation will be detailed. After the impact of the public housing variable is explained, a thorough review of the gentrification variable will take place.

The origin and development of public housing in Atlanta needs to be understood before the lasting effects of current policy can be hypothesized. The first

public housing project in both Atlanta and the United States was built in 1936 as Techwood Homes (Brown 2009). While the project started off all-white, Techwood Homes had become over 60% black within 40 years (Keating 2000). Keating argued that as a result of racial change, business interests in Atlanta, particularly Coca-Cola, became “worried” about having black projects in close proximity (2000). By the 1980’s, the mayor of Atlanta, Andrew Young, agreed with business interests. He supported the “view that gentrified downtown residential development was a key to CBD revitalization” (Rutheiser 1996, Keating 2000). At this time the backing of public housing would never return. The outward support of the mayor and downtown business happened after a 20-year period when Atlanta displaced nearly 68,000 residents from public housing projects (Keating 2000). This history of displacement in Atlanta makes modeling the long-term historical effect of public housing on housing values difficult. With a long-standing precedent of moving residents out of public housing projects, the effects of public housing are likely scattered throughout the city. In the beginning of the 1990’s, the support for public housing reduced even more, and this change ushered in a moment of rapid land use change.

Atlanta’s housing market has changed much because of the HOPE VI program and the Summer Olympics during the 1990’s. HOPE VI (Housing Opportunities for People Everywhere) began in 1992 and ushered in an even greater incentive for local housing authorities to demolish public housing projects (Tester et al. 2011). With public housing regarded as a policy failure, the Clinton administration laid the groundwork for HOPE VI “to disperse residents from centralized projects” (Brown 2009). HOPE VI gave municipal housing authorities funding for the purpose of

renovating or replacing public housing projects. The unclear language of the law frequently led to funds that were kept from replacing public housing communities after they were torn down. A voucher program was added to the HOPE VI policies in 1995 when Congress suspended a previous HOPE VI requirement that local housing authority programs could only demolish projects with a one-to-one replacement. The benefits, if any, to public housing residents moved under the voucher program has yet to be adequately quantified. Wyly and Hammel identify the increased desire to demolish public housing projects within the inner city as “central to contemporary patterns of gentrification and housing market activity in many cities” (1999, Goetz 2011).

In addition to the effect that early 1990’s housing policy has on Atlanta’s public housing, the 1996 Summer Olympic Games were an impetus for Atlanta’s ruling coalition to change the use of inner-city land from public housing to mixed-use and higher value real estate. In preparation for the 1996 Summer Olympic Games, the Atlanta Housing Authority (AHA) began a \$300 million dollar renovation and redevelopment of 42 public housing projects known as the Olympic Legacy Plan (White 1997). Renee Glover, former executive director of the AHA, admitted that the plan would rely on Section 8 housing vouchers to make up the difference in units lost with the execution of the Olympic Legacy Plan (White 1997). Under the plan, the majority of revitalization efforts of the AHA were scheduled to be completed in the 42 public housing projects by the end of 2000. The Olympics and HOPE VI federal policy occurring during the 1990’s have changed the public housing landscape during

the study period. To understand where research is now, a brief explanation of the current state of public housing in Atlanta is necessary.

Researchers today are divided as to the effects of public housing on previous residents and neighborhoods. As of 2012, Atlanta is scheduled to be the first United States city to demolish all of its public housing projects. The last residents of public housing were scheduled to move out in December 2011 (Katz 2010). Katz also points to an alarming statistic: 9 out of 10 residents that were given vouchers in Atlanta during relocation efforts (or lack thereof) continued to live in neighborhoods with high crime and poverty (2010). Even with the lack of public housing options available now, the AHA was paying for more resident's housing in 2009 than it was in the 1980's (Brown 2009). Furthermore, Brown cites that former residents of public housing projects are "scattered throughout the city in mixed-income communities and private housing" with the help of Section 8 vouchers (2009). Another study found that former public housing households were more likely to find gains in employment when relocating to other areas of the city due to voucher programs (Boston 2005). Assuming the validity of this statement, the author claims that distance to housing projects during the study can model the effect of public housing projects on the housing market no better than looking at the neighborhoods previously containing public housing projects. Instead, the presence (or lack thereof) of public housing projects would seemingly indicate lower housing values and income but higher poverty (Boston 2005).

Now that the author has summarized the debate over gentrification, land value theory, hedonic modeling, and public housing, this paper will proceed with a full

description of the study area used for analysis will be completed. After the study area is explained, a chapter discussing descriptives of the model will precede the final model analysis. After finally analyzing the model, the conclusion of this thesis will tie the findings of this paper back to the debate of gentrification, land value theory in Atlanta, and the implications of this paper on future researchers.

CHAPTER 3

FOCUS AREA AND METHODOLOGY

This paper highlights genuine research concerns for gentrification literature with respect to its understanding of the comprehensive effects on local neighborhoods. Completing the rationale for this research, the Atlanta, Georgia study area of Fulton, DeKalb, Cobb, and Clayton counties limited to inside the Interstate 285 loop will be defended. Following an explanation of the study area, the initial model will be given. Then, descriptions of each variable used to analyze residential home value change that has occurred in Atlanta between 2000 and 2009 will be explained. Finally, the initial diagnostics of the initial model will give basis for the final model in the results chapter used to highlight variable significance and measure the effect of gentrification on home values in Atlanta, Georgia after accounting for socioeconomic and locational data. Immediately preceding the chapter on this research's results, a chapter dedicated to showing variable descriptors over the study time will highlight relevant changes in the study area.

Atlanta, Georgia: Inside the Perimeter

“According to research by William Frey of the Brookings Institution, the white population of Atlanta has increased from roughly 30 percent to 35 percent while the black population has declined from 67 percent to 55 percent” between 1990 and 2006” (Ehrenhalt 2008).

Fulton, DeKalb, Cobb, and Clayton counties in Atlanta, GA are this research's focus area for multiple reasons. Atlanta is the ninth-largest metropolitan statistical area

in the United States, and gentrification research has occurred in both smaller and larger cities. This study removed all block groups that had less than 100 people or households as to not skew the results. The remaining 506 block groups within the Atlanta perimeter accounted for growth in a total population from around 844,000 residents in the 2000 U.S. Census to 955,000 in the 2009 5-year American Community Survey (hereafter ACS). Atlanta has documented experience with gentrification back to at least 1970's in the Virginia-Highland community (Bureau of Planning 1998, Census Bureau 2010). Additionally, contemporary gentrification researchers have used Atlanta in studies, and urban economists have recently used Atlanta as a study area for housing values across an urban markets relating to airport access, transportation, and race (Stone 1989, Hammel and Wyly 1996, Wyly and Hammel 1998, Keating 2001, Bostic and Martin 2003, Imbroscio 2004, Gibbs Knotts and Haspel 2006, Martin 2007, Immergluck 2009). The study of home value change between 2000 and 2009 is relevant due to both the timing of published literature corresponding to recent literature on the area and its ability to potentially show holistic impacts on housing values external to gentrified areas (Smith 1979, Ley 1996, Smith 1996, Uitermark, Duyvendak and Kleinhans 2007). While the majority of gentrification in Atlanta occurs in Fulton County, the study area provides an excellent example of a housing market that changed rapidly over the course of two decades. The study area has a traditional wealth held within the Atlanta city limits, but has been spreading farther north (both inside the city and to its suburbs) over the past few decades. Another reason that Atlanta makes a great focus area for gentrification lies in the politics that multiple other researchers have pointed out. The governing coalition

present in Atlanta is based on historical race- and class-based partnerships that have been instrumental in changing Atlanta's landscape and housing values with respect to infrastructure, public assistance, redevelopment initiatives, and public transportation policies throughout the past 50 years (Stone 1989, Kahn 2007, Martin 2007, Glaeser, Kahn and Rappaport 2008, Immergluck 2009). Overall, the study is shown to be both large enough and well recognized as a gentrified hotspot in the U.S. to prompt other academics, local administrations, and planning communities to research more areas where effects of gentrification influence housing value.

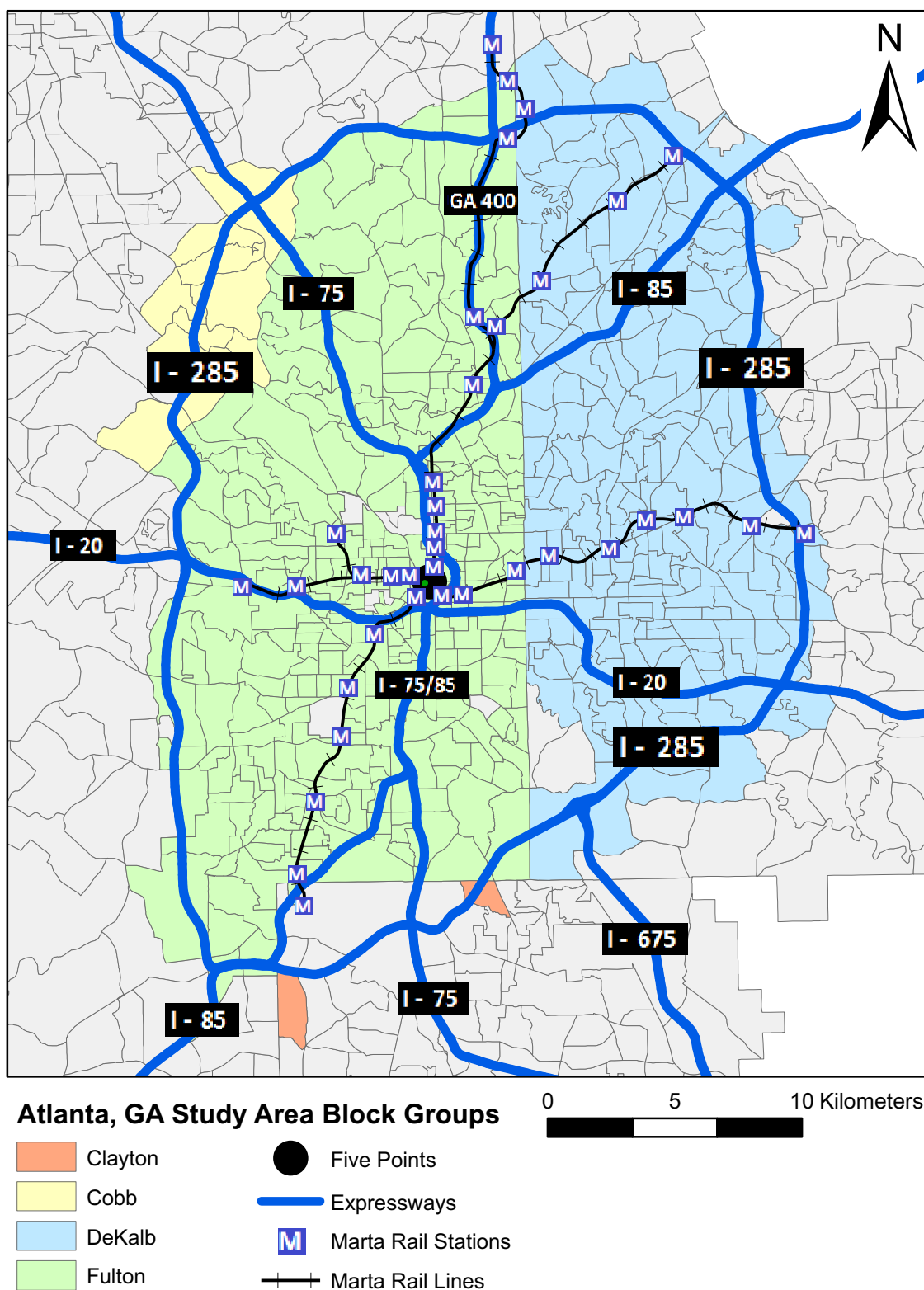
While experiences of displaced residents contribute to the ills of gentrification, it is important to understand that the actors responsible for the urban process have not always been the same. Going back to the description of three waves that characterize gentrification, Atlanta will be shown to be a great study area (Hackworth and Smith 2001). Starting in smaller communities like Virginia-Highland, Atlanta began seeing the origination of gentrification in the 1970's (Bureau of Planning 1998). By the 1980's, the second wave of gentrification (commercial reinvestment) emerged in Atlanta. Over time, with continued investment in gentrification, public transportation (MARTA) and other infrastructure services improved in gentrified areas (Kahn 2007). This can be indicative of gentrification to come. Third-wave gentrification is a result of city-wide reinvestment strategies working with corporate partners attempt to valorize a city. This leads to public-private partnerships that go beyond neighborhood borders and affects entire urban downtowns (Smith and Graves 2005). Scholars argue that with each of these waves of gentrification in place, housing prices rise to where middle class families can afford them but lower income families cannot. This also

brings with it a shift in occupations as the majority of people living in a neighborhood change from working lower paying jobs to new residents employed in professional or managerial roles (Ley 1996). Consequently, after forty years of gentrification, Atlanta is a prime candidate to study how the influx of investment has changed the face of local real estate over a temporal study. As denoted earlier, this project analyzes real estate value changes between gentrified and surrounding non-gentrified census block groups in Atlanta.

Another reason Atlanta, GA makes a great focus area is the published article showing how Atlanta's housing market "experienced greater home price appreciation in new 'Walk and Ride' communities than in new 'Park and Ride' communities" in relevant years (Kahn 2007). If Atlanta were to have increased pressures on MARTA (its public rail transportation), gentrification could both help and hurt the infrastructure. Through gentrification, increased property taxes in communities near "Walk and Ride" stations could prove to help Atlanta's local governments find increased revenue, increase ridership on public transportation, and raise fiscal budgets due to increased property taxes on higher home values. While this can lead people to move back to the city for shorter commute times to work and more access to downtown amenities, the lower-income households that rely on public transportation to get to employment could be displaced by rent hikes or property taxes that force them to move. With each of these reasons solidifying the rationale for studying Atlanta, GA, this paper will discuss the methodology used to arrive at the results.

Figure 3.1 - Atlanta, GA Study Area

Fulton, DeKalb, Cobb, and Clayton County Block Groups within study area



Methodology

Using a multivariate regression with GIS-derived spatial components, this research will be able to assess the effect that gentrification has on residential home value in the Atlanta study area after accounting for socioeconomic and locational variables. As will be argued, block groups are the geographic units best suited for this analysis. Then, the initial regression model will be created using these block groups from Fulton, DeKalb, Cobb, and Clayton Counties U.S. Census Bureau databases from 2000 Decennial Survey and the 5-year ACS released in 2009. Next, the creation of individual variables will be detailed with a complete section devoted to the gentrification variable. Following, a section detailing initial diagnostics will be explained and the final model presented. After the methodology is discussed, a chapter showing descriptors of the study area will precede the chapter providing analysis of the research.

Block Groups – Rationale for Usage

Before describing the methodology and variable creation, it is necessary that block groups be justified as the unit of analysis. Census block groups are used even though data available “suffer(s) from repeated boundary shifts” (Hammel and Wyly 1996). While block group border disputes allow census tracts to be more accurate and easier to analyze, this research uses block group data due to regression research precedent that neighborhood characteristics are more accurately shown in smaller boundary levels than census tracts with more aggregation (Haider et al. 2000, Song and Knaap 2003, Mikelbank 2004, Hess and Almeida 2007, Cohen and Coughlin 2009). Using the block group “is found to increase the accuracy with which the

heterogeneity of neighborhoods within census tracts can be described” according to Goodman (1977). Finally, another reason for using census block groups is the desire to include more observations in the analysis (206 Census Tracts versus 506 Census Block Groups).

There are some drawbacks to using block group data that need to be mentioned. First, using block group data is problematic because of its inability to show gradient measures of variables within the boundaries. The polygon that constructs a U.S. Census block group is unable to show clustering or variations in data within its borders. Instead, one point is chosen to best represent the geographic unit. As such, the point of estimation for each block group will be the exact center of the block group (centroid). These census block group centroids will later be used to compute spatial proximity measurements. Because of survey time gaps, it is important to note that the data used do not take into account change that happens quickly or slowly between survey times. Because the U.S. Census happened in 2000 and the ACS survey data is adjusted to 2009 values, a simplification of data changes to two points shown linearly between 2000 and 2009 is necessary. While this is implicit in the problems of using census data, the researcher points to the work as a proof-of-concept that gentrification research is lacking, and will encourage a better technique to fully understand how gentrification accounts for housing value change as a function of time.

Initial Regression Model

Regression models examining temporal change analyze 2000 and 2009 variables for the study area. The base regression model used for this project, based on Rosen’s work, is:

$$Y = X\beta + E \quad (\text{Eq. 1})$$

$$y = (x_1b_1 + \dots + x_kb_k) + \varepsilon \quad (\text{Eq. 2})$$

where, (Eq. 1) & (Eq. 2) are functionally the same. In (Eq. 1), Y is the dependent variable vector ($n \times 1$) with n number of block groups in the study area. Y shows the median home value arithmetic change of all owner-occupied homes in each block group as estimated in the 2000 U.S. Census and 5-year 2005-2009 ACS (Rosen 1974, Witte et al. 1979). β is the coefficient variable vector ($k \times 1$) estimating the change coefficients each of the variable matrix (X). E is the error term associated with each observation. In (Eq. 2), y is the same dependent variable matrix, but the independent variable matrix is expanded to show each variable's interaction with both the error term, ε , and the dependent variable.

As discussed earlier, many hedonic regression models estimating housing values imply that price of one parcel or house is auto-correlated with (affected by) the surrounding properties. This analysis using block groups instead of parcels, will be considered for the same estimation problem. Block groups are likely to be affected by changes in housing value that are happening around them and because of historical biases on the urban market. Because housing values tend to be similar across a small landscape, distance variables in the analysis will estimate changing housing values over space (Logan and Molotch 1987). Ordinary Least Squares (OLS) analysis can violate the assumption that the error values are independent across all observations if auto-correlation is present in the model. Auto-correlation implies that observations are directly affected by the observations touching them or in immediate proximity. Auto-correlation will force this research to use an alternative estimation technique. If initial

analysis dictates, a spatial lag or spatial error analysis will be used for the final model as dictated by the preliminary analysis.

Independent and Dependent Variables

Table 3.1: Final Model Variables

	<u>Units</u>	<u>Source</u>	<u>Description</u>
Dependent Variable			
<i>MEDHOMEVAL</i>	Dollars	US Census Bureau	Arithmetic change in Median Home Value for all owner-occupied homes
Independent Gentrification Variables			
<i>GENTDIST</i>	Square Root of Inverted Kilometers	Computed Distance	Square root of the inverted straight-line distance of each block group to the nearest gentrified block group
<i>DTtoGENT</i>	Kilometers	Computed Distance	Straight-line distance of each block group to the nearest gentrified block group
<i>INVDToGENT</i>	Inverted Kilometers	Computed Distance	Inverted straight-line distance of each block group to the nearest gentrified block group
Other Independent Variables			
<i>CHGAGE</i>	Years	US Census Bureau	Median age (in years) of residential structures
<i>CHGBED</i>	Nominal	US Census Bureau	Arithmetic change in average block group median number of bedrooms (2000-2009)
<i>CHGBATH</i>	% Point Change	US Census Bureau	Change in percentage points in block group housing stock with adequate plumbing facilities (2000-2009)
<i>CHGHHINC</i>	Dollars	US Census Bureau	Arithmetic change in block group median household income (2000-2009)
<i>PCTPOV</i>	% Point Change	US Census Bureau	Change in percent of individuals under the poverty line
<i>PCTBLACK</i>	% Point Change	US Census Bureau	Change in percent population all individuals claiming any part race makeup as black
<i>PCTTRANS</i>	% Point Change	US Census Bureau	Change in percent population taking public transportation to work
<i>PCTEDUC</i>	% Point Change	US Census Bureau	Change in percent population 25+ (male + female) with college degree or higher
<i>PCTQUAT</i>	% Point Change	US Census Bureau	Change in percent of males and females in "Finance, insurance, real estate and rental leasing", and "Professional, scientific, management, administrative, and waste management services" out of overall 16+ population
<i>FIVEPOINTS</i>	Square Root of Inverted Kilometers	Geocoded Distance	Square root of the inverted straight-line distance of each block group to the center of employment accessibility known as "Five Points Intersection"
<i>MARTA</i>	Square Root of Inverted Kilometers	Geocoded Distance	Square root of the inverted straight-line distance of each block group to the nearest MARTA rail station.
<i>PUBHOUSING</i>	Binary	Georgia HUD Dept.	Dummy variable depicting any block group that had a public housing project

**Important to note: All percentage point change variables are measured in terms of proportion.*

A comprehensive explanation of the variables used is necessary before initial diagnostics can be understood, descriptives shown, and the analysis undertaken. Before examining the creation of each variable in the analysis, two important notes apply to all observations in the dataset. First, before any variables were calculated, all block groups that had fewer than 100 individuals or 100 households for either 2000 or

in the 5-year ACS were removed from the study. The small sample size makes many of the variables used in the analysis prone to significant inaccuracies with a few extreme outliers. Second, all of the following variables listed in dollar amounts were adjusted by the Consumer Price Index (hereafter CPI). ACS data is adjusted annually by the CPI from April 1st of each year to final year's April 1st before inclusion in the 5-year summary file.

Accordingly, U.S. Census 2000 data was also adjusted by the CPI from April 1st, 1999 to April 1st, 2009 to maintain consistency between survey methods. The total inflation amount as predicted by the CPI between April 1999 and April 2009 was 28.91%¹. Each variable (**Table 3.1**) will be outlined and rationalized for its importance to this analysis.

Dependent Variable: Median Home Value

The dependent variable (*MEDHOMEVAL*) for this analysis is the arithmetic dollar change in median home values of owner-occupied housing. This median value is used because average home values may skew the results with a few extreme outliers (excessively large and/or abnormally costly when compared to the block group as a whole). Gentrification modeling techniques have found change in median home value consistently better classifying variable for identifying “gentrifying” or “maybe gentrifying” within census tracts (Hammel and Wyly 1996, Wyly and Hammel 1998). Using median home value as a dependent variable, this analysis will test the hypothesis that gentrification is a significant variable in the estimation of median housing value change after taking into account other socioeconomic and locational

¹ The data for calculating CPI can be found on the U.S. Bureau of Labor Statistics page.
<http://www.bls.gov/cpi/>

variables. Alternatively, testing the null hypothesis that gentrification is not a significant variable will be analyzed.

The change in median home value of owner-occupied housing units is computed in dollars using 2000 U.S. Census Summary File 3 and 2005-2009 5-year ACS data, after the 2000 data was adjusted to 2009 dollars. For the change in median home value variable, block groups that were missing data for either 2000 or 2009 were denoted as having a change in value of \$0. Independent variables will now be clarified.

Independent Variables

In accordance with the various classifications of gentrification among scholars, specific variables are necessary to the quantification of housing values and thus are good variables to use when attempting to establish gentrification as a significant variable. In the final regression model of housing values in Atlanta, neighborhood socioeconomic characteristics, housing characteristics, and locational measures make up the three control variable making up the composite value of residential homes of the study area (Hammel and Wyly 1996, Ley 1996, Smith 1996, Wyly and Hammel 1998, Lees 2000, Freeman 2005, Kahn 2007, Glaeser et al. 2008). After these three sets of independent variables are described, the variable estimating gentrification will be explained.

Housing Characteristics

The first set of independent variables consists of housing characteristics commonly used in hedonic estimations of residential housing values (Haider et al. 2000, Mikelbank 2004, Fingleton 2006, Hess and Almeida 2007, Ryan and Weber

2007, Cohen and Coughlin 2008). The following change variables will comprise part of the final regression model for block group housing price change between 2000 and 2009: median residential housing unit age, average number of bedrooms per housing unit, and percent of homes with adequate plumbing facilities. These are the same or similar to the most consistently used variables in econometric analysis and are a logical fit for the desired results.

Median residential housing unit age (*CHGAGE*) was computed by subtracting the median age of the block group housing stock in 2009 by the median age of housing structures in 2000. So if the median year the structure was in 2009 was 1979, the age of the housing stock for that year would be 30. Likewise, if the median housing age in 2000 was 1976, the age would be 24. If you take the two numbers and subtract 2000 from 2009 (30-24), you would get a positive change in housing stock age value of 6 years for that observation. For the median residential housing unit age variable, any block group that was missing data for either 2000 or 2009 was denoted with a change in age of 0 years.

The average number of bedrooms (*CHGBED*) is a calculated variable based on raw data from the 2000 Census and the 5-year ACS files. In each survey, the number of housing units with 0, 1, 2, 3, 4, and 5+ bedrooms is listed along with the count of total housing units. For both the 2000 and the 2009 variables, the number of houses with one bedroom was added to twice the number of housing units with two bedrooms along with three times the housing units with three bedrooms, et cetera. After this count was finished, the number of bedrooms in the block group was divided by the total number of housing units in that block group. To create the change variable used

in the analysis, the 2009 average number of bedrooms was subtracted by the 2000 average number of bedrooms. This is an accurate measurement of total change between years as the small variation of bedrooms makes outliers unlikely.

The percentage point change in the bathrooms (*CHGBATH*) was computed as the number of housing units in the block group with adequate plumbing facilities divided by the total number of housing units of that block group. This variable was used to account for the amount of homes that would not lose value by lacking one or more of the following: piped water supply with hot and cold leads, a flush toilet, and a bathtub or shower. The 2009 percent of homes with adequate plumbing facilities was reduced by the percent of homes in 2000 with adequate plumbing facilities to obtain the data point for each observation.

Some additional variables used in normal hedonic models showing housing value were unable to be reproduced with the data available. Median lot size and median housing unit floor space is not available for census block groups, and these variables are unable to be included in the analysis.

Socioeconomic Variables

The second set of independent variables pertains to socioeconomic statistics found in the U.S. Census Bureau 2000 Summary File and ACS 5-year Summary File. Included in this set are change variables for median household income, race, education, population living under the poverty line, population taking public transportation to work, and quaternary sector employment. All of the preceding socioeconomic data allow for the estimation of how socioeconomic attributes affect neighborhood values. These variables are all cited in various articles as being

indicative of gentrification (Hammel and Wyly 1996, Ley 1996, Smith 1996, Wyly and Hammel 1998, Freeman 2005).

Median household income (*CHGHHINC*) has the highest predictive ability of the presence of gentrification over a thirty year study over different cities measured and is one of the most commonly cited estimators of gentrification in various other studies (Hammel and Wyly 1996). To create the variable used for this analysis, the 2000 adjusted median household income for each block was subtracted from the 2009 median household income (after adjusting for CPI). These variables come directly from the raw dataset provided by both the 2000 Census and the 2009 5-year ACS.

The race variable (*PCTBLACK*) used for this study is the percentage point change in persons that claim either whole or part black on their U.S. Census Bureau surveys. While race is an inherently difficult demographic variable to describe, its use in gentrification and housing studies makes it essential in this analysis. By taking the number of persons that claimed whole or part black and dividing by the total population for each block group, the 2000 and 2009 percent black values are easily calculated. The change variable was then formed by subtracting the percent black in 2000 from the percent black for 2009.

Percent change in education (*CHGEDU*) for each block group measured the change from 2000 to 2009 in the total number of male and female persons with a bachelors, masters, professional, or doctorate degrees divided by the total block group population for each respective year.

Creating the percent change in population living under the poverty line (*CHGPOV*) was calculated using demographic information provided by the U.S.

Census in 2000 and the 2005-2009 5-year ACS summary file. First, the 2000 estimate was calculated using the U.S. Census data, Table PCT 49 on Summary File 3. The number of individuals whose income was below the poverty line in the past 12 months was divided by the total number of individuals in that block group. Similarly, the identical table in the American Community Survey, ACS Table B17001, was used to calculate the percent poverty in for the 2009 block group estimate. The table provides a raw count of the total population in all age groups whose income was below the poverty line in the past 12 months. The percentage point change variable was then simply the 2009 value minus the 2000 value for percent of the block group population living under the poverty line.

The change variable for representing the percent of the population taking public transportation to work was also created using raw data from the 2000 Census and 5-year 2009 ACS. Census 2000 data for the raw number of persons either claiming that they take any method of transportation in the “Public Transportation” category was added to all of those persons that biked or walked to work. As gentrification studies citing convenience to work and play as factors important to gentrifiers making the addition of those who either moved close enough to bike or walk to work or had already lived there a rational variable to use in the final analysis. The total number of people who take public transportation, bike, or walk to work is then divided by the entire population that is over 16 years of age living in the block group to arrive at the percent taking public transportation for 2000. The 2009 number is calculated using the same fields and method with raw data instead coming from the

5-year ACS. The percentage point change variable is simply the 2009 value minus the 2000 value for each block group.

Quaternary service employment change (*CHGQUAT*) is calculated the same for both 2000 and 2009 data points representing each block group. First the raw person count comes directly from Census 2000 and 5-year ACS data tables. Males and females working in “Finance, insurance, real estate and rental and leasing”, “Professional, scientific, management, administrative, and waste management services”, and “Public administration” were added together and divided by the total population 16 years of age or older. This variable was done for both 2000 and 2009, with the change variable created by subtracting the 2000 percentage point variable from the 2009 percentage point variable.

Locational Measures

The third variable set in the analysis involves the following spatial data components: employment accessibility, transportation, and public housing. These variables are used and commonly found to be significant in multiple other studies of real estate residential housing valuation changes in neighborhood gentrification studies (Witte et al. 1979, Can 1990, Benjamin and Sirmans 1996, Cheshire and Sheppard 1998, Haider et al. 2000, Song and Knaap 2003, Mikelbank 2004, Ryan and Weber 2007, Hess and Almeida 2007, Cohen and Coughlin 2009). Locational data for employment accessibility and transportation was constructed by first taking the centroid of each block group as a representative of the block group as a whole. While this process is potentially problematic, it is used as the U.S. Census Bureau does not produce any file that gives spatial distribution of data within block groups. A GIS

program was used to compute the distance from each block group centroid to nearest location in each of the following sets. Straight line distance is used in the analysis. While network-distance can be more accurate, the benefit of using the method seems illogical when using a centroid of a block group (that could or could not even have a residence located at the point). Public housing data was not calculated using centroids, but will be outlined in its own section. The two variables will be detailed and any information regarding specific inconsistencies will now be addressed.

First, the variable used in both historical and present analyses that measures the distance from each block group's centroid to the center of employment accessibility (*FIVEPOINTS*). Typically in gentrification literature and hedonic modeling, the central business district (CBD) is used to model the center of employment accessibility. While Atlanta has multiple centers of business, the main area known as Five Points will be used for the survey as it provides a strong representative of development in Atlanta. While cities have more recently experienced "sprawl", the inherent value of being closer to employment accessibility is evident in literature pertaining to the econometric analysis of housing values. To calculate the *FIVEPOINTS* variable, the author employed a square root function of the inverted straight-line distance from each block group to five points intersection. This variable was calculated to represent the decaying proximity value first found in Bid-Rent Theory literature (Alonso 1964). This function will continue to provide justification for the transformation of MARTA distance values and ultimately, the gentrification variable.

Second, a variable describing transportation and accessibility was created to represent the distance from each block group centroid to the closest MARTA rail station (*MARTA*). A transportation variable is included in almost all gentrification literature and most contemporary hedonic analysis looking at mixed-income communities and home value change (Witte et al. 1979, Haider et al. 2000, Mikelbank 2004, Hess and Almeida 2007). The final model will require accounting for value placed on living near public transportation rail stations to reduce center city commute times. Because of the similarity of transportation benefit to housing values found in more recent literature, a distance decay model similar to Alonso's Bid-Rent Theory used the square root of the inverse straight-line distance from each block group to the nearest MARTA rail station comprises the variable (Alonso 1964, Benjamin and Sirmans 1996, Haider et al. 2000, Mikelbank 2004, Hess and Almeida 2007).

With the locational variables of employment accessibility and public transportation established, the final locational variable, public housing, requires a more in-depth understanding to its rationale and creation. The next section will give a brief history of public housing in Atlanta and how this research will factor value changes due to the recent demolition and renovation of public housing.

Public Housing

In Chapter 2, the previous 75 years of public housing in Atlanta was discussed. The author has noted the difficulty in assessing housing value change due to public housing with one variable. Policy makers and researchers agree that public housing projects indirectly contribute to disinvestment, declining housing values, poor job availability, and increased poverty (Goetz 2011). The research of Goetz, Brown, and

Boston point to how the effects of public housing are scattered, but the concentrations of poverty, crime, and disinvestment would be difficult to measure in one variable (2005, 2009, 2011). The varied research findings on public housing reinforce the author's claim of the holistic estimation by way of public housing in Atlanta is beyond the scope of this project. The purpose of this project is to highlight potential impacts that gentrification has on non-gentrified block groups, a thorough study and methodology (which has not been found) to estimate public housing's effect on housing value is therefore outside the focus of this research. Therefore, the variable used to represent housing value change attributed to public housing (PUBHOUSING) was constructed as a dummy variable.

The effect of public housing on the Atlanta real estate market will be used as a binary variable helping to explain housing value in the focus area. There is a long standing debate about public housing and its effect on a real estate market. While Atlanta began removing money from public housing efforts in 1994 (HOPE VI), a new program to improve economic conditions in disadvantaged areas began. The new program created empowerment zones, but it will not be measured because "community conflict in Atlanta undermined the empowerment zone program to such a great extent that little was accomplished" (Tester et al. 2011). This research will instead make no assumption as to a positive or negative change associated with the removal of almost all public housing projects in Atlanta between 1994 and 2009, and use the variable to test if it is a significant composite of housing prices.

Creating the variable to represent housing value change due to public housing, PUBHOUSING, was possible with a dataset from the Georgia Department of Housing

and Urban Development (hereafter, HUD). A GIS program was used to map the locations of public housing projects in Atlanta from the HUD database. When intersected with the study area block groups, all block groups that had an active public housing project any time between 1994 and 1999 within its boundaries was classified as having a public housing project. This analysis seeks to estimate any lasting effects on the immediate areas of public housing over a 15 year period after the city of Atlanta discontinued funding the vast majority of public housing projects. While the disadvantages of using a dummy variable to represent the complex relationship between public housing and housing values in Atlanta (or elsewhere in the United States) is obvious, the difficulty of analyzing the holistic effects of public housing on the Atlanta housing market prevent a more detailed analysis. Now that all variables except gentrification have been discussed, a section on the rationale and preparation for the gentrification variable will explain how the analysis will answer the research question.

Gentrification: Atlanta, GA Block Group Classification

Now that the creation and purpose of all other variable sets has been established, the key variable, distance to gentrification, will be thoroughly explained. First, the author will describe how the block groups classified as “gentrified” were chosen. Second, the statistical and field observation work that finalized the group of block groups classified as “gentrified” will be examined. Finally, the author justifies the creation and rationale behind the distance to gentrification variable in the next section. After this process is complete, the author will establish the initial model and descriptives that led to the final model.

First, to maintain academic consistency, a list of neighborhoods in U.S. metropolitan areas that qualify as gentrified, according to fieldwork and statistical criteria is used to establish census tracts in Atlanta that are “gentrified” or “gentrifying” and comprises the block groups that will be evaluated as possibly “gentrified” for this study (Hammel and Wyly 1996, Wyly and Hammel 1998, Wyly and Hammel 1999). With the fifteen baseline “gentrified” census tracts established, the same techniques used by Hammel and Wyly will separate gentrified census block groups from non-gentrified block groups with the baseline census tracts using the variables deemed significant in their gentrification articles (1996, 1998)². Of those fifteen established census tracts, three census tracts fell outside of the Interstate 285 focus area and were removed (1996, 1998). By only considering the gentrified tracts that were in the study area, the twelve leftover census tracts were then subject to statistical criteria and independent field work to determine the final list of gentrified census block groups within the Atlanta Interstate 285 study area.

Second, statistical criteria and field observation tests were performed on each block group within every census tract inside Atlanta’s Interstate 285 classified as “gentrified” by Hammel and Wyly’s articles. The following criteria, based on estimated significance in the 1996 article, was used to determine which block groups would be observed: If a census tract had at least half of its block groups below the study area’s average change in median household income, change in percent population with a bachelor’s degree or higher, and change in percent of the population

² The complete list of gentrified U.S. Census tracts within 23 MSAs that correspond to statistical work and field observations can found on Elvin Wyly’s website.
<http://www.geog.ubc.ca/~ewyly/replication.html>

in quaternary sector employment, then field observation of all block groups was required (Hammel and Wyly). With these observations highlighted, the variables that helped Wyly and Hammel predict gentrification were used to distinguish twenty one block groups that were clearly gentrified from four others that had either not gentrified or undergone gentrification too long ago to be noticeable in the statistical models. The four census block groups within the Atlanta perimeter failing the statistical criteria made up U.S. Census Tract 211 in DeKalb County.

Personal observation was then used to confirm each block group used in the research. Field observation was completed using the U.S. Census Bureau TIGER shapefiles, allowing valid referencing of all streets located in the study area. By intersecting the study area with the TIGER database, a detailed map was created and six randomly chosen neighborhoods within each block group were selected for personal observation. The researcher went to these locations between July-August 2011 and took 3 pictures of what appeared to be average looking homes in six neighborhoods per block group. Appendix A has a sample of the pictures used in determining gentrified census block groups. The entire set of pictures including a map of where each was taken is available by contacting the author. The census block groups around the area just northwest of downtown Atlanta were all gentrified. The gentrified neighborhoods around Virginia-Highland, Inman Park, Candler Park, Decatur, and Gresham Park were all confirmed by both statistical criteria and field observation. The block groups in north DeKalb County are discussed below.

After field observation, the block groups in Census Tract 211 of DeKalb County were deemed quite affluent and possessed little signs of being spots of

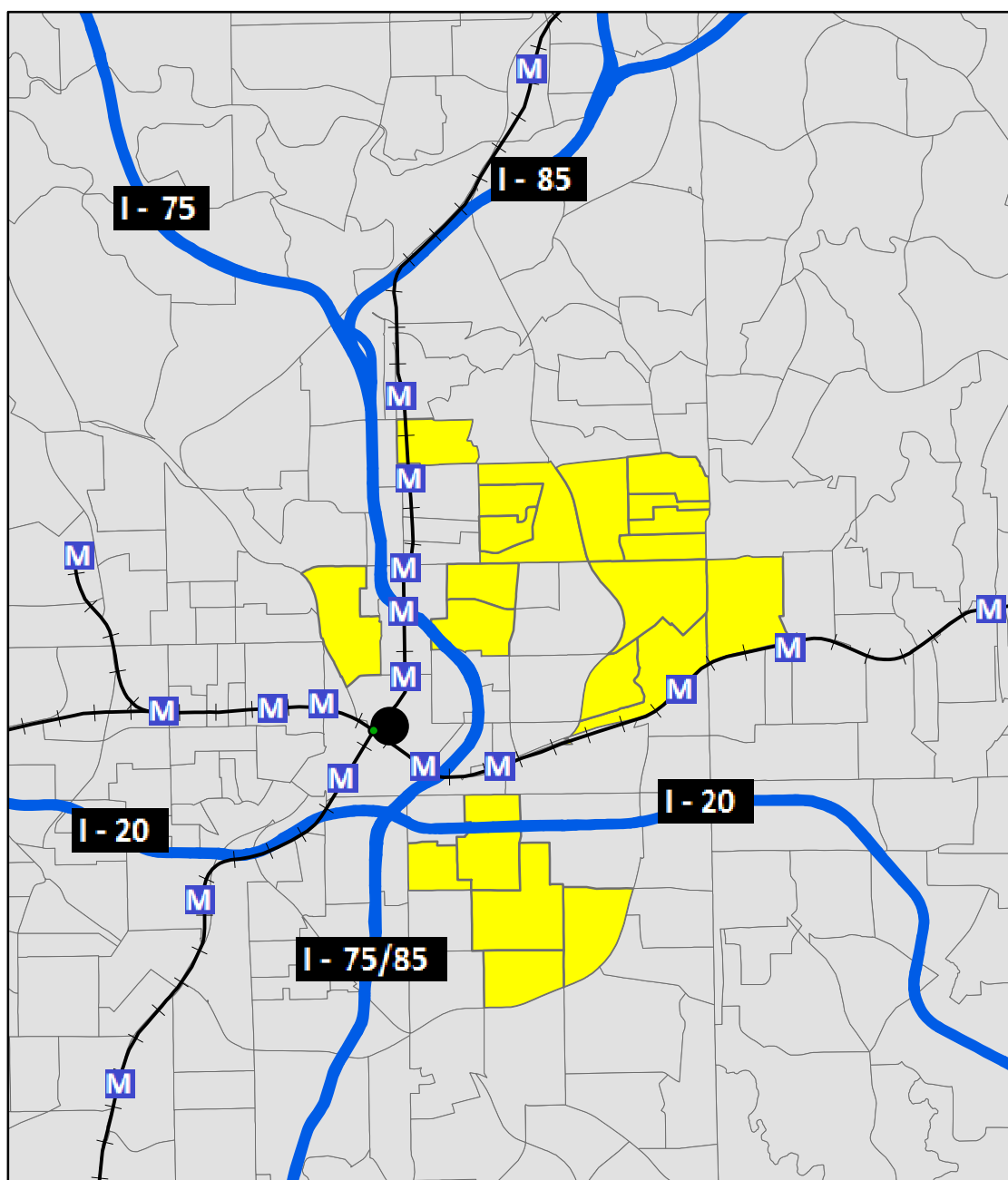
disinvestment, reinvestment, or change. Being in the northern area of Atlanta's city limits, the author felt confident that the Brookhaven area (Census Tract 211) was an area that has continually been occupied by affluent households (or at least relatively affluent). Homes in this area, even during the real estate crisis in the late 2000's, were still selling from \$400,000 to in excess of \$1 million dollars. The lack of demographic changes evidenced by statistical factors described above most likely relates to the fact that the four block groups comprising the census tract under focus were already well ahead of the average median household income, percent educated, and percent employed in quaternary sectors in the 2000 Census dataset. These block groups were removed from the group of gentrified block groups in the Atlanta study area. After eliminating those block groups from the analysis, there were 21 block groups classified as gentrified that were used to create the final distance to gentrification variable (*GENTDIST*), shown in Figure 3.2. The remaining block groups are located near the center of employment accessibility and are close to urban areas typical of gentrification (as discussed in Chapter 2).

Key Variable Preparation: Distance to Gentrification

With the classification of gentrified block groups in Atlanta finished, the creation of the distance to gentrification variable, *GENTDIST*, will highlight any changes to housing value exclusive of socioeconomic variables, location data, and gentrification. First, it is necessary to understand why the author chose the specific functional form used in the final model. Second, the actual calculation of the distance to gentrification variable will be detailed. Finally, the implications and effects of this functional form and variable will be argued.

Figure 3.2 - Final Gentrified Block Groups for Analysis

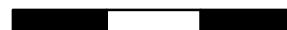
Atlanta, GA Study Area



Atlanta, GA Study Area Block Groups

- Not Gentrified - Studied
- Gentrified
- Five Points
- Expressways
- M Marta Rail Stations
- Marta Rail Lines

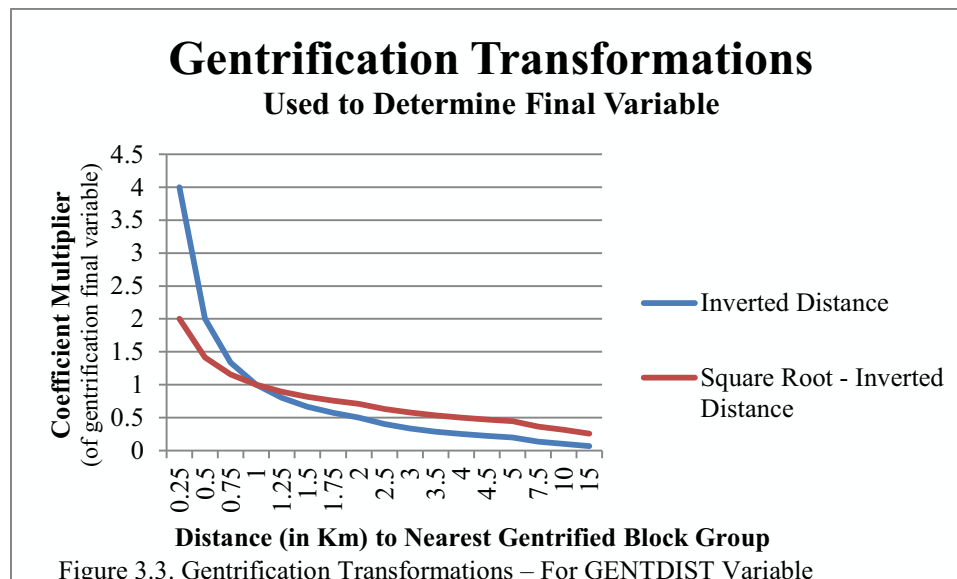
0 1.5 3 Kilometers



First, the creation of a distance to gentrification variable necessitates a transformation that both makes understanding the regression model coefficient useful and is based on rationale similar to the creation of other locational variables. When deciding on which transformation to use in the final model, the author ultimately decided on a transformation that employs a distance decay model. Gentrification cannot possibly affect all residential home values in a metropolitan area the same. While this can be logically inferred, a linear form of gentrification is still provided in the results table. In fact, the rationale for gentrification's spread is evidenced in displacement literature. Because gentrification causes housing values in gentrifying neighborhoods to rise, displacement literature has pointed to spreading housing values that continues a cycle of property owners raising rents and forcing more residents that lease out of nearby neighborhoods (Freeman 2006). The opportunity that real estate developers seek to capitalize on stems from the basic idea that areas nearest gentrifying neighborhoods are most prone to further increases in housing values. This forms the basis for a distance decay model that gives more weight to the distance to gentrification variable in block groups when they are closer to gentrified areas. Based on this logic, the following transformations were graphed before choosing the final distance to gentrification variable: straight-line distance, inverted straight-line distance, square root of straight-line distance, and the square root of inverted straight-line distance. The transformations that fit the distance decay model are seen below in Figure 3.3.

These two transformations provided two choices for a distance decay model. The author ran analysis using both and found that the square root of the inverted

distance best explained the data in the study area. This prompted the selection of the final gentrification variable, GENTDIST, to be created using the square root of inverted straight-line distance from each block group to the nearest gentrified block group. This transformation implies that gentrification has a greater impact on block groups closer to gentrified block groups. The proof-of-concept available with this research will hopefully prompt additional analysis on parcel level data using various distance decay models to better explain gentrification's effect on residential housing values in the United States and other major cities throughout the world.



With the final functional form determined, the variable needed to be calculated according to distance of each block group from the confirmed final list of gentrified block groups. First, the distance from each block group to the nearest confirmed gentrified block group was measured in kilometers using GIS software. After this, the inverse was taken of the distance measurement to display a distance decay model. Finally, after preliminary analysis with other transformations, the square root of the distance decay model created the gentrification variable, GENTDIST. This procedure

effectively created two results. First, all gentrified block groups had adjusted values of zero to create a weighted dummy variable. Second, the formula created the weighted variable is:

$$GENTDIST = \sqrt{\frac{1}{\text{Distance to Nearest Gentrified Block group (km)}}}$$

The final variable (GENTDIST) therefore produces a variable that estimates block groups near gentrification as having greater weight and intricacy with respect to the corresponding coefficient of the distance to gentrification variable in the final model. The square root of the distance decay model gives a more gradual slope to the gentrification variable. This will either be shown to help or hurt the final model, but will provide insight as to the reach of gentrification when looking at residential real estate housing values. Based on literature examining locational effects, the block groups in close proximity to gentrified neighborhoods were able to highlight how the impact of distance on residential housing values. The distance to gentrification variable adequately measures how proximity to gentrification creates a gradually reduced effect on home value as distance from gentrification increases while still accounting for socioeconomic and locational variables used in the analysis.

Preliminary Diagnostics

After detailing each of the variables used in the analysis, preliminary diagnostics are examined to see if any violations of the Ordinary Least Squares assumptions occur. Before diagnostics on the initial model is given, the base model revealed a lower than expected R^2 value (.1287), but the F-test in the initial model

shows that the coefficients are shown to be non-zero with 99% confidence statistical significance.

Ordinary Least Square assumptions need to be evaluated with respect to the initial model before establishing the final model's results. Heteroskedasticity is a problem in the initial model. After taking the log of the change in housing value variable, heteroskedasticity remains. Therefore, while White's test shows the initial model problematic, the dataset's explanatory power is best described by the original variable without any transformation. Multicollinearity is not a problem in the initial model. A scatterplot matrix shows no variables with non-linear relationships. With the highest variance inflation factor of 1.56, the model can confidently move on to other diagnostics.

In addition to linear regression diagnostics, the initial model was tested for spatial auto-correlation. Spatial auto-correlation occurs when observations in the model are dependent on each other based on location. Moran's I test for the dependent variable produces a value of .0776, but 9999 permutations estimate a significance to the 99.9% confidence level. With this statistic realized, the model clearly has the effects of spatial autocorrelation. This is not surprising as one would expect housing values to not be completely random, but related to historical values. Spatial autocorrelation of the data is corrected by creating a spatial lag estimation of the model for the final analysis.

This chapter described why block groups are used instead of neighborhoods, presented the initial model, highlighted important preliminary diagnostics and explained the estimation method used for the final model, and constructed each

variable's rational for use in the final analysis along with the methodology for their creation. Next, a chapter will be devoted to detailing different descriptives of the study area. Following this examination of data trends, the results will be presented in its own chapter. After the results, a brief chapter will probe any further implications that can be reasonably drawn from this research project.

CHAPTER 4

DESCRIPTIVES

The purpose of this study is to examine if gentrified block groups have a quantifiable effect on the housing values of nearby block groups. This measurement of housing value is not isolated, but must be analyzed as a result of comingling changes that have occurred within the study area. As a result, this chapter is dedicated to describing the variables used in the analysis and how they form the basis in Chapter 5. Before describing individual variables before and during the study period, it is best to start with an examination of the dependent variable, change in median home value. The author will begin by looking at historical patterns of housing value in Atlanta along with how it has changed from 2000 to 2009. Then, different variable sets will provide more insight into the study area. Housing characteristics comprise the bulk of hedonic modeling methods popular with economists and other researchers that study urban residential housing values. These measures are important to look at in a spatial context. Important historical and current conditions make the study area integral to a more complete discussion of how gentrification relates to housing value. Additionally, the socioeconomic factors that influence the work of housing market studies are taken into account in this project, and their changes in Atlanta, GA will be displayed and looked into throughout this chapter. Finally, spatial data is important to understanding housing value as it applies to both proximity and the center of employment. Each of

these variable sets will now be explained more fully with detailed maps showing historical and change levels of key variables.

Median Home Value

Before looking at the independent variables of the analysis, a detailed examination of how median home value of owner-occupied housing changed in Atlanta between 2000 and 2009 is important. The average block group median home value for 2000 was \$163,213. This amount grew 54% to an average value of \$251,461 in 2009. While many factors can be attributable to this rise in home value, the variables described in this chapter seek to explain this change. Looking at median home value in 2000, historical flows of money are evidenced. First, the southern side of Atlanta has been where blacks were segregated until the 1970's (Stone 1989). With the flow of old money and affluence never going to the southern areas of Atlanta, it is not surprising to see that the areas with highest housing value are still in the northern areas of Atlanta's city limits. The areas of highest housing value occur in the northwestern quadrant of Atlanta near the Northside Dr., Howell Mill, and Chastain Park areas of Buckhead (a community in northern Atlanta known for being very affluent).

While looking at median home value in 2000 is important to understand historical trends in Atlanta. Keep in mind that the change in median home value is what is most important to the analysis. By looking at arithmetic change between 2000 and 2009, the biases of historical patterns are hopefully reduced.

As evidenced by Figure 3.2, change in median home value was quite different than expected. Areas of the highest home values still managed to have the highest

averages of home value increases throughout the study period. Large variance in the amount of home value change will likely make the accounting for the change more difficult and prone to higher error values.

Table 4.1: Variable Summarization Table					
Variable	Observations	Mean	Std. Dev.	Min	Max
MEDHOMEVAL	506	43645.29	70978.24	-540414.6	357255.8
Housing Characteristics					
CHGAGE	506	6.041502	10.06515	-42	37
CHGBATH	506	-0.0212525	0.0524034	-0.4575893	0.0846502
CHGBED	506	0.2798168	0.3150869	-0.7790096	1.914997
Socioeconomic Data					
CHGHHINC	506	-2003.802	17299.72	-64546.46	95636.1
PCTPOV	506	0.0140929	0.1253378	-0.5618989	0.421475
PCTQUAT	506	-0.0001718	0.1225428	-0.4269663	0.4904014
PCTEDUC	506	0.0579383	0.1178143	-0.2995535	0.5229866
PCTTRANS	506	-0.0162065	0.1395698	-0.7905775	0.5917767
PCTBLACK	506	-0.054466	0.1189598	-0.6441286	0.7087967
Spatial Information					
FIVEPOINTS	506	0.3857265	0.1629626	0.2168771	2.180342
MARTA	506	0.7595702	0.3590674	0.2946724	3.081365
PUBHOUSING	506	0.0750988	0.2638115	0	1
Gentrification					
DToGENT	506	6.354841	4.102346	0	17.21203
INVDTToGENT	506	0.2740014	0.3277048	0	2.33336
GENTDIST	506	0.4611811	0.2478608	0	1.52753

Table 4.1 gives an overview of all analyzed variables, their means, minimums, and maximums. Each variable set that will attempt to account for the \$43,645 average block group home value increase between 2000 and 2009 will be discussed and key variables will be displayed. The baseline and change for each of the variables will be examined in the following sections.

Figure 4.1: Median Home Value, 2000

Atlanta, GA Study Area

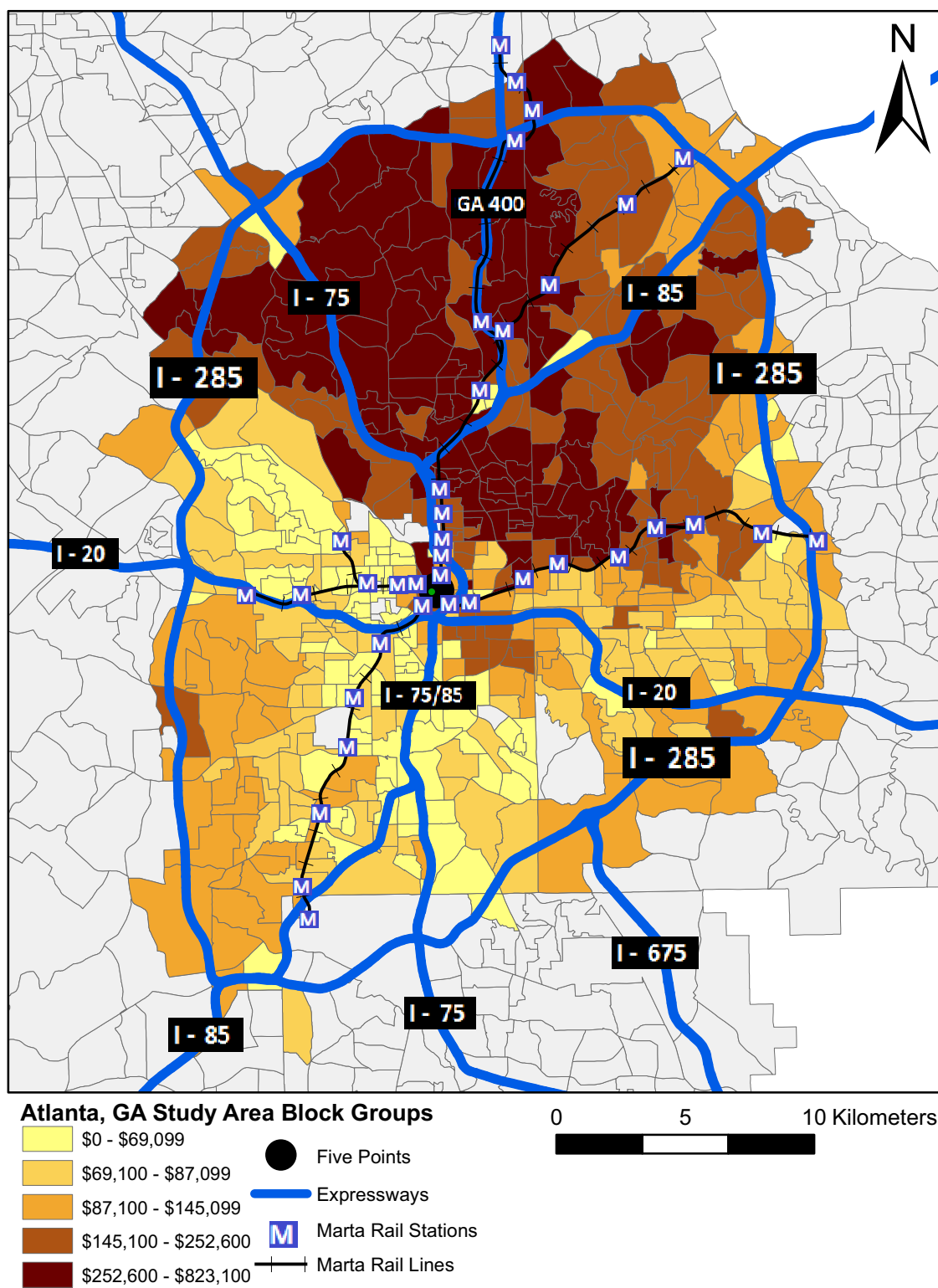


Figure 4.2 - Change in Median Home Value from 2000-2009

Atlanta, GA Study Area

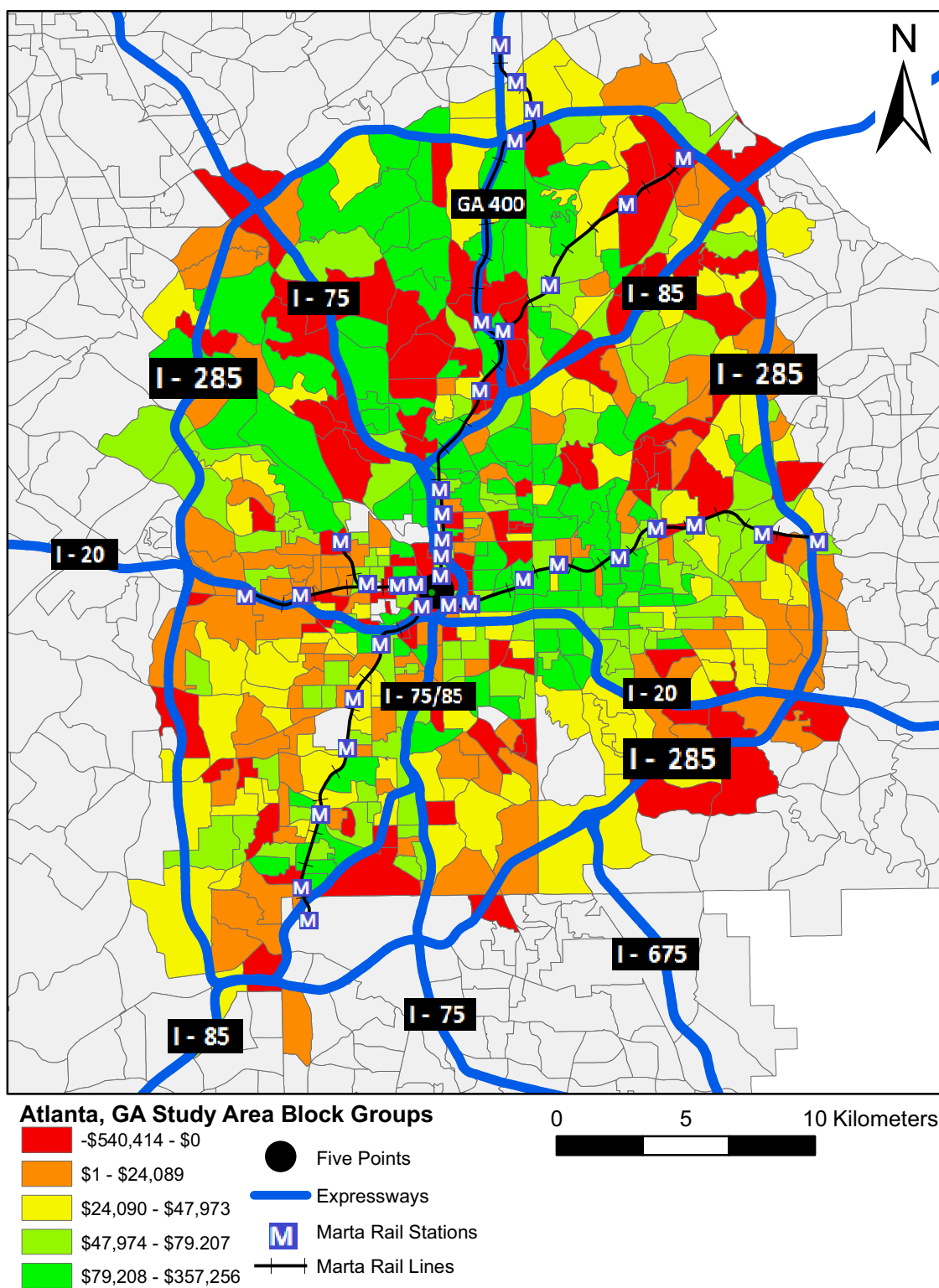
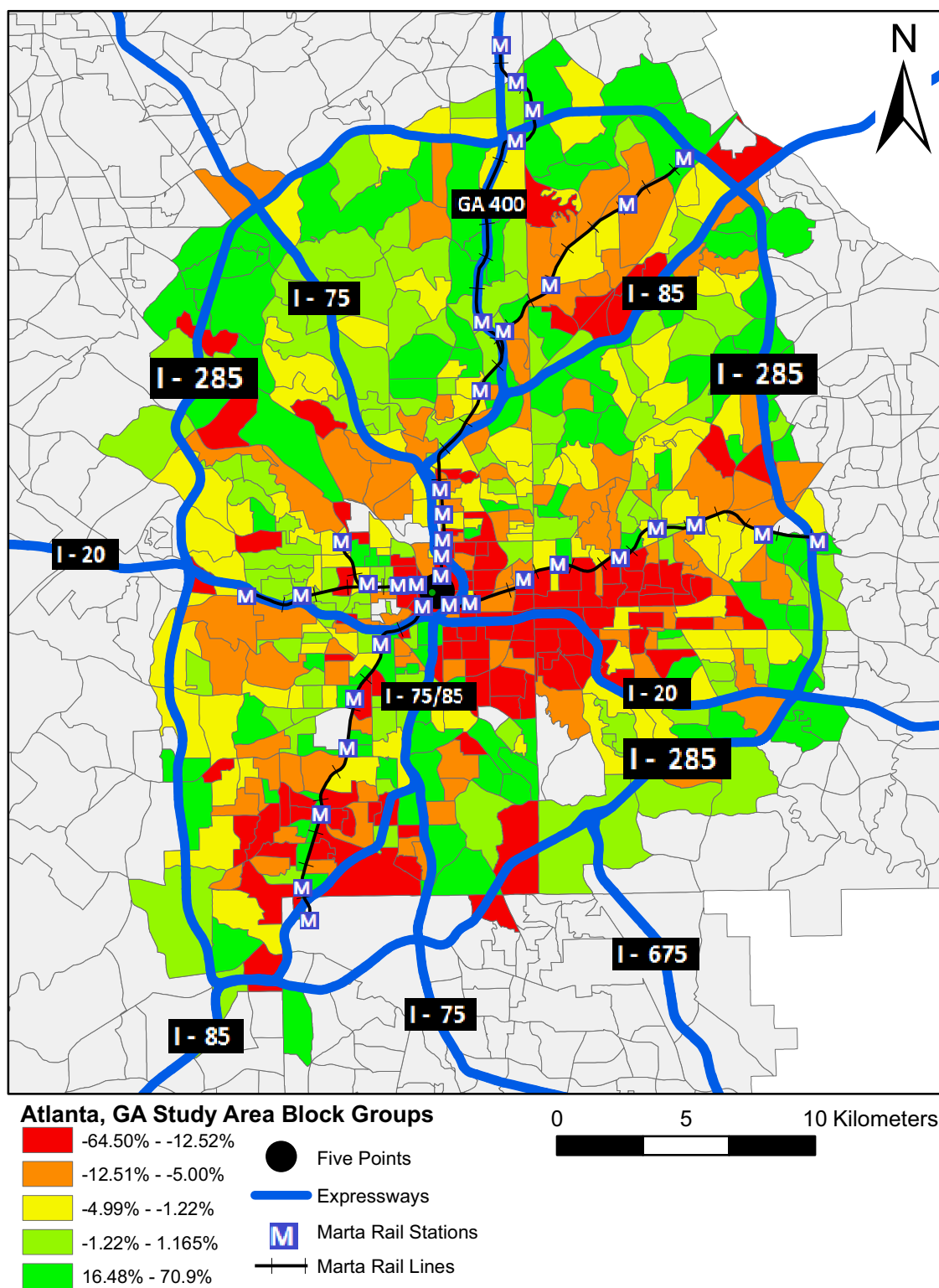


Figure 4.3: Change in Percent Black, 2000

Atlanta, GA Study Area



Housing Characteristics

The housing stock of Atlanta changed considerably over the ten year study period. While a recessed housing market during the 2000's contributed to changes, the area as a whole saw mutual effects. Each of the housing variables used in the analysis play integral parts in standard home valuations and need to be discussed.

First, the block group median age of homes from 2000 to 2009 got 6 years older as the rate of replacement decreased. The majority of older homes in Atlanta are along MARTA rail lines in the more established neighborhoods. Newer developments in the northwest and northeast areas of the study area contributed to block groups with median ages of homes less than 20 years old. Common knowledge would infer that areas with newer or regenerating housing stock would be areas with the highest housing values (or at least increasing housing values). This inference comes from the idea that newer housing has more amenities and features that increase their appeal to the majority of homebuyers.

Second, the average amount of median bedrooms per block group increased during the study area's time period. Alternatively, the average block group percent of homes with adequate plumbing facilities dropped slightly. As an average increase of bedrooms would be expected to cause an increase in home value, the change in bedrooms would be expected to contribute to an overall increase in home value. The drop in homes with adequate plumbing is surprising given the large increases in housing value throughout the study area from 2000 to 2009.

Figure 4.4 - Percent Educated (Four Year Degree or Higher)

Atlanta, GA Study Area

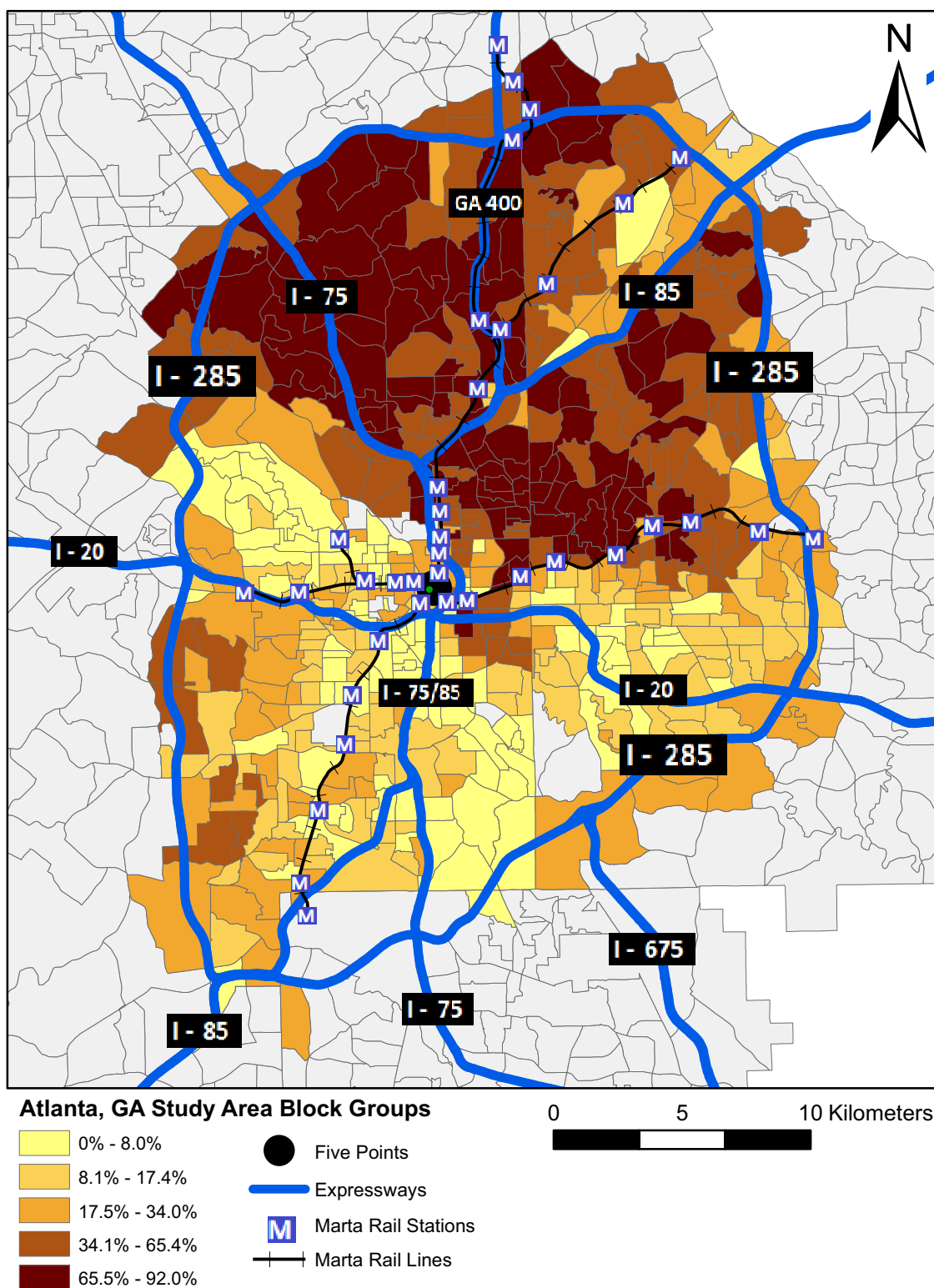


Figure 4.5: Change in Percent Educated

Atlanta, GA Study Area

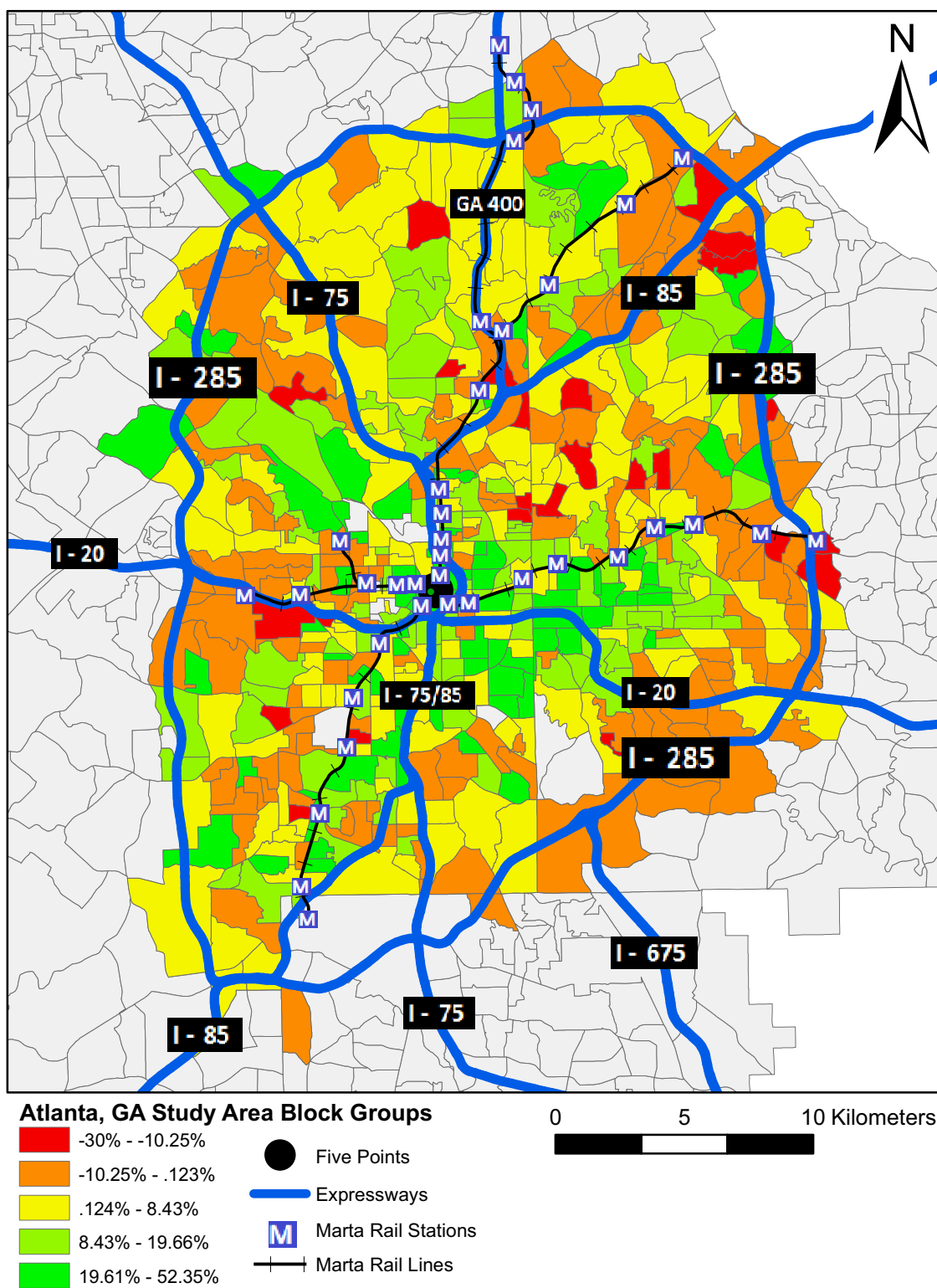


Figure 4.6: Median Household Income, 2000

Atlanta, GA Study Area

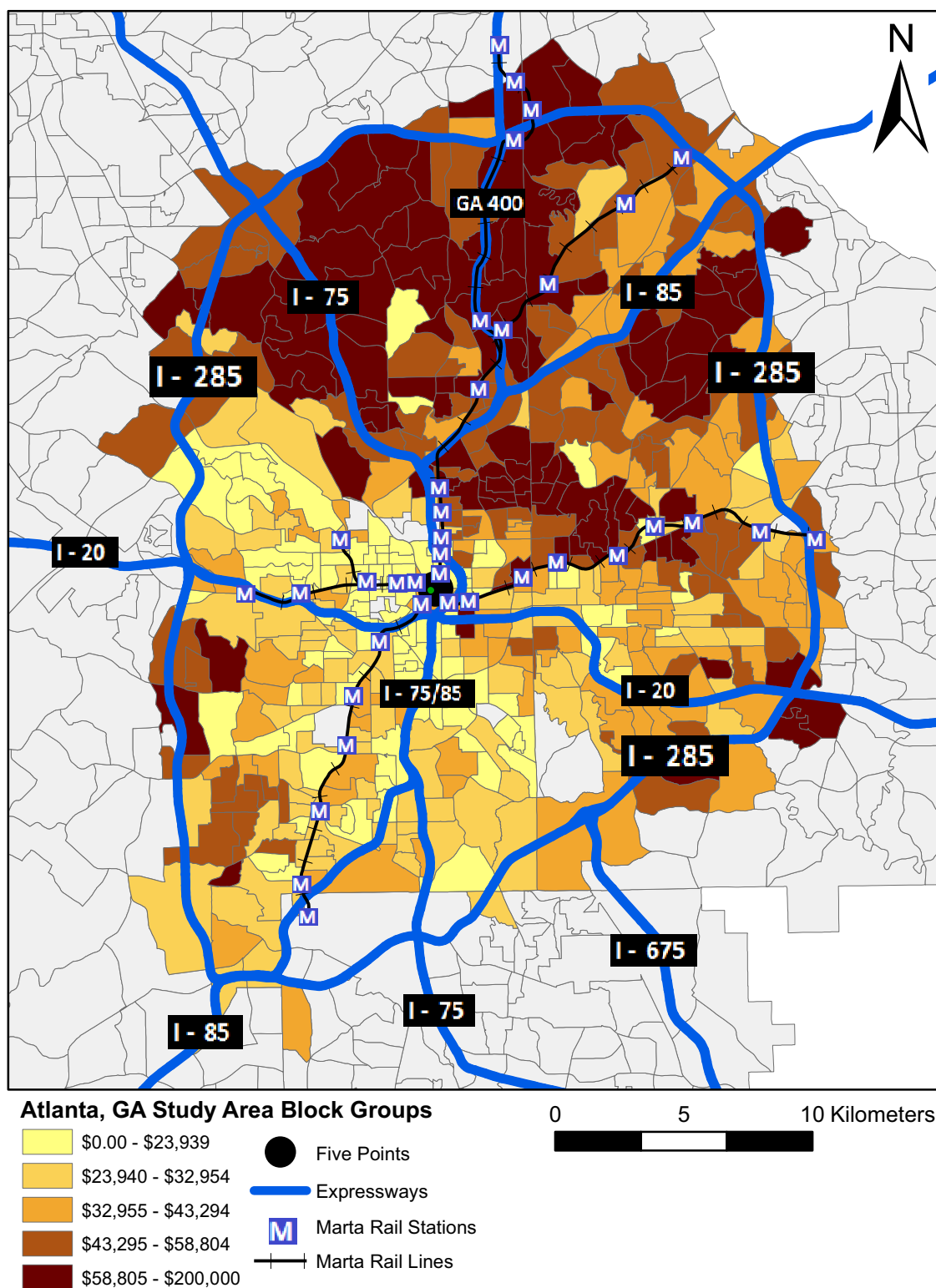
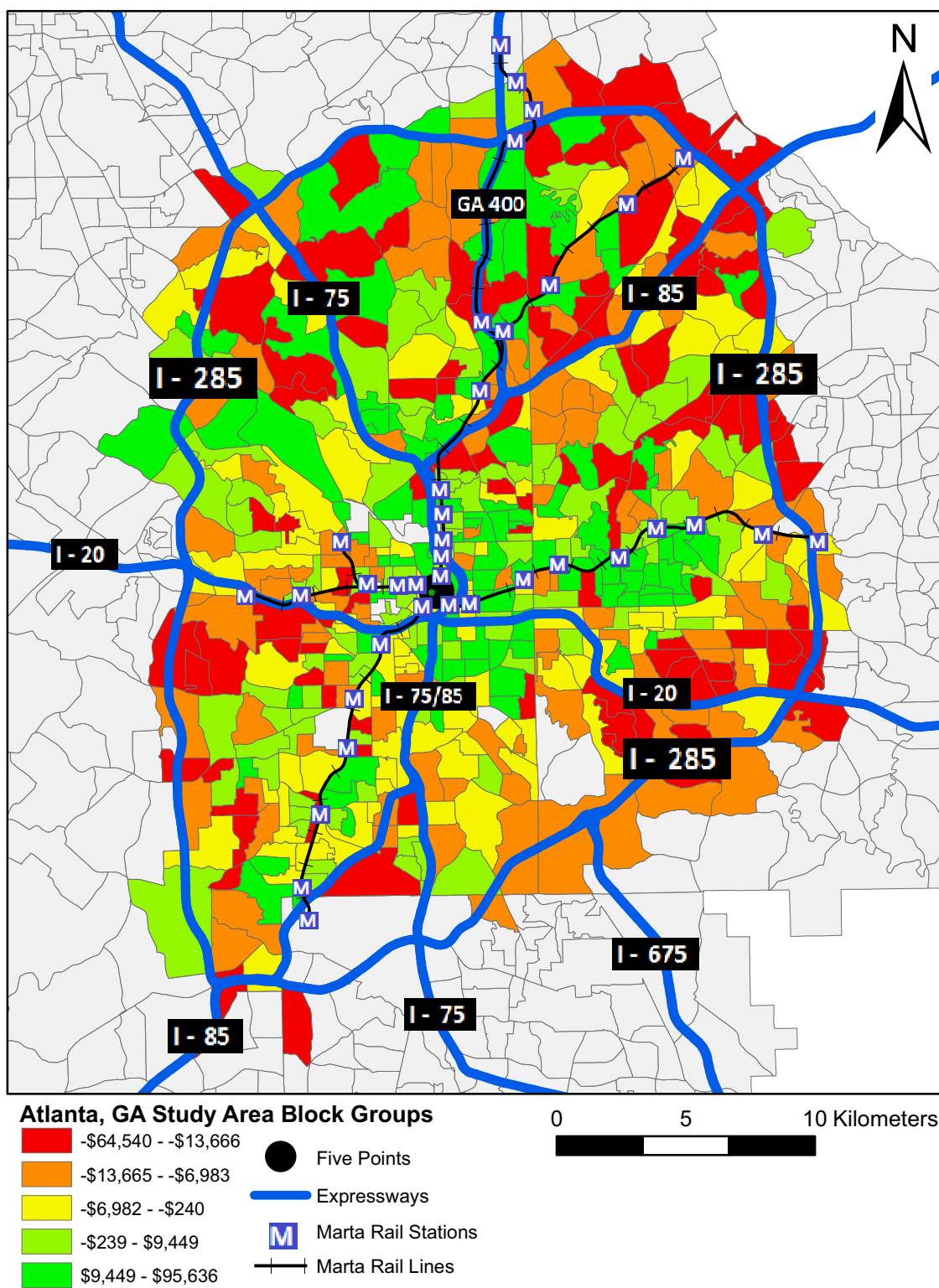


Figure 4.7 - Household Income Change (2000-2009)

Atlanta, GA Study Area



Socioeconomic Variables

Demographic changes, other than the increase in population, that have occurred throughout block groups in Fulton, DeKalb, Cobb, and Clayton Counties include an increase in education along with a decrease in black population and quaternary sector work. General economic conditions within the study area found a decrease in households above the poverty line, household income with an increase in home value (adjusted for inflation). Some key observations will be pointed out before this chapter discusses various spatial variables.

As Figure 4.3 shows and was discussed multiple times earlier in this paper, the black population in Atlanta has been kept south of Five Points until after the 1960's (Stone 1989). Though policies are no longer indirectly in force, the black population has largely remained in the southern areas of the city. Over the past 40 years, the population of black persons has grown farther north but continues to be evidence of historical racial tension and segregation (Stone 1989). As used in various other studies, the percentage of block group population that is black consistently ranks among the variables that are significant predictor's of decreasing housing values (Cheshire and Sheppard 1998, Mikelbank 2004, Song and Knaap 2003). This is due to a multitude of factors (not exhaustively: racial tensions, historical power struggle, direct policies, etc.). This precedent of decreasing housing values in geographic units correlating with higher percentages of black population predicts similar results for this research.

Likewise, higher percentages of the population that is college education is another variable that various studies cite to be significant indicators of home value

increases. In the study area, the average block group percentage of males and females with a bachelor's degree or higher was 33.6% in 2000, and this value grew to 39.4% in 2009. The average percentage of education in 2000, as seen in Figure 4.4, is very highly correlated with average household incomes. Alternatively, the change in education between 2000 and 2009 was fairly equally distributed (Figure 4.5).

The median household income statistics are very similar with the education variable. Initial depictions (Figure 4.6) show the highest incomes to be in the northwest portion of the study area, with change in household incomes (Figure 4.7) evenly distributed around the study area for the decade of the analysis.

Spatial Measurements

After considering the housing and socioeconomic variable sets, other important characteristics towards the analysis are measured by distance. The average distance from each block group to the referenced center of employment accessibility in Atlanta is 8.97 kilometers, while the average distance from each block group to the closest MARTA rail station is a mere 2.81 kilometers. It is important to point out that the average distance between non-gentrified and gentrified block groups throughout the focus area is only 6.35 kilometers.

Econometric analyses on home values consistently find the distance to the center of employment accessibility a significant composite of overall value (Song and Knaap 2003, Haider et al. 2000, Ryan and Weber 2007, Bourassa, Hoesli and Peng 2003). The small distance gradient (Figure 4.8) makes this variable an important indicator of housing value and how small distances from employment accessibility affect overall value.

Figure 4.8 - Distance to Five Points (Kilometers)

Atlanta, GA Study Area

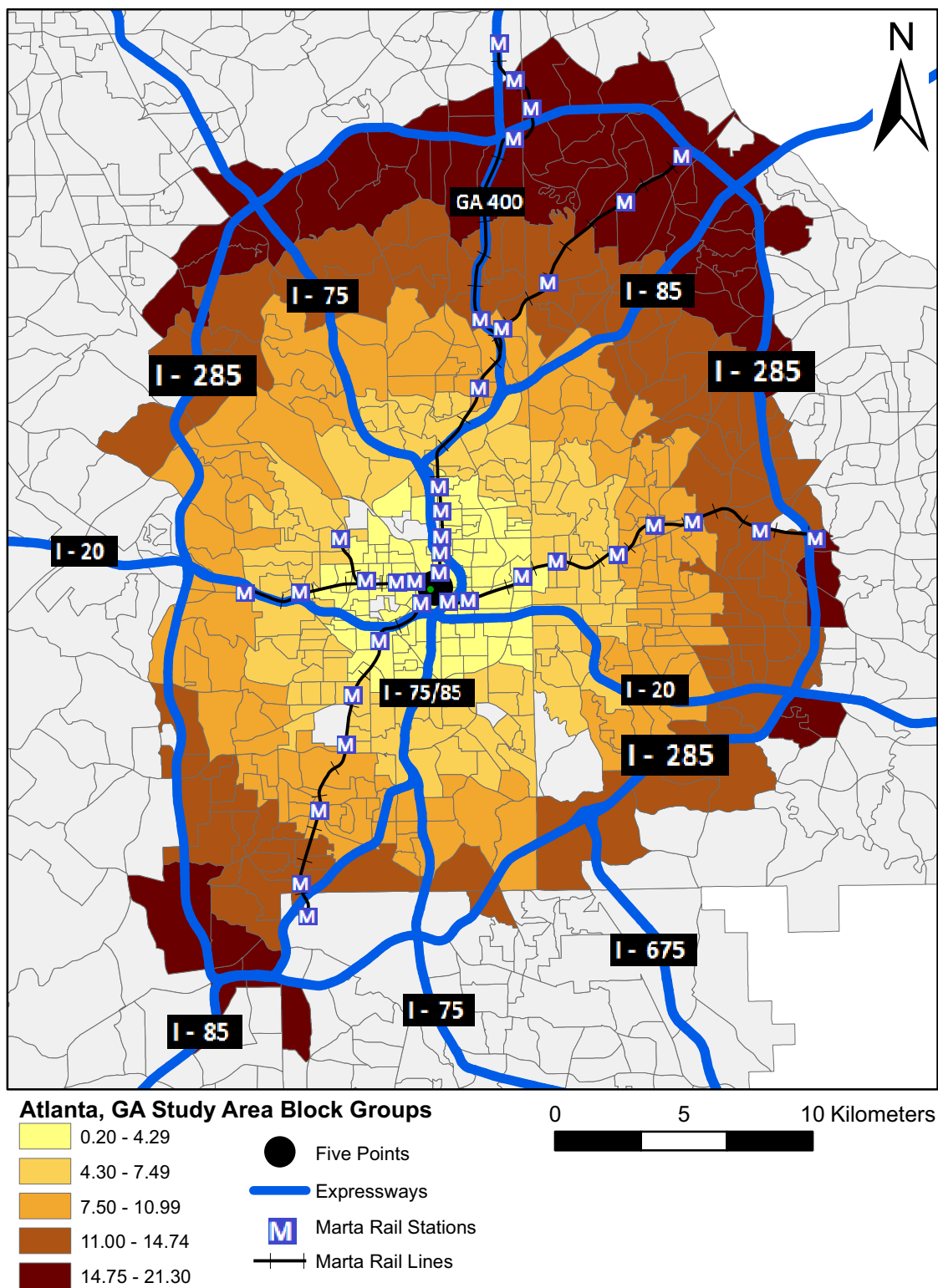


Figure 4.9: Distance to MARTA Rail Station

Atlanta, GA Study Area

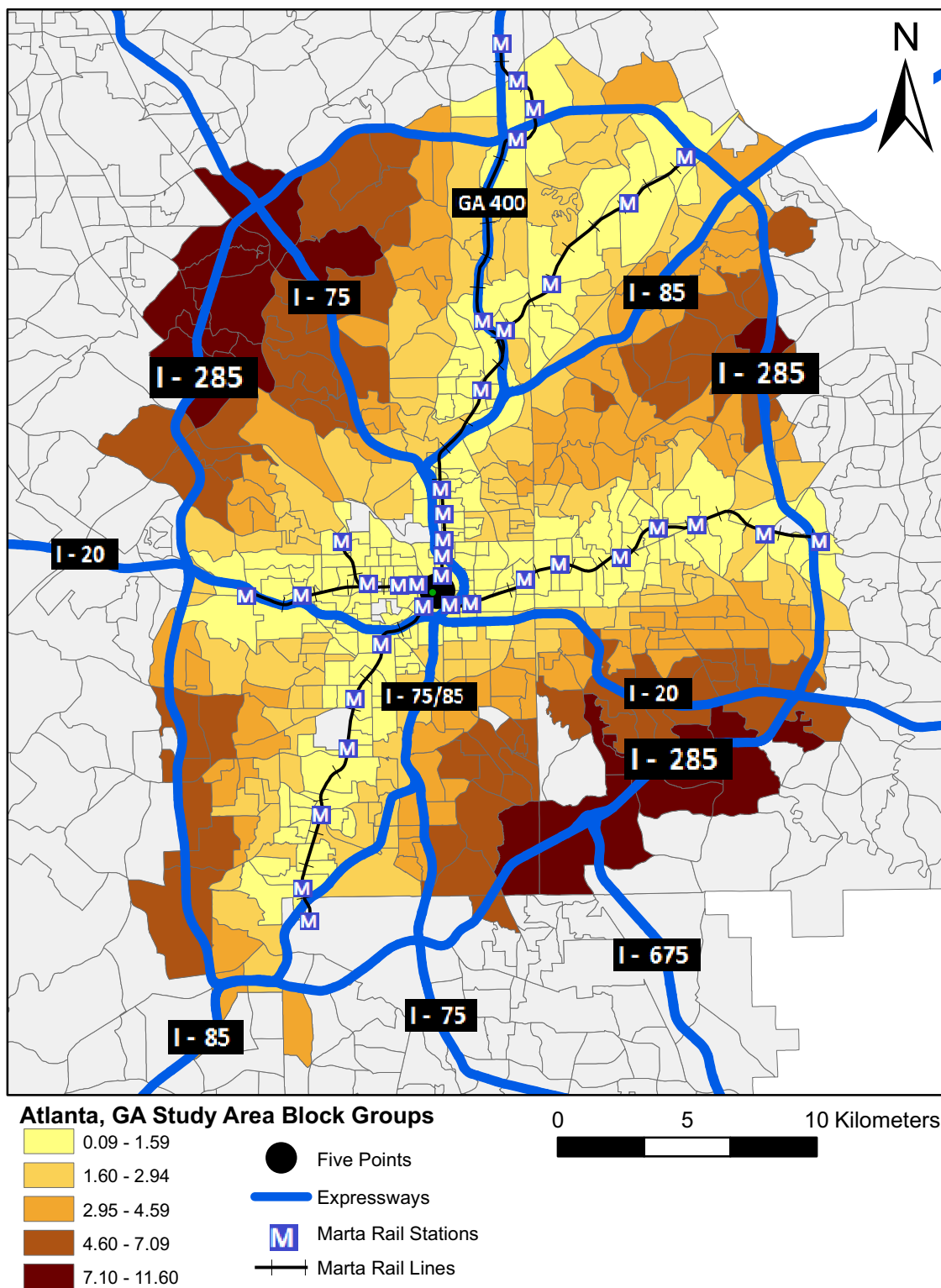
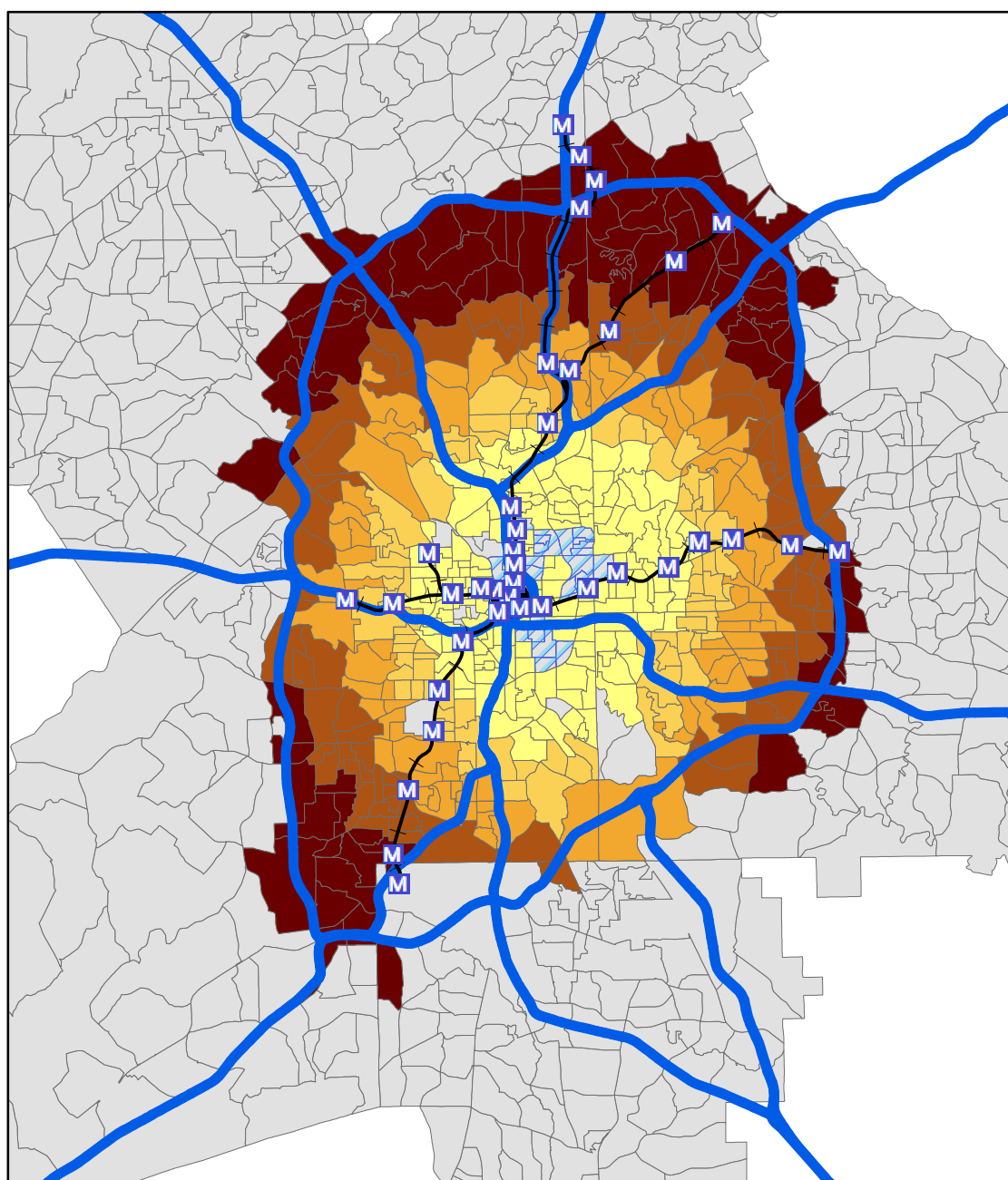


Figure 4.10 - Distance to Gentrified Block Group

Atlanta, GA Study Area



Atlanta, GA Study Area Block Groups

 Gentrified Block Group

 0.01 - 4.16

 4.17 - 6.00

 6.01 - 8.14

 8.15 - 10.50

 10.51 - 17.30

 Five Points

 Expressways

 Marta Rail Stations

 Marta Rail Lines

0 5 10 Kilometers



Public Transportation is also an important variable in determining housing value. Multiple studies examining the relationship between distance to a public transportation stop and home value cite it as a significant variable (Haider et al. 2000, Mikelbank 2004, Hess and Almeida 2007, Benjamin and Sirmans 1996). With MARTA covering a vast amount of the study (Figure 4.9), the value of housing that is influenced by the distance to public transportation is hopefully captured. This analysis seeks to account for similar effects by incorporating Atlanta's largest infrastructure development in the public rail transit system.

Finally, public housing is used in the analysis as a dummy variable. With great variation throughout the study area and varying times of project demolition since 1994, it is argued that a more thorough analysis is beyond the scope of this research. As such, the true effects that the eradication of public housing has on the urban housing market in Atlanta can potentially go unnoticed.

Now that all variables have been described and displayed, the results of the research are presented in Chapter 5. In addition to the regression model being described, the gentrification variable will be summarized and mapped as an aide to analysis. Finally, the research question will be addressed. After analyzing all results of the research, this paper will conclude with a discussion of further implications in Chapter 6.

CHAPTER 5

ANALYSIS

The culmination of this thesis is to use multivariate regression to examine if gentrified block groups have a quantifiable spillover effect on non-gentrified block groups in the Atlanta, GA study area after accounting for housing, socioeconomic, and locational variables. In this chapter, the results of the final model are presented and analysis is performed on the gentrification variable's success at answering the research question. First, the author discusses the functional form of the final model. Next, the control variables are assessed with special emphasis on their impact on the final model. Then, a focus on the gentrification variable and its implications on the model is examined. Finally, the results are summarized before Chapter 6 examines further implications of the research and concludes this project.

Final Model Form & Results

Because of the preliminary diagnostics, the final models are as follows:

$$y = (x_1b_1 + \dots + x_kb_k + x_{DToGENT}b_{DToGENT}) + \varepsilon \quad (\text{Eq. 3})$$

$$y = (x_1b_1 + \dots + x_kb_k + x_{InvDToGENT}b_{InvDToGENT}) + \varepsilon \quad (\text{Eq. 4})$$

$$y = (x_1b_1 + \dots + x_kb_k + x_{gentdist}b_{gentdist}) + \varepsilon \quad (\text{Eq. 5})$$

$$y = \rho Wy + (x_1b_1 + \dots + x_kb_k + x_{DToGENT}b_{DToGENT}) + \varepsilon \quad (\text{Eq. 6})$$

$$y = \rho Wy + (x_1b_1 + \dots + x_kb_k + x_{InvDToGENT}b_{InvDToGENT}) + \varepsilon \quad (\text{Eq. 7})$$

$$y = \rho Wy + (x_1b_1 + \dots + x_kb_k + x_{gentdist}b_{gentdist}) + \varepsilon \quad (\text{Eq. 8})$$

where, Equations 3, 4, and 5 differ from Equation 2 (pg. 25) in the inclusion of the gentrification variables. Equations 6, 7, and 8 include the gentrification variables and corresponding coefficient along with the addition of the spatial-lag function used for Maximum Likelihood Estimation (hereafter MLE). The gentrification variables for OLS estimation have already been explained, but the spatial lag function (for Eq. 6, 7, and 8) is created by, $\mathbf{W}$, the spatial weights matrix. This matrix was created in a Queen's contiguity pattern of the first order. The dependent variable, $\mathbf{y}$, is estimated using the spatial matrix to have a value dependent on the average of all block groups touching it. The coefficient testing its application and importance to the model is, ρ , rho. The spatial lag coefficient will be examined in further detail if it is deemed significant. This allows the researcher to examine the study area in relation to gentrification while assuming that adjacent block groups have dependency on each other for median housing value. The change to a spatial regression function was determined by the value of Moran's I statistic described in the preliminary diagnostics. The spatial lag function was determined to be the best estimation after accounting for more of the model than a spatial error function. With the functional form above, the following final model regression results are as displayed in Table 5.1.

The results that will allow the author to analyze the research question are significant. The results show that with 95% confidence, gentrification has a significant impact on non-gentrified block groups with respect to distance. This is an expected result based on inference from urban economic land theory and Tobler's law. Before concrete statements can be made about the model, it is important to look at the gentrification variable's result and its implications on existing research.

The R^2 value for the final model (Spatial Lag estimation of the GENTDIST variable) is .1614 and is a noticeable improvement over the initial regressions' variables only explaining 12.87% of the model. This improvement is attributable to both a gentrification variable and the introduction of the spatial lag function. Proximity to gentrification has a positive effect on change in median home value for the Atlanta, GA study area between 2000 and 2009. This falls in line with the expectation that gentrified block groups have increases in home value as the area receives continued investment. Alonso described the effects of land value as interconnected upon smaller space, and these results indicate gentrification is no different than other externalities (1964). In addition to the gentrification variable being significant in the final model, four variables were significant in both the initial and final model: change in age, change in household income, change in the median number of bedrooms, and change in percent black.

The model shows through the Likelihood Ratio Test that spatial-lag was not significant, even though it did improve the model. Also, the Rho coefficient measuring spatial lag was very low with a value of only 0.0441. The spatial lag model is used as the final model because it accounted for more of the dependent variable than both an OLS model and estimations with spatial error functions. Additionally, heteroskedasticity was still an issue with the final model. While the heteroskedasticity and Rho coefficient measures are problematic, the nature of the relationships shown in the coefficients indicate that the spatial lag function improved the model and that there is a possibility additional variables are needed to more properly account for the dependent variable.

Table 5.1. Regression Results (OLS Model)

Dependent Variables	Equation 3		Equation 4		Equation 5	
	Atlanta BGs		Atlanta BGs		Atlanta BGs	
	2000-2009	<i>p</i>	2000-2009	<i>p</i>	2000-2009	<i>p</i>
Constant	59784.93	0.000	37741.37	0.000	21681.8	0.030
Rho	--	--	--	--	--	--
GENTDIST	--	--	--	--	62129.19	0.000
DToGENT	-2381.2	0.021	--	--	--	--
INVDToGENT	--	--	40190.32	0.001	--	--
CHGAGE	-814.92	0.010	-679.71	0.033	-696.526	0.027
CHGBED	52798.52	0.000	50054.74	0.000	49950.72	0.000
CHGBATH	29566.83	0.616	30051.81	0.607	39574.87	0.496
CHGHHINC	0.5128	0.010	0.5943	0.003	0.6091	0.002
PCTPOV	34180.18	0.183	33122.6	0.194	32786.4	0.196
PCTBLACK	-74880.09	0.008	-73243.23	0.009	-73742.35	0.009
PCTTRANS	22667.85	0.329	23297.65	0.312	27658.71	0.228
PCTEDU	41269.09	0.170	34071.42	0.255	31520.35	0.289
PCTQUAT	27912.65	0.265	32669.42	0.189	32559.79	0.188
FIVEPOINTS	-56522.3	0.043	-57729.12	0.022	-60610.27	0.013
MARTA	8495.9	0.379	4699.52	0.627	4712.88	0.622
PUBHOUSING	-5755.72	0.617	-7020.91	0.540	-5969.86	0.600
R ²	0.1380		0.1498		0.1605	
N	506		506		506	
F-statistic / Log Likelihood	6.059		6.668		7.234	

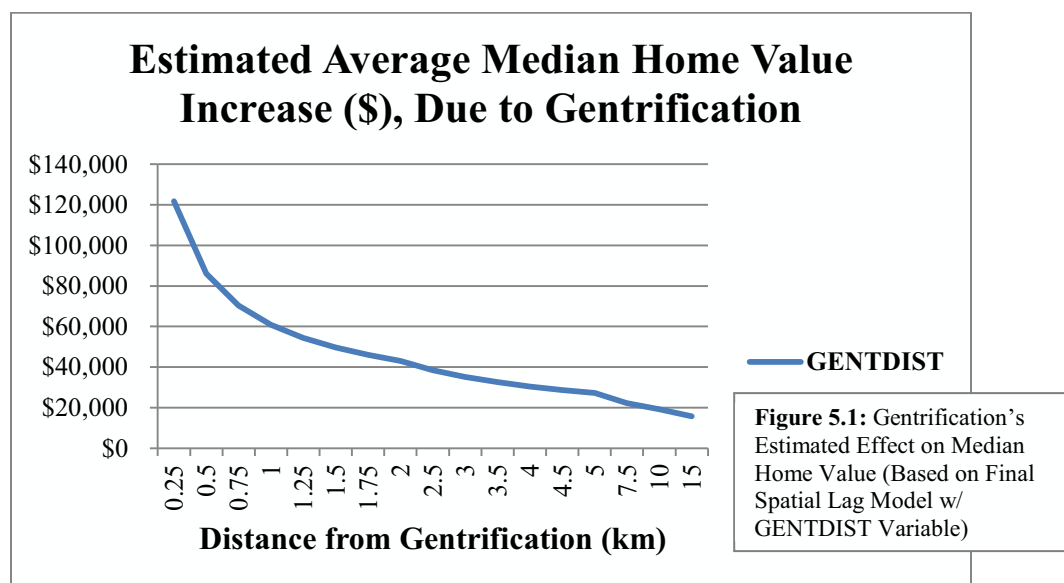
Table 5.2. Regression Results (Spatial Lag Final Model)

Dependent Variables	Equation 6		Equation 7		Equation 8	
	Atlanta BGs		Atlanta BGs		Atlanta BGs	
	2000-2009	<i>p</i>	2000-2009	<i>p</i>	2000-2009	<i>p</i>
Constant	56058.02	0.001	35608.05	0.000	20335.93	0.042
Rho	0.05899	0.396	0.05611	0.414	0.04410	0.521
GENTDIST	--	--	--	--	60866.37	0.000
DToGENT	-2244.991	0.029	--	--	--	--
INVDToGENT	--	--	39123.19	0.001	--	--
CHGAGE	-808.13	0.010	-675.60	0.031	-692.86	0.025
CHGBED	51780.25	0.000	49210.62	0.000	49289.03	0.000
CHGBATH	30069.39	0.604	30868.43	0.592	40030.09	0.485
CHGHHINC	0.5059	0.010	0.5839	0.002	0.6006	0.002
PCTPOV	34332.5	0.174	33298.8	0.184	32931.2	0.187
PCTBLACK	-71944.04	0.010	-70361.58	0.011	-71464.31	0.009
PCTTRANS	22530.58	0.324	23122.48	0.308	27432.22	0.224
PCTEDU	40169.82	0.174	33208.02	0.259	30889.67	0.292
PCTQUAT	27748.09	0.260	32327.21	0.187	32294.51	0.185
FIVEPOINTS	-53982.12	0.049	-56311.51	0.023	-59458.33	0.013
MARTA	8190.49	0.389	4488.41	0.637	4544.26	0.630
PUBHOUSING	-6235.51	0.583	-7465.89	0.508	-6342.01	0.571
R ²	0.1322		0.1514		0.1615	
N	506		506		506	
F-statistic / Log Likelihood	-6333.99		-6328.16		-6325.10	

With the significant and insignificant variables established and the model estimating median home value change between 2000 and 20009, the analysis will continue with a comprehensive exploration of gentrification and its relationship with housing value.

Gentrification and Housing Value

In the final spatial lag model of Atlanta, GA, gentrification is a significant variable in the analysis. A coefficient of 60866, in the context of the final model's transformation, points to a large estimated increase in home values from proximity to gentrification. Figure 5.1 illustrates how the final model shows the gentrification variable correlating with increasing median home value as distance between a block group and the nearest gentrified block group decreases.



In Figure 5.1, the GENTDIST gentrification variable at the 99.4% confidence level indicates a strong relationship between areas that are close to gentrification and increased housing value. In fact, this model makes it very clear that gentrification correlates strongly with a positive spillover effect on real estate values in Atlanta, GA.

This result is important not only to the hedonic modeling of housing values, but is also an important consideration for all gentrification research moving forward. First, it is essential that the author describes the limitations of this result. Then, applicability of the model will be discussed in terms of the relative actors involved in the gentrification debate described in Chapter 2. Finally, a discussion of how this result is important to gentrification scholarship moving forward.

First, additional methodologies need to be tested and parcel-level analysis should be examined to understand a stronger function form of the variable and its significance in other housing markets. While this model shows statistical significance for the Atlanta, GA housing market with respect to block group geographic units, a true hedonic analysis of both Atlanta and other urban housing markets has the potential to improve the estimation of how a distance function from gentrification creates lasting exchange value differences for residential homes. Also, it is important to remember that gentrification studies have varied greatly from one city to another. Socioeconomic conditions have a great impact on the prevalence and spread of gentrification. Additionally, historical trends, politics, and discrimination have had a great deal of influence on the Atlanta, GA area and cannot be ignored (Stone 1989).

After understanding the limitations of this model, the effect that this study should have on future research should not be understated. Gentrification has farther reaching effects than previously studied. Increased home values as a result of neighborhoods gentrifying nearby increases a multitude of important factors in a local area. First, local governments that rely on property taxes for operating funds will likely find this statistically significant result encouraging. By promoting policies

increasing the incentive for investors and developers to rehabilitate homes and land parcels within the city, local governments can expect higher future returns in property taxes. Furthermore, this model does not look at any additional commercial or retail valuation increases that could benefit a local government. For many cities that struggle with revenue problems, policies encouraging gentrification can hope to increase future property tax intakes. Because of the noted increase in housing value surrounding gentrified areas, academics are charged with an even better understanding of the idiosyncrasies that surround other housing markets and gentrification's spillover effects.

Scholars that examine gentrification critically have added reason to be alarmed at the volume of public-private partnerships encouraging gentrification. With increased home values extending beyond the traditionally researched neighborhood borders, gentrification likely affects even more residents that will be unable to afford rent increases in areas in close proximity to gentrification. If housing values rise considerably because of nearby housing rehabilitation, owners of rental homes and multifamily units will likely want to maximize their rent rolls to realize the growth in value of their property, contributing to even more displacement. Rising home values and displacement is an important next step for researchers.

The implications of this research have been discussed for the Atlanta, GA market, along with its effect on practical application and understanding future research needs. With gentrification shown to have an influential increase in housing values near gentrified areas with decreasing magnitude, gentrification research needs to incorporate more holistic effects in future studies. With the gentrification variable now

analyzed and its importance discussed, an exploration of other significant variables will shed additional light on the Atlanta study area. Finally, a summary of results will conclude this chapter.

Control Variables

After examining the relationship between gentrification and median home value, the author wishes to discuss the other control variables that were shown to be significant in the analysis. Change in age, change in household income, change in the median number of bedrooms, and change in percent black are all additional significant variables in the analysis, and their coefficients will be observed as influential changes in the study area's results.

The change in age variable estimates that for every year older that a block group's median year the structure was built, a decrease of \$692.85 is realized. This makes sense as one would expect older homes to appreciate less than newer homes. Additionally, areas that are predicted to have increased housing values give incentives for developers to replace the housing stock. This attempt to capitalize on opportunity is inherent in the valuation of housing stock age. When aggregated throughout a block group, the median year a structure is built is estimated to have a decreasing effect as the block group's structures get older.

Another significant variable whose coefficient indicates previously shown effects is median household income. For the study area, every dollar increase in median household income from 2000 to 2009 is estimated to bring a \$.60 increase in median home value. A strong relationship between income change and housing value

was expected. This assesses that areas with the high growth in household income also had home values that appreciated considerably more than the other areas.

Change in median bedrooms was another significant variable in the analysis. As homes having more bedrooms typically cost more, this model was no different. A block group that increased the median number of bedrooms by 1 received approximately a \$49,289 increase. The large jump in home value change is likely due to the fact that it takes many new bedroom additions or newly built residencies with extra bedrooms to move the median number of bedrooms up by 1 unit (especially because the highest median value of bedrooms in the study area was 1.91).

The change in black population percentage was also deemed significant though the value attributed to the coefficient indicates that every 1 point increase in a block group's black population percentage produces a \$714.64 decrease in home value. This is due to the coefficient of 71464 indicative of a complete proportional change. The coefficient was divided by 100 to establish the estimated change that occurred due to a single percentage point change in the variable. The result for change in black population was expected because the model is similar to many other studies that link increased percentage black with decreasing home values. Also, this variable highlights the extreme racial undertones characterized Atlanta for much of its history (Stone 1989). A coefficient of this magnitude potentially describes a housing market that still bears the challenges of racial integration and white flight. With these significant variables described and analyzed, the following section will summarize the regression results.

Regression Results

The final model has been examined, gentrification was analyzed, and significant variables were discussed. In conclusion, this chapter has outlined the importance of looking at gentrification as a process that is not isolated to neighborhoods. Certain problems such as heteroskedasticity, model estimation, and applicability beyond the study area are all factors that future research needs to address.

When analyzing the final model, it is key to realize that the key variable, distance to gentrification, was significant with each transformation estimated. The type of transformation in each case of the gentrification variable did not affect the ability of the model to more accurately explain a greater percentage of the variation in residential housing prices. Furthermore, the final models allows for a full discussion of further implications regarding the research question. In Chapter 6, this research project is summarized, the research question is answered, and future research opportunities are highlighted.

CHAPTER 6

FURTHER IMPLICATIONS

This paper has examined the effects that gentrification has on the Atlanta, GA study area between the years of 2000 and 2009. Socioeconomic, housing, and spatial variables have been taken into account to produce a final model that shows significant housing value increases associated with proximity to gentrified areas. This question was posed in hopes of engendering a better debate between scholars, government officials, developers, and the public about the holistic effect of gentrification on a local community. Naturally, this research could be expanded to look at national and even international case studies examining how these effects change between urban spaces. In concluding, first a full discussion of the impact this analysis has on the research question will be explained. Finally, a conclusion will summarize the literature, research, and opportunities for further research.

Influence of Analysis on Research Question

The most important aspect of this analysis harkens back to the purpose of this research. After evaluating the entire final model and the final model gentrification variable, this paper concludes that gentrification does create positive housing value spillover effects in the Atlanta, GA study area between 2000 and 2009 after accounting for socioeconomic data, housing characteristics, and spatial variables. While a true hedonic model evaluating parcel by parcel would have established more accurate effects of gentrification based on distance and individualized housing and

neighborhood characteristics, a proof-of-concept has been established for future researchers.

Atlanta, GA has been influenced by government policies and deep seeded patterns of public housing that have inherently shaped the housing market researched today. While these changes could never be fully understood as to their long-lasting effects within this model, an estimation was constructed in an attempt to explore the relationship of change that occurred during the study period. In closing, the term gentrification brings passionate debate from both sides and will continue to do so as cities redevelop precious space close to the center of the city. It is the hope of this author that the next debate focused on gentrification is able to look at more comprehensive effects of gentrification than have been previously researched.

The introduction of this paper highlighted the research question, but the point behind that question is what makes this research matter. Beyond the past and present debate on gentrification, a conclusive finding on gentrification influencing proximate housing values in non-gentrified areas should change the focus of research, policy, and planning moving forward. This section will focus on the importance of this work for academics, policy makers, and real estate development. The impact on scholarly work with respect to gentrification will need to address effects that go beyond the traditional boundaries of research. Policy makers must understand that public-private partnerships encouraging gentrification can greatly influence housing values, but also create deleterious effects on the urban poor. Real estate developers will have a stronger grasp of financial opportunities to redevelop parcels in neighborhoods within close proximity to gentrification.

Academics reading this research will find the conclusion of this work important in that gentrification does influence housing values of nearby non-gentrified census block groups. The impact of this finding is quite significant. Critics of gentrification will need to study not only displacement that occurs directly due to gentrification, but also look at surrounding areas for indirect displacement due to rising housing values. While this research is quick to note that this study cannot claim gentrification causes housing values to rise in non-gentrified areas, the findings highlight a need to incorporate much larger areas of urban land in displacement research. Alternatively, proponents of gentrification that highlight benefits for residents in gentrifying areas need to consider far-reaching effects previously unnoticed. The movement of investment back to the city is not isolated to gentrified areas, but extends outward. While this research highlights a decaying influence as gentrified areas become farther away, a small but noticeable rise in housing values occurred throughout the Atlanta study area between 2000 and 2009. Further research should be undertaken in other metropolitan areas and for different years. A more comprehensive analysis of gentrification's effect on housing value is necessary before gentrification may be debated.

Furthermore, policy makers need to be aware of how influential public policy promoting gentrification can be to local residents. Gentrification can be seen as an effective policy tool to generate additional property taxes. Pro-gentrification policies likely will raise local revenues but can have disastrous effects on both the local housing market and a city's lower-income residents. Before these policies are implemented, local studies should be undertaken to determine if the local housing

market can sustain increased property values without losing the ability for local residents to find affordable housing. Third wave gentrification existing when local governments create public-private partnerships to redevelop inner city land affects many more residents than previously thought.

Finally, real estate developers active in redevelopment initiatives should factor in housing value increases due to proximity to gentrification. While different cities can expect varying effects due to gentrification in a housing market, the strong correlation between gentrification and positive spillover effects will undoubtedly lead to further research. This research does point to a significant increase in housing values in Atlanta, GA around confirmed areas of gentrification, even when taking into account a real estate depression beginning in the late 2000's.

As discussed in Chapter 2, gentrification's more recent past is dominated with large scale developments that change the culture of inner city space. These projects do not create themselves. Instead, third wave gentrification beginning with local governments giving tax breaks, subsidies, or direct investment to real estate developers are creating a push for more gentrified space. While property tax growth and a movement of urban poor outside a city are the goals, this policy change has a potential to cause irreparable damage to the lower income residents currently residing in inner city areas.

Atlanta's urban housing market is potentially at risk of losing more affordable housing within the perimeter. While the vast majority of this reduction in reasonable housing does not stem from a traditional process of individual investor gentrification, the spillover effects cannot be ignored. As real estate housing values rise with

proximity to gentrification, further development and opportunity to realize housing value increases will promote more gentrification. This has the ability to directly cause displacement and movement out of the inner city areas by city residents that need affordable housing in areas that are close proximity to employment centers. As described in Chapter 2, the residents that have the greatest probability of being displaced do not have the transportation or income to move outside the city and commute to the city center for work. This creates a problem when job roles and functions that are relied on by all of society are threatened when individuals working those jobs cannot afford to get to work.

Gentrification policies have been lauded by developers, new urbanists, planners, and many politicians without considering these side effects. A lack of affordable housing in the city does give those with wealth the opportunity to ‘take back the city,’ but instead creates a social tension in which the space is only valuable for the rent that it commands (Smith 1987b). This research does not intend to bolster the ability of revanchists. Instead, this research points to gentrification research missing essential information. The scholars that undertake future studies of gentrification need to examine lasting and holistic effects of this urban process. Beyond looking at the housing value increases found in this study, displacement, racial tensions, development opportunities, and policy decisions are likely to have as much effect on the urban space beyond gentrification as a rise in housing values. It is the hope of this author that finding more holistic effects of gentrification implores new research examining the spillover effects of displacement, race and class tensions, new urbanist movements, and other topics related to gentrification.

Conclusion

Gentrification has attracted scholarly attention for nearly 50 years. In addition to initial research examining displacement and revitalization, contemporary scholars tend to argue between defending gentrification for its cultural and social feel and criticizing it as a cause of displacement and racial tension. A new study technique challenging the scope of gentrification's focus should prove quite relevant. Using census and spatial data to evaluate the impact of gentrification beyond one neighborhood, this project analyzes the externalities that gentrified neighborhoods contribute to the urban housing market. These externalities affecting the property tax base of local governments are quite influential in local planning and policy decisions. With gentrification showing positive externalities on adjoining neighborhoods, research currently evaluating the effects of gentrification needs to change in order to account for exhibited spillover effects. This research argues that gentrification is not spatially isolated and the scope of gentrification's positives and negatives has gone undocumented.

It is the hope of this research that gentrification will be examined as a more holistic process. In closing, gentrification research needs more examination of the broader effects considered for policy purposes and academic inquiry. An expansion of theory on this urban process will better equip researchers, policy makers, and planners alike with a basis for more critical thought on gentrification and its overall effects. Further, policy makers pushing gentrification as a way to expand the tax base will be more knowledgeable about the effects of gentrification on their city, but need a stronger idea of the scope their policies affect within their own urban landscapes.

Planners should proactively discuss future plans encouraging or discouraging gentrification in their communities based on more comprehensive analysis. In conclusion, while this project benefits from previous research in a variety of disciplines, the pursuit of a more comprehensive understanding of gentrification's effect on housing values establishes a rationale to shape the future of research on gentrifying urban space.

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APPENDIX A – FIELD OBSERVATION PICTURES

Block Group 130890211004



Block Group 130890211003



Block Group 130890211002



Virginia-Highland³



³ Picture found on Virginia-Highland Civic Association website. <http://vahi.org/> (Accessed 2/18/12)