FROM SECTION 8 TO STARBUCKS: THE EFFECTS OF GENTRIFICATION ON AFFORDABLE HOUSING IN PITTSBURGH, PENNSYLVANIA

By

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Abstract

This dissertation examines gentrification in Pittsburgh, PA to determine if the process is reducing the amount of affordable housing for low-income groups. There has been considerable debate regarding the merits and consequences of gentrification for the economic development of cities and this research contributes to the discussion by uncovering how housing is affected in a Rust Belt city. The deindustrialized cities of the American Rust Belt have been largely ignored within the gentrification literature because of the population loss and economic slumps these metros have faced due to global restructuring of manufacturing industries. There are signs that many of these urban areas are making the shift to a postindustrial city and that people and capital may soon be returning to their downtowns. In light of the various development projects that have been implemented in places like Pittsburgh, it is important to understand how the urban form is restructured through the process of gentrification.

I use various regression models, including OLS, spatial regression, and geographically weighted regression (GWR) to measure the effect of gentrification on affordable housing for three levels of low-income households. This research shows that gentrification is reducing the availability of affordable housing in the Pittsburgh metro, despite the presence of a soft housing market caused by high vacancy rates within the central city. Regression models show that the vacancy rates are likely reducing the reduction of affordable housing in various neighborhoods of the city, but that buffer of a soft housing market will most likely disappear as data show an increasing interest in moving into the city. The Pittsburgh metro area already has a shortage of extremely low-income affordable units and steps must be taken in Pittsburgh to ensure that low-income households can have affordable access to the city in the future.

Acknowledgements

At the outset of this project it seemed as if it would take crossing an ocean and traversing a mountain range to reach my goals. By placing one foot in front of the other and always keeping that finish line in sight, I was able to complete this seemingly insurmountable challenge and prove to myself that anything was possible with hard work and determination. Luckily, I had help along the way that encouraged, guided, pushed, and pulled me through that ocean and up over that mountain. I would like to thank my advisor, Barney Warf, for his brilliant guidance throughout this process. It seems like only yesterday that I first walked into your office asking for help. You will continue to serve as an inspiration throughout my career. My entire committee offered such important insight and advice along the way and for that I am grateful. Each one of you added to this project through your various areas of expertise.

To my husband, Mike, I would like to thank you for supporting me throughout this long, arduous process. I am so lucky to have you along on this journey with me and I truly appreciate all that you have done to help me make it through. I would also like to thank my family for helping to nurture that desire for knowledge that has propelled me to achieve my dreams. I know that this has seemed like a very long process, one which you might not have always understood, but you have embraced my longing for going out into the world and making my own place. Without that "blue-collar" work ethic you worked so hard to instill in me, I would never have made it through. Last but not least, I need to thank Penny for forcing me to emerge from my office into the sunlight so that I could clear my head and think through the road blocks. I might not have always appreciated it at the time, but I will always remember how much you were a part of this process.

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Chapter 1

Exclusionary Displacement and Affordable Housing: How to Determine if Pittsburgh has a Gentrification Problem

Gentrification is a word that causes much controversy in neighborhood meetings, urban planning offices, and academic circles. Does the development of lower-income neighborhoods spell the end of access to affordable housing in the city for working class residents? This dissertation examines the effects of gentrification on deindustrialized cities, an urban form that has received little attention in the gentrification research due to the bleak history of population loss and poor economies that would seem to discourage the process in those areas. However, postindustrial cities are receiving a lot of attention lately for the new development that is giving these deindustrialized urban cores a facelift. Pittsburgh, Pennsylvania is no exception to this trend and serves as the study area in which to research the geography of gentrification and affordable housing for low-income groups in postindustrial cities. This research will determine whether the redevelopment of urban neighborhoods is resulting in the displacement of low income residents and how changes in the housing markets are restructuring the postindustrial city. This chapter outlines the research problem, study area, and methodology that are used to analyze the effects of gentrification on affordable housing in the United States.

1.1 Gentrification: To Displace or Not Displace?

Gentrification traditionally occurs when middle-class families move in and renovate economically depressed, inner-city neighborhoods, which often results in displacement of the existing, working-class residents (Glass 1964; Lees et al. 2008). The form gentrification takes

and the impacts of this process have been debated since gentrification research began in the 1960s (Davidson 2011). Proponents of gentrification argue that the economic improvement of these neighborhoods through the high incomes of middle-class gentrifiers and the subsequent economic opportunities that new businesses in these neighborhoods attract can help to raise the wealth of lower-income residents who were already living in these areas and that the process may not actually cause displacement (Freeman and Braconi 2004 ; Bryne 2003; Freeman 2005; McKinnish et al. 2008). As Duany (2001, p. 36) put it, "It is the rising tide that lifts all boats"; as gentrifiers help to raise property values and attract new businesses, the original residents will also experience the same benefits from living in revitalized neighborhoods.

Those on the other side of the argument claim that the economic development of the neighborhood does not help long-time residents because they are pushed out by rising rents, property tax rates, and home prices (Glick 2008; Lees et al. 2008; Goetz 2011). If the original residents are displaced, they may not be able to access the jobs created by the new businesses attracted to gentrifying neighborhoods. Even if gentrification creates wealth for homeowners by raising property values, are the original residents able to capitalize on those economic benefits? As most urban policy in the United States has moved to embrace the phenomenon of gentrification by implementing development projects that promote gentrification (Lees and Ley 2008), it is important to understand the effects of gentrification in U.S. cities (Wyly and Hammel 2008; Lees et al. 2008).

1.2 Who Can Afford the Central City?

For the economic development of urban areas to be beneficial for all residents, there needs to be affordable housing for all to attain the opportunities and services provided by these urban areas (Goering 2007; Harvey 2008). One way to accomplish this goal is to ensure adequate supplies of affordable housing for low-income families (Schwartz 2006). If gentrification reduces the amount of affordable housing in an area, low-income residents who could stand to benefit from increased economic opportunities would be pushed from those neighborhoods. In order to assess who actually wins or loses, we need to know if gentrification blocks access to affordable housing in inner-city neighborhoods for low-income groups. One way to examine this issue is to look at changes in the amount of affordable housing in neighborhoods to see if gentrification reduces available affordable housing.

The availability of affordable housing for low-income groups is also crucial for understanding the urban form of postindustrial cities. Economic restructuring across much of the United States in the second half of the 20th century reshaped the form of many urban spaces, particularly those in the American Manufacturing Belt (Ley 1996; Gillette 2005; Safford 2009). Today, that Manufacturing Belt has been transformed into the American Rust Belt, a landscape riddled with almost empty inner cities after much of the population relocated to the suburbs or other areas of the country (Kapp and Armstrong 2012). Analyzing the geography of the availability of the affordable housing in these cities informs our understanding of the morphology of post-industrial cities.

In many of these cities, legacies of racial tension have resulted in a disjoined residential pattern split along racial lines (Goering 2007; Carr and Kutty 2008). Redlining, restrictive

neighborhood covenants, and discrimination created separate neighborhoods with high concentrations of minority groups, often crowded into inner-cities. These actions also contributed to the disproportionately high number of minorities grouped into the lower socio-economic tiers of society, which results in concentrations of poor, minority households in depressed downtowns (Massey and Denton 1993). The effect of gentrification on minority households is still being debated and needs to be further examined (Patillo 2007; Freeman 2009; Goetz 2011).

This dissertation examines the geography of the Pittsburgh metro area, the distribution of affordable housing for low-income groups, and how gentrification affects the availability of those units. Previous studies suggest that low-income groups in the U.S. face shortages in the amount of affordable housing available (Bratt, Stone, and Hartman 2006; Milligan and Gilmour 2012). Gentrification is held to reduce the stock of homes for these low-income groups by raising rents and property values (Lees et al. 2008). Since minority groups have traditionally been overrepresented in neighborhoods ripe for gentrification and in low-income groups, this population would seem to be most at risk for shortages in affordable housing (Wyly and Hammel 2000; Freeman 2006). By looking at whether these assumptions hold true in the changing post-industrial city, this research adds to our understanding of urban morphology, housing, and the residential geography of the city. This dissertation also contributes to the theoretical debate regarding the scope of the term "gentrification" and how it applies to the changing urban landscape in the 21st century.

1.3 Reinvesting in the Rust Belt

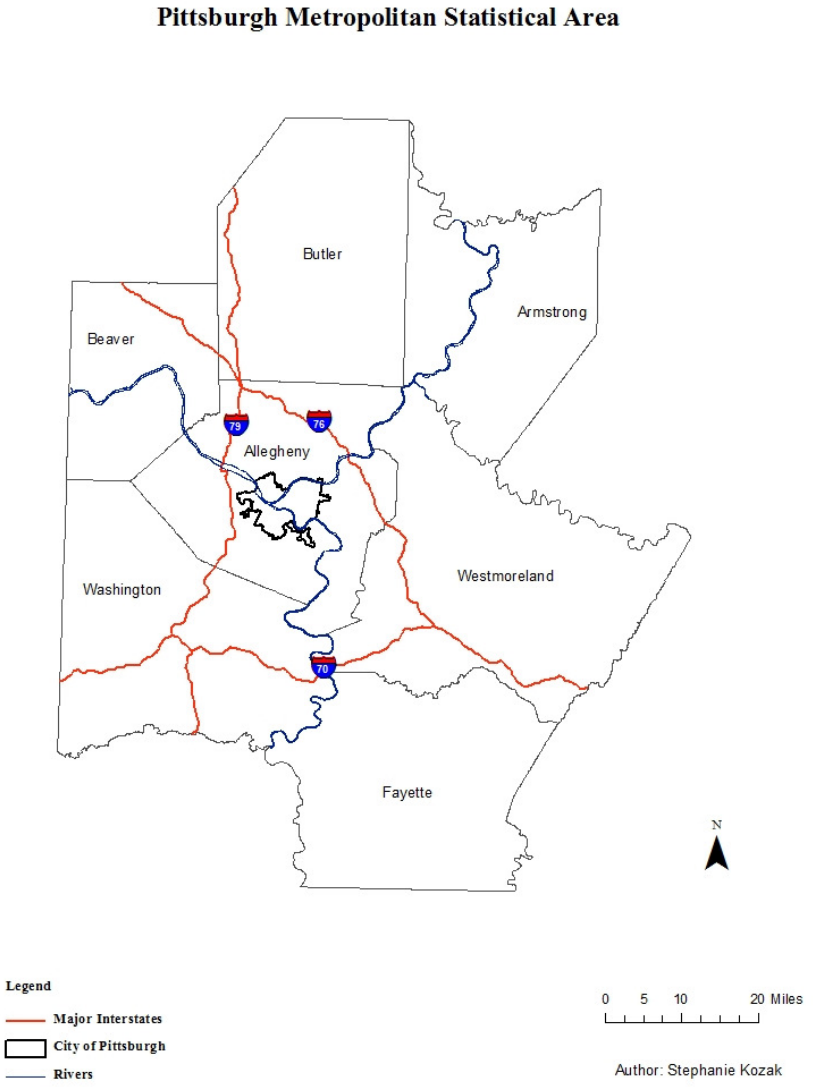
I selected Pittsburgh, Pennsylvania (Figure 1.1) as the study area for this dissertation because the city exemplifies the shift from an industrial to postindustrial urban center (Lubove 1996; Kapp and Armstrong 2012). This process of deindustrialization and reorganization of the economic urban structure has happened in many Western cities, including Manchester (Lloyd and Reeve 1982; Sefawe 1995; Ward et al. 2010), Toronto (Caulfield 1994; Walks 2001; Walks and August 2008), and Detroit (Hill and Negrey 1987; Sugrue 2005). Deindustrialization, or the loss of jobs related to manufacturing and the processing of raw materials, occurred in many industrialized cities that have experienced a shift towards the service and professional industries of the postindustrial city, including health care, education, and technology.

Although the process of urban restructuring unfolds at a local level in that urban policy, local developers, and community groups all play a role in how the process plays out, there are similarities between these places regarding the ways in which deindustrialization restructures the city (Blomley 2004). Gentrification is one such process that can be found in almost every postindustrial city (Lees et al. 2008). It is even occurring in areas of the global South that would not yet be considered postindustrial (Lees 2011). Examining the process of gentrification and its effects in one city makes it possible to uncover the mechanisms behind this highly localized process (Rerat et al. 2010).

Pittsburgh was an important center of the manufacturing and steel industry during most of the 20th century (Hinshaw 2002). The city was home to huge steel mills, like Carnegie Steel Company and U.S. Steel Corporation, and during the nineteenth and twentieth centuries

produced one-third to one-half of the nation's steel. In 1950, the city's population was at its largest with 676,806 people (US Census Bureau 1950).

Figure 1.1. Map of the Pittsburgh Metropolitan Statistical Area.



During the 1970s and 1980s, the steel and manufacturing industries in the United States imploded, leaving many areas that relied heavily on these industries to experience extreme

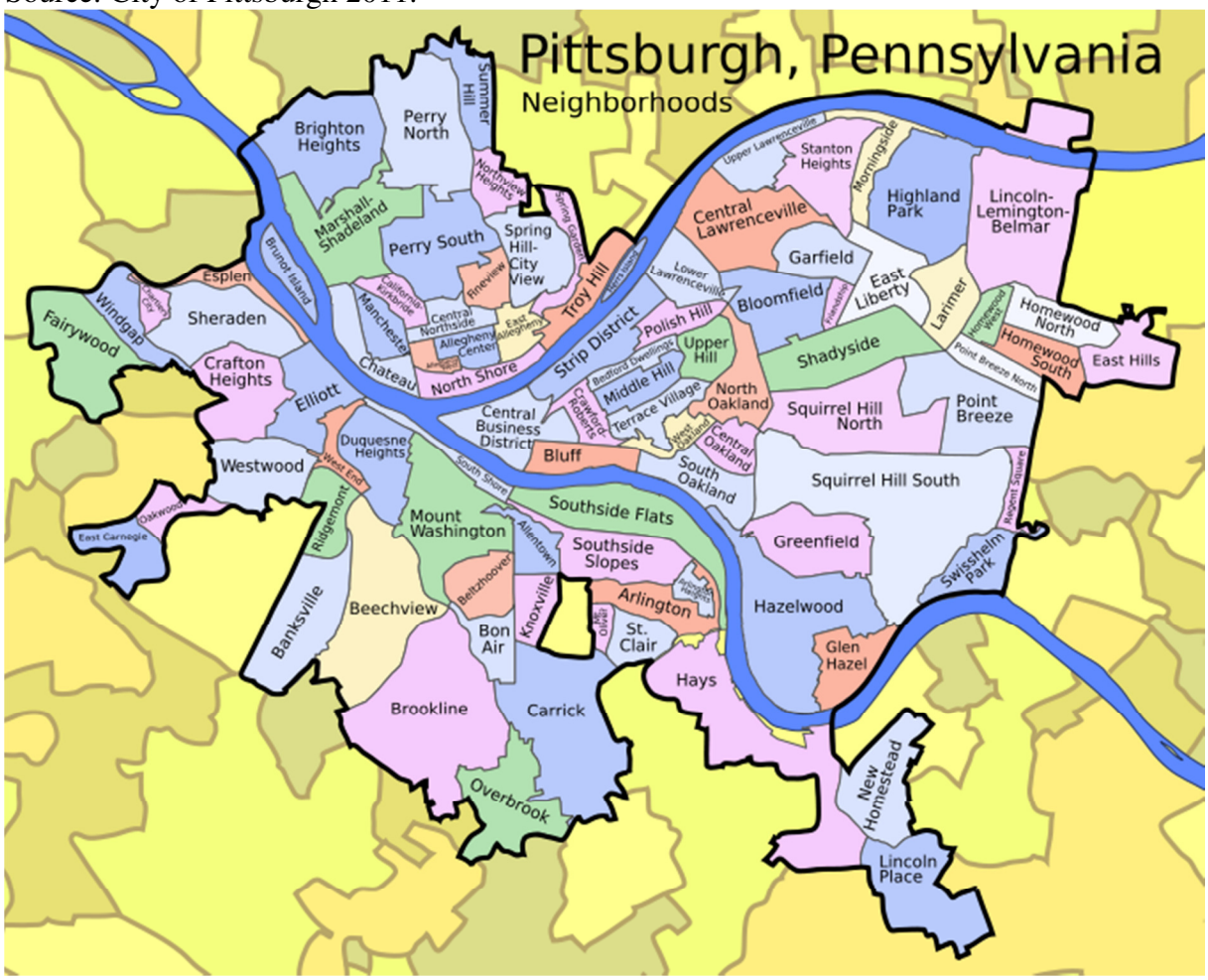
economic distress. Pittsburgh was no exception and the city struggled with reinventing itself in a way that would bring back jobs and economic success (Crowley 2005). Today, no steel mills exist within the city (Strand 2010) and the population in 2010 had shrunk to 305,704 (US Census Bureau 2010). However, the city has managed to rebound from the economic crisis of the 1980s and has reestablished itself as a center for education, technology, and medicine (Domrzalski 2014). This transition from a manufacturing-based to a service-based economy serves as a model of economic success for other postindustrial cities.

The city's largest employer today is the University of Pittsburgh Medical Center, employing 55,000 people in 2013 (UPMC 2013); the percentage of employees in education and health services is 1.4 times greater than that in the U.S. (Holston and Fee 2013). Nine Fortune 500 companies are located in the metro (Olson 2013) and there are more than 1,600 technology companies that contribute to the area's economic success (Bobkoff 2010). Google, which has a satellite office located in Pittsburgh, has reclaimed some of the abandoned manufacturing space and turned it into office space (BakerySquare 2011). The education industry has also been an important part of the diversification of the economy. The city is home to many colleges and universities, including the University of Pittsburgh, Carnegie Mellon University, Duquesne University, and the surrounding metropolitan statistical area has over 20 institutions of higher learning.

According to the City of Pittsburgh, there are 90 distinct neighborhoods within the city (Figure 1.2) (City of Pittsburgh 2011). They can be aggregated into four regions: the Downtown, North Side, South Side, and East End. Although all of the areas have reported residential and commercial development in recent years, the South Side area and neighborhoods in the East End

appear to be the most ripe for gentrification (O'Toole 2006). Home values in the South Side neighborhood rose from a median value of $34,433 in 1990, below the median home value for the city, to $73,900 in 2000, rising above the city's median home value (US Census Bureau 2010). The Urban Redevelopment Authority of Pittsburgh chose the area as the home for a 34 acre, mixed-development project known as the Southside Works, developed on the old site of LTV Steel Company (SouthSideWorks 2011).

Figure 1.2. Map of Neighborhoods in Pittsburgh.
Source: City of Pittsburgh 2011.



Pittsburgh has been experiencing a decline in population since the 1950s, but extensive development over the past 30 years has changed the residential patterns in the area (Toker 2009).

By examining the distribution of affordable housing and how gentrification is affecting the availability of affordable housing, we can gain a better insight into how the postindustrial urban landscape is changing, as well as secure a better understanding of how the gentrification process is unfolding.

1.4 Housing the People

Affordable housing is available via three avenues: the private market, publicly-assisted housing, and third-sector housing, which is made available through social or non-profit organizations (Davis 2012). In areas without rent control, which applies to most of the postindustrial cities of the Midwest, the private market has no mechanism to provide affordable units for low-income groups (National Multi Housing Council 2006). Third-sector housing is often created with the purpose of providing homes for families considered below the poverty level (Clemens and Guthrie 2010), so while it is considered private housing, these units are not sold or rented on the private-market in the same way as are houses supplied through the private market.

In the Pittsburgh area, all three types of housing are available for low-income households. Some housing is provided through federal public assistance, although these programs fall short of being able to provide assistance for all of the families needing their help. The Department of Housing and Urban Development (HUD) is responsible for assisting low-income renters and homebuyers in securing affordable housing. HUD has multiple programs in place for doing this and helps many local and state agencies distribute federal funds for affordable housing programs (Thompson 2006).

Funds are also available through public housing programs that allocate monies to local housing authorities to build, operate, or make improvements to housing owned by local agencies. Tenant based assistance refers to the Housing Choice Voucher Program (formerly known as Section 8 certificates), which allows tenants to find and lease housing in the private market (HUD 2013a). Local agencies administer the program by entering into a contract with HUD to secure the funds for the program, and then enter into contracts with private landlords to supply the housing for the program. Privately owned, project-based programs consist of private rental housing that is available to low-income residents because HUD enters into a contract with the landlord to subsidize the cost of the rent.

The Housing Authority of the City of Pittsburgh (HACP) is a municipal corporation responsible for providing affordable housing for low-income households. It provides housing for over 20,000 residents, or about 7% of the city's population, by giving assistance in securing homes in public housing projects, Scattered Site homes, and Housing Choice Vouchers (HACP 2013). Public housing projects in Pittsburgh consist of large complexes built to house multiple families, similar to apartment buildings. The first development, Bedford Dwellings, was built between 1938 and 1940. Twenty more public housing projects were built by 1970 to house low-income residents. During the 1960s, the HACP began to administer the Scattered Site program, in which homes were available for low-income residents in a variety of mixed-income neighborhoods. This program was intended to "find new and better alternatives to traditional publicly subsidized housing" (HACP 2011). Many of these projects have been demolished to make way for new, mixed-income communities. An additional program was added to the HACP's offerings in 1976 with the implementation of the Section 8 NC/SR program. This

program allows tenants to rent from private landlords by also receiving public assistance to help cover the cost of the rent.

Although these public programs exist, there are many more low-income households who secure their housing on the private market. Those families are most susceptible to changes in the housing market because the lack of assistance from public funding forces them to secure private housing on their own. As housing markets change and affordable housing becomes scarce, these households would be displaced first. This project looks at all affordable housing in the Pittsburgh area in order to account for the large proportion of residents who are forced to find affordable housing on the private market.

1.5 How to Determine if Pittsburgh Has a Gentrification Problem

The purpose of this research is to answer several questions about affordable housing and gentrification in Pittsburgh in order to expand the understanding of the process and its role in transforming the postindustrial city.

1. What are the demographic, economic, and housing patterns of the metro area and how have these changed from 2000-2009?
2. Is there a shortage of affordable housing for low-income groups in Pittsburgh?
3. Is there geographic variation concerning where the affordable homes are located versus where low-income families reside?
4. Does gentrification affect the availability of affordable housing in Pittsburgh?

The dissertation answers these questions by analyzing various demographic, socio-economic, and housing variables for the Pittsburgh Metropolitan Statistical Area (MSA). In order to piece together a picture of the urban landscape for the Pittsburgh MSA and how that has changed over the first decade of the 21st century, I create maps for each variable using Census Data to show spatial patterns in 2000 and 2009, as well as maps to illustrate the changes that occur over the study period. The maps are used to form a narrative of the urban geography for Pittsburgh and to provide spatial and temporal context for analyzing the changing geography of affordable housing and gentrification.

The second part of the analysis looks at changes in affordable housing for low-income households and identifies areas in the MSA that have housing surpluses or deficits. I calculate variables to assess the amount of affordable housing and low-income households per census tract. I also calculate a statistic to determine if there is a shortage or surplus of affordable housing. I then map the variables to identify the spatial patterns that exist to determine if there is a spatial mismatch between low-income households and affordable housing.

Finally, I run various regression models using variables commonly used to detect the gentrification process for census tracts in the Pittsburgh MSA. I use these models to test whether gentrification is reducing the amount of affordable housing for low-income households, thus causing exclusionary displacement for developing areas. I analyze the results to construct a geography of gentrification in Pittsburgh and identify theories regarding urban change that can be applied to explain processes that are occurring in other postindustrial cities.

1.6 Roadmap of the Dissertation

Chapter 2 builds the conceptual trajectory for the various concepts that will be used in the analysis. The history of gentrification research is laid out and relevant concepts in recent literature are examined to build a theoretical framework with which to compare the results of the analysis from the Pittsburgh region. This chapter also looks at the topics of housing markets, the urban landscape, and postindustrial cities. A synopsis of the relevant literature for each of these subjects is given and contextualized according to how the previous work relates to the research questions that will be answered with this dissertation.

The history of the Pittsburgh area is presented in Chapter 3, with a particular emphasis on the urban development and residential patterns that have emerged throughout the history of the metropolitan region. The current demographic, economic, and residential characteristics of the area are outlined. Finally, each area within the city of Pittsburgh, as well as the surrounding counties in the MSA, is described in terms of their present conditions and residential development.

In order to create a narrative describing and explaining the urban form, I use various demographic, socio-economic, and housing variables to map the urban geography of Pittsburgh in Chapter 4. I use Census Data to construct maps for these variables that provide a snapshot of the area for 2000 and 2009. I also analyze the change between these two years in order to theorize about how the urban form will affect the availability of affordable housing, the gentrification process, and future development of the area.

Chapter 5 is an analysis of the current state of affordable housing in the Pittsburgh area. Changes in the amount of affordable units for low-income groups, as well as fluctuations in

various demographic and socio-economic characteristics are examined in each census tract and mapped to identify geographic variations. A theory regarding why spatial mismatch of affordable units and families who need those homes exists is then developed and analyzed in terms of the local housing market and residential development in the area.

The regression analysis of the gentrification variables on the amount of affordable housing is performed in Chapter 6 using ordinary least squares, spatial regression, and geographically weighted regression techniques. These models are compared to determine which offers the best fit to the data in order to explain the variation in the amount of affordable units available. This analysis also uses data on housing development in the area to add to the theoretical understanding of the gentrification process in postindustrial cities.

Finally, Chapter 7 provides a summation of the results as they apply to Pittsburgh and other postindustrial cities. This section outlines how the results of this study add to the theoretical understanding of the gentrification process, as well as the urban morphology of postindustrial cities and their residential communities. Finally, it will provide suggestions for policy that will help to ensure the availability of affordable housing for low-income groups and to mitigate the detrimental effects of gentrification as Rust Belt cities transition into participants in the global economy.

Chapter 2

Contextualizing Affordable Housing and Gentrification Research

Debates about the morphology of urban neighborhoods have been an important and popular subject within the disciplines of geography, sociology, and urban studies for the past several decades. The critical turn has opened new avenues for exploring the experience of subaltern groups that expose the detrimental effects that globalization and the transformation of the urban economy has had on disadvantaged people within the city. Scholars are still arguing over the extent that gentrification displaces original residents of low-income neighborhoods and what types of development fall under the scope of gentrification. Others have unearthed the multiplicity of actors and processes that play out in space and place that contribute to the changing character of urban neighborhoods. Before examining the effects of gentrification on affordable housing in Pittsburgh, it is important first to understand the current state of gentrification, housing, and urban geography.

2.1 Class and Race in the City

2.1.1 Growth of Gentrification Studies

Gentrification research began in the 1950s and 1960s as scholars and policy makers noticed a resurgence of development in the inner cities of the United States and Britain. The phrase was first coined by sociologist Ruth Glass, who observed the changes occurring in

working-class neighborhoods of London (Lees et al. 2008). According to Glass, this phenomenon was

> the process by which working class residential neighborhoods are rehabilitated by middle class homebuyers, landlords and professional developers. I make the theoretical distinction between gentrification and redevelopment. Redevelopment involves not rehabilitation of old structures but the construction of new buildings on previously developed land (Glass 1964).

Even more remarkable about this process was that it was antithetical to what neoclassical economic urban models predicted for post-war, advanced capitalist cities. Models at the time (e.g., Alonso 1964; Muth 1969; Mills 1971) predicted that middle-class residents would move out to the suburbs where they could purchase larger properties. Instead, however, some of these families were moving into inner-city neighborhoods.

In both Britain (Glass 1964) and the United States (Smith 1996) during the 1950s and 1960s, cities often experienced a flight of middle-class residents from the city center searching for the suburban dream. The Chicago School and neoclassical urban models explained this phenomenon as the "natural" process by which consumers trade off distance to the city for the cheaper land of the surrounding suburbs (Burgess 1925; Hoyt 1939; Alonso 1960, 1964). A theory of land use, adopted from von Thünen's model of agricultural land use, was developed by William Alonso, Edwin Mills, and Richard Muth to explain residential patterns in relation to the city center (Carruthers et al. 2010). When applied to agricultural land use, the "highest and best use" of land, i.e., its maximum rate of profit, is determined by the cost of transporting the crop to market, or crops that have high costs of transport to market will be produced closer to the point of sale (Alonso 1964; Muth 1969; Mills 1971). Adapting this theory to explain urban land use, a household that desires more land than they can afford in the central city and is willing to pay

more transportation costs to get to the central business district (CBD) can purchase land farther from the city center. More land can be purchased as one moves away from the central city because rents are lower, which offsets the higher transportation costs to reach the city center. The bid-rent, or amount a household is willing to pay for land, is a function of distance from the CBD and utility, or satisfaction from attaining and using larger areas of land. Wealthier households were held to move to the suburbs because they desired more land and could afford to pay higher transportation costs, so they were led to the suburban fringes of the city (Brueckner and Fansler 1983; Fujita 1987; Anas et al. 1998).

Urban centers were also experiencing a "residential filtering" where homes built for wealthier residents were abandoned and taken over by successively poorer households (Burgess 1925; Hoyt 1939; Anas 1980; Clark 1984). Residential filtering is a pattern of mobility that has been widely used to explain how laissez-faire economic policies lead to available housing-stock for low-income families (Gray and Boddy 1979; Galster 1996). A home is first built for an upper- or middle-income family. Eventually, that family vacates the home in search of newer property, and a family of increasingly lower-income moves in. As the wealthier groups continually move out to the suburbs in search of newer and larger housing, poorer households make use of the remaining housing-stock closer to the city center. This process explains what happened to the housing-stock as wealthier residents continually moved farther from the city center (Clark 2010; Hedin et al. 2012). Low-income city dwellers were left to crowd into high-value properties because they were unable to buy into the suburban life.

Gentrification was seen first as an anomaly because it went against the prevailing idea that the autonomous consumer would make a rational decision to maximize his/her space by moving to the outer-ring of the city. This "Back to the City Movement," as it was sometimes

called (Williams 1986), involved middle-class, educated households moving into areas of the inner city where disinvestment had depressed property values. Another term used in place of gentrification was "homesteading," which came from the U.S. Department of Housing and Urban Development's (HUD) Urban Homesteading Program (Lees and Bondi 1995). The program facilitated the transfer of vacant and dilapidated, inner-city homes to "homesteaders" at extremely cheap prices, a process similar to that of developing the United States' Western "frontier" (Smith 1996). Smith (1982) argued that the terms used to describe gentrification conveyed attitudes about the process; in this case middle-class families were wanted to settle the "wild" and empty "frontier" of the inner city, which of course was not empty at all.

At first, gentrification studies aimed at merely describing the phenomenon, with little theoretical attempt to explain it (Lees et al. 2008). Changes in consumer preferences were often cited as the reason (Ley 1996; Butler 1997), but why were preferences changing? This question sparked a divide in gentrification studies over whether the causes of the process were rooted in production-based or consumption-based theories (Lees et al. 2008). Production-based theories are focused on the urban division of labor and the effects of the housing market and capitalism as the driving force behind gentrification (Smith 1979), whereas consumption-based theories point to demographics and the individual preferences of the gentrifiers as the driving force (Ley 1996).

Smith's rent-gap thesis was the first to explain gentrification as the result of capitalist forces of production (1979, 1984, 1987, 1996). In urban areas, investments are made to create structures that produce a profit. These buildings (factories, shops, homes, etc.) are first built using the most advanced techniques in order to maximize developers' and investors' profits. Over time, they begin to require additional investments in order to continue generating profits. Investors must make the decision whether to continue to upgrade these structures or find new

locations to build new structures. Capitalism requires the exploitation of new markets in order to continually generate profits. “Capital investment is always animated by a geographical tension: between the need to equalize conditions and seek out new markets in new places, versus the need for differentiation and a division of labor that is matched to various places' comparative advantage” (Lees et al. 2008, p. 50). Locating close to new markets or building new places of production creates areas of new investment while older areas of investment are left abandoned (Smith 1984). In U.S. cities, this process results in dilapidated inner-cities and burgeoning suburbs.

The rent-gap theory offers an explanation for why investors return to the inner-city to gain new profits (Smith 1984). As structures within the city fall into disrepair, through the process of aging and declining rates of reinvestment, the gap between potential ground rent (how much value the property could be worth) and the actual ground rent (how much profit a land-owner actually makes) widens. If investors purchase the property while the gap is wide, they can begin to close the gap as they invest in the property, raise the property value, and thus maximize their profits, with additional investment. Closing the gap can only occur, however, if the collective value of the area increases, or if investment occurs within an entire neighborhood (Smith 1979). First-stage gentrifiers are usually homeowners willing to invest their own time and money into a property in the hopes that their property value will eventually increase as other gentrifiers move into the area (Clay 1979). This process explains why gentrification usually takes place on the outskirts of disinvested areas, where gentrifiers can still access the more affordable areas of the city.

Production-centered explanations cite the conditions created by capitalism as the force that makes gentrification attractive to investors. Consumption-centered theories, on the other

hand, place more emphasis on the decisions and preferences of homebuyers. David Ley became the champion of consumption-oriented explanations, using humanistic research as the basis for describing a new middle-class interested in living inner city life (1980, 1987, 1996). A post-industrial society, described first by Daniel Bell (1973), became the basis of Ley's work on gentrification. In this view, the decline in manufacturing gave way to an expanding service sector that employed many of the new, middle class interested in gentrification (Short 1989).

Post-industrial society was held to contain a middle class that was not solely pre-occupied with maximizing property investments, but was also interested in improving their quality of life (Ley 1996). This new middle class was usually well-educated, childless couples interested in living close to the city center (Lipton 1977). Ley refers to the "embourgeoisement" of the central city as the cause of gentrification, fueled by a reaction to the consumerist, market-driven culture of the suburbs by counter-culture, baby boomers (Ley 1996). Ley challenged Smith's rent-gap thesis by pointing to small-scale entrepreneurs and single-family renovators as evidence that the gentrification process is not fueled by property developers and investors (Ley 1996). Much of Ley's work tries to identify this new middle-class group within the baby-boomer generation that were usually more educated, often childless, professionals interested in taking part in new cultural activities different from their parents (Ley 1994; Ley 1996).

However, an alternate type of consumerism was bolstered by this new middle class in the redeveloped neighborhoods of the city. This consumerist culture was more focused on an "artistic, avant-garde" lifestyle than on the imagery mass-produced by media, corporations, and the government (Bell 1973). This group was characterized by a desire to live among groups of different types of people, within neighborhoods that embodied a sense of community and offered vibrant artistic social scenes for entertainment. This group is similar to that described by Richard

Florida as the “creative class” (2003). Florida claims that in order for cities to become economically successful, they need to attract this class, comprised of gays, managers, professionals, professors, artists, entrepreneurs, etc.

The shift of post-industrial cities from manufacturing centers to service-based labor markets created a desire of this new middle-class to live close to the city center (Hamnett 1996), i.e., the “bright lights, big city” explanation for gentrification. However, reconciliation between these differing explanations needed to occur in order to move past arguments regarding the cause of gentrification and focus on the effects. Jan van Wessep (1994) challenged researchers to move past the causal debate and focus on the effects, particularly on urban policy. The debate has shifted today to whether or not gentrification is good for the development of urban areas, but many of these arguments are still shrouded in the debate over the causes.

2.1.2 Three Cheers for Gentrification?

In the early days of gentrification research, most academics expressed opposition to gentrification because it resulted in the displacement of working-class residents from their inner-city neighborhoods. However, researchers who used consumption-oriented explanations to explain the process began to tout the new, postindustrial culture of the middle-class as one that rejects "the oppressive conformity of suburbia, modernist planning and market principles" (Caulfield 1989). Sharon Zukin, in *Loft Living* (1982), described the “artistic mode of creation” used in gentrifying imagery as a transformed cultural consumption strategy that only served as a form of capital accumulation; she began to champion the outcome of gentrification in the East Village of Lower Manhattan as a burgeoning economic zone of boutique shops and hip restaurants (Zukin and Kosta 2004).

Andres Duany wrote “Three cheers for gentrification” (2001) in which he claimed "Gentrification rebalances a concentration of poverty by providing the tax base, rub-off work ethic, and political effectiveness of a middle-class, and in the process improves the quality of life for all of a community's residents” (p. 36). Following this article was one by the legal scholar Peter Bryne titled “Two cheers for gentrification” (2003), which also praises the “balance” that could be achieved through gentrification that helps to pick up the downtrodden working class by modeling themselves after their gentrifying neighbors. Freeman published studies on gentrification aimed at showing how mobility and displacement did not appear to be motivating factors in demographic changes of gentrifying neighborhoods (2005) and that socio-economic and racial diversity were increasing in gentrified areas (2009).

At the beginning of the 21st century, gentrification research began to move past emphasizing the causes in order to focus on the effects of the process. Slater (2006) wrote a scathing critique about how critical perspectives were being left out of recent work on gentrification. He argued that the “theoretical squabble” over production and consumption-oriented theories was taking the focus away from the detrimental effects of gentrification and silencing the political examination of neoliberal urban polices. Slater also claimed that humanistic studies of the actors involved in gentrification were unduly focused on the middle-class, ignoring the working-class residents who were also involved in the process. Finally, the focus on social mixing, or the integration of different socio-economic, racial and ethnic groups in a neighborhood, failed to highlight the neoliberal policies that were hiding behind the veil of diversity.

Some scholars responded to Slater’s challenges and began focusing their work on these topics. For instance, Walks and Maaranen (2008) found that social mixing, ethnic diversity, and

immigrant concentration declined in gentrified neighborhoods in three Canadian cities and that gentrification was implicated in the growth of neighborhood income polarization and inequality, most likely due to the reduction in affordable housing. Lees (2011) argued that the emphasis urban policy put on social mixing that was to be achieved through gentrification ignored the empirical evidence that this increased diversity was not occurring, or was even the desired means to achieve urban revitalization. Others focused on the racial dimension of gentrification to show that minority groups often suffered at the expense of capital accumulation by white residents (Glick 2008; Goetz 2011).

2.1.3 New Forms of Gentrification

Recent research has used gentrification as a tool for exploring other urban processes. The latest wave of gentrification since the mid-1990s is often referred to as third-wave gentrification (Hackworth and Smith 2001; Powell and Spencer 2003; Boddy 2007). Rather than a government-sponsored redevelopment scheme (first-wave) or the revitalization process of depressed, inner-city neighborhoods by individuals that characterized much of the gentrification described between 1970 and the early 1990s (second-wave), third-wave gentrification is characterized by large-scale development projects that are often the result of neoliberal partnerships between private and public entities (Lees et al. 2008). The type of gentrification that is typical of the third-wave is often facilitated by the shift towards a neoliberal agenda in regards to urban redevelopment (Hackworth and Smith 2001).

Third-wave gentrification is also linked to the process of globalization (Butler and Lees 2006; Davidson 2007; Zukin et al. 2009). Smith (2002, p. 80) referred to gentrification as a "global urban strategy" in that global capital and the linkages between various institutions and

sources of capital drive local gentrification processes. Gotham (2005) uses the term "tourism gentrification" to refer to the gentrification of areas for entertainment and retail venues that are meant to create spaces for global consumers. The spread of gentrification to non-Western cities is also referenced as an example of the globalization process and has been referred to as the new urban colonialism (Atkinson and Bridge 2005).

Many scholars have linked the gentrification process to recent neoliberal urban policies that result in the state acting as agents of gentrification (Hackworth and Smith, 2001; Smith 2002; Hamnett, 2003; Peck 2006). As municipal governments have shifted from sources of welfare for their constituents to facilitators of the market through private-public partnerships, the gentrification process has been spurred by these government forces. This new state-sponsored gentrification involves development schemes and public funds being used to reinvest in deteriorated inner-city areas. Pittsburgh has multiple examples of neoliberal mechanisms contributing to the gentrification of areas, particularly in relation to the development of brownfields (Urban Redevelopment Authority 2009; O'Toole 2010; Bergman 2011). Neoliberal policies have also permeated into the dominant discourse of affordable housing through the HOPE VI process (Hanlon 2010; Jones and Popke 2010) and the promotion of social mix strategies in revitalizing the central city (Slater 2006; Bridge et al. 2012).

Many of these studies explain new types of gentrification that are different from the classical gentrification described by Phillip Clay in 1979, where middle-class residents and business owners moved into working-class neighborhoods. There is much debate about how restrictive the definition of gentrification should be today or if the concept should be elastic enough to include some of the processes described in the recent literature (Davidson 2011).

Mark Davidson and Loretta Lees explore the relationships between new-build gentrification, or the construction of new residential and commercial buildings in economically-depressed areas of the city, and globalization in Britain (Davidson 2007; Davidson and Lees 2010), illustrating the role of developers in evoking global images in marketing and architecture to rapidly populate new river-front developments in cities like London and Vancouver. This concept has been further explored in other areas of the world, like South Africa (Visser and Kotze 2008) and New Zealand (Murphy 2008). Some scholars (Boddy 2007; Butler 2007) contend that this new construction does not result in the same type of displacement or changes in neighborhood composition as the traditional understanding of the concept of gentrification.

Urban planners tout environmental issues and eco-minded planning initiatives in cities as progressive changes to urban areas, but problems arise when green development, planning policies that are based on sustainable and eco-friendly principles, results in displacement of original city residents in a form of gentrification. Dooling (2009) and Quastel (2009) explored issues of "ecological gentrification" that examine the intersections of environmental urban development and displacement in new urbanism. Spaces that are being transformed into green spaces rather than residential developments have applied the term gentrification to the process of displacement of original residents and of repurposing part of the city for a more privileged group of people. Pearsall (2010) also looked at issues of displacement and "social sustainability" in New York City as they relate to brownfield redevelopment.

A substantial literature regarding "rural gentrification" has also developed that examines the processes of capital investment, displacement, and class colonization as they apply to rural areas. Phillips (1993, 2004) identified crossovers between urban and rural gentrification by acknowledging the different contexts of the areas while also drawing attention to the overlapping

processes that exist. Rural gentrification studies have been carried out in various places, including Montana (Ghose, 2004), Scotland (Stockdale 2010), and England (Smith and Higley 2012).

2.1.4 Gentrification and Race

In the United States, race and class are closely intertwined because of the social and legal practices that have long favored whites over minorities (Lieberson 1980; Massey and Denton 1993; Briggs 2005). Racial categories are a social construction in that there is no biological distinction between these categories, but despite the arbitrary racial divisions, differences in skin color have had very real implications. Several authors have shown how racial categories have been constructed in the U.S. and how those classifications have led to discrimination and uneven social and economic outcomes that are still evident in society today (Ignatiev 1996; Roediger 2005; Telles and Ortiz 2009). Whiteness studies have tried to uncover the pervasiveness of white ideologies and power in today's society and how these ideas have become normalized (Jackson 1998). Although many legal barriers to minorities have been removed in the housing and labor markets, several scholars agree that the outcomes of these historical structures and the persistence of informal discrimination still exist to fragment American society along racial lines (O'Connor et al. 2001; Goering 2007; Carr and Kutty 2008).

The mechanisms responsible for racial residential segregation began to be examined as early as the beginning of the 20th century by W. E. B. Du Bois and his identification of the color line dividing American society (1903). As scholars took notice of the urban "ghettoes" springing up around the country, they began to write about how this could be detrimental to the health of American communities (Myrdal, 1944; Taeuber and Taeuber 1965). Racial unrest and the

economic upheaval of deindustrialization highlighted the issue of residential segregation throughout the 1960s and 1970s, leading to legislation that attempted to end discrimination within the housing market. Academics ignored the issue of residential segregation until the late 1980s when William Julius Wilson (1987) and Douglas Massey and Nancy Denton (1987; 1989; 1993) once again took a closer look at the racial lines separating American communities.

Scholars such as Wilson, Massey, and Denton posited different theories as to why racial residential segregation persisted despite legal transformations of the housing market. Wilson (1987) felt that deindustrialization and the movement of whites to the suburbs created a concentration of poverty within the inner city where blacks and other minority groups predominated. Affluent blacks were able to also escape the declining central city, leaving behind lower-class African Americans who had been predominantly employed in the failing industrial sector.

Massey and Denton offered a differing explanation in *American Apartheid* (1993). They claimed that the ability of middle-class blacks to leave the ghetto undermined the issues that put blacks in the position in the first place through the historical processes that created residential segregation. Issues of class and race became intertwined because of the disproportionate numbers from minority groups existing within the underclass due to segregation policies. These policies only exacerbated and perpetuated the issues of poverty and social and geographic isolation of minority groups from whites, linking together minorities with lower-class status (Jargowsky 1997).

Gentrification brings to light the racial issues that have plagued American society for centuries. Race and class are intricately tied together because of historical processes that have

created structural barriers for many minority groups, resulting in the disproportionate presence of non-whites at lower socio-economic levels (Massey and Denton 1993). Gentrification research often portrays gentrifiers as whites who move into areas occupied by non-whites (Walks and Maaranen 2008; Murdie and Teixeira 2011; Lees 2011). Walks and Maaranen (2008) discuss how gentrification is often used by municipalities as a way to promote racial integration, or "social mix," by encouraging white, middle-class residents to move into lower-income, minority neighborhoods. Freeman (2006) has done extensive ethnographic work in two, largely black, neighborhoods in New York City to uncover how there are mixed feelings among the residents regarding gentrification. Some of the residents complained that gentrification was promoting the idea that only white neighborhoods produced the necessary community atmospheres to increase economic standing.

However, the widely-accepted notion that gentrification is only undertaken by whites has been challenged. Kesha Moore (2009) studied instances of gentrification in Philadelphia where middle-class black gentrifiers moved into low-income neighborhoods. She argues that this is a unique type of gentrification in that there are different opportunities and constraints that result in a process that is different than that typically expected in gentrification research. Examining the change in the racial composition of neighborhoods in which gentrification is occurring in Pittsburgh sheds light on how this process affects both the amount of racial mixing that occurs in the city as well as how it contributes to the racial differentiation of groups in the US.

Recently the public policy initiative of "social-mixing" has come under scrutiny for its role in promoting state-sponsored gentrification and the consequences it has for existing communities. Slater (2006, p. 737) cited the "pervasive influence of neoliberal urban policies of 'social mix'" as one of the possible reasons for the lack of critical research in the area of

gentrification studies. Many municipal governments have adopted a strategy of trying to attract middle-income families into lower-income neighborhoods, using the idea of social mixing, or integration, as a way to "revitalize" a devalorized neighborhood (Rose 2004; Walks and Maaranen 2008). "Yet there is a poor evidence base for this policy of 'positive gentrification' for, as the gentrification literature tells us, despite the new middle classes' desire for diversity and difference they tend to self-aggregate and, far from being tolerant, gentrification is part of an aggressive, revanchist ideology designed to retake the inner city for the middle classes" (Lees 2008, p. 2449).

The gentrification occurring in Pittsburgh appears to be indicative of "third-wave" gentrification in that it often occurs in the form of large, mixed-use development projects that are sponsored by state and private interests. In addition, there is anecdotal evidence pointing to displacement or the threat of neighborhood invasion that appears to disproportionately affect African-Americans in the area. This research adds to the understanding of the ontological scope of the term gentrification, how neoliberal urban policies are shaping the process of neighborhood development, and whether the revitalization of these communities are resulting in negative consequences for the lower-income groups who also have a right to the city.

2.2 Housing the Masses

Affordable housing has been an important issue within the fields of geography and urban studies. The Chicago School developed theories to explain how city neighborhoods and urban spaces changed in the early 20th century. As suburbanization and deindustrialization dramatically altered the urban landscape many urban scholars churned out research about the changing urban

landscapes and the actors involved in rearranging urban geographies. This dissertation will contribute to the field of urban geography by analyzing how the urban landscape is changing in postindustrial cities and how gentrification is acting as a driving force in that change.

2.2.1 The Urban Landscape

Scholars have been interested in housing and the urban landscape since the Industrial Revolution led people to crowd into cities and began making their mark on the landscape through the proliferation of smokestacks and railroad tracks. Early sociologists, like Emile Durkheim (1893) and Georg Simmel (1903), often compared this new type of place to the "traditional" agrarian communities that supplied new workers in the cities and worried that cities would lead to the eradication of community and social order.

The Chicago school of sociology and urban geography, associated with Robert Park and Ernest Burgess (1925), developed the urban ecology approach to studying cities. Using empirically oriented methods, the studies that came out of this time looked at the city as an ecological community (Warf 2010). These scholars developed theories about changes in land use and residential patterns that borrowed from ecological ideas like invasion and succession. The theories developed from the research in Chicago described many of the processes taking place in the city as natural, hearkening to an idea of an environmental science influence in describing the behavior, community relations, and built environment that developed during the early 20th century.

The creation of models by the Chicago School, and later by scholars concerned with using the spatial science principles and quantitative methods of the 1950s and 1960s to explain urban form and function, exemplified urban geography throughout much of the mid-20th century

(Grammenos 2010). Starting in the 1970s, Marxism became influential for understanding the city and the urban landscape by analyzing the political economy of a system and how the control of capital shapes and changes various aspects of the city (Soja 1989, 2000; Herod 1994; Harvey 2008). Residential differentiation along social lines is often based on class divisions and, in turn, affects social reproduction (Harvey 1975). In industrial cities, residential neighborhoods were divided strictly between those who controlled capital and the laborers, who did not. Row houses in these cities were often even built by the owners of capital and served as a means of control for the sources of labor and a division of classes.

In postindustrial cities, changes from manufacturing to service-based economies had profound social and structural impacts on the urban landscape (Kirkwood 2001; Kapp and Armstrong 2012). The relocation of existing manufacturing centers and the creation of residential and commercial areas in new locations on the periphery of the city radically transformed the organization of cities throughout the United States. These changes in the location of capital dramatically impacted the ways of life and the residential patterns of these postindustrial cities. Most of the wealth moved to the suburbs, leaving the inner-city areas increasingly void of job opportunities. The movement of families to the suburbs also left urban neighborhoods without a tax base that could provide much needed services.

Globalization also affected cities and the urban landscape in profound ways (Smith 2002). The widening gap between rich and poor in the global market created what some call a dual or divided city in which the separation between socioeconomic groups is evident on the landscape (Mollenkopf and Castells 1991). The influence of globalization is evident in the process of gentrification in that it creates a professional class with interests in moving back to the

city and private development projects by firms throughout the world via global linkages (Lees et al. 2008).

2.2.2 Housing Research in Geography

The Chicago School shaped much early work on housing within the field of urban geography in trying to apply the ecological approach in order to understand how housing markets functioned (Grammenos 2010). The process of invasion and succession was an important theory about the ways in which the characteristics of neighborhoods changed, usually along ethnic and racial or class lines (Park 1952). As new immigrants moved into the industrial city, they started to reside in neighborhoods closer to sources of employment (i.e., factories) and residents previously living in those lower-class neighborhoods began to move out of the city in order to physically and socially distance themselves from the newcomers. This theory is based on what was happening as mass migration from Europe and the Southern United States by African Americans reshaped the urban landscapes of northern cities.

Filtering was another theory to come out of the early 20th century in regards to housing. Rather than growth of cities being spurred by large groups of immigrants moving into the city, Hoyt (1939) theorized that it was the desire of more affluent families to live on larger plots of land that were available on the outskirts of the city. Advancements in transportation facilitated their ability to do so, thus driving changes in residential patterns. The homes that were left vacant by higher-income families were then available for a family with a more moderate income to move in. The effects of this movement were to create a vacancy chain in which households with higher incomes slowly moved towards the outskirts of the city, with groups of subsequently lower incomes moving in to the neighborhoods that were now vacant, leaving the central city

occupied by those with the lowest incomes. Burgess (1925) also describes this process of filtering in his early work on inner-city poverty, although he believes pressures from inside of the city spur residential filtering, rather than growth from the outside as described by Hoyt (1939).

Hoyt (1939) thought the filtering process could be sufficient at creating enough housing for each income group, provided that housing policies spurred continued growth on the outskirts of urban areas. However, in many cities during the Great Depression and World War II, new construction of housing slowed significantly or even stopped, creating a housing shortage that resulted in difficulties for low to moderate income families in securing affordable housing. In addition, filtering does not always work as intended in that older, physically-deteriorated buildings may be torn down and reduce the amount of housing available for the lowest income groups. The housing that is left over at the end of the cycle is usually in poor condition and unfit for families to live in.

Another theory regarding the housing market emerged post-WWII that drew heavily on the assumptions made by the Chicago School. Edgar Hoover and Raymond Vernon (1962) developed a model based on five stages that characterized the type and condition of the housing in cities as they undergo neighborhood transitions. As urbanization occurs and population growth accelerates, the density of housing increases and multifamily homes are built in addition to traditional, single-family dwellings. Eventually, older housing is converted into multifamily units and the housing stock begins to deteriorate, population growth and density decreases as people move out of the city and units are abandoned. Eventually, the neighborhoods within the city can be revitalized through the construction of more multifamily homes, but usually not without state intervention. What is missing from these explanations of neighborhood change is the role of the

urban economy, class, or the division of labor in shifting residential patterns in the city, concepts that are later explored by Smith (1979, 1984, 1996) and Harvey (1975, 2008).

More recent work on the housing market has focused on issues of accessibility, discrimination, public housing policies, and the role of public and private entities in the market (Anderson et al. 2003; Briggs 2005; Glick 2008; Walks and August 2008; Martin 2010). Early studies (Wienk 1979; Galster 1986 ; Massey and Denton 1987) on discrimination in the housing market looked at processes like redlining, block busting, and the use of community covenants to keep out particular groups from white, middle and upper class neighborhoods. Redlining refers to the process of lending institutions demarcating lower-income neighborhoods, often of largely minority residents, and deeming these areas unfit for residential loans, which resulted in the concentration of poverty because these residents were then unable to sell their homes to prospective buyers. Blockbusting occurred when real estate agents pressured white home owners to sell their properties within the city by convincing the residents that their neighborhoods were being infiltrated by minorities. This practice encouraged white flight to the suburbs to escape the fear of declining property values in the city. Even after laws were passed to ban discrimination in the housing market during the 1960s and 1970s, real estate agents and landlords were still trying to segregate neighborhoods by steering prospective buyers or renters from certain (i.e., low income minority) areas.

Recently, research on discrimination in the housing market has shown how lending practices have contributed to the issue of residential segregation (Pager and Shepard 2008; Wyly et al. 2009; Massey and Rugh 2010). Predatory lending, or giving out subprime loans to applicants who are seen as riskier borrowers when they could qualify for regular loans, involves charging higher fees on loans with higher interest rates. Other scholars have looked at the effect

of the 2008-2013 economic crisis on the geography of housing markets (Aalbers 2009; Martin 2010).

Research on affordable housing has largely focused on the role of public housing in meeting the growing needs of low-income groups in securing lodging (Cisneros and Engdahl 2009; Hanlon 2010). Many studies have tried to gauge the level of success of various governmental programs in providing affordable housing, such as the Low Income Housing Tax Credit, Housing Vouchers, and HOPE VI programs (McClure 2010, 2011a; Goetz 2011a, 2011b). Much of the debate around the issue of affordable housing stems from concerns about what is the best way and who should be held responsible for supplying an adequate stock of affordable units.

2.3 Postindustrial Cities

Daniel Bell (1973) predicted that economies of the industrialized nations would begin to shift from manufacturing to service-based economies throughout the latter half of the 20th century. This change is seen in the rise of service-oriented, professional, and managerial classes, many of whom have moved back to the city. David Ley (1996) attributed the gentrification process to the shifting ideological values and cultural preferences of this new middle class. The shift from industrial to postindustrial societies is reflected most in cities that relied heavily on manufacturing activities during the 19th and 20th centuries and have since struggled to adjust to service-based economies (Dietrick 1999; Kirkwood 2001; Gillette 2005).

Not all cities in the postindustrial era are created equal, however. “Over the next 40 years, Rust Belt cities were characterized by depopulation, disinvestment, and decline while Sun Belt

cities were characterized by population explosion, economic growth, and sprawl" (Carter 2012). The decline in Rust Belt cities can be attributed to the movement of many manufacturing operations to the Sunbelt and to other countries in order to capitalize on lower wages and the technological innovations that allowed for the reduced need of un-skilled labor. While the spatial patterns of industrial firms during the 19th and 20th centuries were centered around core regions, like the Manufacturing Belt, in a "oligopolistic structure of industry," by the late 20th century, the industrial landscape changed to one of decentralization and movement towards the periphery, both within the U.S. and in other parts of the world (Scott and Storper 2005, p. 3). This restructuring of manufacturing left many former industrialized cities facing huge job losses and a decline in population as residents left to find work elsewhere.

It is important not to cast aside industrial cities as relics of the past, but instead focus on their place in the future of the country. As Sunbelt cities face increasing problems associated with auto-dependency, water shortages, and urban sprawl, post-industrial cities like Pittsburgh and Detroit offer the infrastructure aligned with the burgeoning trend of "smart growth" (Carter 2012). The concept of smart-growth is to utilize existing locational advantages, like infrastructure or natural amenities, to attract new residents while also incorporating sustainable urban planning practices, like designing walkable neighborhoods and integrating easy access to public transportation into urban planning. The infrastructure, affordable cost of living, education and medical centers, and historical and cultural attractions make these cities attractive for entrepreneurs and the creative class (Florida 2012).

Kapp and Armstrong (2012, p. xi) argue the struggle that these postindustrial cities face to attract innovation and economic activity that incorporates them into the global economy is partly an issue of perception:

> Currently, the postindustrial areas of Midwestern cities are either underutilized or not utilized at all. While globalization is partly to blame, the challenge of brownfield remediation and a pervasive attitude that these districts are antiquated and inconsequential have hampered development efforts. This has led these districts to be declared 'postindustrial'—places belonging to a once industrial age in American history and repositories of forgotten artifacts that include factories, warehouses, freight ports, railroads, streets, and alleys.

Many of these cities, like Pittsburgh, Youngstown, Cleveland, and Detroit, are trying to take industrial images and use them as a development strategy by catering to the service, technology, healthcare, and professional industries.

Scholars (Pallagst et al. 2009; Florida 2012, Kapp and Armstrong 2012) who tout cities like Pittsburgh as the tool for sustainable living in the future point to affordable housing as one of the potential draws for these cities. However, as places like Pittsburgh experience an uptick in populations and economic prosperity, it is important to take into account effects on the housing stock to maintain this affordability. It is also important that public and private leaders driving development plans incorporate the need for an adequate supply of housing for all income groups as part of their development strategies in order to not exacerbate the housing shortages that were caused by many post-WWII policies.

2.4 How Pittsburgh Can Add to the Discussion

Pittsburgh is gentrifying through both the traditional form of gentrification that consists of private citizens and small-businesses investing in lower-income areas of the city, as well as via state-sponsored gentrification characterized by large development schemes partly paid for with public funds and encouraged by municipal governments. While the debate over whether

gentrification causes displacement of working-class residents rages on, this dissertation adds to that discussion by providing evidence of how development is affecting lower-income households. In addition, the analysis of the changing urban landscape of the Pittsburgh metropolitan area provides a case study of how postindustrial cities are changing in the 21st century. This study shows that gentrification is a driving force in changing residential patterns in Pittsburgh and that the development is causing equity issues regarding access to affordable housing. If "smart growth," which describes the type of development taking place in Pittsburgh, is to be embraced as the best way to encourage successful urban areas in the 21st century, the issues of lack of access to affordable housing and the detrimental effects of gentrification must be addressed in order to provide equal access to the city for all.

The following chapters discuss how our understanding of the gentrification process in Pittsburgh contributes to the conceptual development and debate regarding the scope of the term gentrification. Chapter 3 provides historical context and outlines the current residential and economic situation present in Pittsburgh in order to understand how the region fits into the debate about gentrification, affordable housing, and postindustrial cities.

Chapter 3

Placing Pittsburgh: Gentrification in Historical Context

I chose the Pittsburgh Metropolitan Statistical Area (MSA) as the study area because it is a model city of the transition from an industrial to postindustrial economy. During the early 20th century, Pittsburgh was one of the most populous cities in the country and had immense influence through its manufacturing prowess (Crowley 2005). Beginning in the 1920s and continuing through the 1970s, Pittsburgh underwent a devastating decline in manufacturing that enormously affected the economic vitality of the area. However, the metro was also able to capitalize on economic restructuring through innovative redevelopment efforts that were led by a coalition of local politicians and business leaders. This public-private partnership is a typical outcome of the shift in the role of municipal governments in the 1980s from one of providing efficient city services to that of attracting capital in order to compete with other cities, although Pittsburgh has had a long history of collaboration between private and public actors (Harvey 1989). Competition among cities is enhanced by the contending forces within them that make up the urban growth machine and contribute to the desire for constant development of the metro area (Logan and Molotch 1987). This development, public, private, or both, is causing gentrification to unfold in Pittsburgh in a way that is restructuring the urban form.

The Pittsburgh MSA is successfully rebounding from deindustrialization as evidenced by its strong economy today, although the recovery of the area's population is occurring at a slower rate. While the population of the city of Pittsburgh has experienced a steady decline since 1950, it saw a population increase between 2010 and 2012, albeit of less than 1% (Census Bureau 2012). The population for the rest of the metropolitan area has remained stable. The area was

economically successful through the first decade of the 21st century and redevelopment projects and gentrification have spurred changes in property values throughout the area (Urban Redevelopment Authority 2009; Barnes 2012; Gough 2013). The city had a long way to go to rebound from the low property values and high vacancy rates caused by the decline in manufacturing in the 1970s and 1980s. Recently the area has experienced rising property values and lower vacancy rates. These changes may cause problems for the working class residents of these communities (Spatter 2013). In addition, the mountainous topography of the Pittsburgh region makes it difficult for development to expand into new areas, thus forcing the need to focus redevelopment in existing communities in the form of gentrification (Lee 2008).

The Pittsburgh metropolitan area offers the perfect place to study how the shift from manufacturing to a post-industrial economy affects the urban morphology and housing markets in Rustbelt cities. Milwaukee, Cleveland, St. Louis, and Detroit all show signs of rebounding from the massive declines in population and economic activity that followed the restructuring of the economy during the 20th century (*Forbes* 2013). In order to make informed policy decisions, we need to examine the effects of gentrification and urban redevelopment on the stock of affordable housing in Pittsburgh and apply these observations to other post-industrial cities.

3.1 The History of Pittsburgh

3.1.1 The Beginnings of a Manufacturing Powerhouse

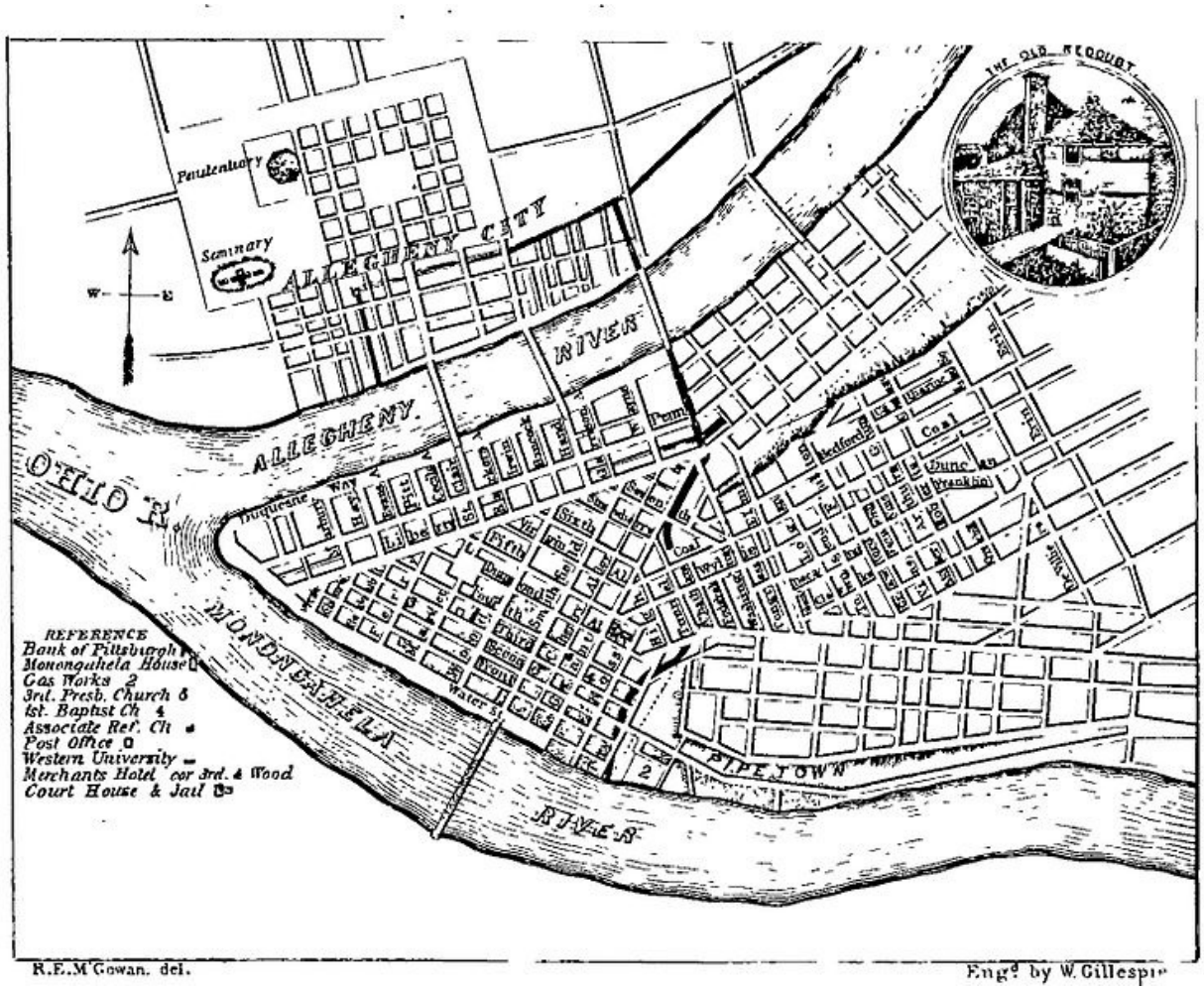
Like that of many capitalist cities, Pittsburgh's history is one of explosive growth and decline. The area established itself as an important force in the early growth of the U.S. economy. The site around which the city eventually grew was originally established as a French

fort, Fort Duquesne, in 1754 (Dietrich 2008). Four years later the fort, renamed Fort Pitt, was rebuilt by the British (Pencak 2002). Starting around 1760, the area around the fort was slowly populated as it grew into a commercial center for area farmers and settlers traveling west. Pittsburgh had very early roots in the development of strong universities and research institutions in the area as well. In 1787 the Pittsburgh Academy was founded, an institution that later became the University of Pittsburgh (University of Pittsburgh 2013).

Eventually manufacturing operations, like shipbuilding and glass making, began to take hold and the growing population necessitated the need to establish a governing body to direct the growing town. The City of Pittsburgh was incorporated in 1816 and by 1820 it had a population of a little over 7,000 (Gibson 1998). The city's locational advantage at the confluence of three navigable rivers and the intersection of multiple rail lines facilitated transportation (Figure 3.1). The surrounding coal fields helped spur the growth of the city into an industrial powerhouse (Dietrich 2008). By 1860, Pittsburgh had become an important source of iron and steel manufacturing (Lapsansky 2002). In 1852, the Jones and Laughlin Steel Corporation was founded and the Clinton and Soho iron furnaces opened in 1859. When the Civil War ended in 1865, Pittsburgh accounted for half of the steel produced in the U.S. (Licht 2002). In 1901, Andrew Carnegie merged multiple companies together to form U.S. Steel, which controlled two-thirds of steel production for the entire country when it was founded (Boselovic 2001). The abundance of raw materials needed in steel production, the rail and water transportation networks, influx of cheap labor via immigration, and protective U.S. tariffs gave the American Manufacturing Belt an edge over other international competitors (Kennedy 1987). The industry in Pittsburgh was also bolstered by the Pittsburgh Plus pricing system, which required all steel, other than rails, to be sold at the same price as the Pittsburgh base price, plus a fictitious freight

charge that gave Pittsburgh firms, particularly U.S. Steel, an advantage (*New York Times* 1921). Early industrialists, like Andrew Carnegie, Andrew Mellon, Charles Schwab, and George Westinghouse, made their fortunes in Pittsburgh (Contosta 2002). Their political influence shaped the development of the area. Their philanthropic activities resulted in the founding of many important institutions. Andrew Carnegie founded the Carnegie Technical School in 1900, which later became Carnegie Mellon University, and the Carnegie Museums of Pittsburgh.

Figure 3.1. Map of Pittsburgh in 1845.
Source: Foster 1845.



By 1870, most of the large iron and steel producers and other manufacturers had absorbed the smaller operations and expanded beyond the city limits across much of Allegheny County (Muller 2001). Multiple mill towns and satellite residential communities were built around these industrial operations to house the labor force that worked in the operations surrounding the city. "The separation of production and administration was a common trend in the organization of big businesses, and in Pittsburgh, it contributed to the growth of industrial suburbs and the municipal fragmentation of the urban area" (Stevens 1987, p. 6). While the surrounding municipalities resisted annexation by the city of Pittsburgh, they were still included in many of the development strategies in the area. This process produced the interconnected patchwork of towns and suburbs that exist throughout the Pittsburgh MSA today (Muller 2001).

The economic growth of the city attracted new residents to the area and the population of the metro area continued to grow. By 1890, 65.9% of people living in Pittsburgh were either first or second generation immigrants, many of whom were of Eastern European origin (Crowley 2005). Federally funded, working class housing was built during World War I for "war industry areas," which set a precedent for Pittsburgh of having large-scale housing for lower income groups built by the federal government (Stevens 1987). With growth came changes in the residential geography of Pittsburgh. Planned subdivisions first started to appear in the 1920s (Toker 2009). Single-family dwellings, often built by the homeowner, dominated the residential communities developed before WWII.

Stevens (1987) describes the growth of the private and public housing nexus throughout the 20th century. The Pittsburgh Housing Association (PHA) was founded in 1928. It was the first voluntary nonprofit organization in Pittsburgh that focused solely on housing. While the population of Pittsburgh grew throughout the late 19th and early 20th centuries, most housing

initiatives focused on private development of middle and upper-income housing outside of the central city. Other housing initiatives dealt with the demolition and/or rehabilitation of older structures that were located near the city's center. The PHA first focused on pushing for the enforcement of housing codes that resulted in greater pressures on working class groups to access affordable housing.

Growth in manufacturing started to diminish during the 1920s. Initially, Pittsburgh did not diversify its economy, as did other Midwestern industrial cities (e.g., Detroit, St. Louis, Cleveland, Milwaukee), into other forms of manufacturing besides metal production (Crowley 2005). This caused the city to be particularly vulnerable during the Great Depression. The economic downturn resulted in high downtown vacancy rates and the foreclosure on many private residences which led to a large number of abandoned buildings throughout the city, a decrease in tax base due to the sharp decline in property values, and the movement of many businesses and people to the suburbs. In the Lower Hill District, property values dropped by 45% between 1914 and 1956, compared to the national average of only 16% (Crowley 2005).

Home foreclosures in Pittsburgh were on the rise even before the 1929 stock market crash due to intense speculation during the 1920s (Stevens 1987). In addition, the effort by the PHA to enforce housing codes led to the destruction of housing stock with little or no replacement, exacerbating problems of an insufficient supply of affordable housing. By 1950, an expanding African American population surpassed the number of foreign born residents living in the inner-city (Bodnar et al. 1982). During this period the Pennsylvania Department of Welfare found that black families were charged higher rents for similar types of units as those occupied by white households and that African Americans were restricted to neighborhoods with more sub-standard housing than neighborhoods available to white residents (Gottlieb 1987).

Great strides were made in terms of legislation intended to stimulate the housing market during the Great Depression, including the National Housing Act of 1934, the U.S. Housing Act of 1937, and the creation of the Federal Housing Administration in 1934 (Schwartz 2006). However, federal public housing programs were unsuccessful in meeting the housing needs of low-income families in Pittsburgh due to the continued focus on building or rehabilitating physical structures, rather than addressing economic and community development issues, a process that led to shortages of affordable housing (Stevens 1987). The Housing Authority of the City of Pittsburgh (HACP) was founded in 1937 under the Housing Act and became responsible for distributing federal funds to provide affordable public housing (HACP 2013). The U.S. Housing Act of 1937 provided federal funds to local housing authorities for the construction of public housing aimed at improving the housing situation for low-income families.

The practice of redlining, which was put in place through the rating system adopted by the FHA from the Home Owners' Loan Corporation (HOLC), contributed to the devalorization of inner city neighborhoods by giving low ratings, and thus cutting off investment, for older and racially mixed neighborhoods in the inner city (Frazier et al. 2003). Areas were given a grade of values one through four, with four assigned to areas that were least desirable for lending and delineated on maps with a red line (Jackson 1985). This helped contribute to the growth of new suburban neighborhoods outside of the historic city center.

Voluntary non-profit groups were also active in shaping the housing situation in the area. The PHA focused mostly on slum clearance and the enforcement of housing codes that resulted in the decline of housing for lower income groups. (Stevens 1987) The Buhl Foundation, on the other hand, tried to implement changes to the private development process of residential

construction by sponsoring the development of Chatham Village in the South Side neighborhood of Mount Washington for white-collar workers (Contosta 2002).

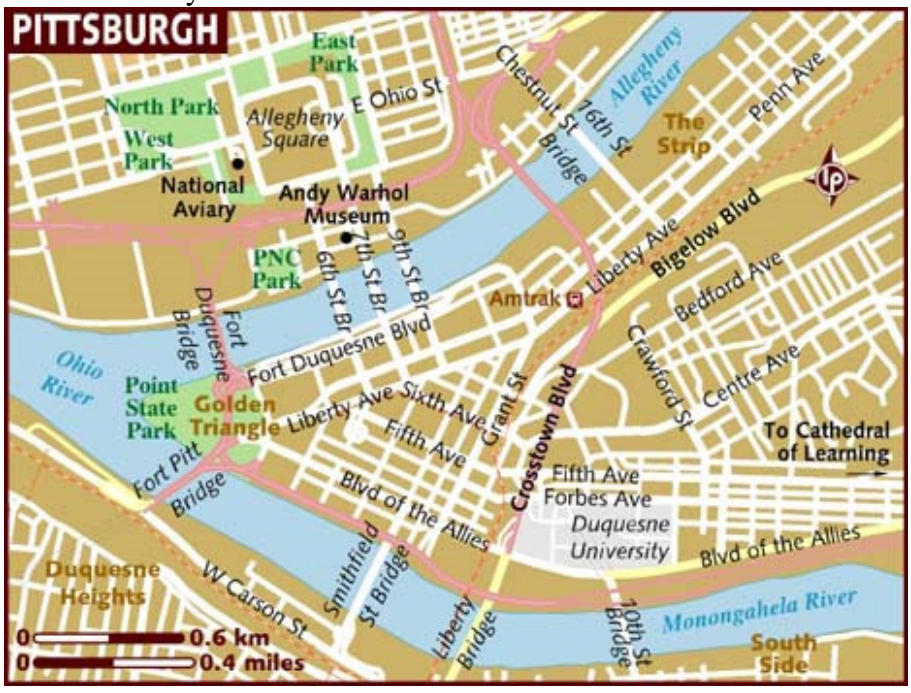
3.1.2 The Beginning of the Fall and Renaissance I

The manufacturing sector started to decline as early as the 1920s in Pittsburgh, but the advent of World War II resulted in one last growth spurt before the area resumed its decline in manufacturing employment and output in the 1950s (Crowley 1995). Suburbanization was also on the rise, although this process had already been occurring in the area due to the distribution of manufacturing plants throughout the Pittsburgh metropolitan area (Toker 2009). As more people and businesses began to leave the downtown area (Ferman 1996), business leaders worked with politicians to create a plan to spur urban redevelopment. At the same time, federally funded housing schemes severely altered the shape of the urban landscape in Pittsburgh, much like it did in other parts of the country.

Following World War II, the federal government was instrumental in promoting urban development projects in an attempt to guide the restructuring of the national economy in peacetime (Schwartz 2006). All across the country groups were formed under the direction of the federal government to shape urban redevelopment and to address the issues of inner-city blight that resulted from the high vacancy rates due to large numbers of home foreclosures, the movement of people and business to the suburbs and the decline in manufacturing (Scott 1995). In Pittsburgh, the Pennsylvania Post-War Planning Commission (PPWPC) and the Federal Housing Act of 1949 encouraged private-public partnerships that had the capacity to direct urban development (Crowley 2005).

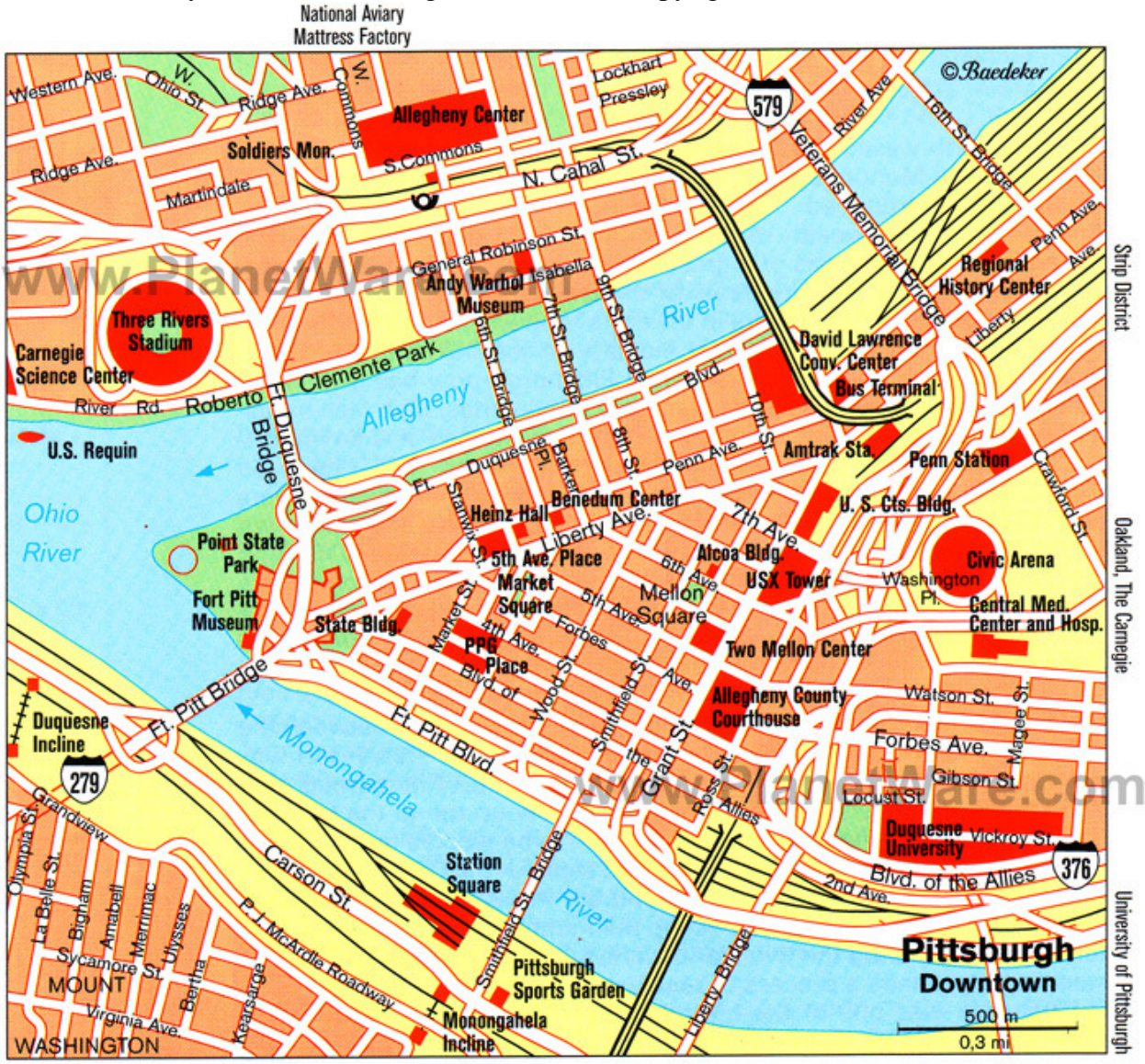
The Allegheny Conference on Community Development (ACCD) was a nonprofit organization created by leading business executives in 1944 that worked with Mayor David Lawrence to guide urban planning efforts for the next 30 years (ACCD 2013). The ACCD "set in motion a process that would permanently change Pittsburgh's economic base and physical landscape" (Ferman 1996, p. 47). The ACCD was instrumental in creating the Urban Redevelopment Authority that facilitated the urban development under Mayor Lawrence, which came to be known as Renaissance I (Lubove 1996). This project allowed for the development of infrastructure, environmental, and economic initiatives, (e.g., flood and smoke control, investment and redevelopment in the Golden Triangle) that helped move the region in a new direction in the face of crippling deindustrialization (Figure 3.2). "Pittsburgh was one of the first cities to implement a large-scale urban redevelopment program, and its leadership coalition became a model for revitalization activities elsewhere" (Stevens 1987, p. iv).

Figure 3.2. Map of Downtown Pittsburgh.
Source: Lonely Planet 2014.



Most of the development for physical infrastructure was focused on office buildings in the CBD and not on residential neighborhoods. The Greater Pittsburgh Municipal Airport opened in 1953 and a new Civic Arena opened in 1961 under the direction of the ACCD (ACCD 2013). In the downtown area and in nearby neighborhoods, development of the "Golden Triangle" was facilitated through the building of the U.S. Steel Tower, Three Rivers Stadium, and Point State Park (Figure 3.3).

Figure 3.3. Map of Downtown Attractions.
Source: Courtesy PlanetWare. All rights reserved. © Copyright 2014.



The ACCD hired a consultant to study the state of post-war housing in Pittsburgh and to develop a plan for moving forward with housing redevelopment in the Renaissance Plan (Tarr 1989). The consultant compared the quality of housing to other cities, with Pittsburgh faring the worst in housing growth and quality. The weak housing market was a reflection of the poor purchasing power of the dwindling working force. The plan called for the construction of 800 public housing units in Allegheny County and the development of Neighborhood Housing Councils to direct the redevelopment of various neighborhoods.

Stevens (1987) outlines the housing program of the Renaissance I project that was put together by ACTION-Housing, a voluntary, nonprofit corporation that was fundamental in the residential rehabilitation in Pittsburgh. The main objective of the program was to build new housing units and to rehabilitate existing housing for low and middle-income groups. "The origin of ACTION-Housing marked the beginning of an unprecedented era of intervention by large corporate capitalists into low and moderate cost housing reform in Pittsburgh" (Stevens 1987, p. 76). Even in the early stages of urban redevelopment, there were strong public-private relationships that shaped policies and implemented programs that would affect the stock of housing for the area.

Throughout Allegheny County, most of the new housing after World War II was typical of the development that occurred all across the United States (Trotter and Day 2010). The availability of low-interest home mortgages at an unprecedented scale and the construction of new, large-scale housing developments generated growth in the suburbs of mostly white, middle-class homeowners. The Housing Act of 1949 provided funding for slum clearance and new construction by private developers (von Hoffman 2000). This act resulted in public housing

projects being located in economically depressed areas and for the negative association of public housing with inner-city slums.

At first, private developers in Pittsburgh opposed federally funded public housing because they worried it would compete with private market units (Stevens 1987). With the Housing Act of 1949 and the ability for private industry to get involved in the creation of new housing development projects partly funded by the federal government, the attitudes of private developers began to change. Cities could receive grants or loans to purchase and demolish slum areas that could be sold to private developers at a subsidized cost (Hirsch 2000). "In the ensuing years, real estate interests were principle boosters and economic beneficiaries of federally sponsored area redevelopment" (Stevens 1987, p. 50).

The U.S. Housing Act of 1954 amended the legislation passed in 1949 to establish an urban renewal program that not only funded new construction, but also subsidized the rehabilitation of existing devalorized areas as well (Hirsch 2000). The act also authorized the use of up to 10% of the funds for non-residential development. The program expanded the focus from areas that were thought of as blighted, inner-city neighborhoods to other areas of the city that included commercial developments. While the legislation provided an alternative to razing entire areas of the city, entire residential or mixed-use communities within the city were completely removed to create space for commercial and industrial uses (Stevens 1987).

The lower Hill District and the East Liberty neighborhood are examples of the type of large-scale slum clearance that occurred in Pittsburgh at this time (Trotter and Day 2010). The lower Hill District was an African-American neighborhood that was destroyed to make way for the new Civic Arena. Ninety-five acres were cleared, which displaced hundreds of families and

businesses. Over 125 acres were cleared in the East Liberty neighborhood to make way for new public-housing projects that became an area of intense poverty due to the lack of integration of the community into the area, the high concentration of low-income families, and the clearing out of businesses from the area. Between 1949 and 1963, a total of 4,488 families were displaced by urban redevelopment and renewal in Pittsburgh (Stevens 1987).

Urban renewal projects during the 1950s and 1960s left many families looking for affordable housing in new areas because of the demolition of neighborhoods. This resulted in a pressure on the market that was not fully met by either public or private entities. Housing shortages during downturns in the housing market and rising home prices put lower and middle income families at a disadvantage. “Through the decade (1950s), cities used federal redevelopment to tear down an estimated 140,000 units of low cost housing and constructed no more than 2,000 units within the price range of low income families. The process depleted the stock of low cost housing and set the stage for a housing crisis” (Stevens 1987, p. 68).

In other areas of the city, the redevelopment of older, deteriorated housing stock in historic neighborhoods resulted in the gentrification of parts of the urban core. As the economic base of the area shifted from manufacturing to high-service, technology, and education-related fields, young professionals began moving into neighborhoods near the downtown area that they then renovated. “In rising numbers, single persons usually white and young couples have moved into renovated housing in some Pittsburgh neighborhoods with interesting vintage architecture” (Stevens 1987, p. 254).

The Mexican War Street area on the North Side and the Shadyside and Grandview Avenue areas of Mount Washington underwent gentrification from professionals moving in and

restoring older homes (Figure 3.4). Due to the high vacancy rates in the city at the time, Stevens (1987) reported that little displacement seemed to be occurring in these areas but that tension did exist between the original residents and newcomers. This anecdotal observation does not provide empirical evidence that displacement did not occur or take into account the types of neighborhoods displaced original residents relocated to where lower vacancy rates existed. In South Oakland, leaders within the black community voiced concern that rising property values would become a threat to lower-income groups, many of which were African-American.

Figure 3.4. Homes from the Mexican War Street Neighborhood.
Source: Ainulindale 2007.

3.1.3 From Steel Mills to Shopping Districts – Renaissance II and New Beginnings

The Renaissance II development era in Pittsburgh is associated with Mayor Richard Caliguiri, who was in office from 1977 until 1988, and the extensive cultural projects that were undertaken at this time. Around two billion dollars in downtown development went towards building six new office towers and a convention center hotel (Carter 2012). There was also improvement to the public transportation system with the building of a light rail subway system and by expanding bus routes to the eastern part of the city. Like the earlier Renaissance I era, a public-private partnership was the driving force behind the improvements to the city and also included more input from non-profit groups (Tarr 1989). The Pittsburgh Cultural District was also developed at this time, under the direction of the ACCD (ACCD 2013).

One difference that emerged in the funding of Renaissance II projects was that leaders looked towards more involvement from private sources, rather than federal intervention, to promote economic growth and improve infrastructure (Lubove 1996). Federal funding of social programs, like the Department of Housing and Urban Development (HUD), started to wane with budget cuts during the Reagan administration (Schwartz 2006). The ACCD called for private "investment and risk taking" to try and drive the necessary changes to the region's economic sectors and promote improvements in the city that would help to counteract the devastating closures that occurred in much of the manufacturing sector (Stevens 1987).

The University of Pittsburgh, Carnegie Mellon University, and area medical centers were growth poles for the shifting economy during this period (Trotter and Day 2010). The city looked at these institutions as a strategy for successfully moving the region into the globalized economy.

New nonprofit organizations emerged that helped spur growth in the technology sector (Lubove 1996).

Development leaders embraced the idea that quality of life standards would be an important part of competing with other cities in a globalized market and that developments in culture, as well as community-directed development of neighborhoods, would be crucial to making Pittsburgh an economically viable city. "What evolved in its [heavy-manufacturing legacy] place was a strategy of modernization encompassing economic diversification (with an emphasis on professional services), nurture of the advanced technology and research sectors, a reduced but streamlined, more efficient, and more competitive manufacturing component, and a new awareness of the direct economic benefits of cultural vitality and heightened quality of life and their role in enhancing the community's image as a place to do business" (Lubove 1996, p. ix).

By the mid-1980s, the Pittsburgh area was fully into the transition from a manufacturing-based economy to a post-industrial economy (Table 3.1). Almost 157,000 manufacturing jobs were lost between 1970 and 1990 (Detrick 1999). Between 1982 and 1987, eight steel plants closed, resulting in the layoffs of thousands of workers (Haller 2005). Some Fortune 500 company headquarters that had called the city home began to leave Pittsburgh, dropping from 24 in 1957 to 13 in 1987 (Koritz 1991). While the development projects during the Renaissance I and II phases may not have been able to stop the closing of many of the manufacturing operations or have kept key businesses from leaving the city for other locations, they did help set up the infrastructure that would attract new types of economic activity to the area in the future.

Table 3.1. The Decline in Manufacturing in Pittsburgh.
(Source: Crowley 2005)

Year	Manufacturing as percentage of total employment
1953	44.1
1960	38.1
1969	33.6
1979	26.7
1985	17.9
1995	11.3

The Pittsburgh History and Landmarks Foundation was instrumental in development during this time period through its emphasis on historic preservation and economic growth (PHLF 2013). The group acquired the Pittsburgh and Lake Erie Railroad yards near the Mount Washington neighborhood and developed the area into a mixed-use shopping and residential area called Station Square. The Pittsburgh Technology Center was built on a former industrial site, the J & L Steel complex, providing space for various technology companies.

Various community development corporations (CDCs) were founded to direct the redevelopment of residential neighborhoods (Lubove 1996). A CDC is a neighborhood organization with the status of a legal corporation in order to aid in economic development of the area. These groups often buy and sell property and serve as recipients of funds from various sources to use towards neighborhood projects. These organizations were able to secure funding for projects that could be used in neighborhoods that were outside the direction of the ACCD or municipal control. Many of these groups were born out of a response to the negative effects, often disproportionately detrimental to minority groups, of large-scale urban housing projects of the 1950s and 1960s.

Neumann (2011) argues that the Renaissance II project created a separation between the city of Pittsburgh and the surrounding white, middle-class suburbs and the mill towns spread

throughout the area that were hit harder by deindustrialization because of their sole dependence on the steel and manufacturing-related industries. Neumann characterizes the goal of Renaissance II as turning manufacturing spaces into consumption spaces for the professional class and the entrepreneurs ACCD wanted to attract to the postindustrial city. This neoliberal strategy of private-public sponsored development projects contributed to the gentrification of working class neighborhoods during this time.

Starting in 1985, Pittsburgh lost three major corporations, Gulf Oil, Rockwell International, and Koppers. The steel industry was feeling the full effects of its implosion with massive shutdowns starting in the late 1970s and continuing into the 1980s. Despite these losses, Pittsburgh was still named the "Most Livable City" by the Rand McNally's *Places Rated Almanac* in 1985 and again in 2007 (Carter 2012). *The Economist* named the city the Most Livable U.S. City in 2009 and *Forbes* chose the Pittsburgh metro area as its Most Livable City and the Best Place to Buy a Home in 2010.

The ACCD also sponsored the *Strategy* 21 project, an initiative to further empower private entities with public power. The *Strategy 21: Pittsburgh/Allegheny Economic Development Strategy to Begin the 21st Century* helped facilitate the restructuring of the postindustrial economy by developing technology, research and development, advanced services, and entrepreneurship in the region (Detrick 1999). The area's two primary universities, the University of Pittsburgh and Carnegie Mellon University, were given funds to develop biotechnology (The Pittsburgh Super Computing Center), and software and robotics programs (The Software Engineering Institute), respectively. The airport's new international terminal and the extensive development of brownfield projects also resulted from the *Strategy 21* plan.

According to the *Toward a Shared Economic Vision for Pittsburgh and Southwestern Pennsylvania* report by ACCD (1993), when the region was compared to the top 25 metropolitan areas from 1970 to 1990, the Pittsburgh metropolitan area had lost a disproportionately higher number of manufacturing jobs, added fewer service jobs, and experienced the largest population loss. Richard Florida, then-director of the Center for Economic Development of Carnegie Mellon University's School of Public Policy and Management, played a major role in the development of the report, which "reflected Florida's views on manufacturing, especially high-performance manufacturing, as the basis of economic well-being (Lubove 1996, p. 255).

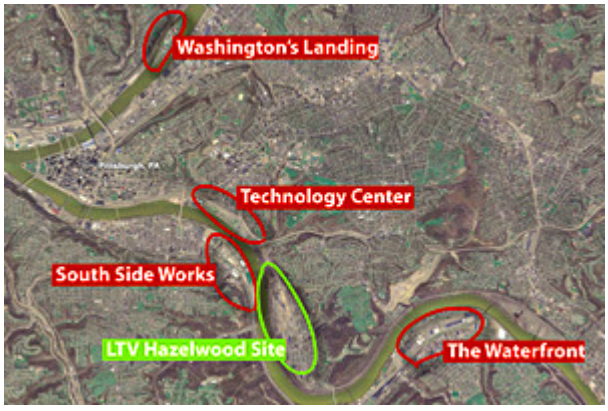
As Pittsburgh moved into the 21st century, the public started to have a stronger voice in the direction of development projects that were being proposed by private and public entities. Mayor Tom Murphy proposed a plan in 1999 that focused on revitalizing the CBD, particularly the area around Market Square, which would involve the demolition of 62 properties (Crowley 2005). Public backlash against the focus on big box retailers over the smaller, independent stores hurt the plan. Grassroots activism has become a significant force in decision making about the direction of the growth of the Pittsburgh region. It has also resulted in the gentrification of various neighborhoods. "This bottom-up energy was especially exhibited by young adults in their twenties and thirties who began populating older neighborhoods, renovating houses, creating art, and starting new businesses" (Carter 2012, p. xx).

Brownfield development, made possible by the cooperation of local government and the capital of private investors, occurred throughout the Renaissance II era and persists into the present (Morris 2010). This type of development occurs on previously industrial sites, often resulting in larger obstacles for developers because of the cost of cleaning up these polluted areas. Historically, the major industrial sections of the city were found along the waterfront to

take advantage of easy access to major transportation routes. The large expanses of flat land along the floodplains were a locational prerequisite for large manufacturing plants in the hilly Pittsburgh area. After many of these operations closed, the land could be reclaimed for new development.

The city led the efforts to redevelop the brownfield areas around the riverfront (Figure 3.5). Mayor Thomas Murphy had the city purchase and cleanup the former industrial properties along the riverfront to sell to private developers (French 2006). This gave the city some control over what happened to the properties after they were cleaned up by collaborating with private developers in the redevelopment process (Hollander 2009). According to Mayor Murphy, "We made the decision to buy that property and do the work necessary to remove the environmental pollutants and then partner with the private sector to revitalize these properties. Today, Pittsburgh is among the nation's leaders in brownfield reclamation, and we have created thriving, vibrant new communities with housing, retail, entertainment, and trails were our steel mills once stood" (Stern 2005, p.2). In the past 20 years, three of the largest riverfront projects have been Washington's Landing on the Allegheny River, the Pittsburgh Technology Center, and the Southside Works on the Monongahela River (Morris 2010).

Figure 3.5. Map of Brownfield Development Sites in Pittsburgh.
Source: Farrell 2007.



Washington's Landing, located on a small island formerly known as Herr's Island, was the former site of a stockyards and meat processing plant (McKay 2008). After a total combined investment of $71 million in public and private funds, a mixed-use area of residential, light-industrial, commercial, and recreational land was created on the island. Several bridges were built to connect the strip to the rest of the city (De Sousa 2004). The Pittsburgh Technology Center now consists of eight office and research buildings where the Jones and Laughlin Steelworks once stood (Toker 2007).

The Southside Works project is located in the South Side neighborhood where the LTV Steel Co. steel plant was once located (Gannon 1991). This development project was located near an inner city neighborhood that was home to many working class residents and which had a fairly successful downtown area (Morris 2010). The residents were originally concerned that the redevelopment project would hurt their existing businesses and they were brought into the decision making process. Construction began in 2000 and by 2007 only two parcels on the 123 acre site had not yet been developed.

Southside Works has been touted as an urban development success. The project "has tightly linked itself to the old Southside both visually and functionally, with equal emphasis on retail, food, and entertainment and on working and living spaces" (Toker 2007, p. 73). However, sales prices for properties in adjacent neighborhoods increased between 160% and 225% from 2000 to 2007, compared to an average city-wide increase of 18% (Urban Redevelopment Authority 2009). This could cause displacement issues for long-term residents in the adjoining communities.

3.2 The State of Pittsburgh in 2010

Since 1985, manufacturing jobs in Pittsburgh have decreased by 40% while total employment in the region has increased by 13% (Bureau of Economic Analysis 2010). Most of the growth has been in the fields of health care, education, research, technology, finance, and the arts (Table 5.2). Education and health services account for 20.5% of employment in the area, followed by trade, transportation, and utilities (18%) and professional and businesses services (15.2%). Manufacturing employment only accounts for 7.6% of the area workforce. The unemployment rate for the area was 7.5% in 2013, slightly below the national average of 8.4% (Bureau Labor Statistics 2013).

Nine of the top 150 banks currently operate in the Pittsburgh area, five of which are based in the city (Tascarella 2011). Large banks are essential for cities to compete in the global economy and the presence of these banks helped to put Pittsburgh in a prime spot for growth (Sassen 2001). Nine Fortune 500 companies are located in the Pittsburgh region. The U.S. Steel Corp. is the highest-ranked area business at 147, followed by PNC Financial Services at 170. (Olson 2013).

The University of Pittsburgh Medical Center (UPMC) is the region's largest employer with more than 62,000 employees (UPMC 2013). UPMC has 2.3 times as many employees as the area's second largest employer, the U.S. government (Lott 2013). UPMC is the largest private property owner in the area, in terms of real estate value, but 86% of their property is exempt from taxes (Hamill and Silver 2012). The organization is one of the largest driving forces behind new real estate development in the area. Fourteen of the 50 largest employers in the area are in the health care sector (Lott 2013). These firms, like the West Penn Allegheny Health

System and Highmark's Allegheny Health Network, hire a range of employees in the area, from doctors and administrators to clerical and maintenance workers.

Pittsburgh's national share of education and health services industries is 1.5 times greater than the average U.S. city (Miller and Rudick 2007). Today the area is home to 36 colleges and universities. Carlow College, Chatham College, the Art Institute of Pittsburgh, Point Park University, and Robert Morris University are located within the City of Pittsburgh (Eldridge 2007). The University of Pittsburgh is the second largest employer, not counting the U.S. or state government, with 12,600 employees (ACCD 2012). Carnegie Mellon University has been instrumental in leading the robotics and software engineering development in the area.

While the population of the city declined from around 667,000 in 1950 to 312,000 in 2009, a 53% loss, the Pittsburgh metropolitan area fared much better. The Pittsburgh MSA had a population of 2,581,297 in 1950, compared to 2,356,285 in 2010. The loss of 230,000 represents an 8.7% decline in population. This trend of growth or no population loss in the suburbs of these industrial cities coupled with the shrinking population base within city centers has been referred to as "sprawl without growth" (Pendall 2003).

The population hemorrhage seems to have slowed somewhat compared to other areas in the country. Miller (2008) found that the region's net out-migration ranked 17th out of the top 40 regions, lower than that of Boston, Chicago, San Diego, and Silicon Valley. The city also seems to be attracting or retaining younger generations with the median age of the employed population dropping (Bowling 2008).

Table 3.2. Population Growth in the City of Pittsburgh and Metropolitan Area, 1900-2010.

Census Year	City of Pittsburgh Population	Percent Change	Metro Area Population	Percent Change
1900	321,616		1,303,771	
1910	533,905	66%	1,779,718	36.5%
1920	588,343	10.2%	2,100,931	18%
1930	669,817	13.8%	2,381,589	13.4%
1940	671,659	0.3%	2,452,232	2.9%
1950	676,806	0.8%	2,581,297	5.3%
1960	604,332	-10.7%	2,768,938	7.3%
1970	520,117	-13.9%	2,759,443	-0.3%
1980	423,938	-18.5%	2,651,991	-3.8%
1990	369,879	-12.8%	2,468,289	-6.9%
2000	334,563	-9.5%	2,431,087	-1.5%
2010	305,704	-8.6%	2,356,285	-3.1%

Despite the recent upswing in the economic growth of the region, very real problems remain that plague the economic health of the area. “Thorny issues nevertheless remain for the Pittsburgh region, including a surplus of vacant land and buildings; declining neighborhoods; racial and socioeconomic inequities; aging infrastructure, such as combined sewer overflows and bridge maintenance; stressed municipal finances; fragmented government; and an underfunded public transit system” (Carter 2012, p. xxi). These hurdles put a strain on the ability of public entities and private nonprofit groups to maintain a sufficient stock of affordable housing in the city. As the population of the area increases, this may mean a larger squeeze on housing expenditures for low-income families.

New housing developments are being built in Pittsburgh, but many of them are private-market units that cater to middle to upper income clientele. “In the last twenty years a half-dozen housing complexes have been developed, some so big they constitute whole neighborhoods” (Toker 2009, p. xii). These housing projects have been part of mostly mixed-use complexes that

created new spaces of consumption through brownfield development. Rehabilitation of existing housing stock has occurred in many of the older neighborhoods, largely through the direction of neighborhood groups and historical preservation organizations, has resulted in the gentrification of formerly working-class neighborhoods.

Federal funding for public housing has declined since the Reagan administration began cutting these programs in the 1980s. Pittsburgh has a history of charitable organizations contributing to the stock of affordable housing in the area, but the mistakes of the slum clearance and concentration of poverty in inner-city neighborhoods still afflict many neighborhoods in the area.

The Housing Authority of the City of Pittsburgh (HACP) assists more than 20,000 residents, oversees 4,000 public housing units, and helps manage 900 more mixed-finance homes (HACP 2013). The HOPE VI program has enabled the demolition of many public housing projects from the 1950s and 1960s to make way for mixed-income neighborhoods. The effects of the shift in policy towards developing mixed-income neighborhoods through the HOPE VI program are still being researched. However, many of these projects do result in the reduction of available units for low-income families.

The last section discusses individual neighborhoods and areas throughout the Pittsburgh Metropolitan Statistical area. It is important to keep in mind the local context of these individual areas because development and neighborhood transition happen differently in the various places. Local context is important when understanding the phenomena that shape the postindustrial urban landscape.

3.3 Neighborhoods of Pittsburgh's MSA

The changes in affordable housing and the gentrification activity that take place in the Pittsburgh metro area are largely influenced by local factors. Spatial processes do not occur homogeneously across the metro area and it is important to understand the characteristics of the various Pittsburgh neighborhoods in order to contextualize the changes that occur. The following section provides information on areas within and outside of the city necessary for understanding the local analysis of gentrification and changes in affordable housing.

3.3.1 City of Pittsburgh

The city can be broken down into four major areas: Downtown, East End, South Side, and North Side. Each of these areas consists of numerous neighborhoods, 90 in all, many with very distinct characteristics separating them from other communities within the area (Figure 1.2). The following discussion highlights some of the most important neighborhoods within each area.

Downtown

The downtown, or "Golden Triangle," is largely a financial district with very few residential areas and little activity after business hours. Recently, more residential development has occurred in the area which has increased the number of permanent residents. East of the CBD is the Cultural District, which is home to four performing arts centers and many restaurants and retail establishments. Market Square is located just south of this area and was the original market area for the city when it was first established. It now consists mostly of chain restaurants and retail establishments that serve employees visiting during their lunch hour.

The Strip District area of downtown is filled with restaurants and grocery stores that cater to the immigrant populations in the city. It is also full of warehouses and loft buildings. At night, it is a popular place for entertainment with numerous bars and dance clubs. The population of downtown increased from 2,500 in 2000 to 5,174 in 2008 (Plushnick-Masti 2009). The cost of living downtown is very high, particularly for those who own a car. Most residents choose to live downtown in order to be close to school or work (Pittsburgh Downtown Partnership 2012). However, the high-cost of downtown living has not stopped the booming residential market from adding units and the occupancy rate for apartments in and around the downtown area are at 95% (Belko 2012).

East End

Oakland, Pittsburgh's most important East End neighborhood, is where the region's two largest universities, Carnegie Mellon and the University of Pittsburgh, are located. Many restaurants and shops are located here, along with the Carnegie Library and the Carnegie Museums of Art and Natural History. Shadyside is an upscale neighborhood located just east of Oakland featuring residents with very high incomes and education levels.

A very large Jewish community is located in the neighborhood of Squirrel Hill. The neighborhood stretches from Carnegie Mellon University to Homewood Cemetery and Frick Park in the east. This area has the city's largest population concentration. Past the cemetery and park are the neighborhoods of Regent Square and Point Breeze, both of which are fairly upscale, residential neighborhoods. Bloomfield was traditionally a neighborhood for Italian immigrants and is sometimes referred to as Little Italy. All of these neighborhoods in the East End have some of the highest proportions of residents holding a bachelor's degree or higher.

Lawrenceville is a largely working class neighborhood that stretches along the Allegheny River from the Strip District to the Morningside neighborhood. The area has seen some gentrification activity along Butler Street (Conti 2013) and the East Liberty neighborhood is newly gentrifying. The East Liberty neighborhood had much of its commercial activity wiped out during the 1960s due to a large-scale urban renewal project that razed many of the buildings and forced residents of the community to move. Large public housing projects were built in the area that contributed to the concentration of poverty and an increase in crime rates in the area. These housing projects were all demolished between 2005 and 2009, which again resulted in the movement of many residents, largely African-American. This process caused an uproar from citizens in the area about state-sponsored gentrification (O'Toole 2010).

South Side

The South Side refers to an area south of the Monongahela River. It was once the location of the various mills and row houses that made Pittsburgh a formidable industrial force. Pittsburgh's South Side area has neighborhoods that have seen a lot of revitalization. One of the most notable brownfield development projects is SouthSide Works, which is a large shopping center built on the site of a former steel mill.

Station Square is a 52-acre, indoor entertainment complex that was previously an area filled with railroad yards used by the Pittsburgh and Lake Erie Railroad Company (Eldridge 2007). The project was made possible through both public and private funds totaling $100 million since 1976. The creation of Station Square was led by the Pittsburgh History and Landmarks Foundation (PHLF), a non-profit historical organization that focuses on the

preservation and revitalization of areas in the Pittsburgh area (PHLF 2013). PHLF also includes a for-profit development company, Landmarks Development Corporation.

The South Side Slopes neighborhood is a traditional working-class, residential community. Many of the homes in the area were originally row houses for the mill workers working in the mills in what is now the South Side Flats area. This area is experiencing gentrification with the development of mixed-income housing and upscale condominiums.

Mount Washington is the name of the ridge that borders the flat floodplain along the Monongahela River. It is most famous for its two working funiculars and its upscale restaurants. To the west of Mount Washington is a series of residential neighborhoods that were once older suburbs of the city. The neighborhoods are mostly a mix of incomes and entrenched working-class communities.

North Side Area

Redevelopment akin to gentrification in parts of the inner-city in Pittsburgh was being researched during the late 1970s (Drexler 1981). Pittsburgh's North Side neighborhood is located directly north of the confluence of the Allegheny and Monongahela rivers. The area was originally the City of Allegheny, which was incorporated into the City of Pittsburgh in 1907. Wealthier families began to move to the suburbs northeast of this area around the time it was annexed. Eastern European immigrants and later African Americans began to move into the neighborhood.

By 1951, the Department of City Planning and the Public Health Department had classified the lower North Side as consisting of 41.5% "slum or substandard" housing (Stevens 1987). Plans were made to demolish some of the neighborhoods within the North Side area

during the 1950s as part of the large-scale urban redevelopment that occurred around much of the country. The plan was later abandoned and a shift was made towards housing rehabilitation and community development during the 1960s and 1970s.

Gentrification occurred in the North Side in the Central North Side neighborhood, and particularly in the area known as the Mexican War Streets (Drexler 1981). The Mexican War Streets neighborhood is known for its renovated Victorian-era homes, many of which are on the National Register of Historic Places. The North Shore area is home to Heinz Field and PNC Park where the Steelers and Pirates play, respectively. Much of the development of this area was spurred by private developers in creating an entertainment district that would capitalize on the opening of the sports complexes in 2001.

3.3.2 Surrounding Area

The Metropolitan Statistical Area consists of Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, and Westmoreland Counties (Figure 1.1). The area surrounding the city grew mostly as satellite towns were built around manufacturing operations in the area. Many of these factories were located along the river banks of the Monongahela (Mon Valley), Allegheny, and Ohio Rivers.

Allegheny County is dominated by the presence of the city of Pittsburgh in the middle of its 745 square miles. The county had a population of 1,223,348 in 2010 and is the second most populous county in the state of Pennsylvania. The next largest county in the MSA, Westmoreland, is considerably smaller with a population of 365,169. Armstrong County is the least populated county in the area with a population of 68,941.

Butler County is the wealthiest county in the area, with the highest median household income, $57,474, and median home value, $162,900. This area also has the lowest percent of individuals considered below the poverty level at 8.7%. Fayette County is the poorest county with the lowest median household income, $36,605, lowest median home value, $83,600, and highest poverty rate, 19.2%.

All of the counties, except for Armstrong County, were below the national vacancy rate of 11.4%. Butler County has the lowest vacancy rate and one of the highest homeownership rates for the area, indicating a tighter housing market in this area. Allegheny County has the highest proportion of renters, largely due to the higher proportion of rental units within Pittsburgh in comparison to the surrounding area.

Table 3.3. Characteristics of Counties in Pittsburgh MSA.
(Source: Census 2010)

	Allegheny	Armstrong	Beaver	Butler	Fayette	Washington	Westmoreland
Population, 2010	1,223,348	68,941	170,539	183,862	136,606	207,820	365,169
Median Household Income	$49,805	$44,663	$47,928	$57,474	$36,605	$51,965	$48,979
Percent Below Poverty Level	12.4%	11.8%	11.6%	8.7%	19.2%	10.2%	10.0%
Housing Units	588,591	32,449	77,963	78,387	62,248	93,242	168,381
Median Home Value	$118,700	$91,600	$113,600	$162,900	$83,600	$136,400	$130,800
Homeowners hip Rate	66.4%	77.2%	74.4%	77.2%	73.0%	77.2%	76.3%
Vacancy Rate	9.4%	11.7%	8.7%	6.8%	10.8%	8.5%	8.6%

Pittsburgh has clearly undergone an economic transformation from an industrial powerhouse to a service-oriented economy that is bolstered by the success of the area's health, education, and technology fields. While the city of Pittsburgh has experienced a steady loss of population since the 1950s, the population in the rest of the metropolitan area has remained relatively stable. The historical and present-day context of the Pittsburgh region is important for understanding the housing market, geography of affordable housing, impacts of gentrification, and racial differences that exist within the area. These concepts will be explored in the next three chapters.

Chapter 4

Morphology of the Postindustrial Urban Form in Pittsburgh

Changes in the residential structure of a city do not happen in a vacuum. Demographic, economic, and social processes all play a role in the changing morphology of the city's built environment. The capitalist system encourages a constant shift of infrastructure, capital, and labor in order to seek out new markets and to overcome the inertia of costly, decaying structures that are stuck in place (Harvey 2010). Analyzing the effects of gentrification on affordable housing supplies without understanding how the entire urban form is changing would be akin to describing an elephant by only feeling its trunk. In addition, a study of the changing urban form of the Pittsburgh area provides a framework in which to develop principles about postindustrial urban development in the 21st century.

In this chapter I examine the evolution of the urban form of the Pittsburgh metro area by analyzing the changes in social, economic, and housing variables over the first decade of the 21st century. This overview gives a snapshot of not only what the city is like at the beginning and end of the study period, but also how these transformations aid in the understanding of gentrification in the postindustrial city. The trends uncovered in these various indicators also provide clues as to the future of the Pittsburgh metro area, and possibly what will occur subsequently in other Rust Belt cities in the future.

4.1 Changing Urban Forms and Restructuring of the Pittsburgh Economy

The growth of suburbs combined with deindustrialization's crippling loss of jobs in the city created a new urban form not just in the United States, but in many other industrialized countries as well. Many people were leaving the cities for the suburbs and those moving from rural areas often settled first in the ring outside the city, rather than making one of the older neighborhoods within the central city their home. Companies also began relocating to the cheaper suburban areas where there was more land and, increasingly, labor (Smith 1984). This shift of capital caused a decline of the tax base within cities as labor and capital left, leaving behind depressed downtowns. Suburbanization left behind lower-income residents, many of whom were non-white, to live in the city (Massey and Denton 1993).

Central cities tried desperately to entice residents back to the downtown areas by implementing costly development projects. Many of these projects were neoliberal endeavors that combined the incentives such as tax breaks or large-scale acquisitions of property, with private firms controlling the sites once construction was completed. Much of the river front development on brownfield sites that took place in many of these deindustrialized cities, Pittsburgh included, is an example of these private-public partnerships. In addition, developers began embracing a new form of mixed-use development that combined residential, retail, and commercial spaces. As I show in the following analysis, this development has been successful in bringing back the people and the capital to the city, but at what costs to those already calling downtown Pittsburgh their home? There are changes in the housing markets and characters of neighborhoods throughout the entire metro area that will transform the urban form into one distinct from that of the 20th century.

Post-industrial cities are experiencing changes in their urban structure and governance. Hackworth (2007) argues that the neoliberal city, characterized by a revitalized urban core and the devalorization of older suburbs, has taken a similar form in multiple places throughout the 21st century, although localization is still an important part of the process shaping those cities. Capitalism works to restructure urban spaces because of the need for expansion into new areas and to seek new spaces of investment and production (Harvey 2001). The current restructuring process has been spurred by globalization and neoliberal policies within urban governments that have paved the way for owners of capital to shift their gaze to the central city where large profit margins await investors because of continued disinvestment that have caused large rent gaps (Smith 1987). Pittsburgh's high-service oriented economy has been successful in attracting global capital through the financial, healthcare, and technology fields, and in turn, the organizations in these areas have been responsible for spurring much of the development that is occurring in Pittsburgh.

4.2 Data and Methodology for this Chapter

In this chapter I explore how the socio-economic geography and the housing market of the Pittsburgh MSA changed from 2000 to 2009. Scholars such as Florida (2012) and media outlets like *Forbes* (2013) have heralded the growing importance of the Rust Belt region like a phoenix rising from its ashes. In order to assess how this region has changed and to provide a context in which to understand how gentrification is affecting the availability of affordable housing, I looked at how the region's housing market and various measures of social and economic indicators have changed over the first part of the 21st century.

I obtained the housing and socio-economic data from the 2000 Decennial Survey and the 2005-2009 American Community Survey (http://factfinder.census.gov). The Census Bureau discontinued collecting socio-economic data with the 2000 decennial census, instead opting for an annual sample of data called the American Community Survey. In order to get data at the census tract level, a five-year estimate from 2005-2009 was used. I compared those data to the 2000 census to identify changes in socio-economic and housing characteristics of neighborhoods in the study area.

The time frame for the analysis was also chosen in order to ensure that census tracts for each time period would match. The boundaries of tracts are adjusted over time as population fluctuates, which can make it difficult to compare changes at this spatial resolution over a long period of time. While the time frame for the study limits how much change can occur over this period, it does capture much of the development that is occurring in Pittsburgh over the first decade of the 21st century.

4.3 Changing Metro Area

The social, economic, and housing variables provide a snapshot into the urban form of the metro area that can provide context for the gentrification dynamics within the city. The fluctuations that occurred between 2000 and 2009 show that the metro area is experiencing a restructuring of neighborhoods that is changing the city's form. These changes are due to wider social and economic changes that are occurring not only in the region, but throughout the country. The analysis of the changing metro area can be used to not only understand the new Pittsburgh metro area, but also similar metro areas throughout the United States.

4.3.1 Demographic Changes

The demographic variables for 2000 show that Pittsburgh exhibits characteristics of a deindustrialized city that has experienced sustained population loss within the central city and growth of the less-densely populated suburbs. The area also has similar racial patterns to other Rust Belt cities due to large-scale migration of African Americans to industrialized cities in the north during the early 20th century, followed by white flight to the suburbs after World War II. Changes in these patterns between 2000 and 2009, however, suggest that the metro area is experiencing some urban restructuring that may contribute to increased social mixing and heightened interest in living downtown.

Table 4.1. Demographic Statistics for the City of Pittsburgh and Pittsburgh MSA between 2000 and 2009.
(Source: Census Bureau 2000, 2009)

	Population[1]	Population Density per Square Mile	Percent with Bachelor's Degree or Higher[2]	Median Age	Percent White[3]	Percent Black
City of Pittsburgh						
2000	334,563	5,739	26.2%	35.5	67.6%	27.1%
2005-2009	305,704	5,370	33.2%	35.5	69.8%	26.7%
Change	-28,859	-369	7%	0	2.2%	-0.4%
Pittsburgh MSA						
2000	2,431,087	455	23.5%	40.4	90.6%	7.9%
2005-2009	2,356,285	441	28.4%	42.6	87.8%	8.4%
Change	-74,802	-14	4.9%	2.2	-2.8%	0.5%

[1] Population for 2009 reflects 2010 Census because population estimates are more accurate for decennial census than ACS estimates.
[2] Proportion calculated from total population 25 years and older.
[3] Reflects number from population of "Race alone or in combination with one or more other races."

Population

Both the Pittsburgh MSA and the city itself experienced a population loss between 2000 and 2009 (Table 4.1). The most recent American Community Survey shows that the population hemorrhaging may have reached its farthest extent as there was a slight increase in population within the city to 306,211 in 2012 (ACS 2012). While the 0.2% increase in population between 2009 and 2012 is slight, it may indicate that the steady population decline that the region has experienced since the 1950s may be ending. The city hopes that the downtown residential development in Pittsburgh will attract more people back from the suburbs to live in Pittsburgh and there are many mixed-use development projects that have been constructed recently that have attracted new residents in those areas. If these development projects continue, it is very likely that the population will continue to grow downtown.

Pittsburgh's population distribution looks much like expected for a postindustrial city in that the largest concentrations of residents are located outside of the city limits. The population maps for both 2000 and 2009 (Figures 4.1 and 4.2) show that the tracts with the largest populations are located along the I-76 and I-79 corridors northwest of the city and scattered throughout Westmoreland and Fayette counties. These are also the areas that experienced the most growth between these years (Figure 4.3). Most population loss outside of the city occurred in the more rural areas towards the outer edges of the MSA and in the areas immediately south and east of the city. The areas to the south and east of the city are a mix of older, streetcar suburbs and newer suburbs established during the mid-20th century (Toker 2009). These older suburbs are experiencing population declines as newer suburbs, particularly northeast of the city at the junction of highways I-76 and I-79, begin to attract more development.

Figure 4.1. Population per Census Tract in the Pittsburgh MSA, 2000.

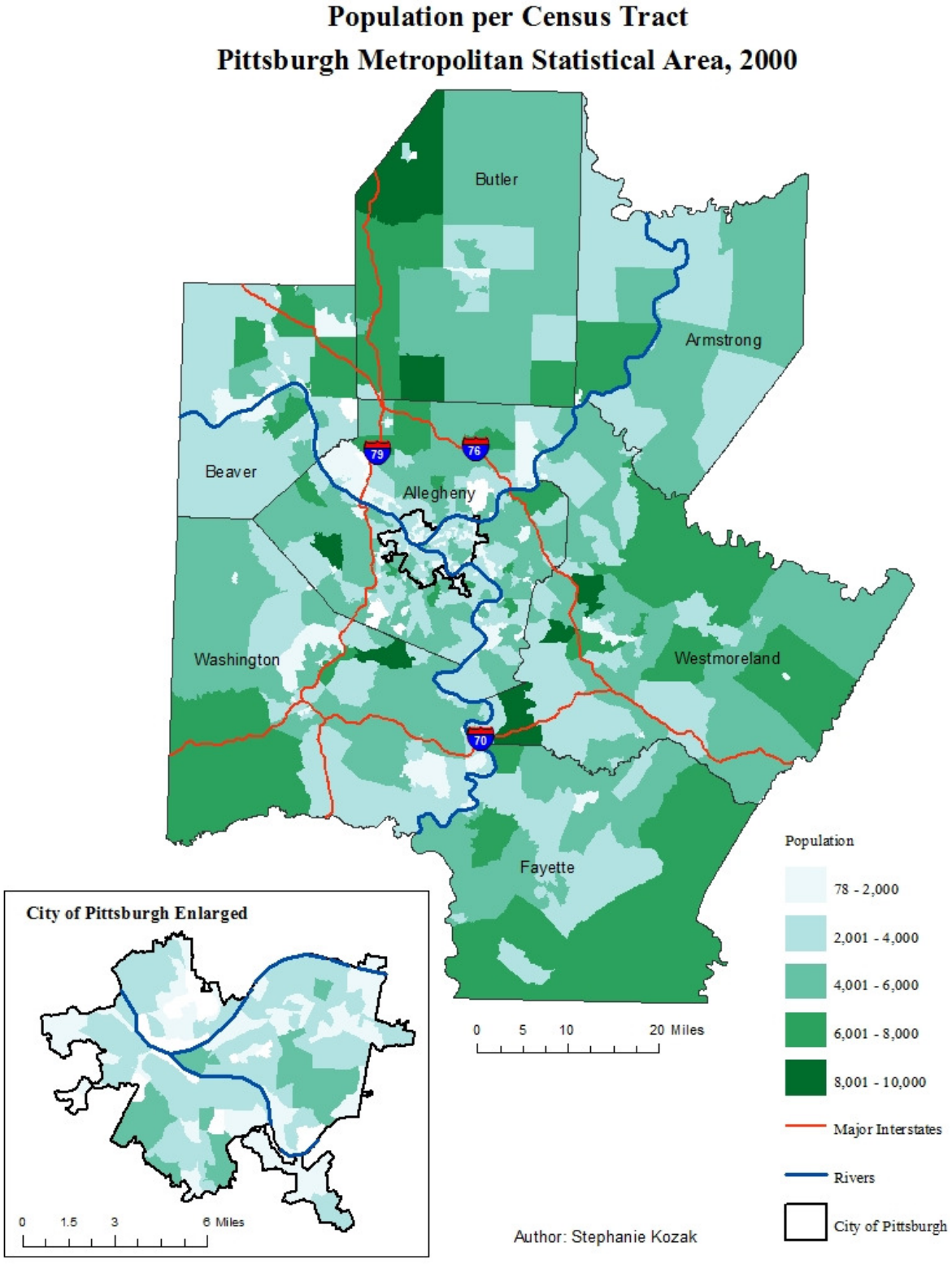


Figure 4.2. Population per Census Tract in the Pittsburgh MSA, 2009.

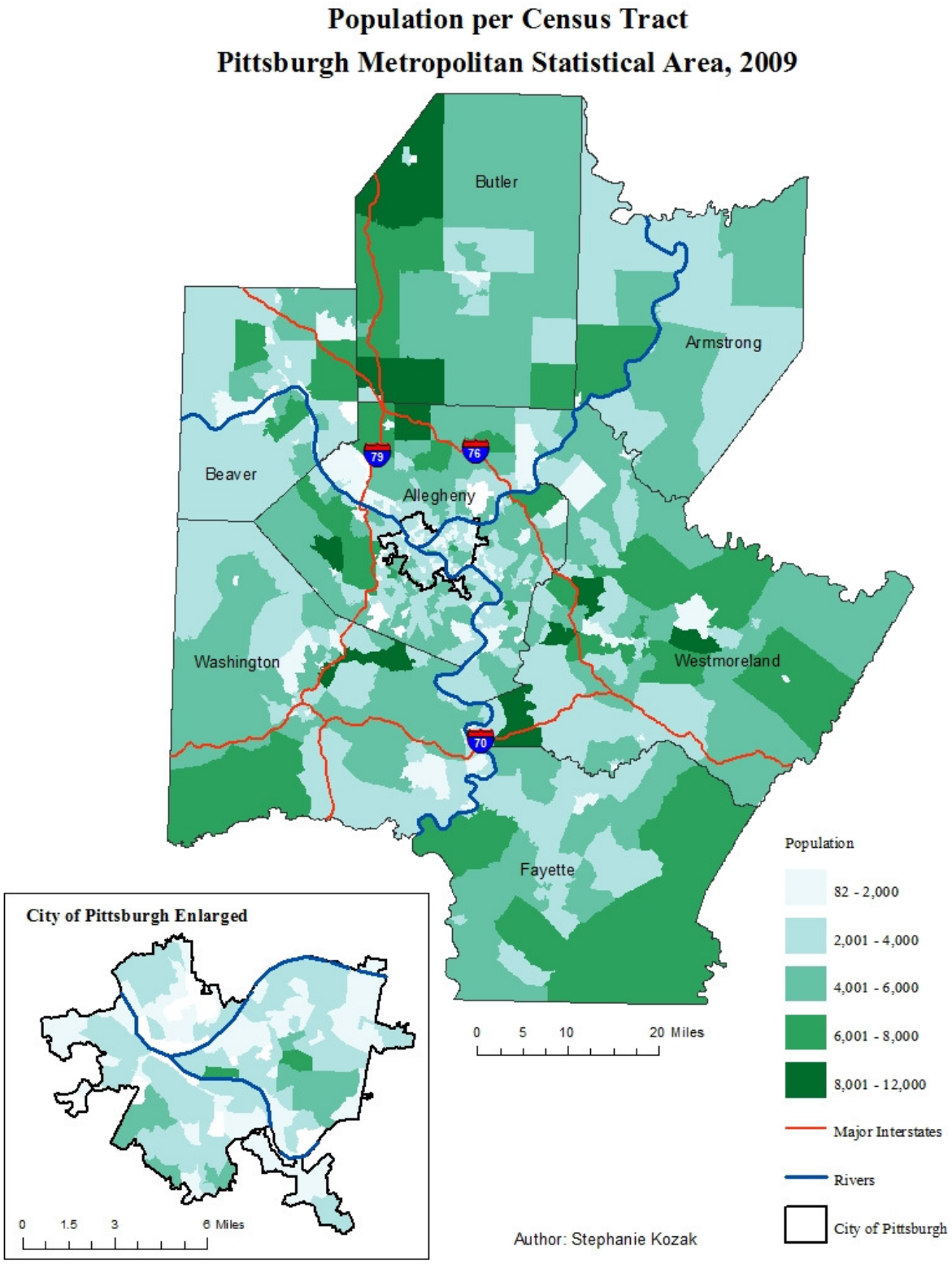
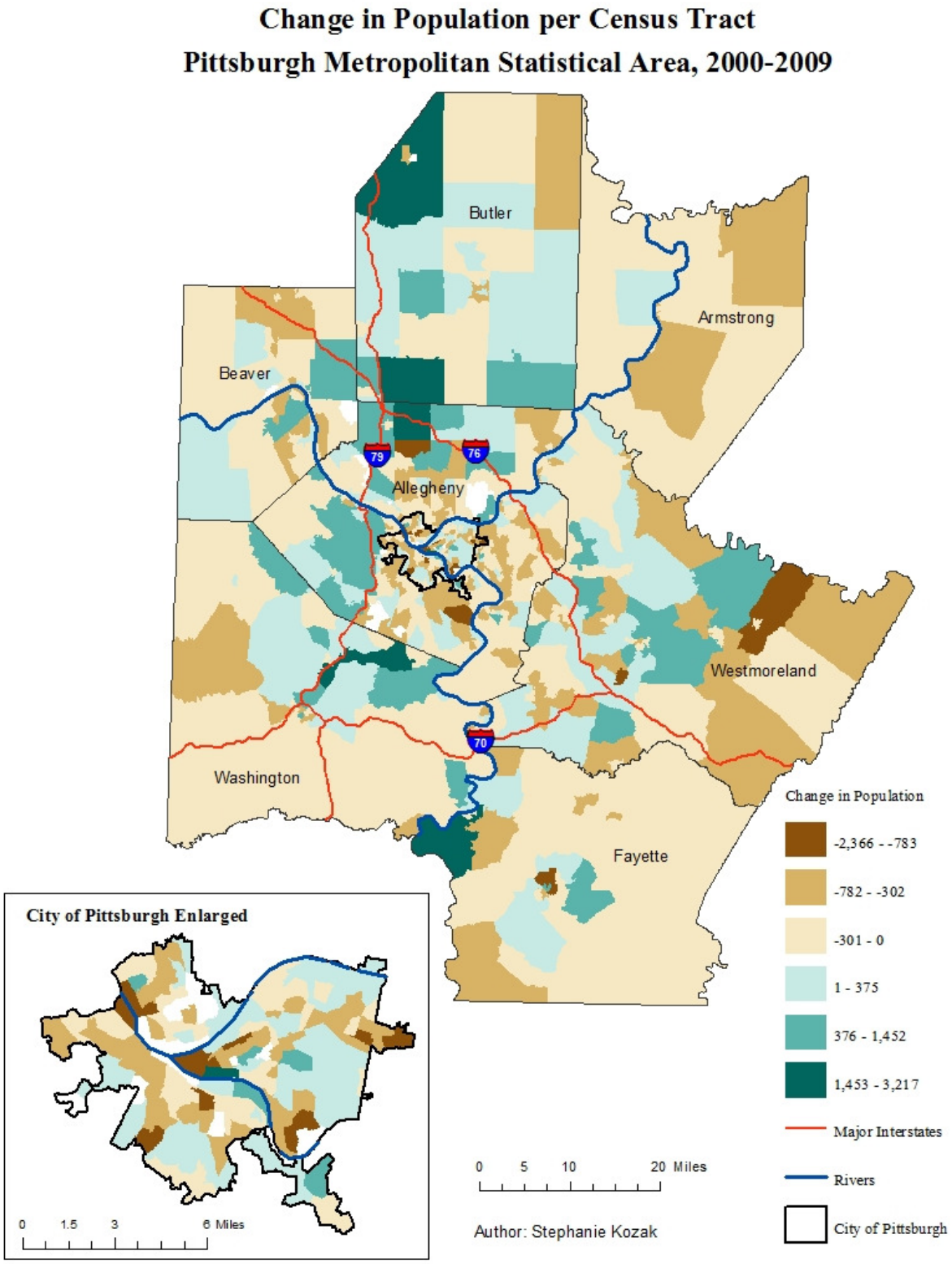


Figure 4.3. Change in Population per Census Tract in the Pittsburgh MSA, 2000-2009.



Between 2000 and 2009, most growth within the city occurred on the east side, which is where most of the gentrification within Pittsburgh is occurring. Some of the largest losses of population in the city occurred in the CBD, which is directly east of the confluence of the rivers in an area known as the "Golden Triangle." There was also a decline in the more residential neighborhoods south of downtown and in the lower-income neighborhoods of the eastern portion of the city. The wealthy Squirrel Hill neighborhood east of the universities was one of the few areas to experience a slight increase in population. The gentrification that is occurring in the Southside neighborhood across the Monongahela River from the Golden Triangle also resulted in a large increase in population for the area.

Population Density

Census tracts throughout the Pittsburgh MSA vary in size, particularly in the outer edges of the more rural counties, so it is useful to look at the population density for the area. In 2000, the areas with the highest population densities were within the city, the older suburbs immediately outside of the city limits, and along the rivers as they flow out from the center of the MSA (Figure 4.4). While the maps of total population show that the tracts with the largest populations are located outside of the city, the population density maps help to account for differences in tract sizes. The same tracts with high total populations outside of the city actually have some of the lowest population densities for the area. The population density appeared similar in 2009 (Figure 4.5). Within the city of Pittsburgh, the highest densities are found in the Shadyside, Bloomfield, Friendship, and East Liberty neighborhoods in the East End.

Figure 4.4. Population Density per Census Tract in Pittsburgh MSA, 2000.

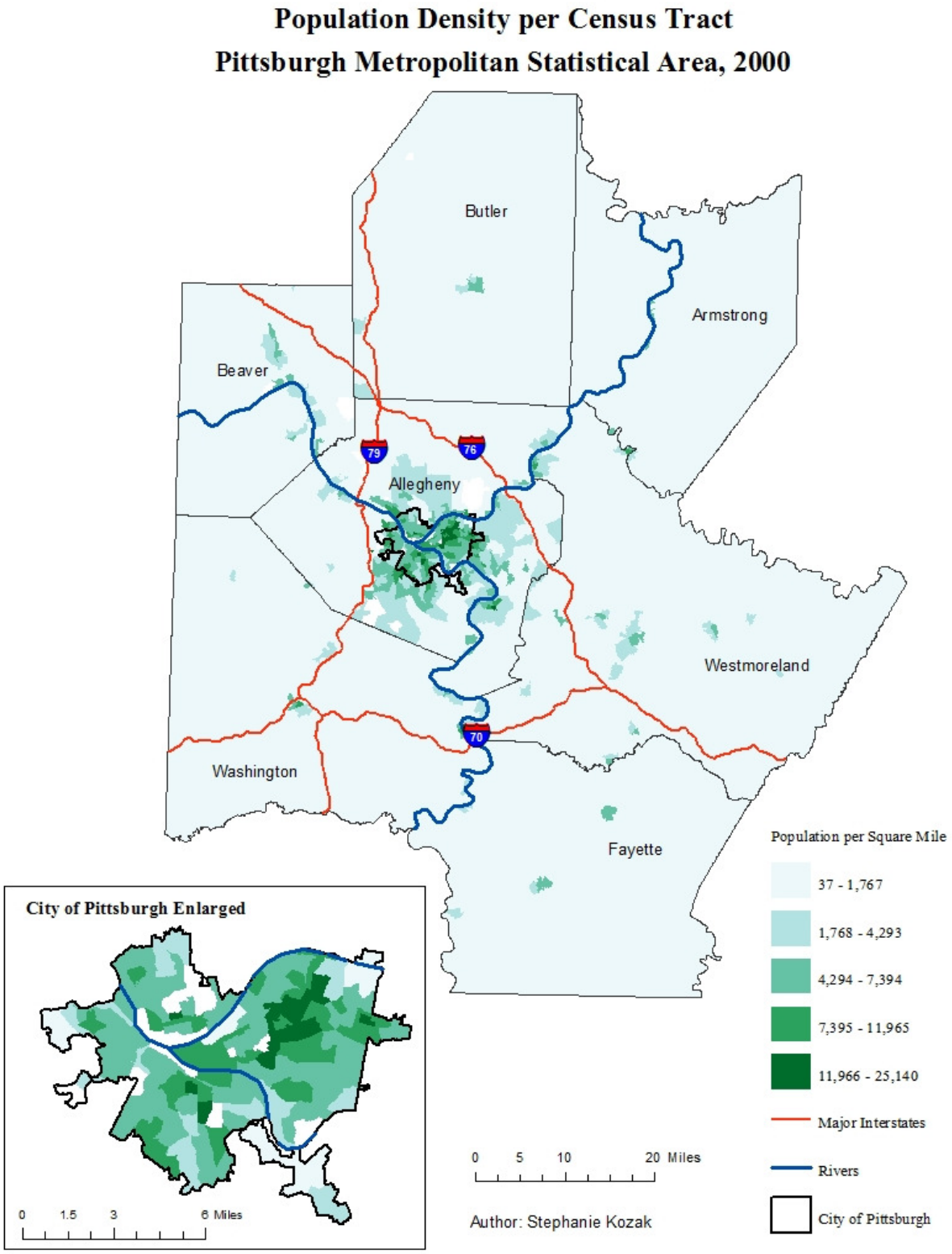


Figure 4.5. Population Density per Census Tract in Pittsburgh MSA, 2009.

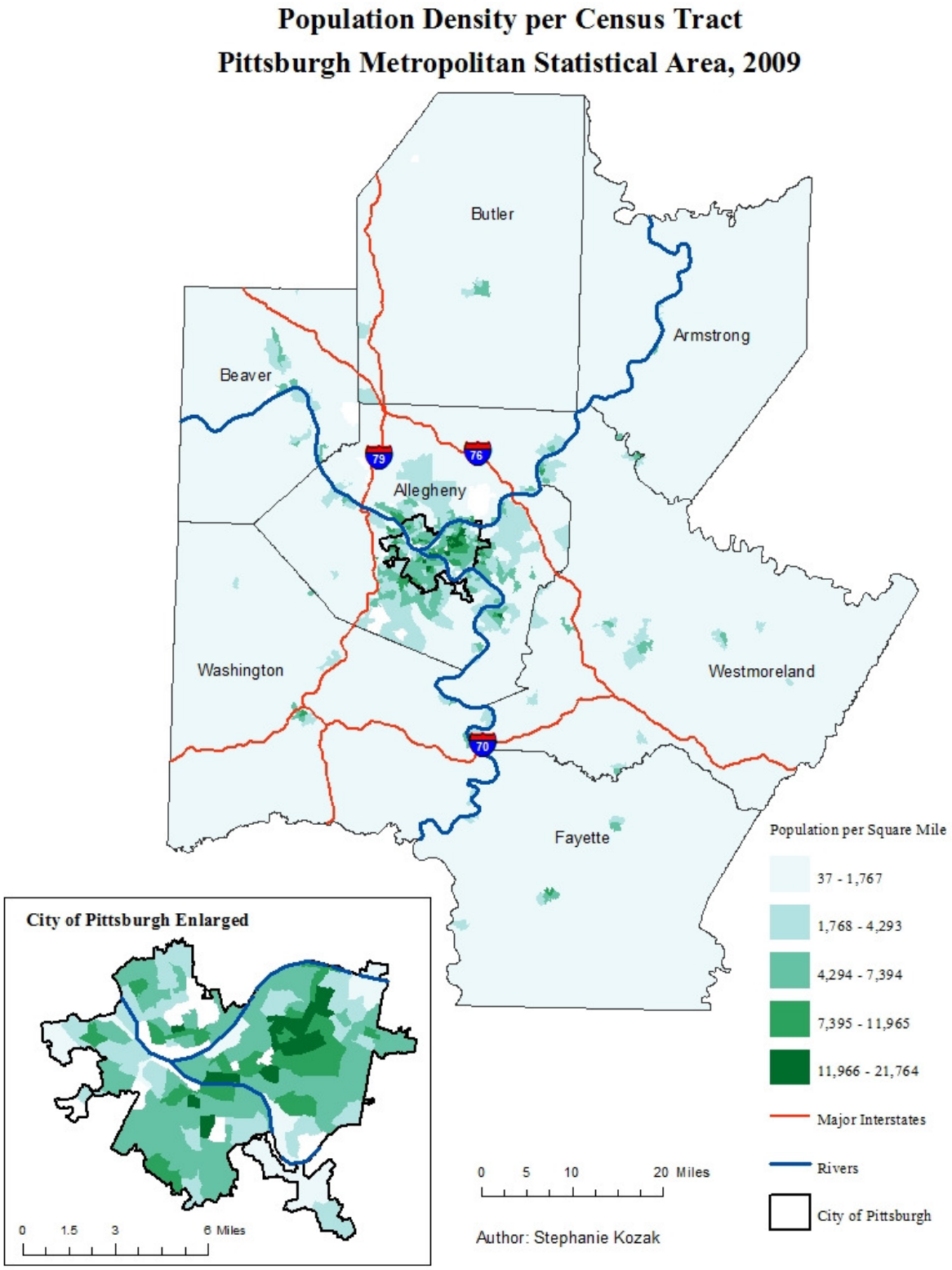
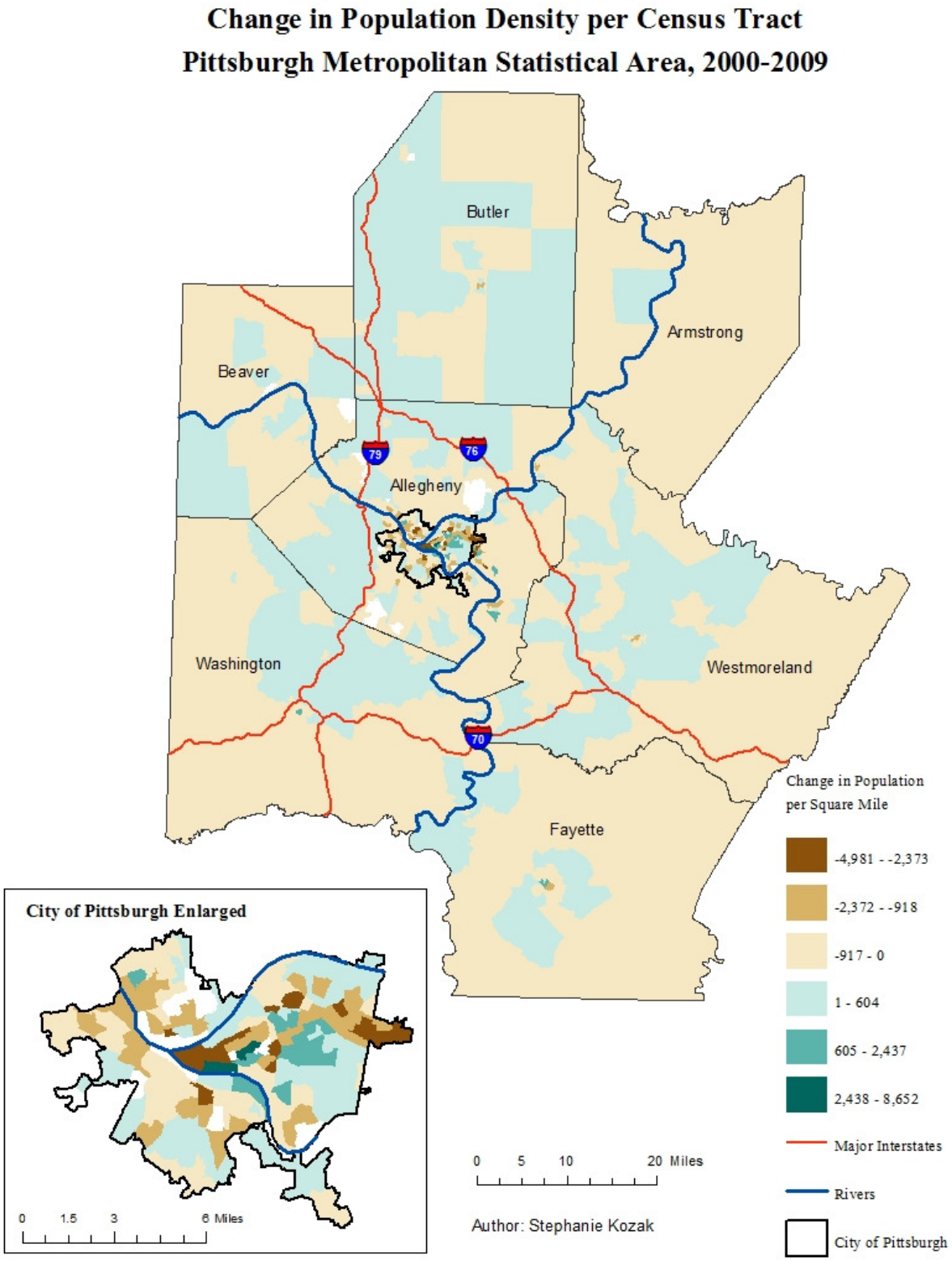


Figure 4.6. Change in Population Density per Census Tract in Pittsburgh MSA, 2000-2009.



The largest increase in population density between 2000 and 2009 within the city occurred in the Bluff and Terrace Village neighborhoods located close to the Golden Triangle (Figure 4.6). Some neighborhoods, mostly around the universities on the east side, also experienced an increase. Many of the areas with low incomes and a high proportion of minority residents experienced the largest decline in population density. Outside of the city, most of the suburbs experienced a slight increase, while the more rural areas experienced a slight decrease in population density.

Age

The city of Pittsburgh is demographically slightly younger than the surrounding MSA, with a median age of 35.5 compared to 40.4 and 42.6 for the entire area in 2000 and 2009, respectively. This pattern is to be expected as younger residents move into the city for the universities and middle-aged residents move out to the suburbs as they start families. The slightly younger group within the city could help to fuel gentrification within the devalorized downtown.

Education

A little over a quarter of the Pittsburgh MSA population had a bachelor's degree or higher in 2000, which rose by 7% to about a third of the population in 2009. Most of the higher-educated population was concentrated in three areas in 2000: the wealthy Squirrel Hill, Shadyside, and Oakland neighborhoods within the city, the suburbs south and northwest of Pittsburgh, and in the wealthier towns to the east (Figure 4.7). These areas are also where some of the highest median household incomes and home values are located. In 2009, areas with large proportions of residents with bachelor's degree expanded somewhat to include other areas of the suburbs and to reflect the growing interest in downtown living in the Strip District (Figure 4.8).

There were also higher levels of college-educated individuals in areas located on the east side of the city that experienced gentrification throughout the study period.

Median level of education rose for most neighborhoods in the area. The median for change in percentage with a bachelor's degree or higher was 4% for all census tracts in the MSA. The distribution for change in education exhibited a slight positive skew, indicating that there were more neighborhoods in which people were obtaining degrees that did not previously have them, or that they were moving into neighborhoods that had lower levels of education. Negative values indicate neighborhoods from which more educated people are leaving than entering or into which relatively uneducated people are locating. Neighborhoods within the city that experienced an increase in education were also locations where gentrification activities had been reported, like the South Side and Lawrenceville areas (Figure 5.9). The lowest rates of percentage with a bachelor's degree or higher were located throughout most of the rest of the city and in the rural areas. Both of these areas had a mix of increase and decrease in education per census tract between 2000 and 2009 for education. The most extreme changes in either direction occurred within the city. It does appear that education levels rise in tracts that are gentrifying, but the overall increase throughout the metro area in percent with a bachelor's degree or higher may drown out the effect of increasing education in gentrifying neighborhoods.

Figure 4.7. Percent of Population per Census Tract with a Bachelor's Degree or Higher in Pittsburgh MSA, 2000.

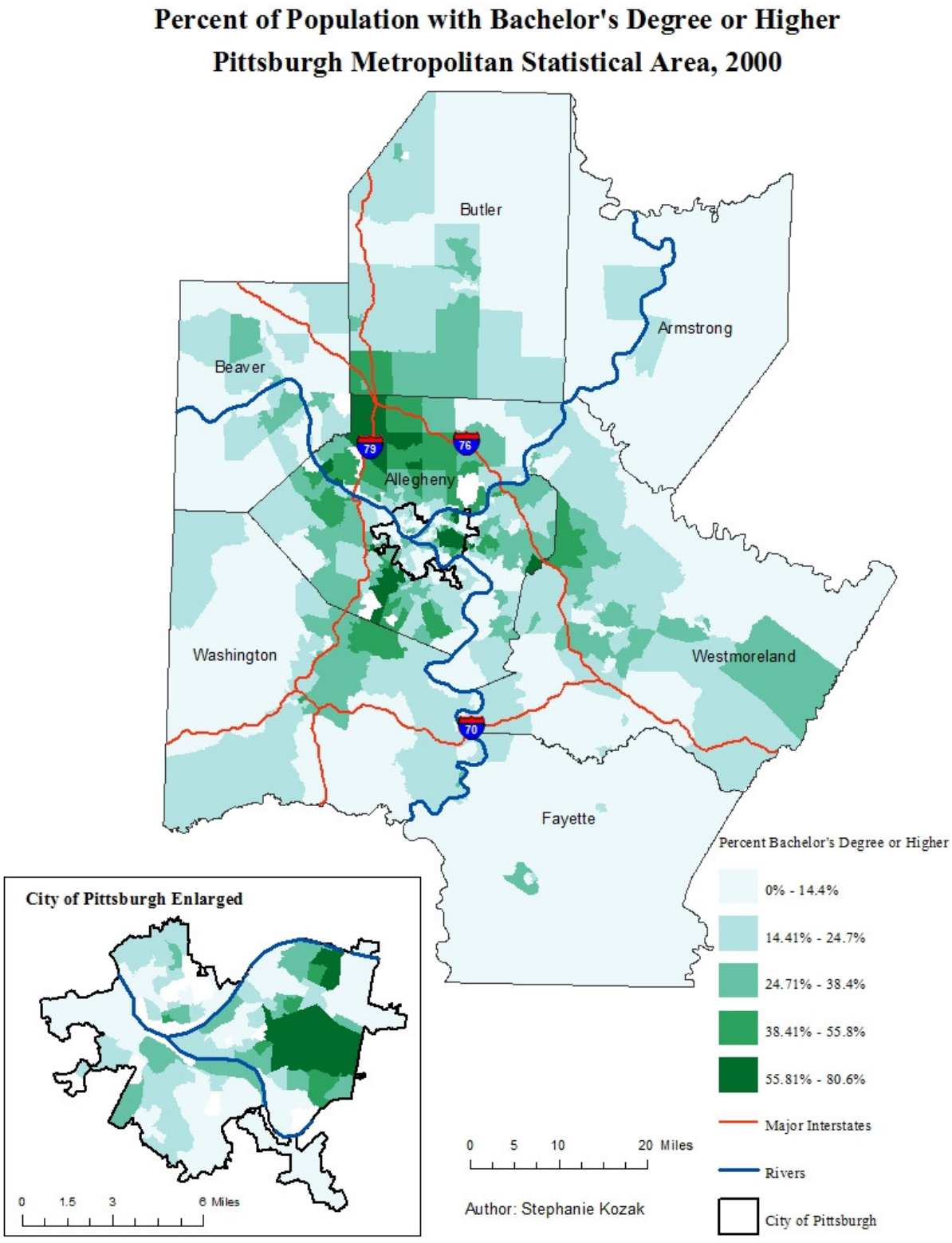


Figure 4.8. Percent of Population per Census Tract with a Bachelor's Degree or Higher in Pittsburgh MSA, 2009.

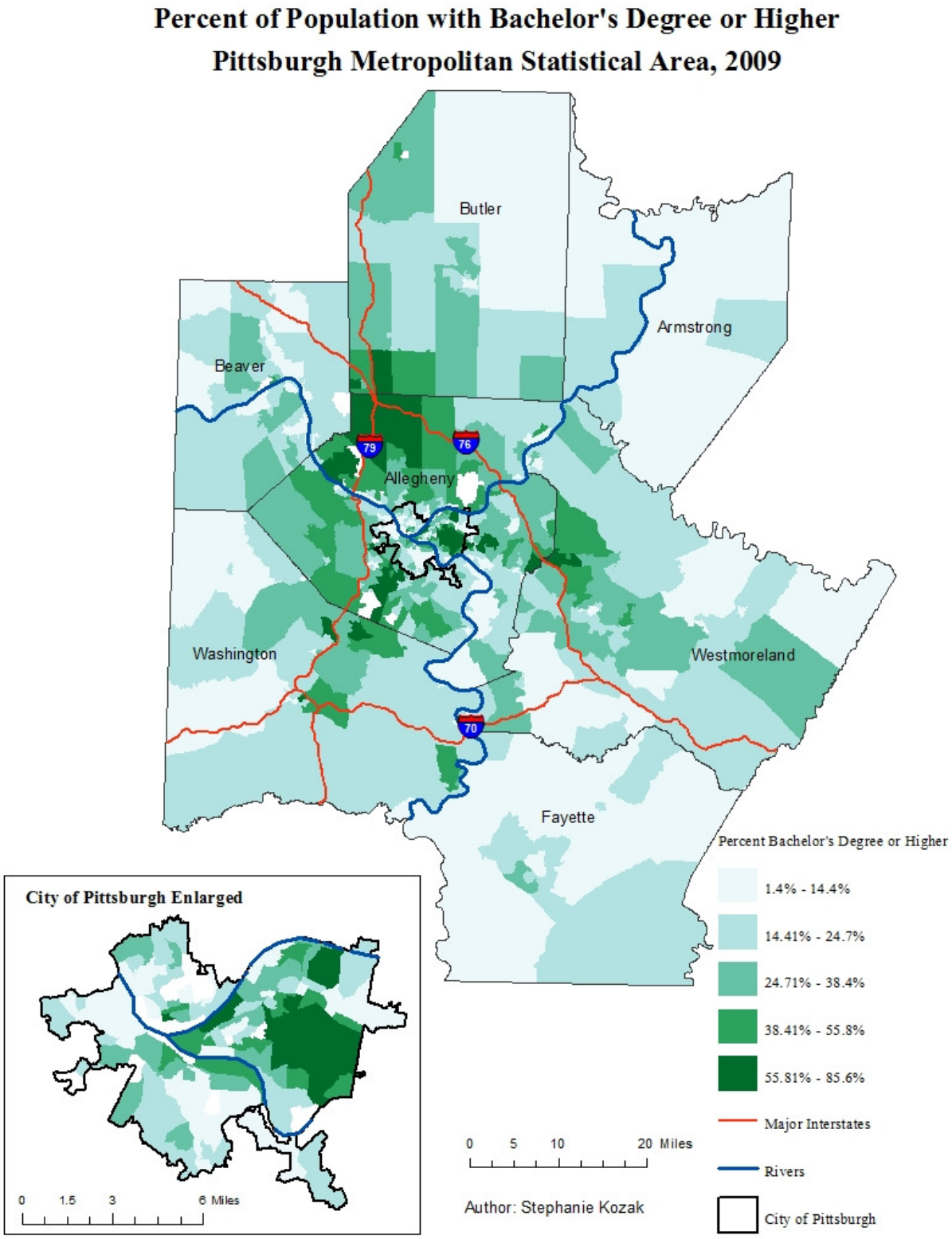
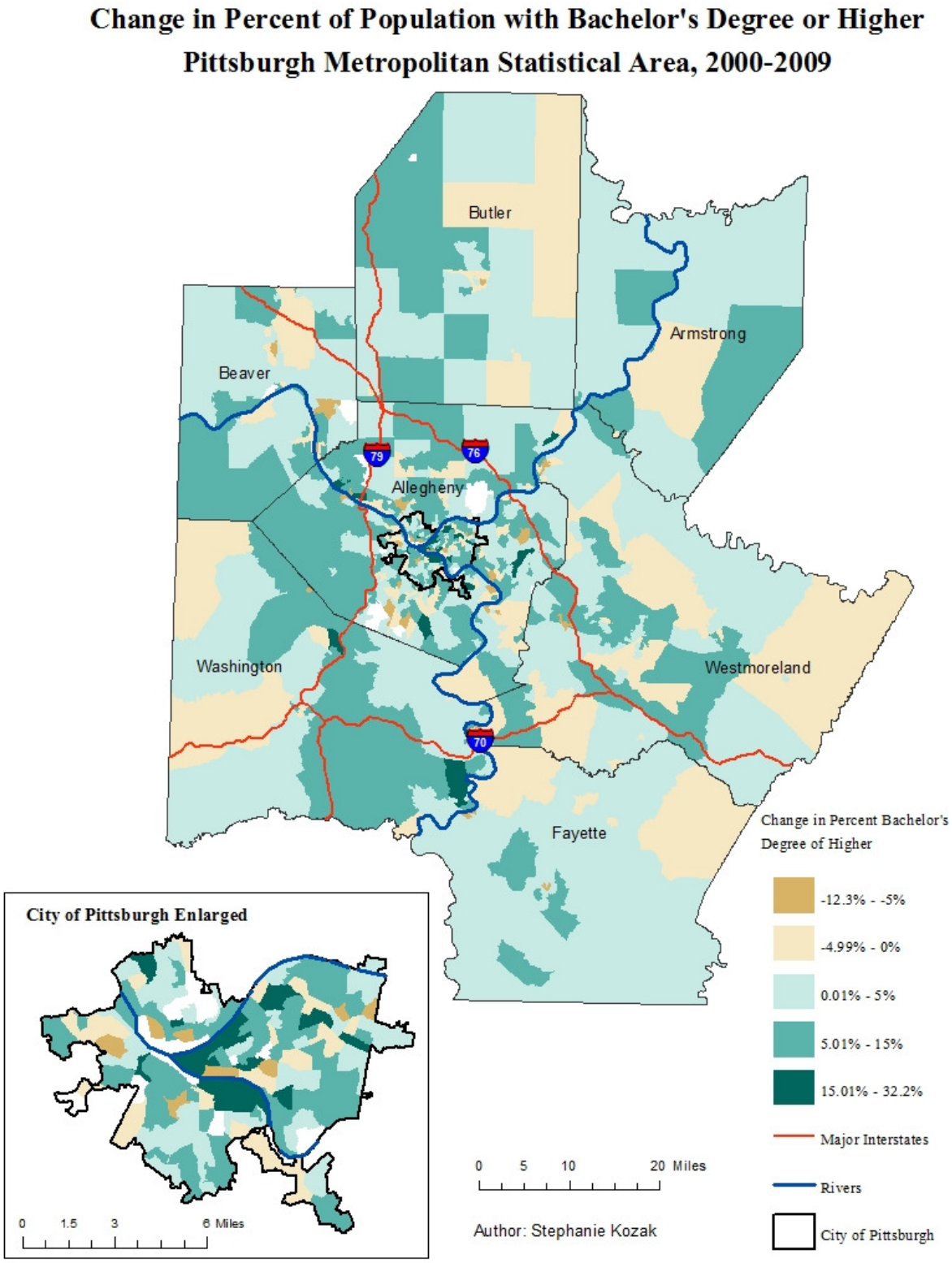


Figure 4.9. Change in Percent of Population per Census Tract with a Bachelor's Degree or Higher in Pittsburgh MSA, 2009.



Race

The Pittsburgh MSA has a distinct geography of race and class along rural, suburban, and urban divisions. The region is overwhelmingly white with only 12% of the population considered to be non-white. The next largest racial group in the area is black, with 8%. Most residents considered non-white live within the city limits or directly east of Pittsburgh (Figure 4.11). There are some neighborhoods within the city that have a majority of non-white citizens, but almost none located outside of the urban areas. Tracts outside of the city are located either in the older suburbs directly east of the city, or along the rivers. The racial segregation is typical for northern cities, like Pittsburgh, which experienced large influxes of black residents during the 20th century and white flight to the suburbs that contributed to the growth of the "national ghetto system" in the U.S. where blacks are concentrated in the urban centers of many northern cities (Frazier et al. 2003, p. 26).

The area is increasing in "social mix" along racial lines, a term used to describe degree of heterogeneity of a neighborhood in regards to race and ethnicity, class, age, culture, etc. (Walks and Maaranen 2008). The map for 2000 shows that there were slightly fewer counties outside of the city with more minorities than there were in 2009 (Figure 4.10). Differences in the patterns emerge when comparing the entire metro area to the city (Figure 4.12). The MSA had a population that was 90.6% white in 2000, which decreased by 2.8% to 87.8% in 2009. The city itself, however, had an increase in percent white from 67.6% in 2000 to 69.8% in 2009, a difference of 2.2%. When looking at the change on a local level, the variable for change in percent white had a negative means of -1.5% across all tracts. Changes in percent white can occur when either those who previously resided in a neighborhood begin to move out, non-whites who were not previously in the neighborhood move in, or a combination of both. Both

scenarios indicate that there is some mobility in or out of the neighborhood, and they result in slightly more social mix in the suburbs and less within the city itself. This would be expected if gentrification within the city is being undertaken by mostly whites, but newspaper accounts of gentrification in some neighborhoods suggests that gentrifiers are not exclusively white in Pittsburgh (Clemetson 2002).

Figure 4.10. Percent of Population Identifying as White per Census Tract in Pittsburgh MSA, 2000.

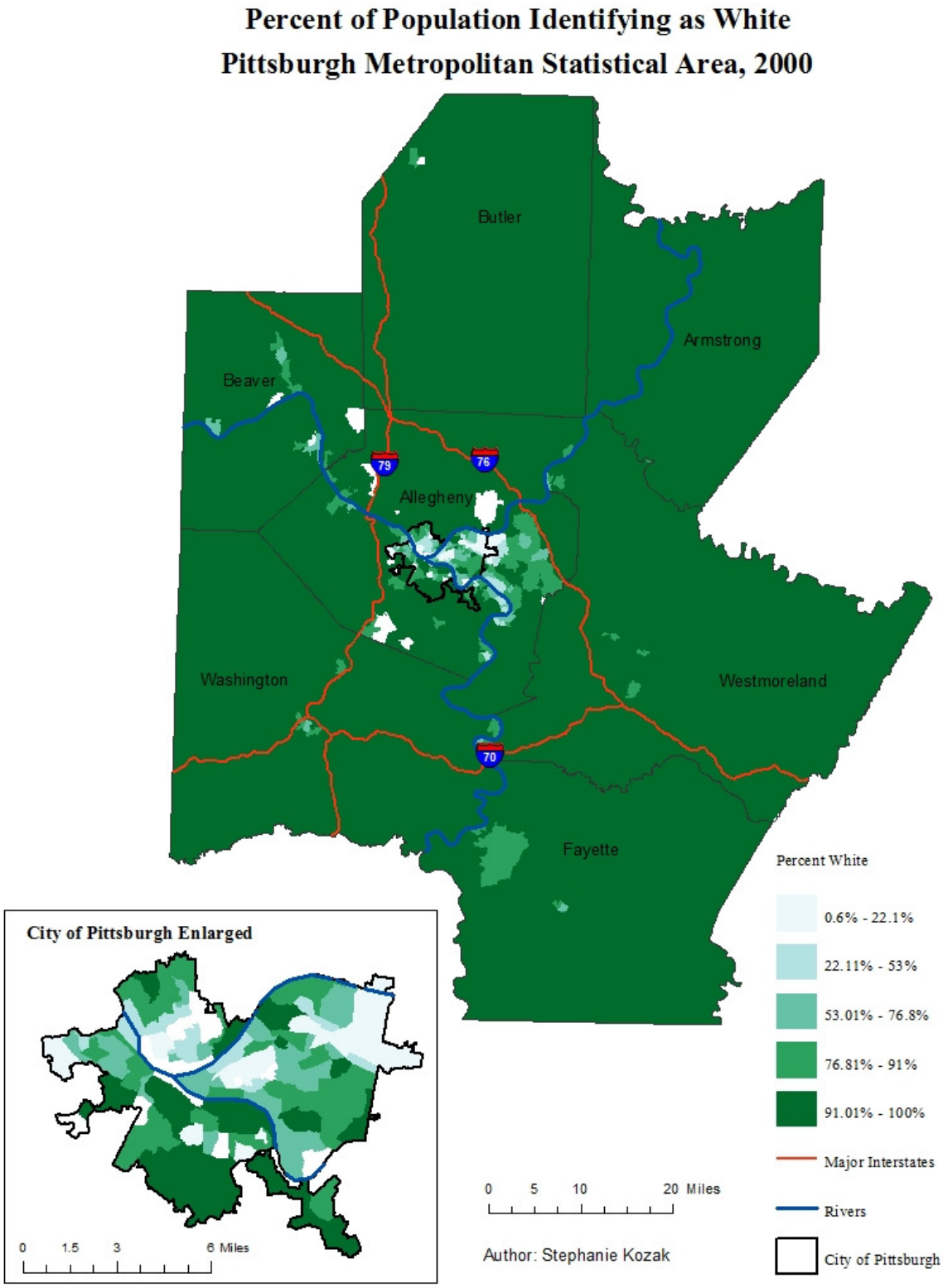


Figure 4.11. Percent of Population Edentifying as White per Census Tract in Pittsburgh MSA, 2009.

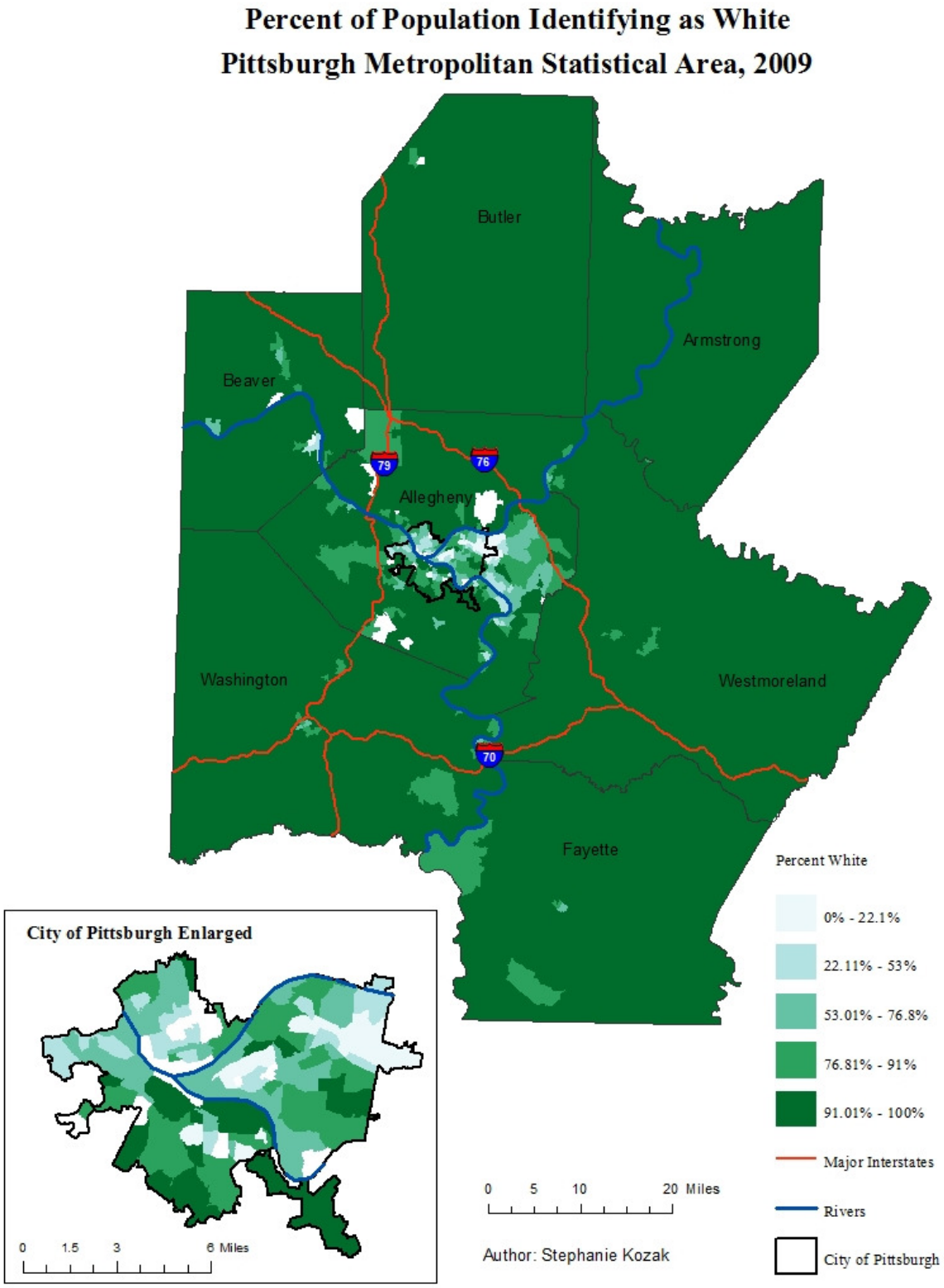
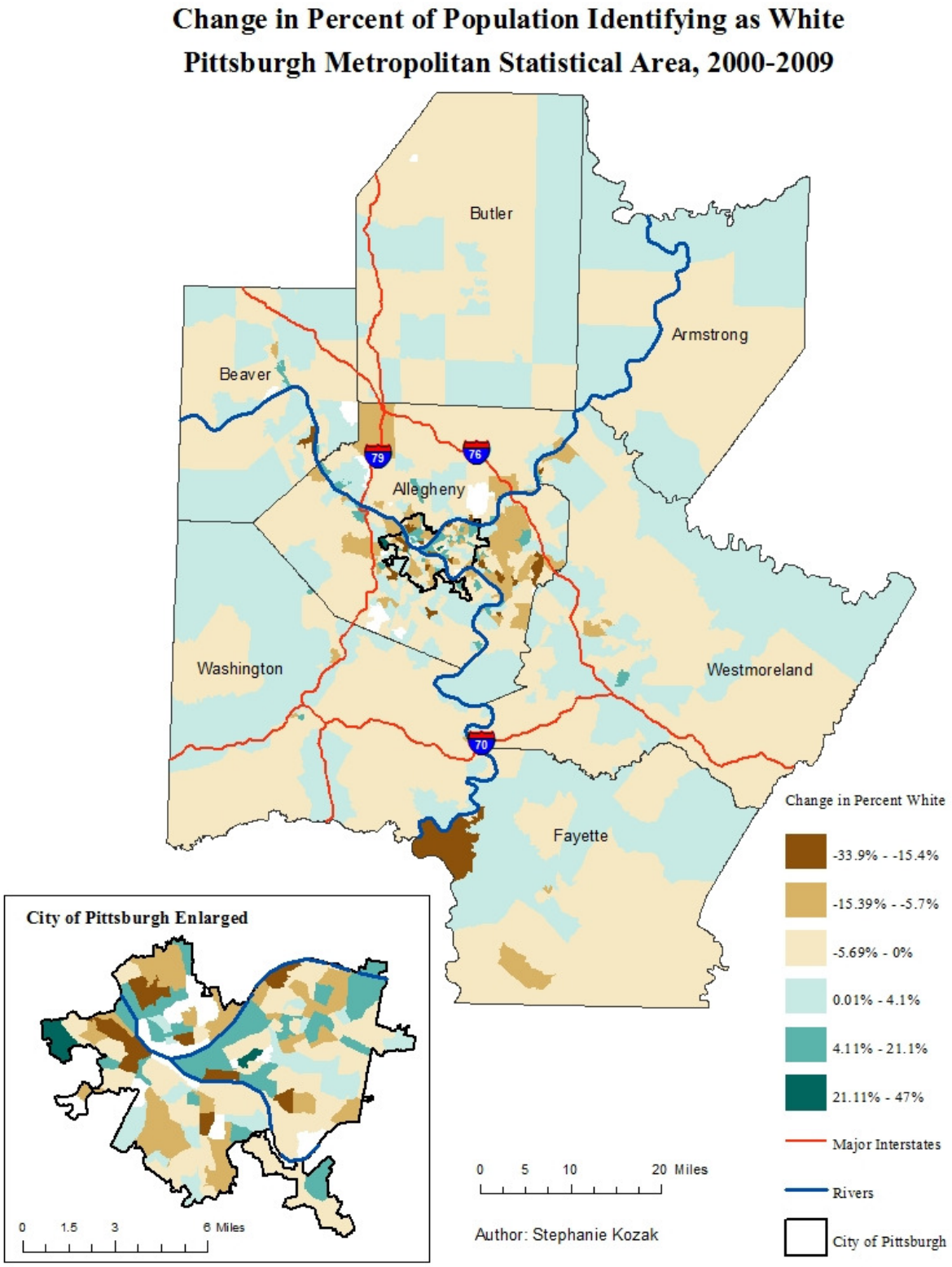


Figure 4.12. Change in Percent of Population Identifying as White per Census Tract in Pittsburgh MSA, 2000-2009.



4.3.2 Economic Changes

Pittsburgh follows a similar spatial structure as other Rust Belt cities throughout the United States with a clear economic shift towards the suburbs. An analysis of income levels, labor, and unemployment levels show that many wealthier residents employed in higher-end services left for the suburbs, leaving the city with an eroded tax base and higher unemployment rates. Change between 2000 and 2009 in these various economic variables show that the urban economy is starting to improve for the City of Pittsburgh. Chapter 5 will include a more detailed look at the spatial patterns of low-income households throughout the MSA.

Table 4.2. Economic Statistics for the City of Pittsburgh and Pittsburgh MSA between 2000 and 2009.
(Source: Census Bureau 2000, 2009)

	Median Household Income[4]	Percent Working Class[5]	Percent Unemployed[6]
City of Pittsburgh			
2000	$36,801	-	5.9%
2005-2009	$35,732	-	4.9%
Change	-$1,069	-	-1.0%
Pittsburgh MSA			
2000	$47,766	38.8%	5.8%
2005-2009	$47,497	37.4%	4.2%
Change	-$269	-1.4%	-1.6%

[4] Income for 2000 adjusted for inflation to 2009 income levels.
[5] The percent working class variable combined the following occupations: service, farming, fishing, forestry, construction, extraction, maintenance, production, transportation, and material moving operations. These are approximate categories due to the way in which the Census Bureau classifies occupations and may include or leave out some occupations not typically thought of as working class. This is the best approximation based on the data available.
[6] Percent from total population 16 years and over in civilian labor force.

Income

For both 2000 and 2009, the metro area had a higher median household income than the city itself (Table 4.2). The median household income barely decreased for the MSA from $47,766 in 2000 to $47,497 in 2009, representing a drop of 0.5%. The median for the city, however, dropped from $36,801 to $35,732, a decline of 3%. The economic crisis of the 2007 – 2009 recession resulted in many incomes becoming stagnant or even declining during the first decade of the 20th century, which caused median household income to drop throughout the area (Delano 2011). When this variable is mapped, clear patterns emerge that separate areas of the metro based on income (Figure 4.13). The tracts with the lowest income are concentrated within the city, particularly in the North Side Area and East End. The wealthier neighborhoods around Squirrel Hill and in the residential neighborhoods south of the rivers are exceptions. We also see lower incomes along the rivers flowing out of the city and in the more rural areas of Armstrong, Westmoreland, and Fayette counties. The newer suburbs northwest and southwest of the city contain some of the highest incomes.

The only noteworthy difference between the income patterns for 2000 and 2009 is observable downtown. The extensive development that has been occurring there, particularly downtown in the Strip District and in the Lawrenceville, Morningside, and Highland Park neighborhoods, appears to have increased the income for these areas (Figure 4.14). These same areas show some of the greatest increases in incomes between 2000 and 2009, while some of the neighborhoods surrounding these tracts have some of the greatest decreases in median incomes (Figure 4.15). The decline in incomes for neighboring tracts could result from lower-income households being pushed out of their neighborhoods as they gentrify. Overall, the largest declines in median household income occurred not in the lowest-income areas, but in some of the

wealthier suburbs outside of the city. This trend could be attributed to the housing bubble that hit new housing developments hardest in the latter half of the decade.

Figure 4.13. Median Household Income per Census Tract in Pittsburgh MSA, 2000.

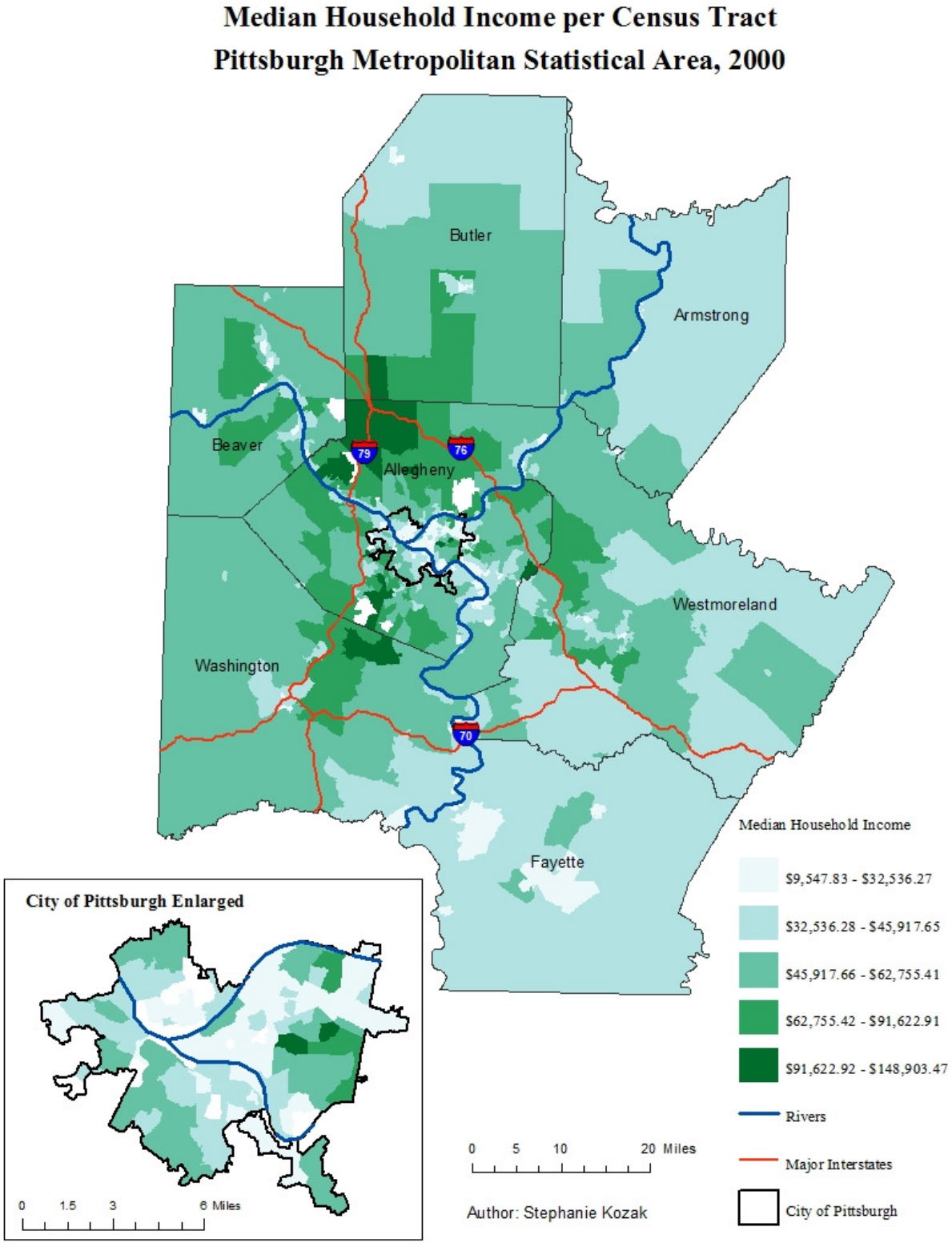


Figure 4.14. Median Household Income per Census Tract in Pittsburgh MSA, 2009.

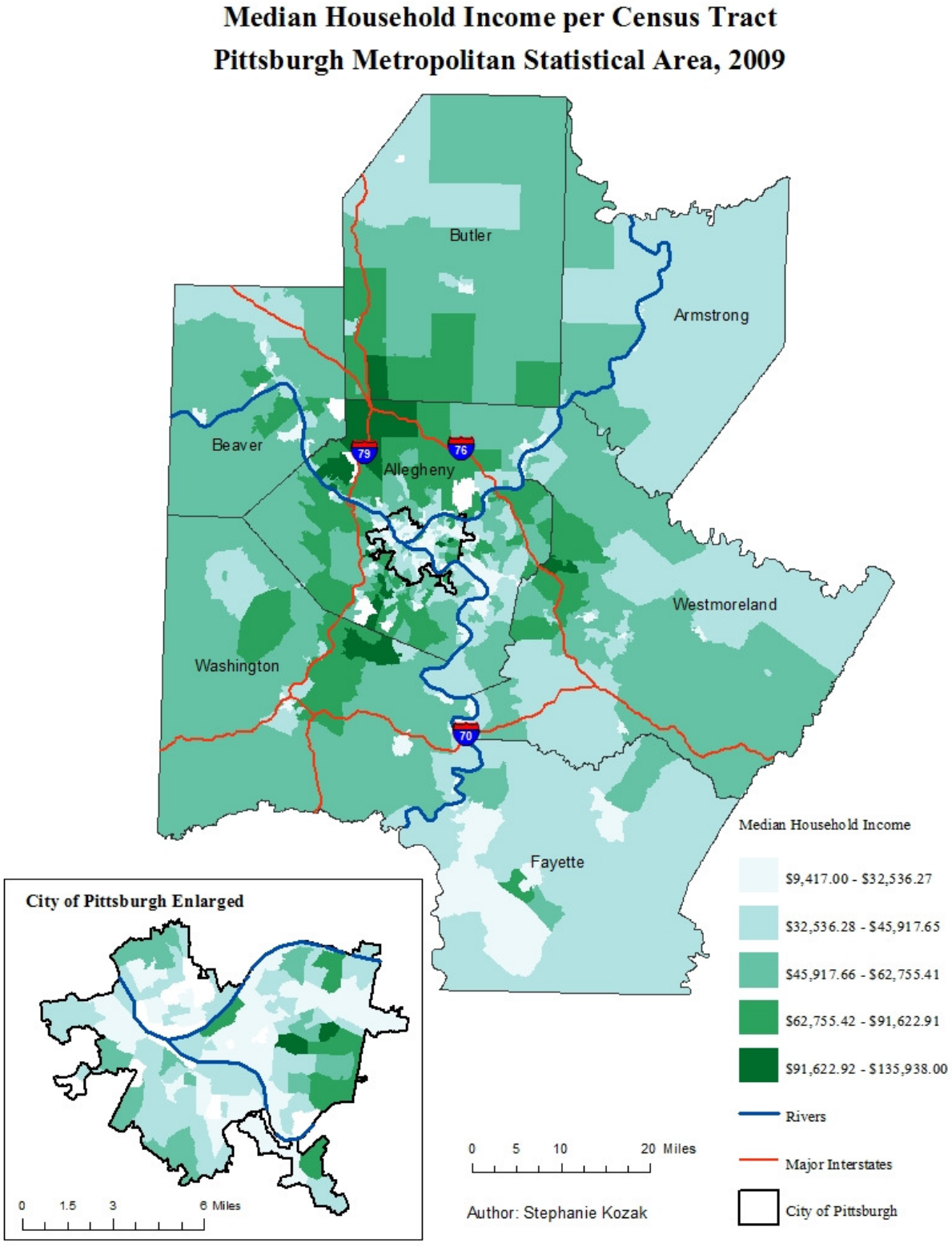
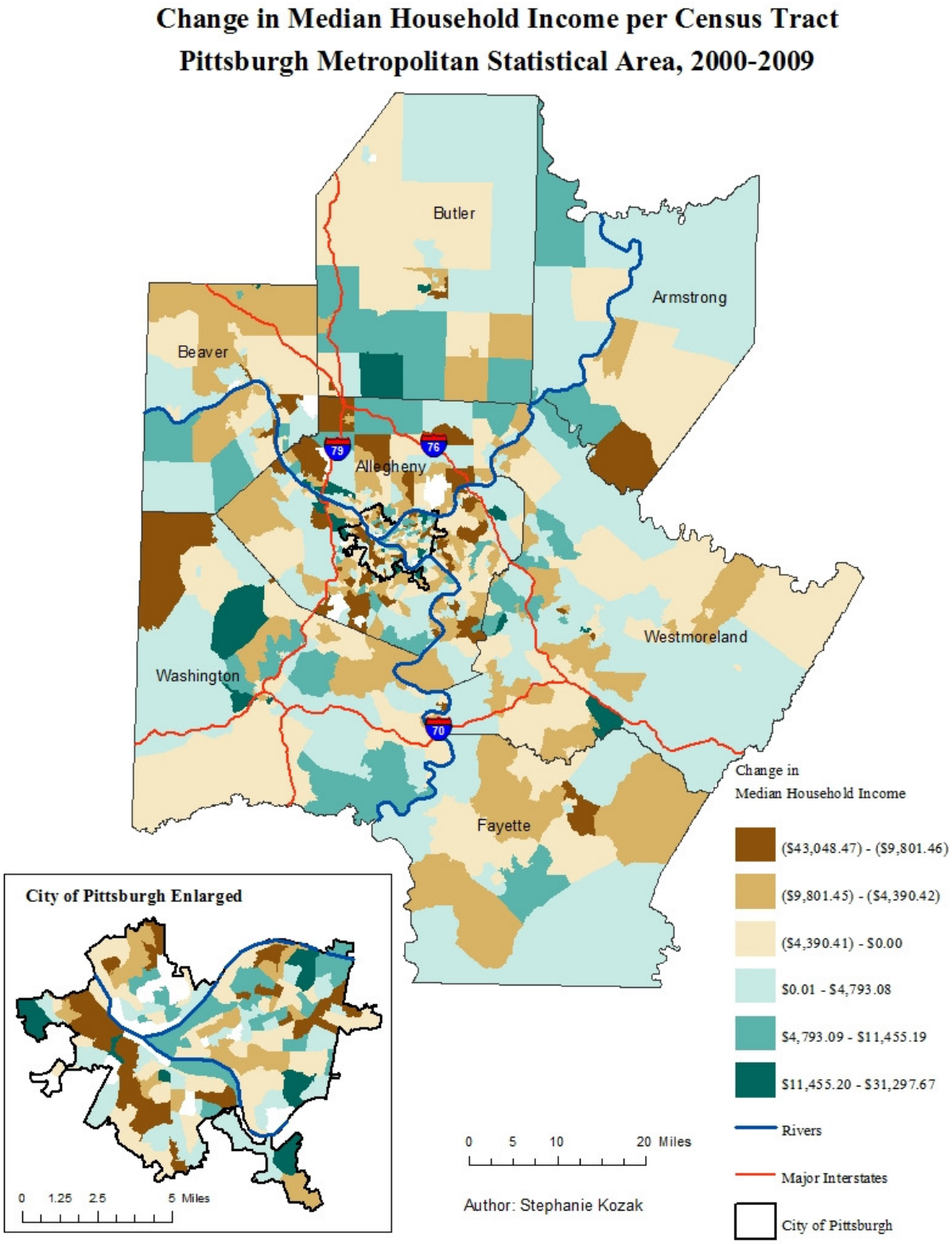


Figure 4.15. Change in Median Household Income per Census Tract in Pittsburgh MSA, 2005-2009.



Occupation

The suburban areas outside of the city and the upper-income neighborhoods in the East End are clearly divided by class in that very few working-class individuals are found in these communities. In 2000, working-class residents are clearly in lower to middle-income areas of the city, along the rivers, and in the more rural fringes of the MSA (Figure 4.13). The suburbs stick out as having very low proportions for working-class residents as defined by occupation. The city also has areas downtown with lower concentrations, particularly in the East End. The rural areas of the MSA have higher proportions of working-class residents, as do some neighborhoods in the city. The pattern is similar for the area in 2009 (Figure 4.14). Overall, the maps of median household income and percent working-class show similar patterns, indicating that using the variable for working class to measure changes in both income and class of worker is appropriate for the statistical analysis in Chapter 6.

Throughout the MSA, there is a decline in percent working class between 2000 and 2009 by 1.4%. Areas of slight increase were located mostly south and east of the city in the older suburbs, but both within and outside of the city the percentages have dropped (Figure 4.15). The decrease in working-class residents in neighborhoods adjacent to the city can be explained by the population losses in those areas, leaving behind larger concentrations of the working class or from the movement of lower-income families into those areas that have been pushed out by rising rents in the city. The average of the decline per census tract was -1.2%, which is close to the overall decline in working class occupations throughout the metro. The most dramatic declines within the city were spread throughout the area. The proportion of working-class residents per tract can change regardless of whether or not someone moves into or out of the

neighborhood. An individual can gain or lose employment in an occupation that is considered working class, which does not necessarily imply that they are moving.

Most of the loss in working class occupations occurred within natural resource, construction, maintenance, production, transportation, and material moving occupations (Table 4.3). Service occupations actually grew between 2000 and 2009, which were also included in the variable for working-class residents. In 2000, the largest proportions of employees in service occupations were in low-income neighborhoods of the city and along the rivers (Figure 4.16). The surrounding suburbs have some of the lowest proportions of service employees, as well the upper-income neighborhoods of the East End. In 2009, there were some low income neighborhoods within the city that appear to have higher proportions of employees in service occupations (Figure 4.17). There are also some neighborhoods in the suburbs, particularly right outside the City of Pittsburgh, that have higher proportions. The map of change between 2000 and 2009 in the proportion of service employees per tract shows that there are some low-income areas within the city that experienced a growth in the proportion of service employees, while other impoverished neighborhoods did not (Figure 4.18). Most of the metro area, including some of the wealthier suburbs, had an increase in service employees. Many employed in service occupations are working for low wages, which is why there is such a large concentration in lower-income neighborhoods. As the gap between upper and lower-class employees widens in the U.S., there will be an increase in the proportion of lower-income service workers (Autor and Dorn 2013). The increase in low-wage, service employment will lead to increased income polarization in the Pittsburgh metro area, putting a larger strain on the demand for affordable, low-income housing.

Table 4.3 illustrates the shift in the urban economy of the Pittsburgh metro. Service occupations increased between 2000 and 2009 by 1.5% while other occupations that would be considered working class occupations declined. The decline in the working class variable is because of the loss of manufacturing, transportation, construction, and primary sector occupations, a pattern that is typical in a deindustrialized city. The strong consumer and producer service fields in Pittsburgh are attributed with helping the area to quickly bounce back from the 2007-2009 recession (*Tribune-Review* 2012). Those service fields employ the three occupation groups that saw a growth over the decade: management, business, science, and arts; service; and sales and office.

Table 4.3. Occupation Statistics for the Pittsburgh MSA between 2000 and 2009.
(Source: Census Bureau 2000, 2009)

	Total		**Percent**		**Change**
Occupation	2000	2009	2000	2009	2000-2009
All Employees (nonfarm) (000s)	1104.9	1119.9	-	-	
Management, business, science, and arts	371.2	411.0	33.6%	36.7%	3.1%
Service	175.4	194.8	15.9%	17.4%	1.5%
Sales and office	304.8	289.5	27.6%	25.9%	-1.7%
Natural resources, construction, and maintenance	101.8	92.9	9.2%	8.3%	-0.9%
Production, transportation, and material moving	151.6	131.5	13.7%	11.7%	-2.0%

Figure 4.16. Percent Working Class per Census Tract in Pittsburgh MSA, 2000.

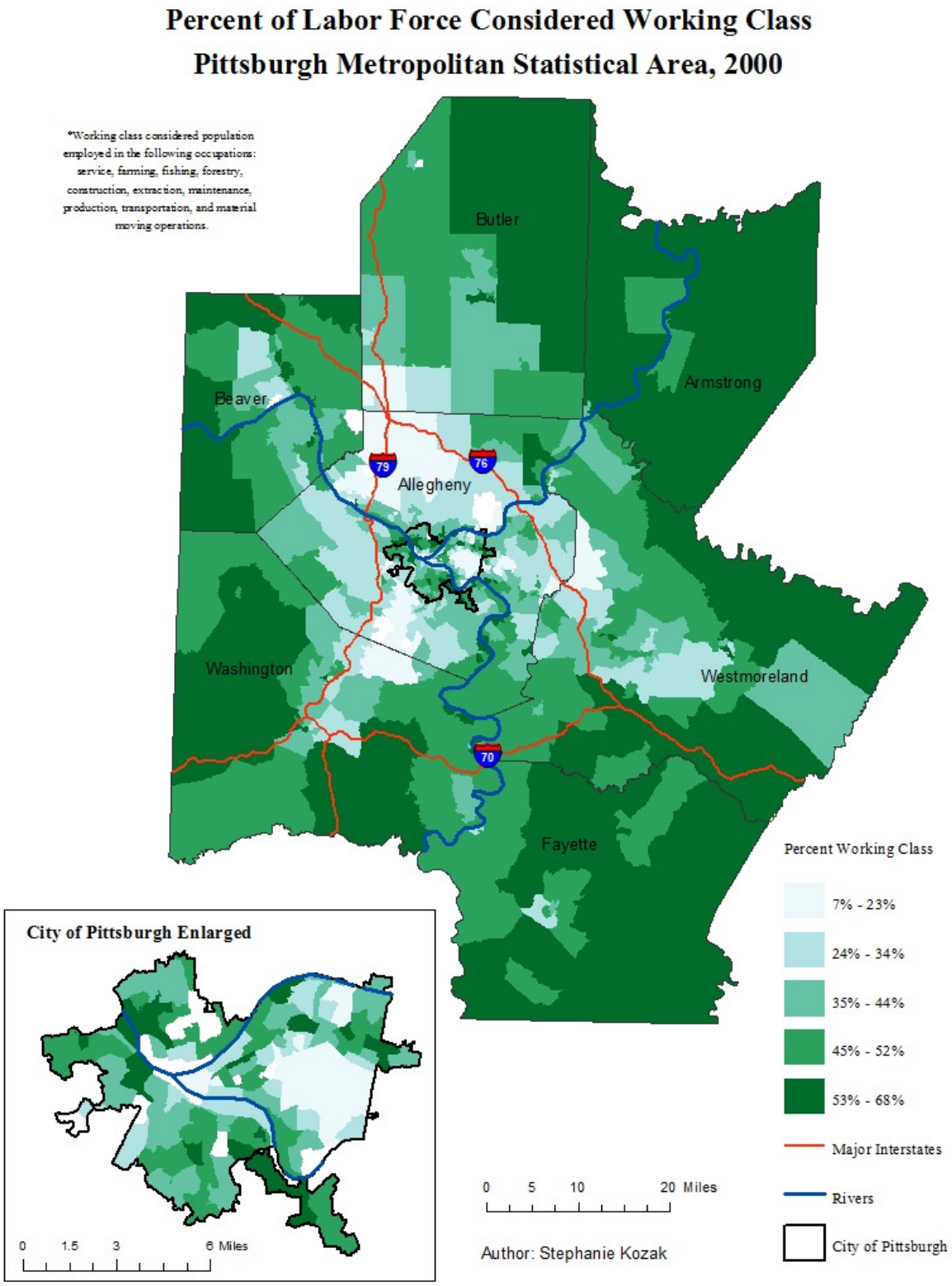


Figure 4.17. Percent Working Class per Census Tract in Pittsburgh MSA, 2009.

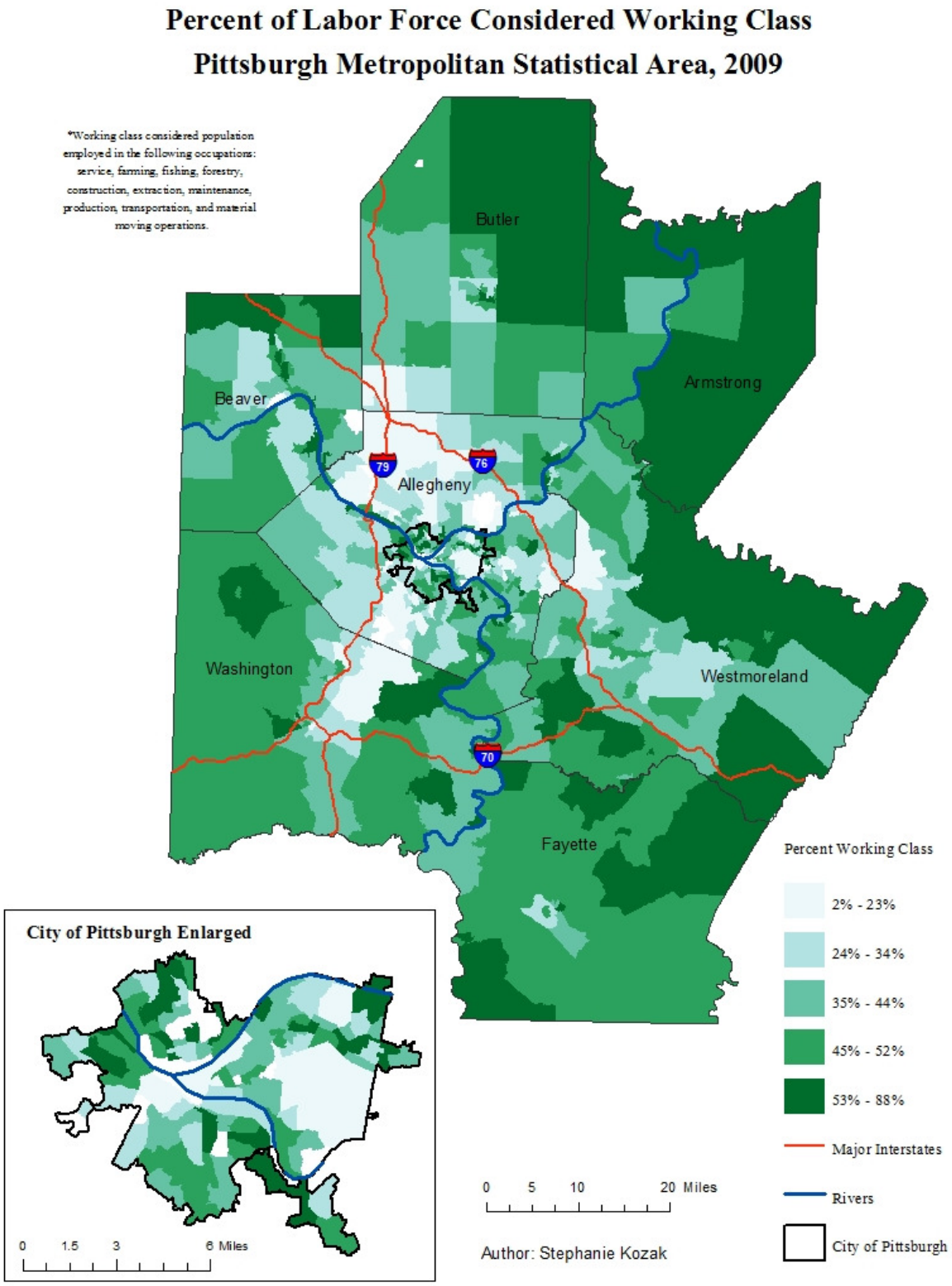


Figure 4.18. Change in Percent Working Class per Census Tract in Pittsburgh MSA, 2000-2009.

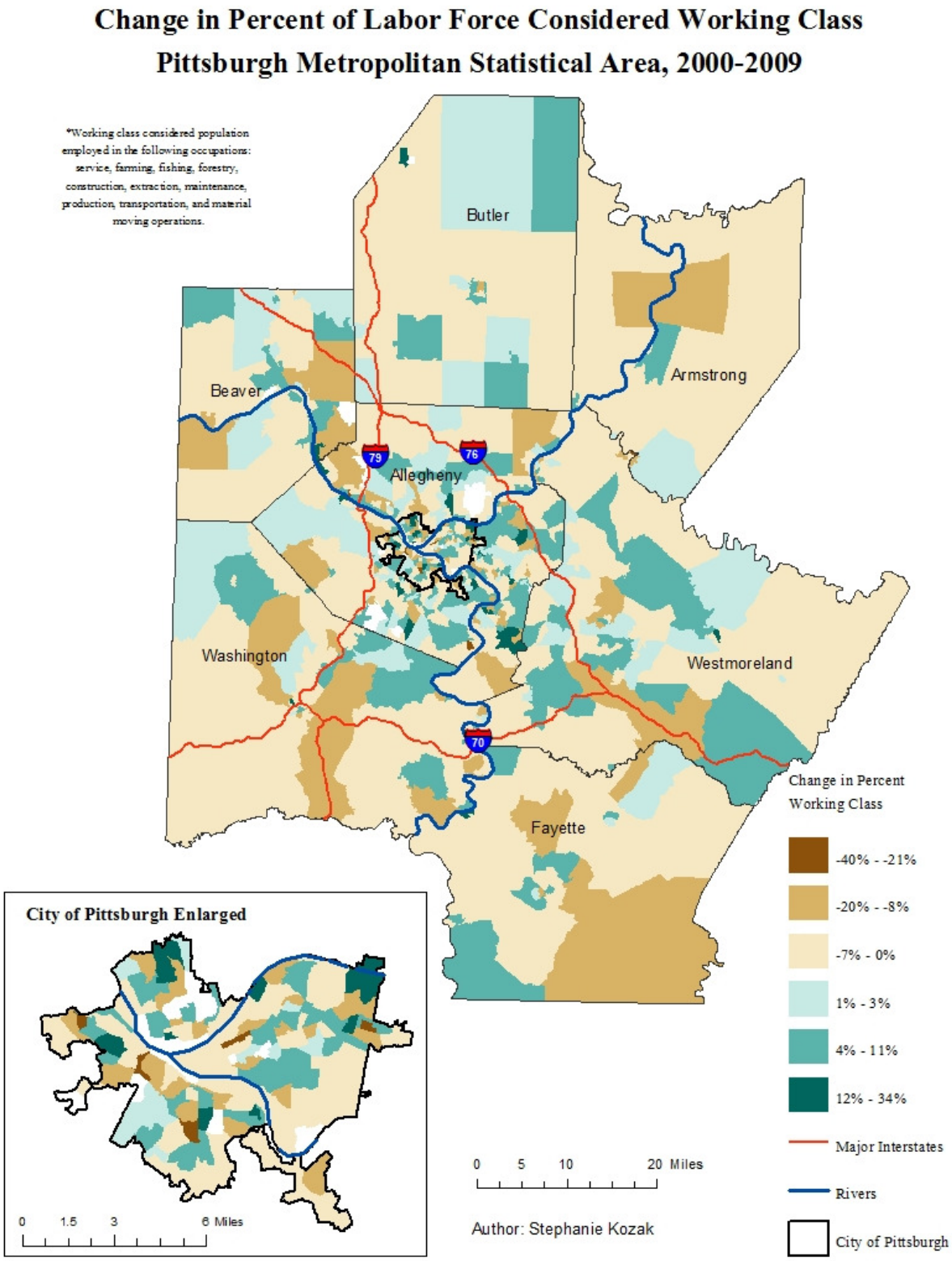


Figure 4.19. Percent Employed in Service Occupation per Census Tract in Pittsburgh MSA, 2000.

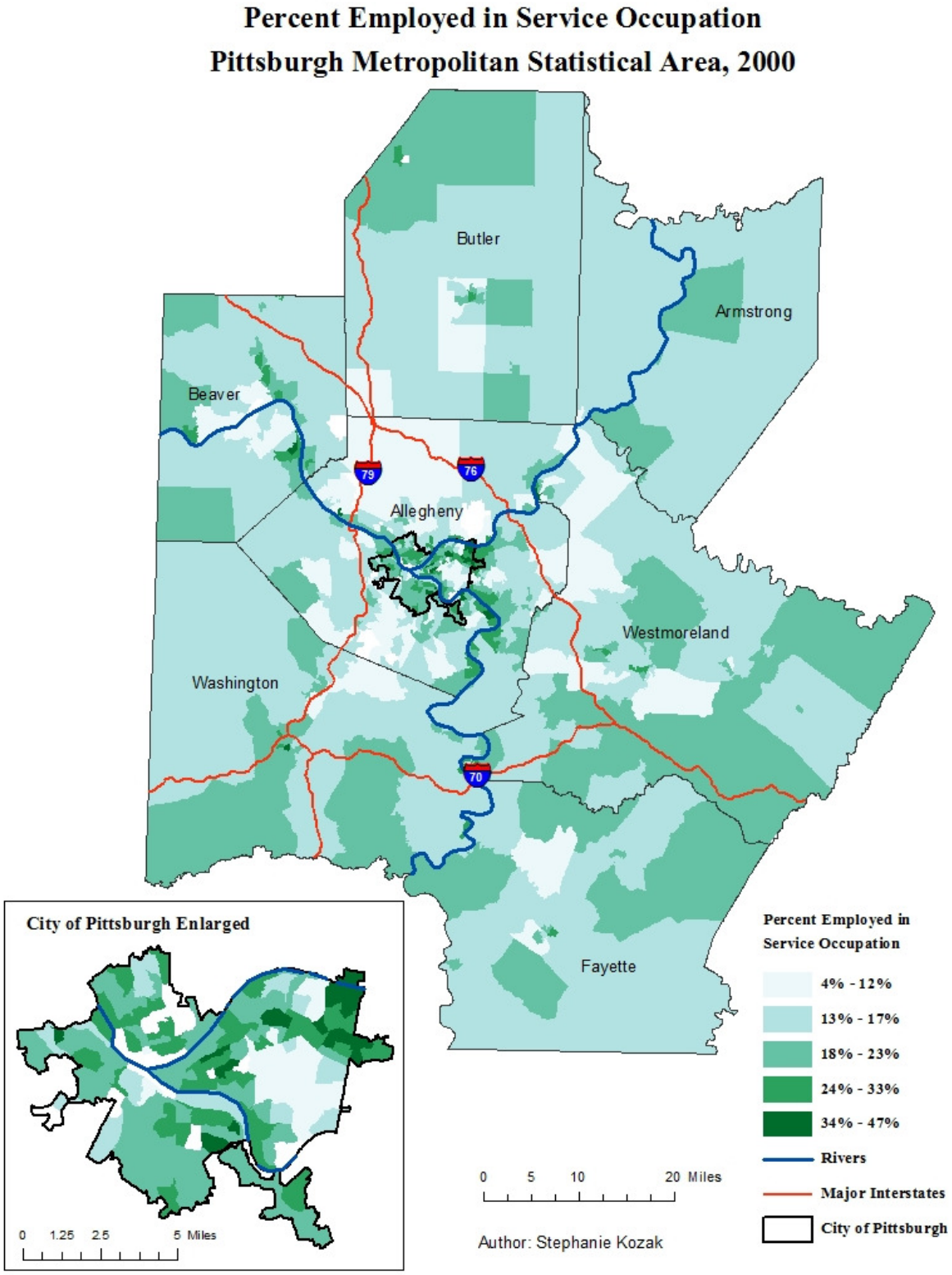


Figure 4.20. Percent Employed in Service Occupation per Census Tract in Pittsburgh MSA, 2009.

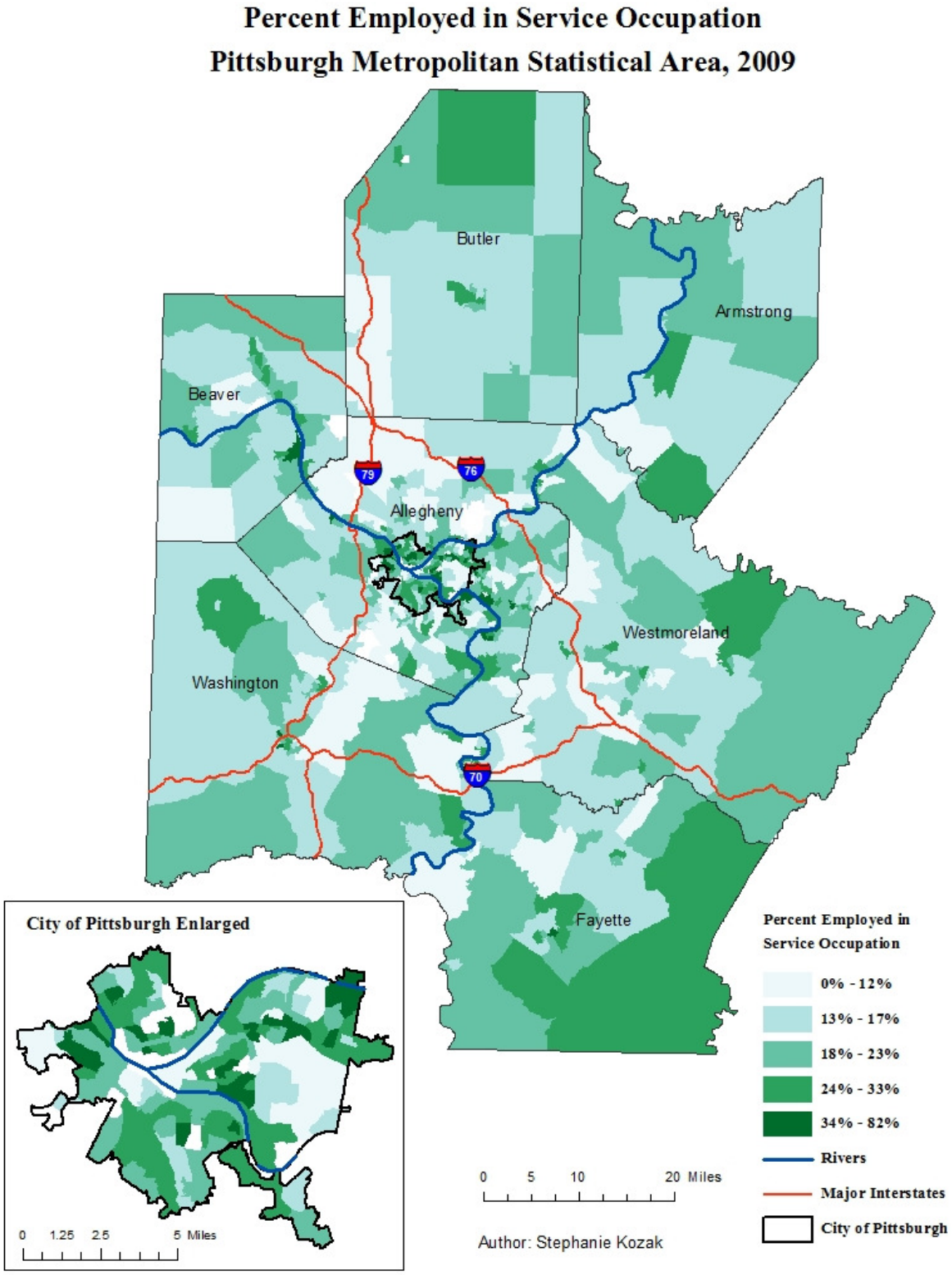
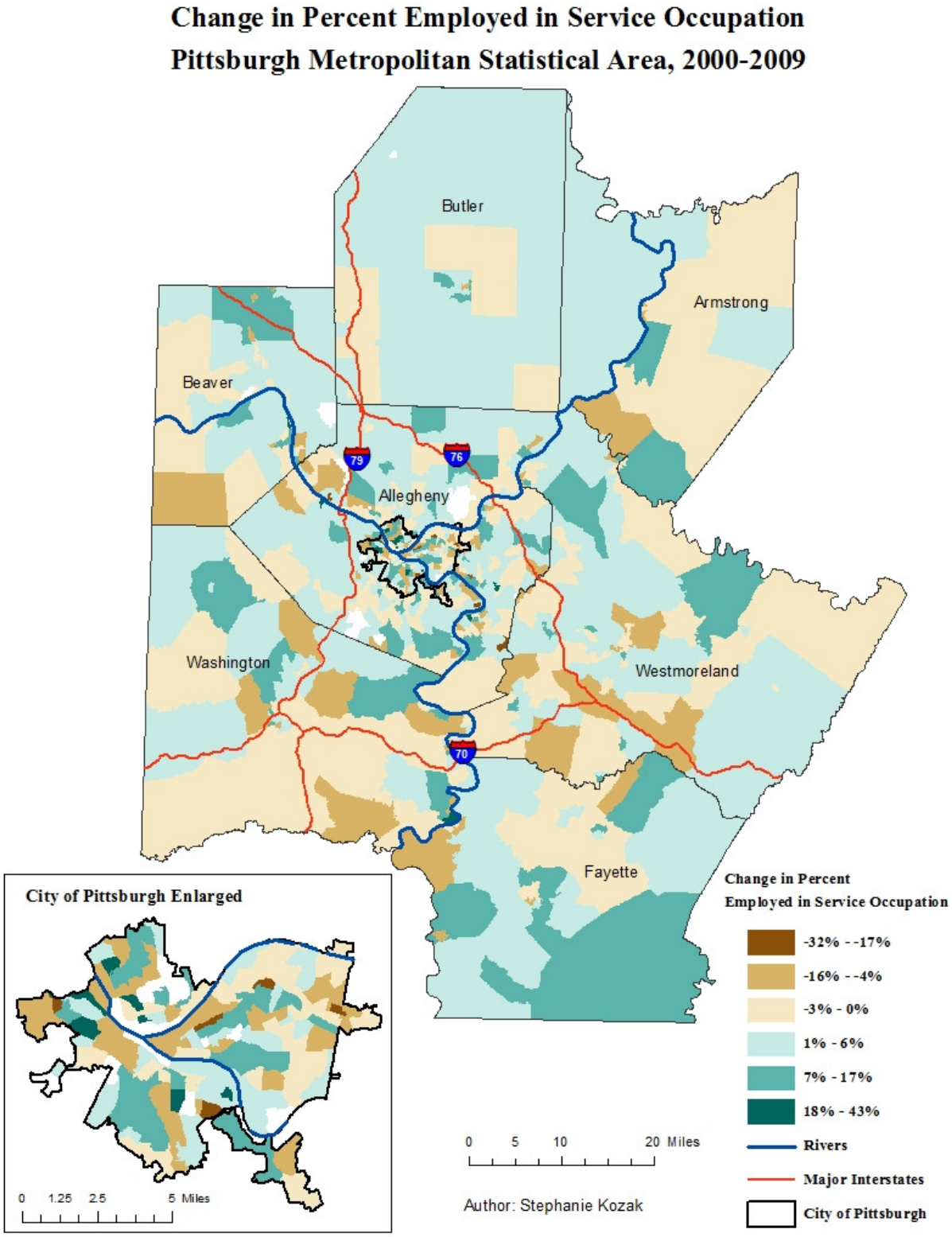


Figure 4.21. Change in Percent Employed in Service Occupation per Census Tract in Pittsburgh MSA, 2000-2009.

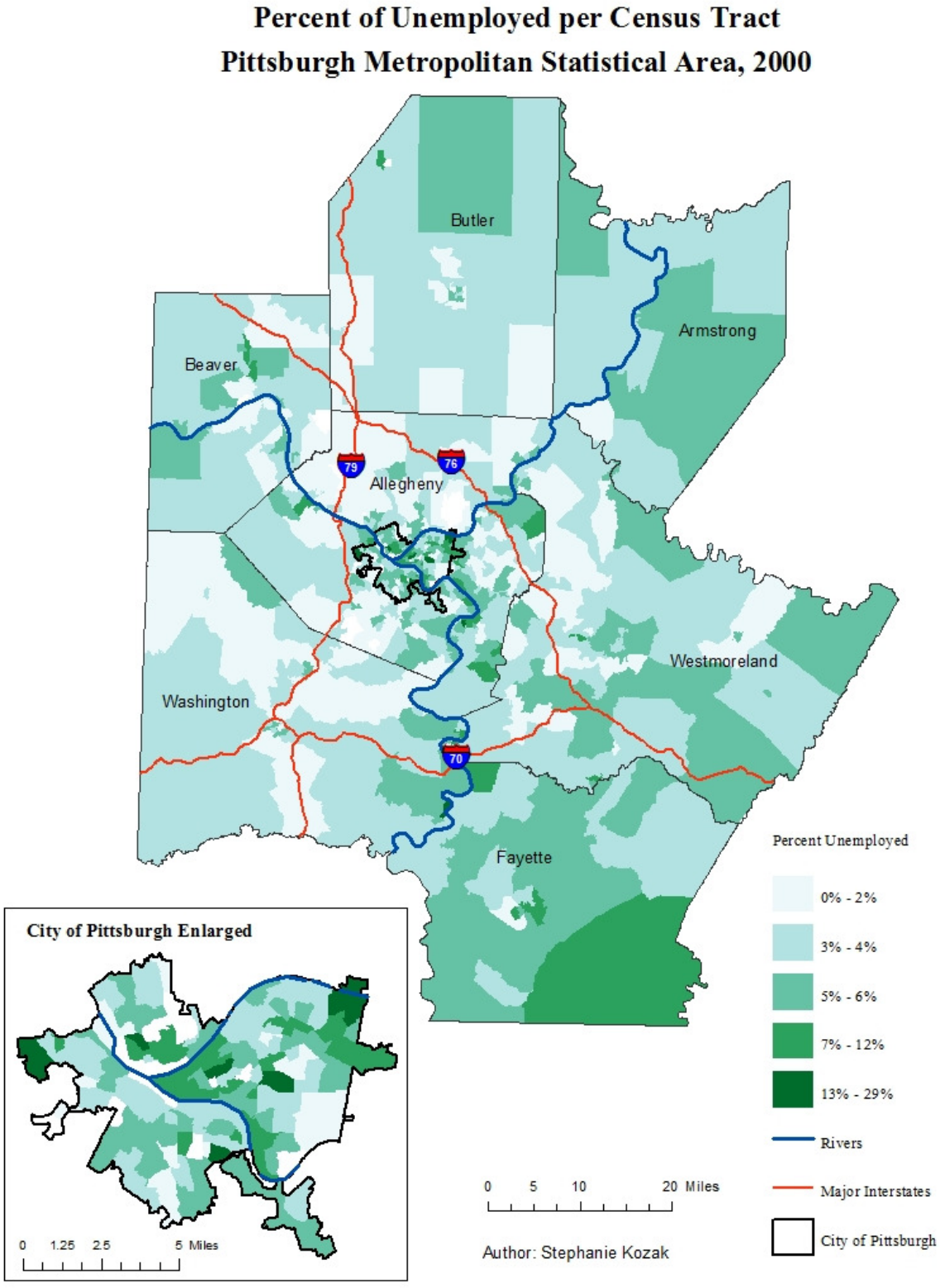


Unemployment

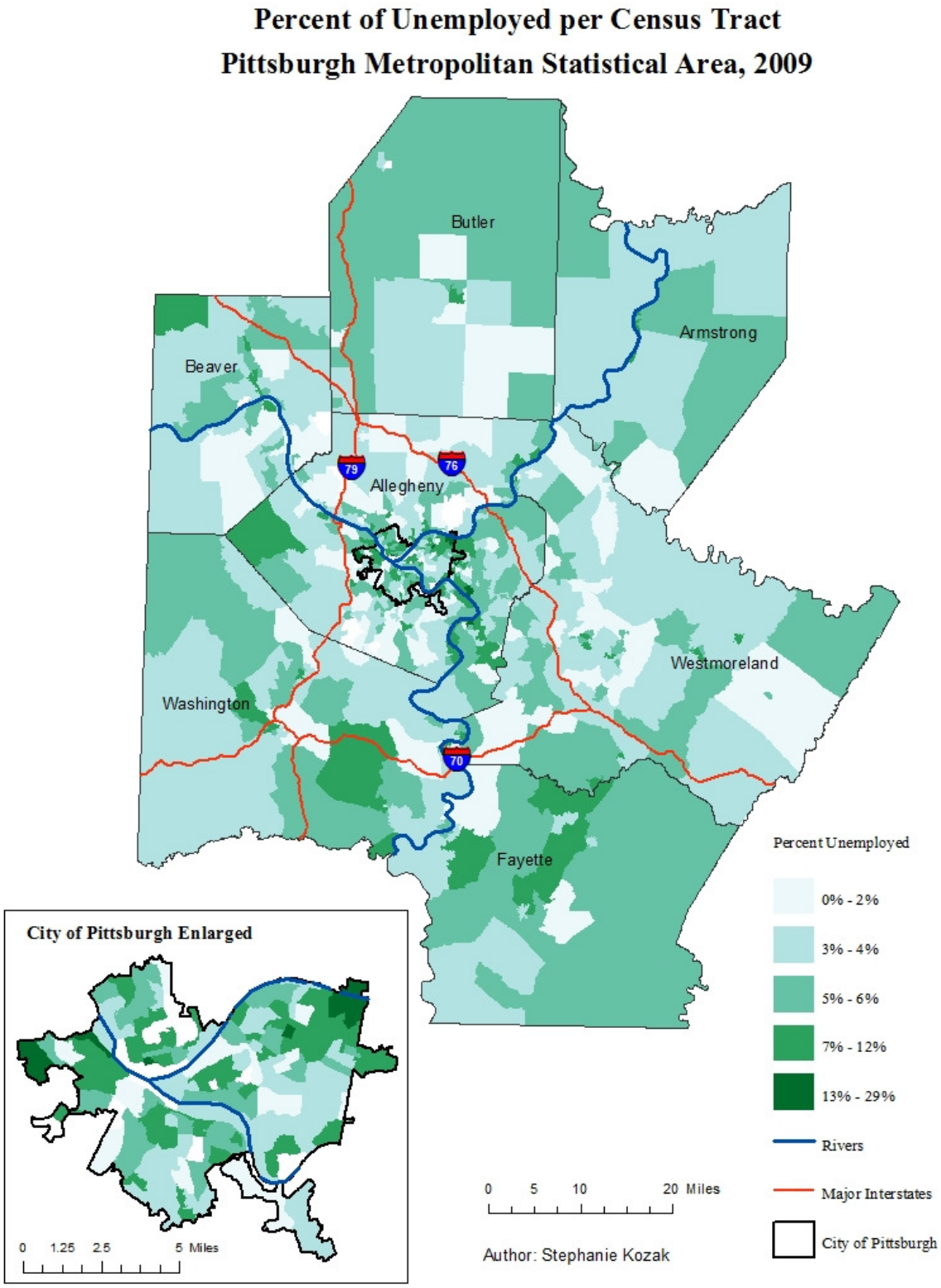
Levels of unemployment provide information about the economic vitality of the region. In 2000, the unemployment rate for the area was at 5.8%, two points higher than the national average (Bureau of Labor Statistics 2000). The highest levels of unemployment were in census tracts located in the city, particularly in some of the lower-income neighborhoods northeast of downtown (Figure 4.22). The suburbs had some of the lowest rates of unemployment. The unemployment rate dropped to 4.2% in 2009, which was considerably lower than the national average of 9.3% (Bureau of Labor Statistics, 2009). While overall the tracts within the city have lower unemployment rates in 2009, this area still has some of the highest rates in the metro area while the suburbs continue to have some of the lowest rates (Figure 4.23). The area east of the city with a large minority population and lower income also has a higher concentration of unemployed workers compared to the rest of the metro's suburbs.

The tracts with the largest declines in unemployment rates were primarily downtown in areas that have experienced extensive development between 2000 and 2009 (Figure 4.24). The lower to middle-income neighborhoods north of the Oakland and Squirrel Hill neighborhoods experienced increases in unemployment. Outside of the city, most tracts had a slight increase in unemployment while the rural areas saw a drop in rates. Unemployment patterns suggest that the economy improved during the first decade of the 21st century, especially compared to other areas of the country (Delano 2011).

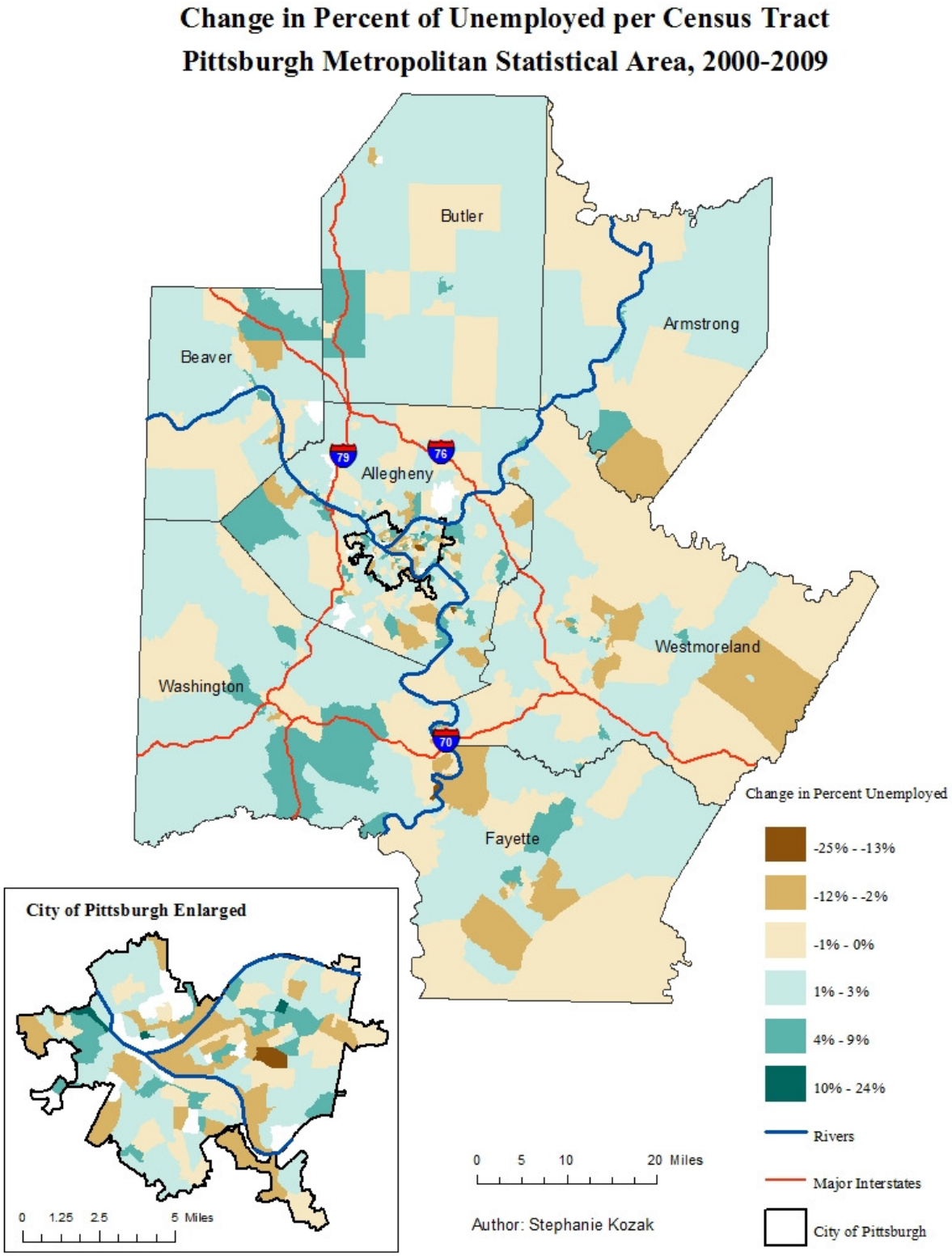
4.22. Percent of Unemployed per Census Tract in Pittsburgh MSA, 2000.



4.23. Percent of Unemployed per Census Tract in Pittsburgh MSA, 2009.



4.24. Change in Percent of Unemployed per Census Tract in Pittsburgh MSA, 2000-2009.



4.3.3 Housing Changes

In order to contextualize the changes brought about by gentrification, it is important to understand what the housing market is like in Pittsburgh and how it has changed over the study period. In Chapter 5 I look more closely at the geography of affordable housing and low-income groups in the region. What follows is an analysis of the residential geography of the area, which shows that there are distinct differences between what is happening within the city and in the rest of the metro area.

Table 4.4. Housing Statistics for the City of Pittsburgh and Pittsburgh MSA between 2000 and 2009.
(Source: Census Bureau 2000, 2009)

	Number of Units	Percent Vacant	Percent Renter Occupied	Median Gross Rent[7]	Median Home Value
City of Pittsburgh					
2000	163,366	12%	47.9%	$644	$76,851
2005-2009	165,294	16.1%	47.9%	$687	$83,100
Change	1,928	4.1%	0%	$43	$6,249
Pittsburgh MSA					
2000	1,078,481	7.7%	28.5%	$556	$109,420
2005-2009	1,107,310	9.1%	30.4%	$644	$117,900
Change	28,829	1.4%	1.9%	$88	$8,480

[7] Median gross rent and median home value for 2000 have been adjusted for inflation to 2009 levels.

Housing Units

It is not surprising that the surrounding metro area has considerably more housing units, 942,016, than the city with 165,294 units (Table 4.4). In 2000, most of those units were spread throughout the suburbs and rural areas, with the exception of the Squirrel Hill neighborhood within the city (Figure 4.25). By 2009, the development near the downtown area and across the Monongahela River in the Southside Flats area had greatly increased the number of units in those areas (Figure 4.26) and both neighborhoods had the greatest increase in number of units within the city (Figure 4.27). Other tracts within the city saw a slight increase in units, except for the lower-income, minority neighborhoods that experienced a loss. Outside of the city, most of the decline in units occurred to the south in the older suburban neighborhoods and in areas of eastern Armstrong and Westmoreland counties. The wealthy suburbs northeast of the city continue to dominate the growth in the area as these tracts experienced the largest increases in number of units. This pattern is not surprising considering the growth of units between 2000 and 2009 occurred within the city at a rate of 1.18%, compared to an increase of 2.67% within the entire metro.

Figure 4.25. Number of Housing Units per Census Tract in Pittsburgh MSA, 2000.

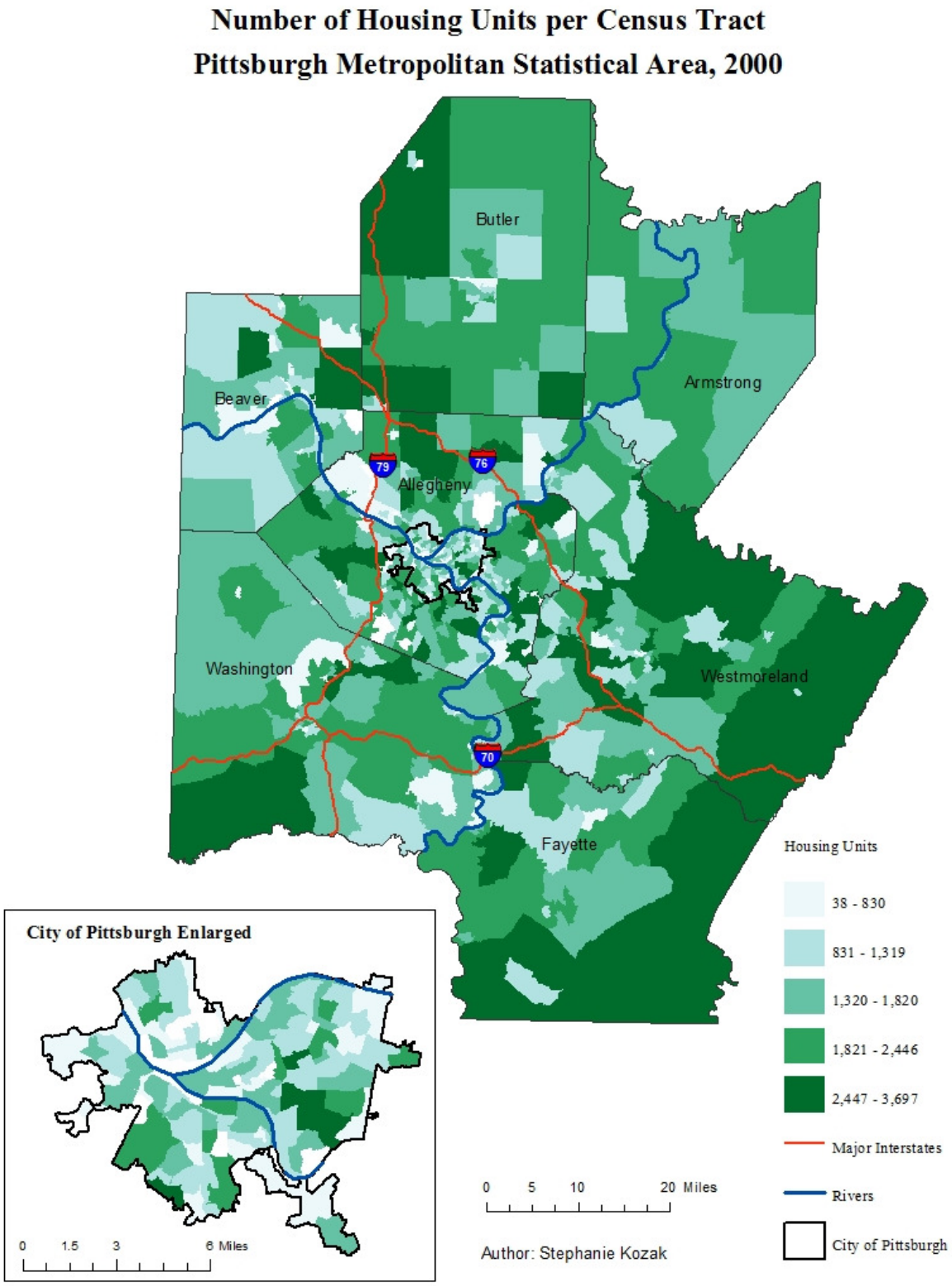


Figure 4.26. Number of Housing Units per Census Tract in Pittsburgh MSA, 2009.

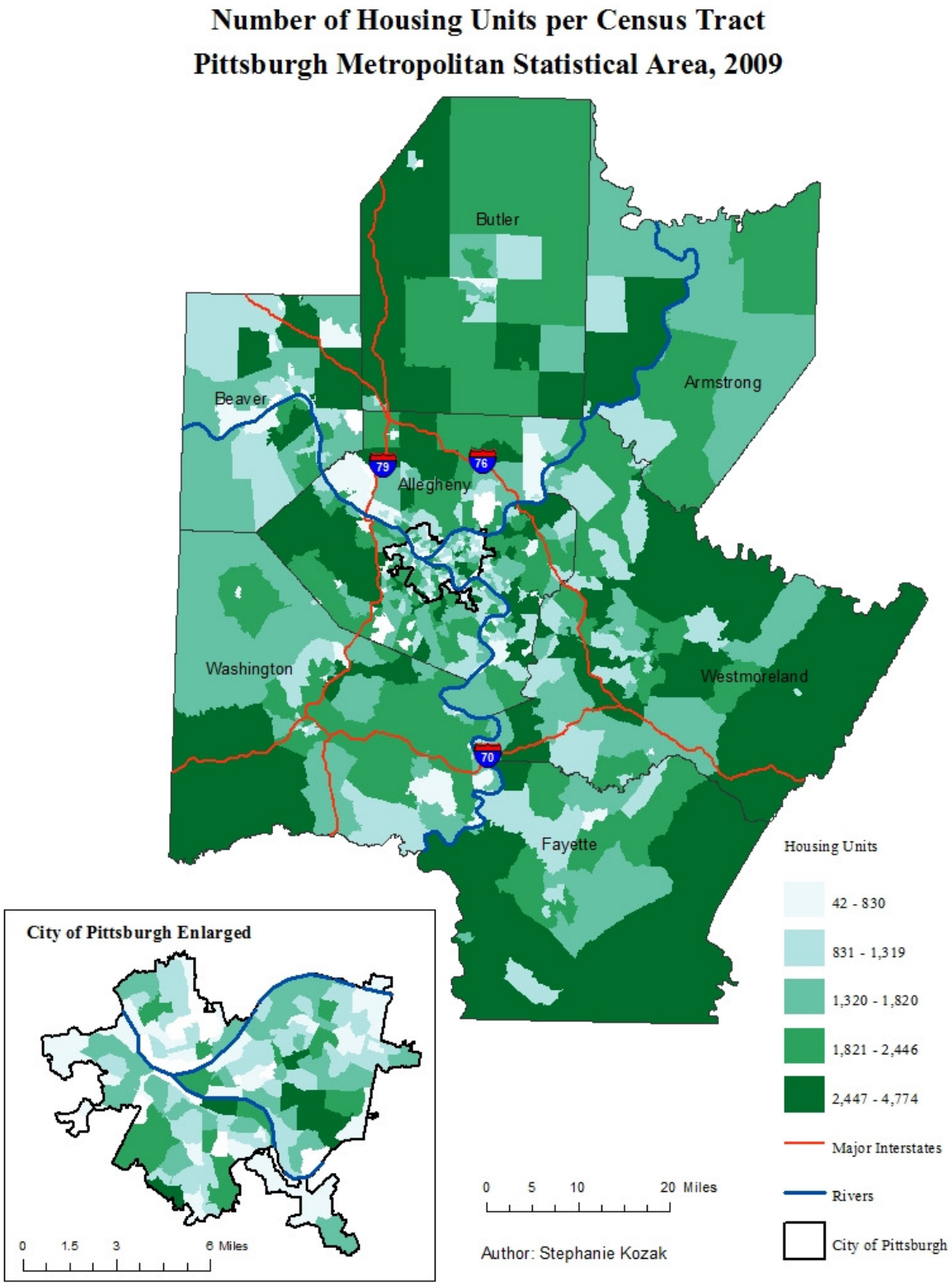
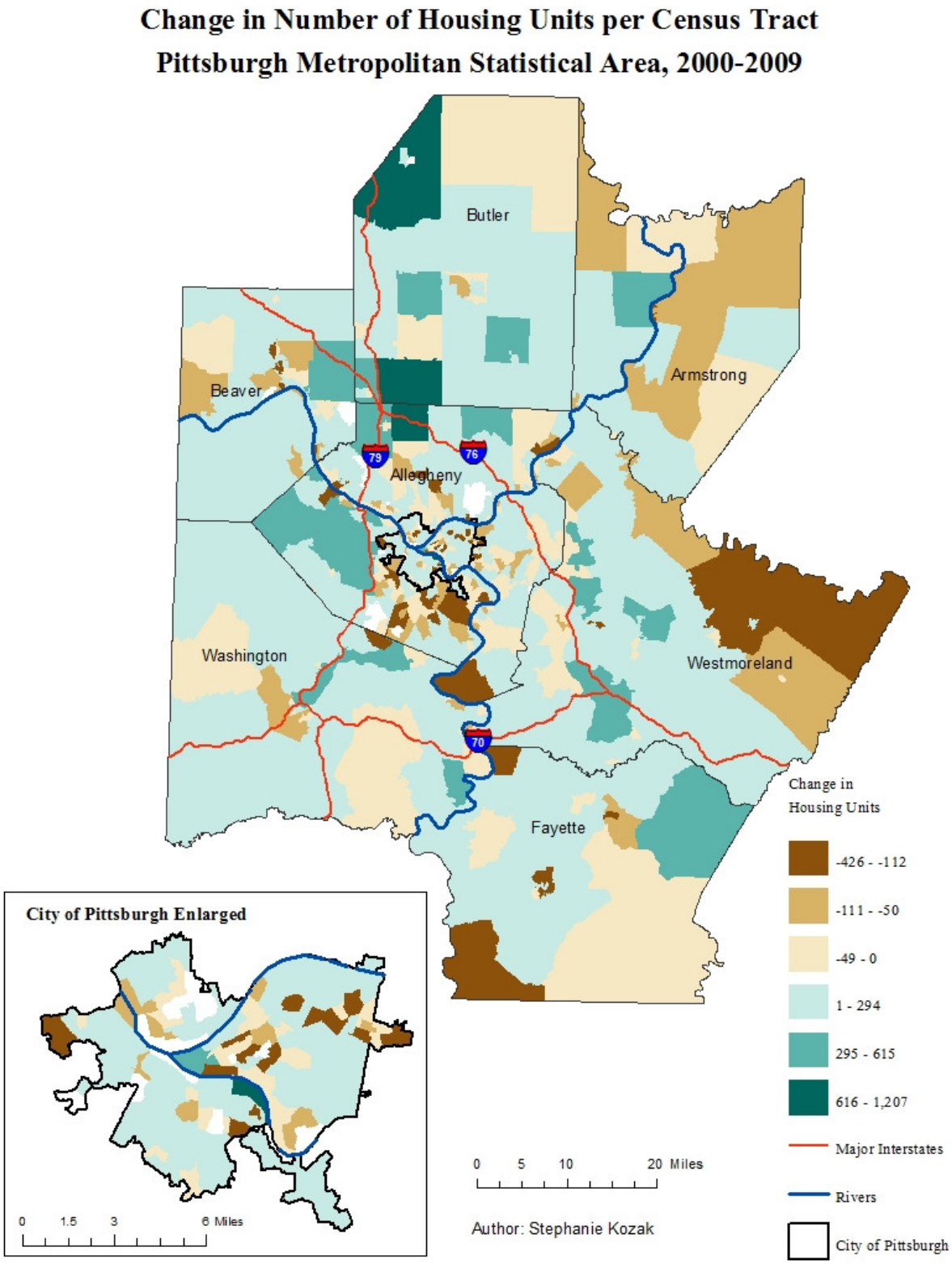


Figure 4.27. Change in Number of Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.



Vacancy Rates

While the MSA has more units to fill, there is not nearly as large of a problem filling those units as there is within the city. In 2000, the metro area had a vacancy rate of 7.7%, while the city had a rate of 12%. The map of vacancy rates clearly shows the tracts with the largest proportion of vacant units are located in the city, especially in the Golden Triangle area and in the lower-income neighborhoods of the east side (Figure 4.28). There are also some tracts within the rural areas that have some of the higher rates in the MSA. The vacancy rate within the city increased by 2009, with many more tracts showing higher rates except for the wealthier neighborhoods in the east and some of the residential areas in the south (Figure 4.29). However, the suburbs begin to illustrate an increase in vacancy rates, possibly due to the national housing crisis, and that some of the neighborhoods along the rivers also show higher rates.

The high vacancy rates within the city are an important part of why the metro has a soft housing market. The state of the housing market has a large impact on how gentrification plays out in Pittsburgh and works to create a buffer in which rents and, to a larger extent, home values rise more slowly than expected in gentrifying tracts because of the high vacancy rates. This will insulate the supply of affordable housing from quickly declining in those neighborhoods until vacancy rates drop. Chapter 6 will explore the effect of the soft housing market on gentrification and affordable housing in Pittsburgh in greater depth.

Figure 4.28. Vacancy Rate per Census Tract in Pittsburgh MSA, 2000.

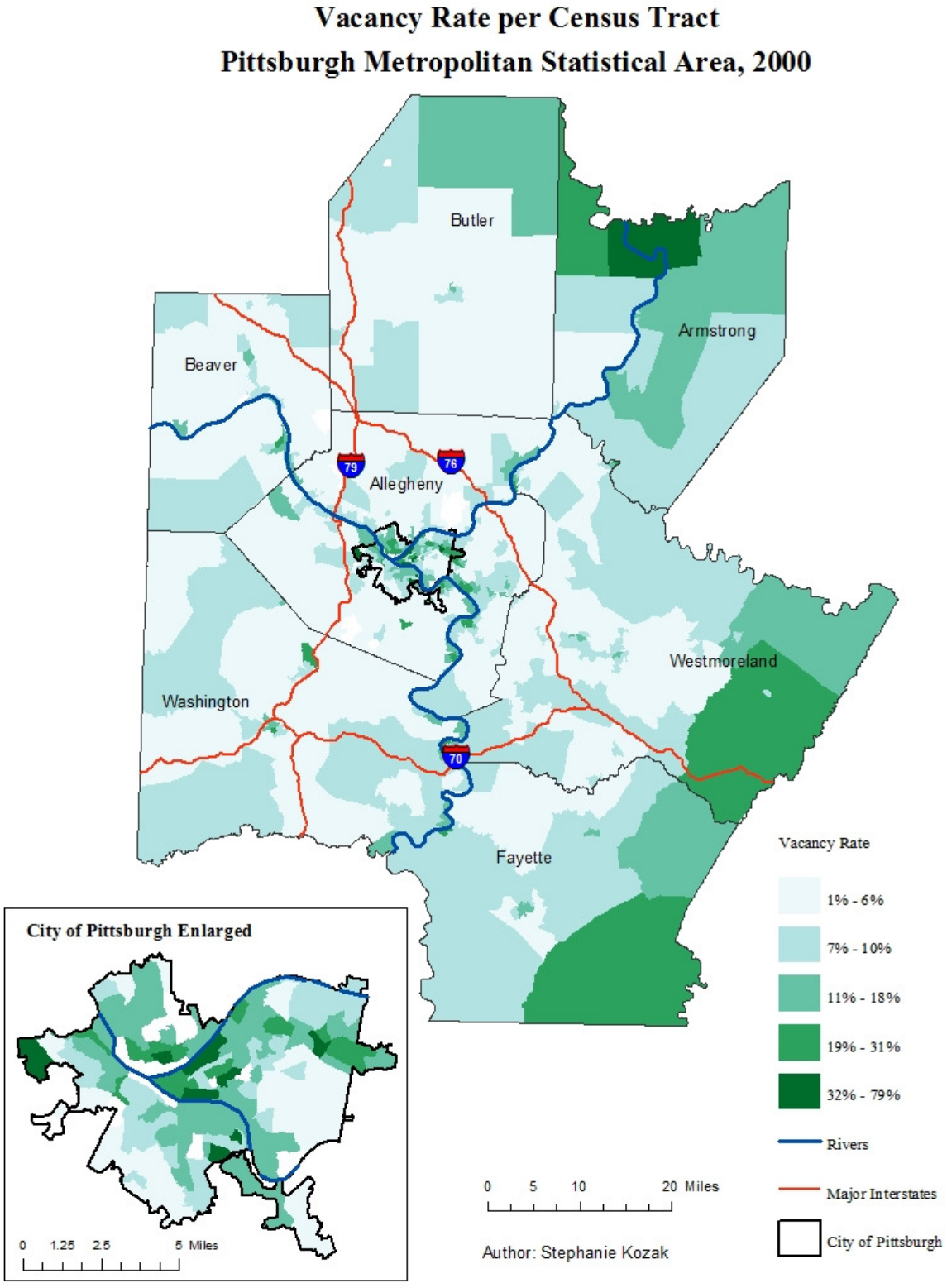


Figure 4.29. Vacancy Rate per Census Tract in Pittsburgh MSA, 2009.

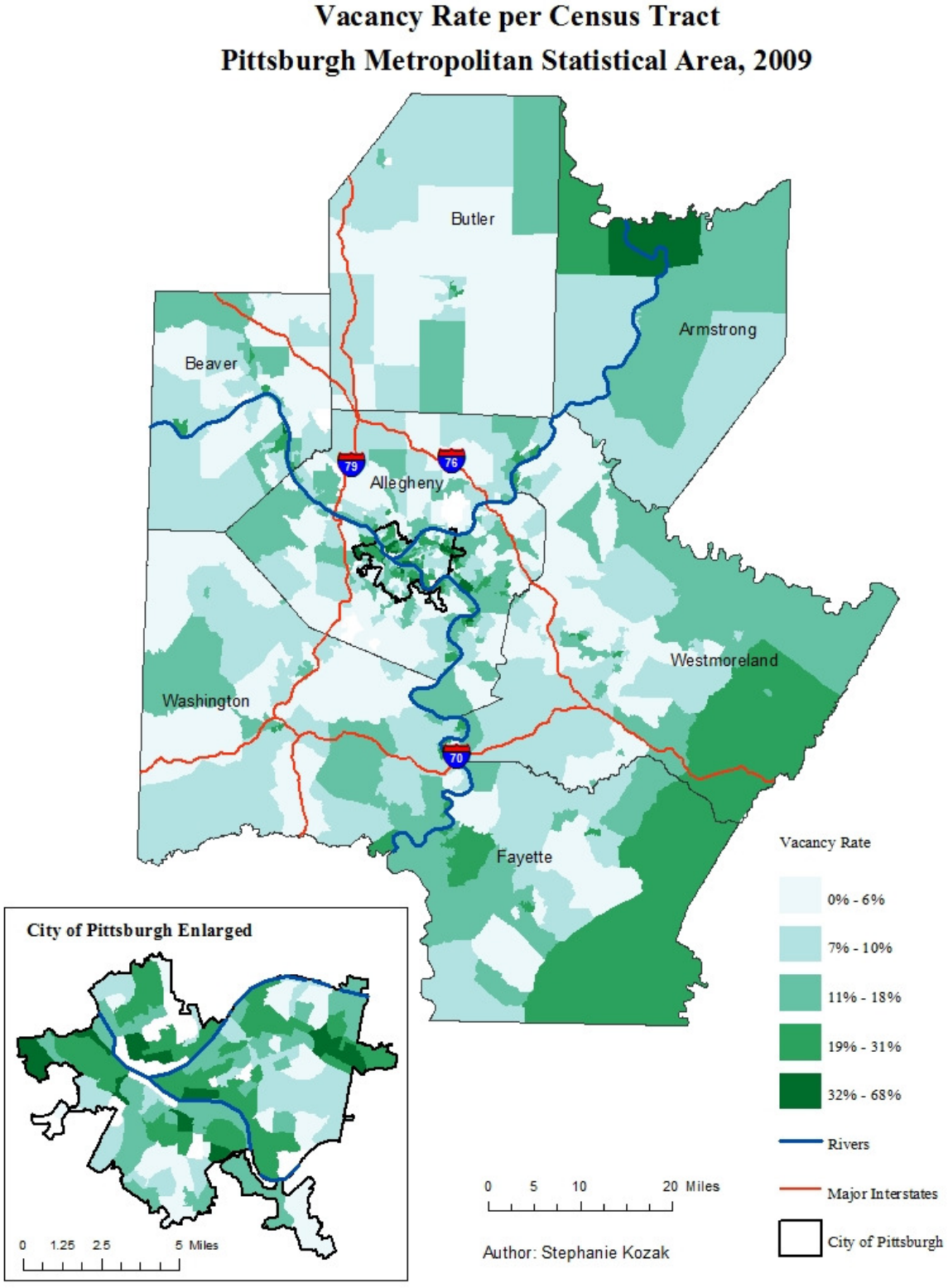
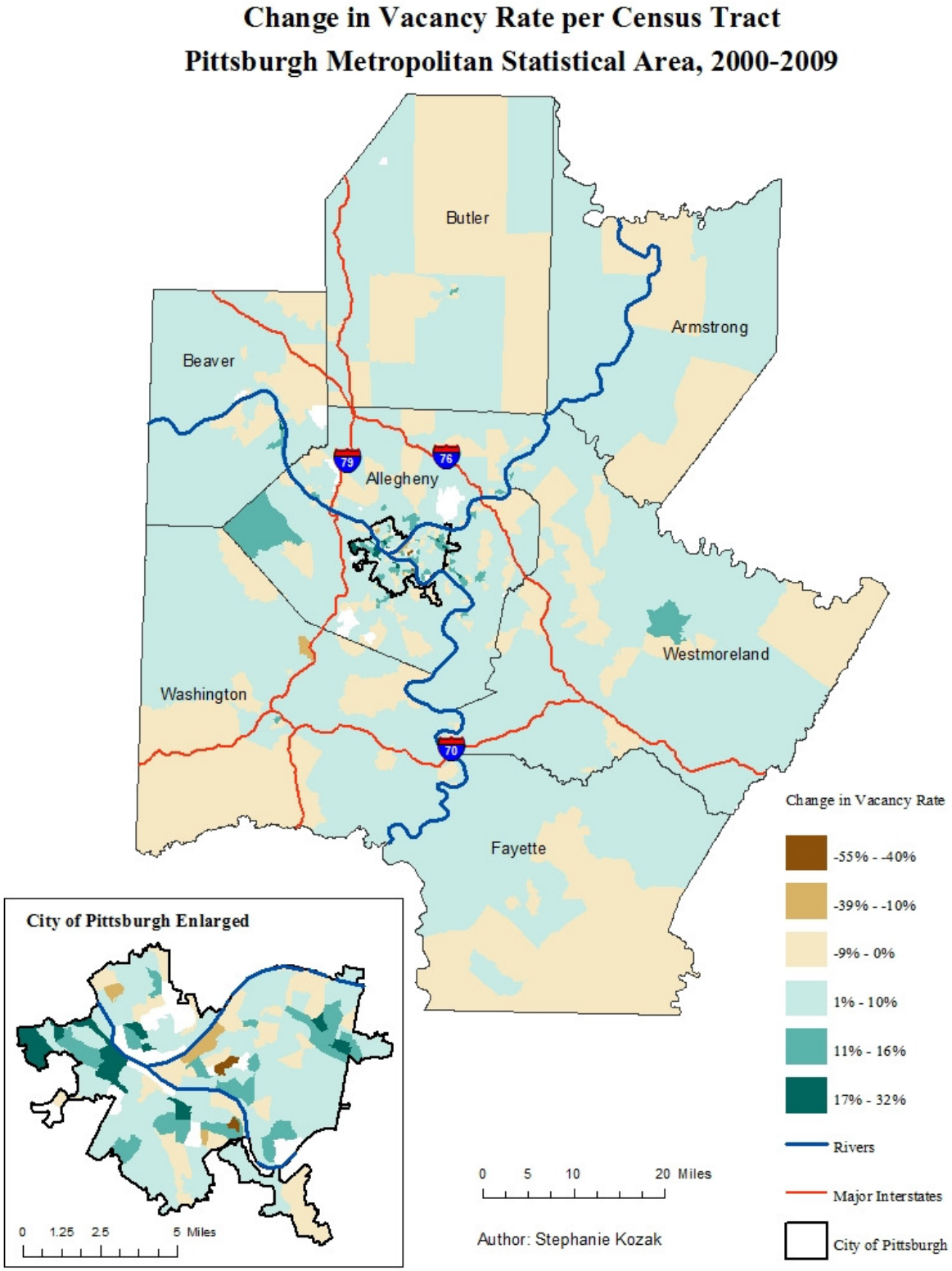


Figure 4.30. Change in Vacancy Rate per Census Tract in Pittsburgh MSA, 2000-2009.



Looking at change between 2000 and 2009, it is evident that the vacancy rates increased most within the city, but that there were slight increases throughout the majority of the suburban areas (Figure 4.30). The increase in vacancy rates throughout the MSA, which rose from 7.7% in 2000 to 9.1% in 2009, indicates that the entire area has a weak housing market. The rise in vacancy rates can be attributed to the decline in population throughout the metro. Higher vacancy rates drive down housing prices and rents due to an increase in supply, especially within the city. The soft housing market with high vacancy rates provides a temporary buffer for low-income residents in gentrifying neighborhoods until vacancy rates lower to a point at which a tighter housing market can raise property values.

Rental Market

Neighborhoods with the highest proportions of renters are also typically found in the city, as well as in the neighborhoods to the east and along the rivers flowing out of Pittsburgh. This pattern is similar to the rental housing market in other cities. The growth in owner-occupied homes in the suburbs was largely fueled by federal loan programs that favored development in the new suburbs after World War II (Schwartz 2006). Coupled with the flight of middle-income residents from the city that left behind lower-income city dwellers that had few options for housing other than renting, the suburban growth has caused a distinct residential pattern of more home ownership in the suburbs and higher rental rates in the city. In 2000, many renters were located on the east side of the city, particularly in lower- to middle-income areas, downtown, and in neighborhoods around the universities (Figure 4.31). The only change that appears by 2009 is that there were some areas within the suburbs with higher rates of renters (Figure 4.32). The tracts with the lowest proportions of renters are found in the outer suburbs of the metro area where there is a larger amount of residents who want to own their own homes rather than rent.

There is no apparent difference in the changes from 2000 to 2009 between the outer metro area and the city (Figure 4.33). There are tracts both within and outside of the city that have larger changes in either direction. Most of the increases are in tracts that had fewer renters in 2009, indicating that rental properties appeared in neighborhoods that had relatively little stock before. This phenomenon could also be attributed to national changes in the housing market that forced many former home owners looking for rental properties after their homes were foreclosed (Flanagan and Wilson 2013). The large proportion of renters has implications for how the gentrification process will affect the availability of affordable housing in the city. Chapter 6 will show that increasing rents have the largest effect on the reduction of affordable units in gentrifying neighborhoods. If a large proportion of residents in the city are renters, gentrification is going to greatly reduce the availability of affordable housing for this cohort. In addition, renters are unable to capitalize on increased property values in gentrifying neighborhoods because they do not own the structure in which they live.

Figure 4.31. Percent of Renter-Occupied Housing Units per Census Tract in Pittsburgh MSA, 2000.

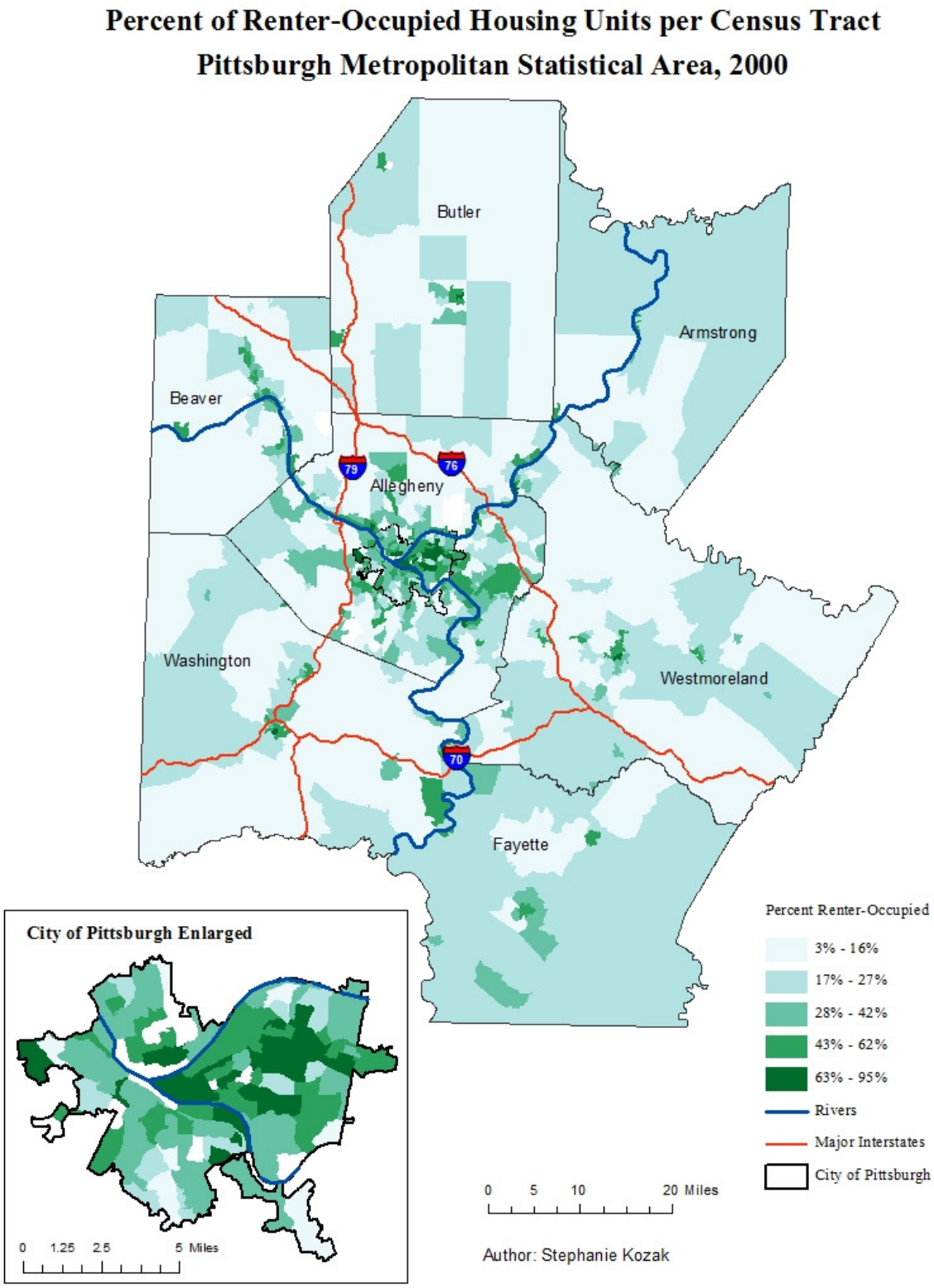


Figure 4.32. Percent of Renter-Occupied Housing Units per Census Tract in Pittsburgh MSA, 2009.

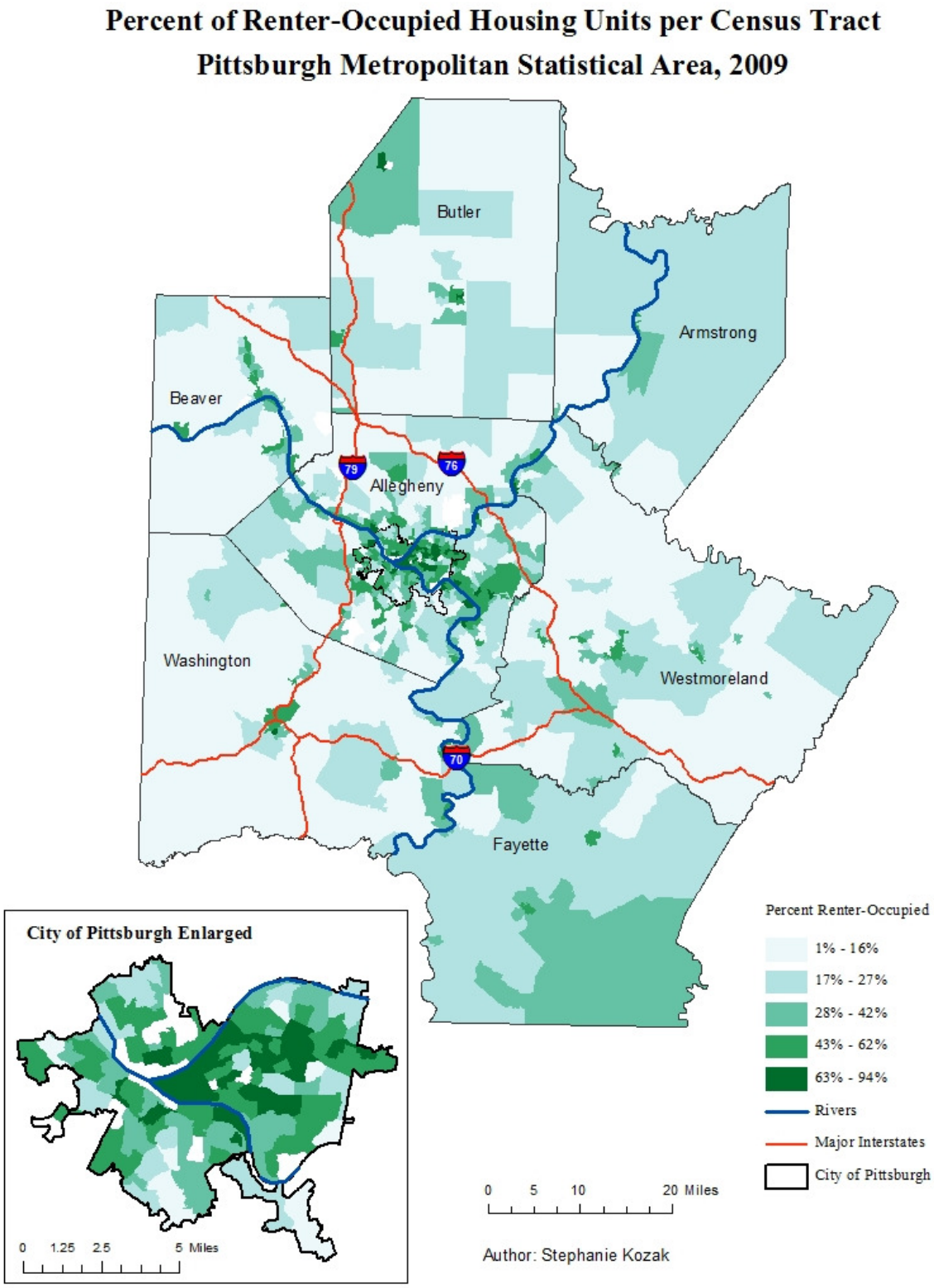
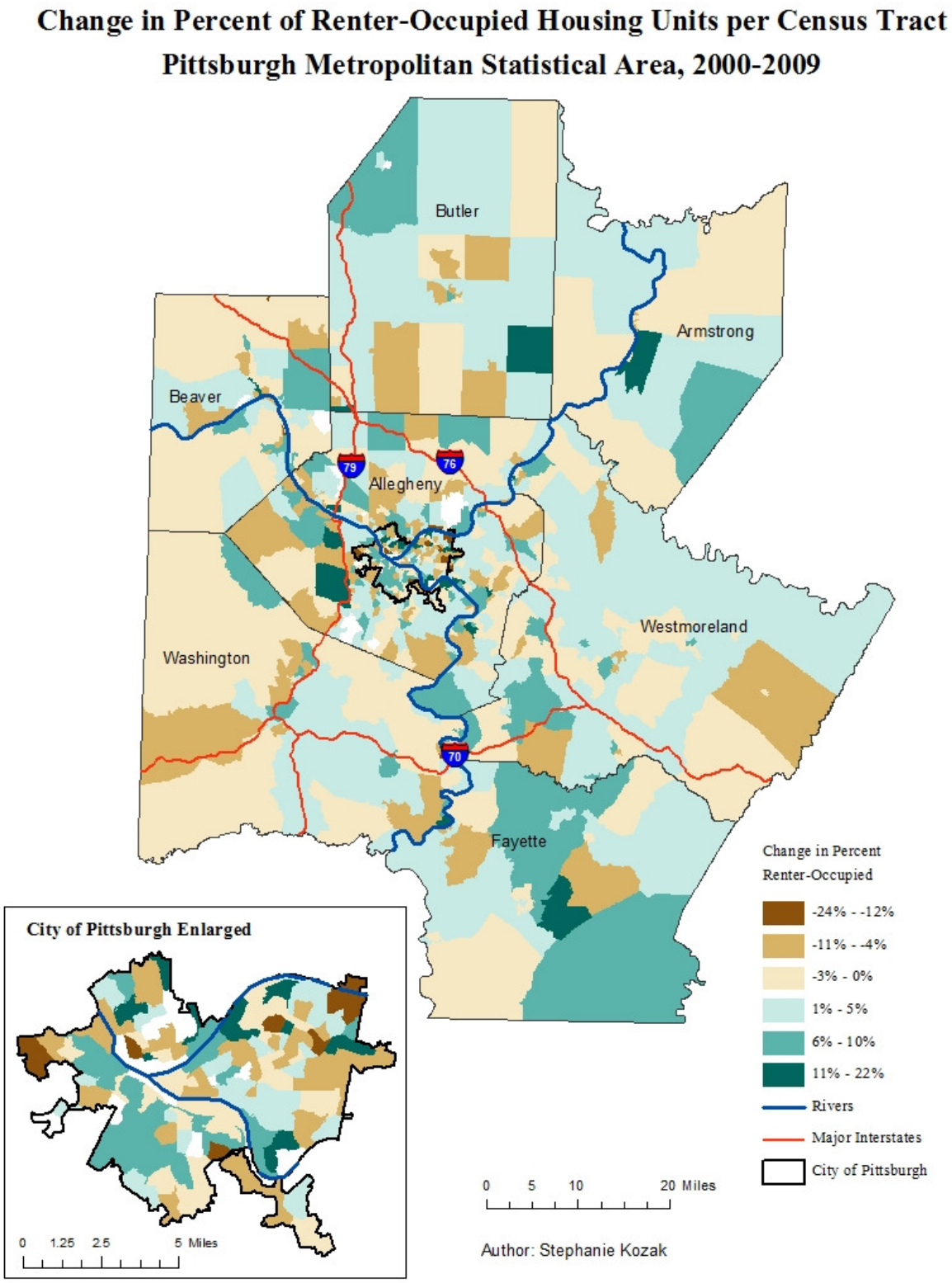


Figure 4.33. Change in Percent of Renter-Occupied Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.



Rents and Home Values

The highest home values and rents in 2000 were in the suburbs northwest of the city along I-76 and I-79, which had the highest median family incomes, along with the wealthy Shadyside and Squirrel Hill neighborhoods in the east end of Pittsburgh (Figures 4.34 and 4.37). The lower home values were found throughout most of the city, along the Monongahela River, and in rural areas in the east of the MSA. The lowest rents, on the other hand, were not found in the city, but in the rural areas. This pattern can be attributed to the higher proportion of renters in Pittsburgh compared to the surrounding metro where approximately one-half of units in the city are renter-occupied, compared to less than a third in the MSA (Table 4.4).

In 2009, tracts with higher home values and gross rents are found in the Strip District, Stanton Heights/Highland Park area, and the Southside Flats within the city (Figures 4.35 and 4.38). The higher property values in the gentrifying areas reinforce the trend seen in other variables (e.g., median household income and vacancy rates) that the development projects in these areas have brought in new residents. In essence, rents increased downtown while they declined in the suburbs (Figure 4.36). Home values increased within the city, especially near the downtown area, along the rivers, around the universities, and north of the rivers (Figure 4.39). The higher home values along the river reflect the brownfield projects that resulted in new mixed-use communities that are attracting attention in the city. Most of the declines in home values occurred in tracts south and east of the city, the rural areas towards the outer edges of the MSA, and along the Allegheny and Monongahela Rivers.

The entire MSA experienced an increase in both median gross rent and median home values between 2000 and 2009. Compared to the rest of the country, Pittsburgh's housing market fared better than many other cities during the 2007-2009 recession (Schooley 2013). Pittsburgh was cited as one of the first cities to recover from the recession, largely due to a strong local

economy that has drawn people to the area and the agglomeration of business services (*Tribune Review* 2012). While there was not much of a difference in rents between the metro area and the city, there are depressed home values in the city compared to the suburbs. The spatial variation of home values is caused by the growth in the suburbs that created a strong, local housing market, while the high vacancy rates in the city due to the flight of city residents during the 20th century has created a very weak housing market downtown. Most of the residents that were left within the city were low-income renters, so there is less of a demand for owner-occupied housing in Pittsburgh that, in turn depresses the home values in those neighborhoods. The analysis of the gentrification process in Chapter 6 will show that the differences between the home values and rents in the suburbs and the city affect how gentrification reduces the availability of affordable housing.

Figure 4.34. Median Gross Rent per Census Tract in Pittsburgh MSA, 2000.

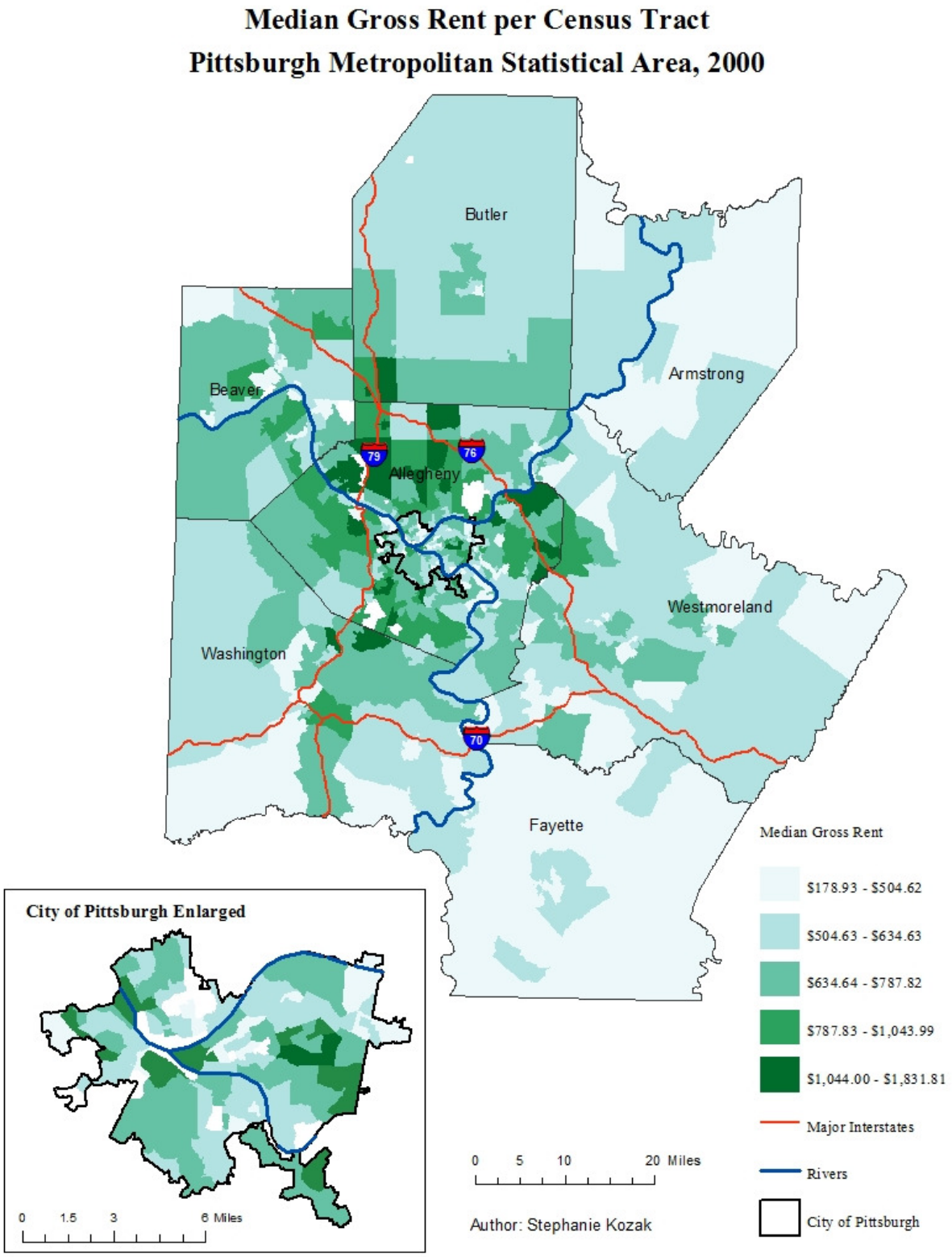


Figure 4.35. Median Gross Rent per Census Tract in Pittsburgh MSA, 2009.

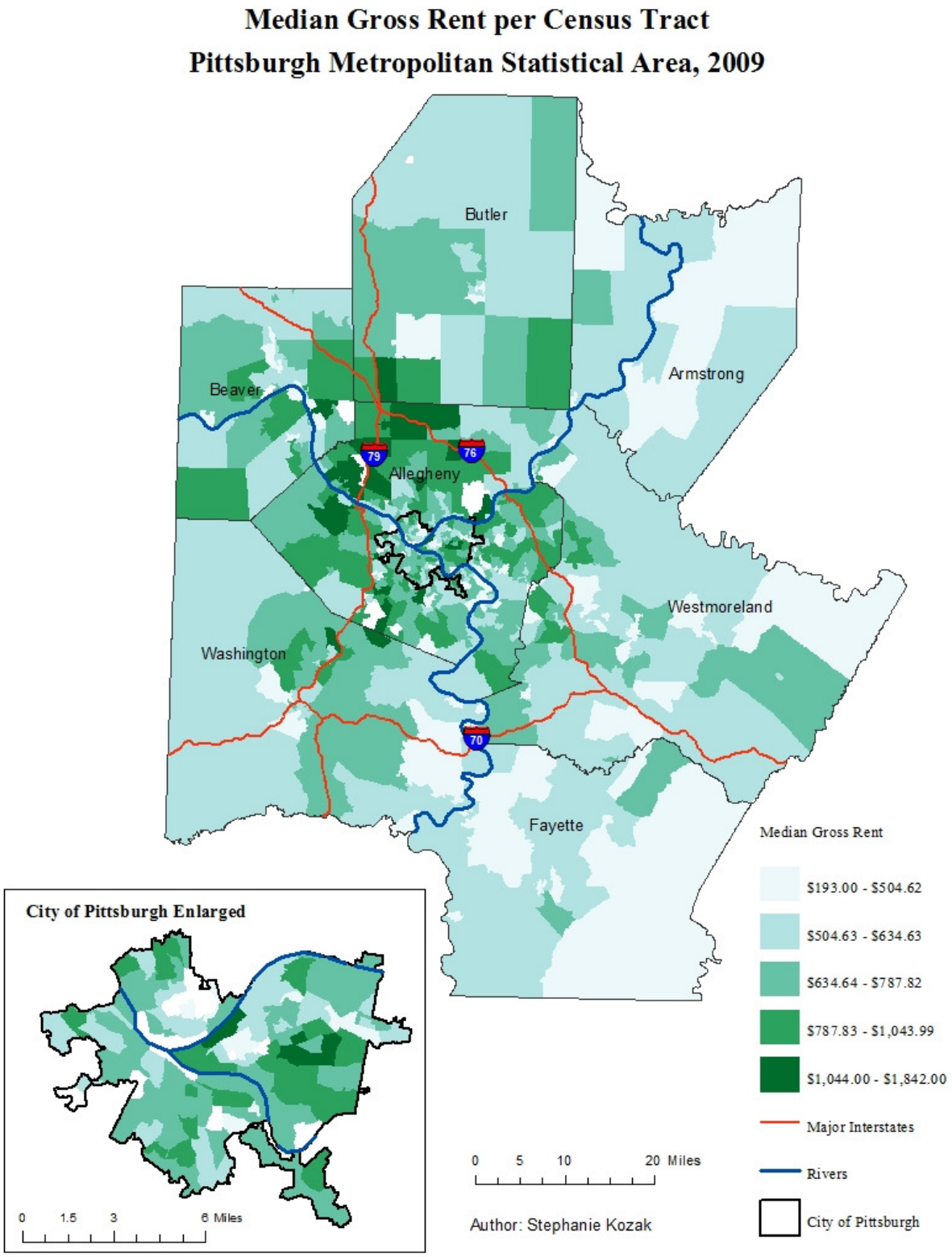


Figure 4.36. Change in Median Gross Rent per Census Tract in Pittsburgh MSA, 2000-2009.

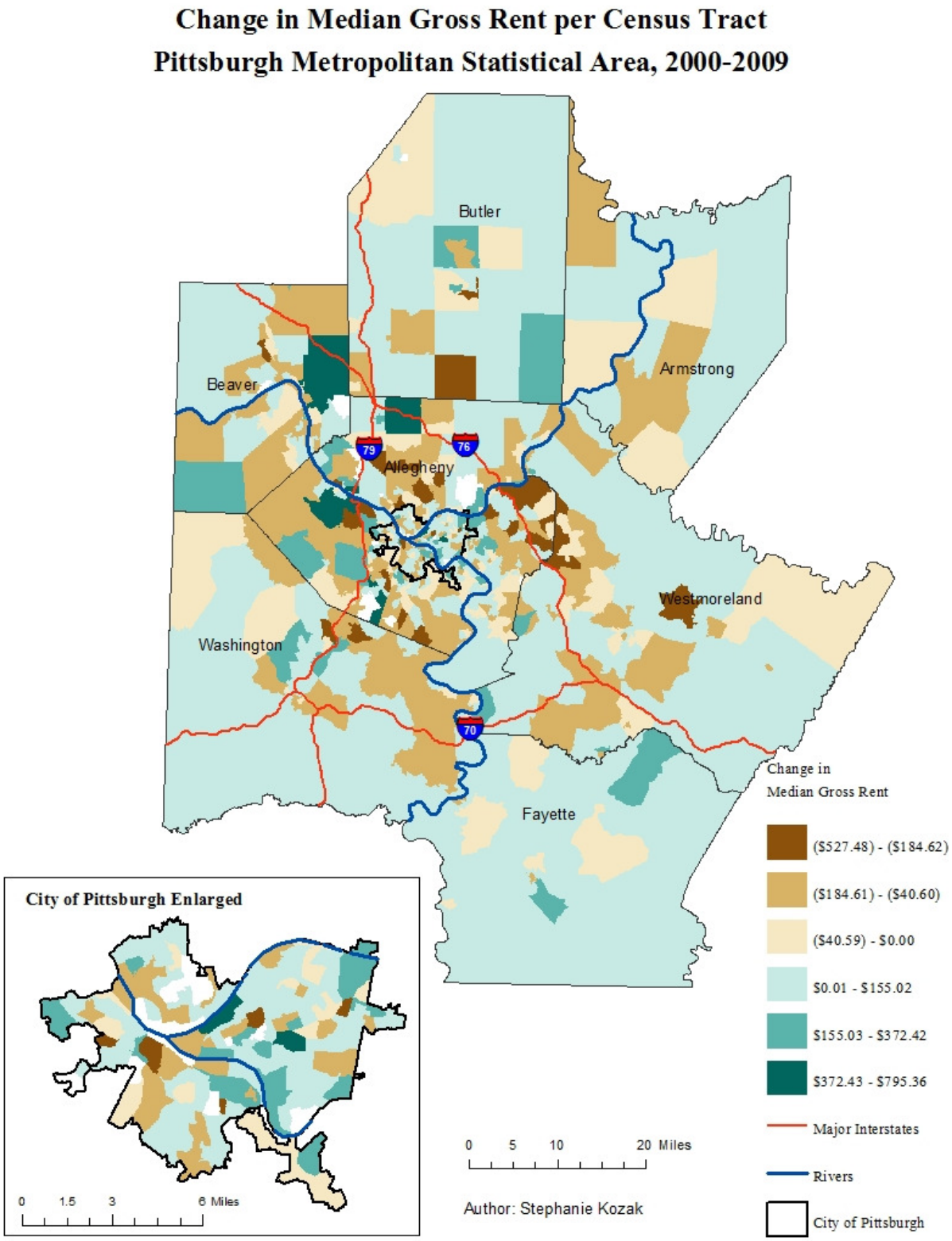


Figure 4.37. Median Home Value per Census Tract in Pittsburgh MSA, 2000.

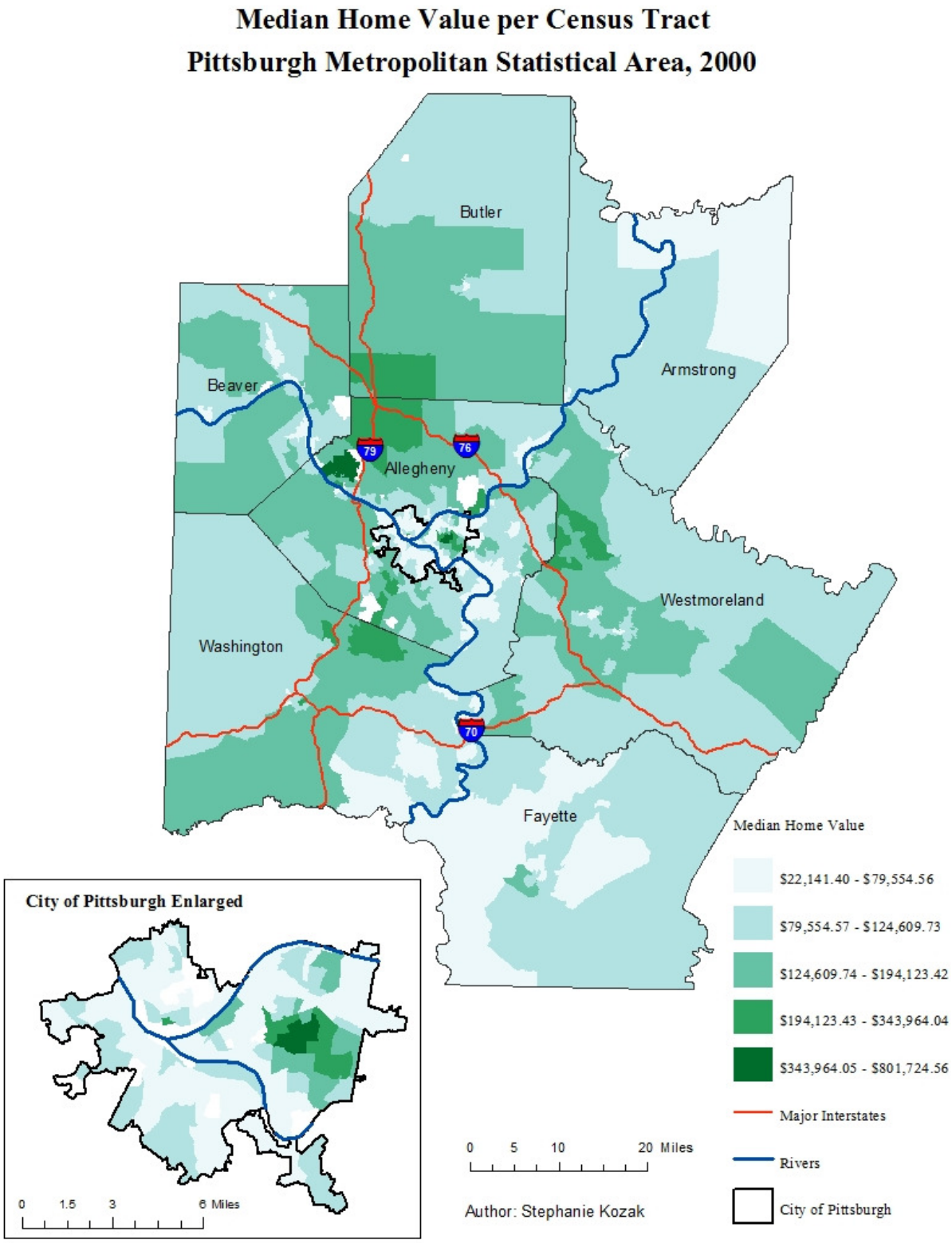


Figure 4.38. Median Home Value per Census Tract in Pittsburgh MSA, 2009.

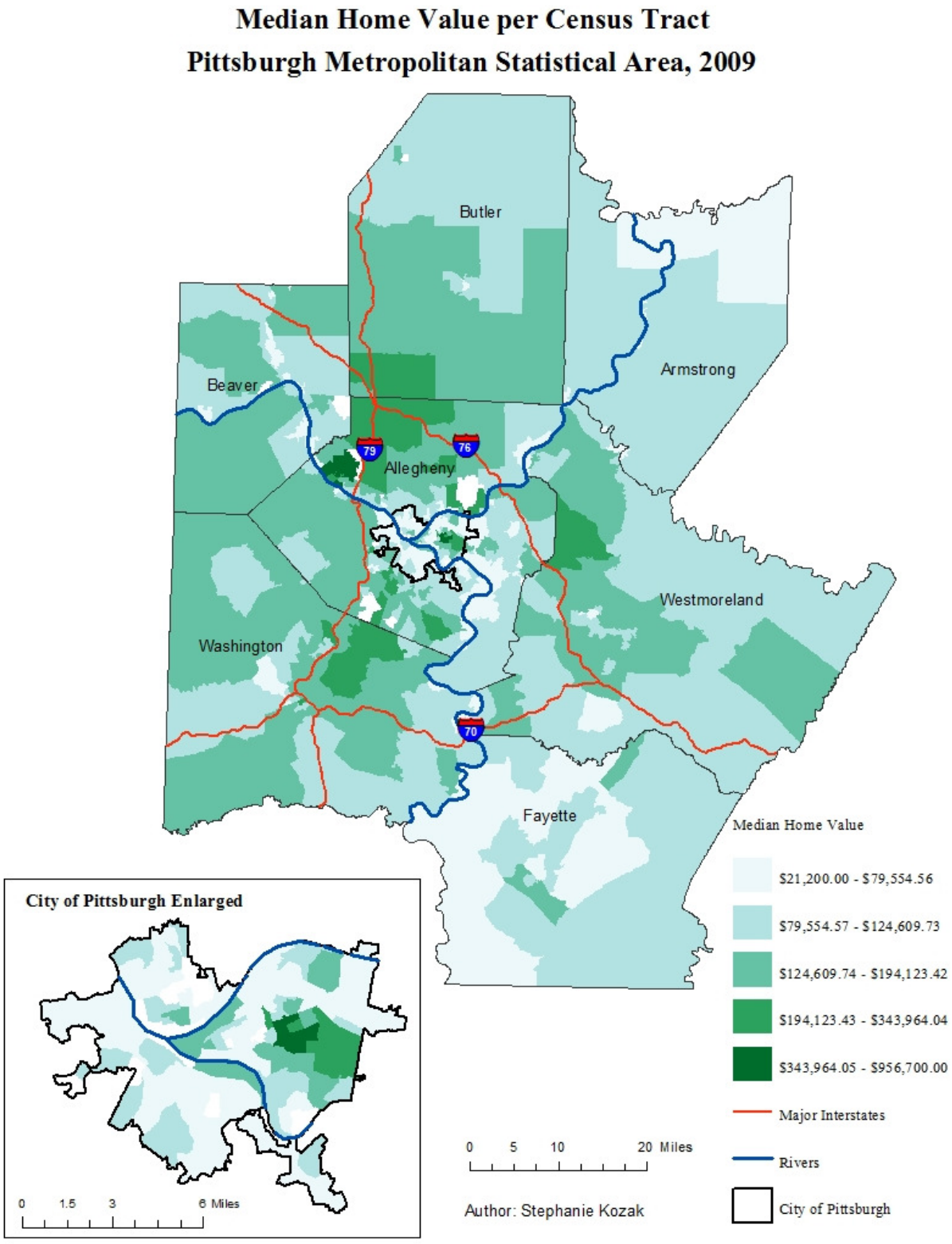
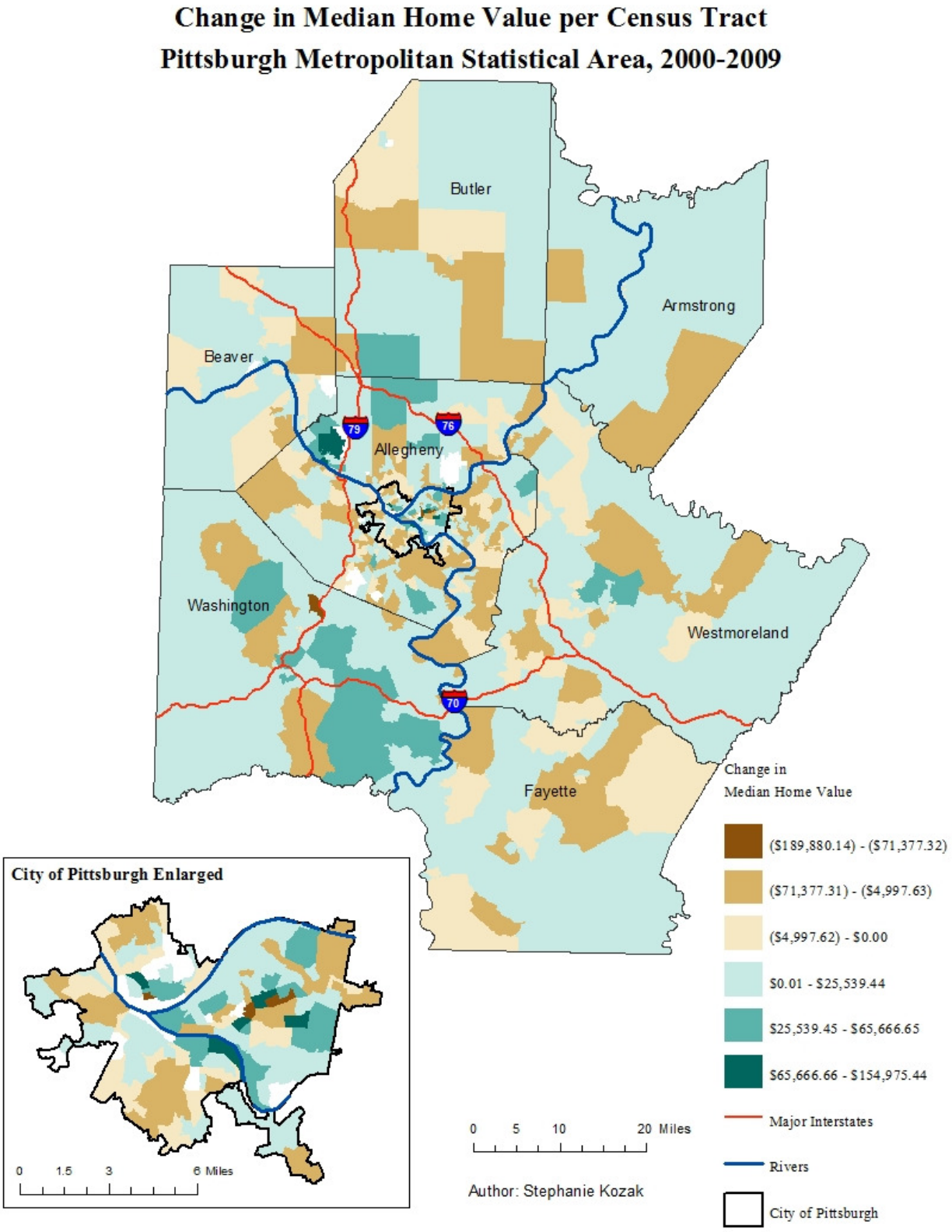


Figure 4.39. Change in Median Home Value per Census Tract in Pittsburgh MSA, 2000-2009.



4.5 Towards a New Urban Form

A clear urban form emerges when looking at the social, economic, and housing variables for the Pittsburgh MSA. There are stark differences between the city, suburbs, and rural areas. While the majority of the region's population lives in the suburbs, the city still has the highest population densities. This pattern creates different problems for development within the city because higher population densities mean there is less existing space for development. Rather than moving into new areas, improvements will need to be made to or in place of existing structures because the value of the land will promote development that would allow owners to increase the actual rent received in these areas (Smith 1987). Those improvements facilitate gentrification because there are already residents in those neighborhoods that undergo development that can then lead to displacement. Exceptions to this pattern include brownfield development, especially along riverfront areas, where there was no residential use before development. Brownfield development, however, may increase interest in the city, which could help spur gentrification in other areas of the city. As more people begin to move into these mixed-use developments, like Herr's Island, development could spill over into neighboring tracts that would gentrify those nearby areas.

The long history of population loss in deindustrialized cities has created a temporal buffer because there are such high vacancy rates within the city. Since vacancy rates rose throughout the metro area between 2000 and 2009, this buffer continues to stay in place. In addition, the lower-income neighborhoods have some of the smallest populations and will take longer to fill those surplus vacancies. Once those vacancy rates begin to decline, neighborhoods will no longer have soft housing markets that can insulate some lower-income residents from being pushed out of their homes. There is already a decrease in incomes for neighborhoods near tracts where

incomes are increasing, suggesting that displacement is already occurring because residents are being pushed out of gentrifying tracts into nearby lower-income neighborhoods. For the time being, the population continues to grow mostly in suburban areas, but development projects and a changing urban economy downtown may reverse that pattern in the future.

There are also clear social and economic differences between the suburbs and the city. The newer suburbs and edge cities along the interstates have some of the highest regional incomes, education levels, and home values. The exception to this within the city is the area surrounding the universities and medical centers in the neighborhoods stretching from Oakland to Squirrel Hill. Increases in education and income levels in neighborhoods that have undergone development within the city suggest that the new urban form for Pittsburgh will include less of an urban-suburban divide.

Not only do the suburbs have more wealth and a stronger housing market, they also have a strong racial composition favoring whites. Minority households are found almost exclusively within the city and within the poorer mill towns along the rivers, but this pattern shows signs of change. There has been an increase in non-Whites in the metro and an increase of whites in the city, but levels are nowhere near to reversing the trend of metro area segregation. The role of race in gentrification has been shown to be very a localized phenomenon (Clemetson 2002; Moore 2009), so it is uncertain by looking just at descriptive statistics as to how the racial patterns will change in the future.

The economy for the metro area seems to be slowly improving and a restructuring of the urban economy is taking place. Unemployment levels rose above national averages throughout the decade and there was an overall decrease in percent of employees considered working-class,

suggesting a growth in the service sector. Not all of that growth in service industries, however, has been in professional services that provide employees with higher incomes, a trend discussed in Chapter 5. The central city still has a long way to go with economic improvement as this area has the highest unemployment rates, especially in lower-income neighborhoods.

Analysis of the social, economic, and housing trends in the Pittsburgh metro area shows that the downtown is ripe for gentrification and is already showing signs of change due to development projects in the area. Because most neighborhoods in the city have had higher unemployment, vacancy, and rental rates and lower levels of employment, incomes, rents, and home values when compared to the rest of the MSA, these areas present a new opportunity for capital to return to the city. I further examine how this return affects lower-income residents already living in the city in Chapters 5 and 6.

Chapter 5

Pittsburgh's Housing Problem in All the Wrong Places:

Affordable Housing and Spatial Mismatch

Every city faces the challenge of providing adequate housing for its residents, and the persistent need for safe, affordable housing has been well documented (WHO 1989; Crowley 2003; ICPH 2012). Planners, governments, housing authorities, and community groups encounter numerous issues and limitations in trying to supply sufficient affordable housing for the residents of an area (Cisneros and Engdahl 2009; Graddy and Bostic 2010; McClure 2010). The problem of affordable housing is amplified for low-income groups, who have a much harder time meeting their needs from the private-market housing stock than wealthier residents (Wallace 1995; Bratt, Stone, and Hartman 2006). The volatile nature of the private market and the budget constraints that sources of publicly-assisted housing face often results in a shortage of affordable housing in many urban areas of the United States (Anderson et al. 2003; Stone 2006a). The shift to neoliberal policies in many U.S. cities since the 1980s has increasingly left the production of affordable units in the hands of private developers, which has not led to an increase in the availability of homes for low-income groups (Glynn 2009). Pittsburgh is an example of a housing market in which affordable housing should be readily available due to low real estate values and high vacancy rates, but the area experiences extreme spatial mismatches between the housing stock and the people who need it.

This chapter examines the availability of affordable housing in the Pittsburgh Metropolitan Statistical Area to see if there is adequate housing provided through the private

market, nonprofit organizations, and publicly-assisted programs for low-income households. The problem of supply and demand requires careful attention to spatial scale in that an area may provide adequate housing for the metropolitan area, but exhibit shortages at the neighborhood level (Nelson 1994). Households unable to secure affordable housing in a particular area may not be able to relocate in order to obtain housing that is within their means (Crowley 2003). The spatial mismatch of affordable housing is most severe for the poorest groups and often results in the concentration of poverty within urban areas (Anderson et al 2003). Spatial mismatch occurs when there is enough affordable housing available for a specific cohort but it is being occupied by higher-income groups or located in areas of the city far from the families that need it most. It is important to identify the geography of affordable housing in the Pittsburgh metro before discussing how gentrification affects the availability of that housing. If the availability of affordable housing differs across space in Pittsburgh, it is then necessary to use that information to contextualize the process of gentrification as it unfolds locally.

5.1 Danger of Housing Disadvantage

Families who cannot secure affordable housing are often unable to meet other needs, such as food, education, health care, and accumulating savings (HUD 2013a). Households without housing assistance are exposed to higher levels of housing-related health hazards (Sharfstein et al. 2001). Children of households unable to secure affordable housing are put at an extreme disadvantage. They may face issues that keep them within the "cycle of poverty" (Bartlett 1998, p. 420) and put them at risk for performing poorly in school (Crowley 2003).

Twelve million renter and homeowner households spend more than 50% of their income on housing (HUD 2013a), a value well above the threshold for what is considered to be a high housing-cost burden. About 70% of those households are low-income households paying more than 50% of their annual incomes on housing costs (*New York Times* 2012). Only a small portion of the low-income households that need assistance are able to acquire it through housing programs, leaving the rest to try and solve their needs via the private market (HUD 2013b). This avenue has proven to be extremely inadequate in meeting the needs of the nation's at-risk households (Goetz 1993; Bratt, Stone, and Hartman 2006).

The widening gap between low-income households and adequate housing is intricately linked with the increasing concentration of poverty in residential neighborhoods and the continued segregation of racial groups within the United States (Massey and Denton 1993; Carr and Kutty 2008). "Among the most pressing health-related, neighborhood-level issues currently facing the nation are the inadequate supply of housing affordable to lower-income households and the increasing spatial (residential) segregation of households by income, race, ethnicity, or social class, as well as the related increase in poverty and impoverished areas within many of the country's urban centers" (Anderson et al. 2003, p. 47).

The changing urban economy (Li et al. 2013), continued discrimination in the housing market (De Souza Briggs 2005), funding cuts in public-assisted housing programs (Bratt, Stone, and Hartman 2006), and the increase in low-income households (HUD 2013b) have heightened the housing shortage problem in the United States and contributed to the increasing concentration of low-income households in poor neighborhoods without sufficient access to affordable housing. According to the Institute for Children, Poverty and Homelessness (2012), there was a shortage of 5.5 million affordable units for the 10.5 million poor households earning

less than $12,000 annually. The number of affordable rental units has not exceeded the number of families in need since 1970 and the gap has continued to climb since that time.

5.2 Defining Affordable Housing

The Department of Housing and Urban Development (HUD) has explicit guidelines for how to determine what is considered to be affordable housing. Affordable housing consists of units in which households do not have to pay more than 30% of their gross income on housing (HUD 2013a). Schwartz and Wilson (2006) outlined how this amount is calculated by the Census Bureau. For renters, this means that the household pays less than 30% of its income on contract rent and utilities, which includes electricity, gas, water and sewer bills, and other utilities, expressed as gross rent. The census calculates housing costs for owner-occupied units by collecting information on mortgages, home equity loans, real estate taxes, homeowners insurance, homeowner association fees, mobile home costs, and utilities. If households pay more than 30% of their income on housing costs, they are considered to be under a high housing-cost burden. Housing-cost burdens have been increasing in the United States and Schwartz and Wilson (2006:1) say that in 2006 46% of renters and 37% of owners with a mortgage were under a high housing-cost burden.

Affordable housing can be broken down by income cohorts (Schwartz 2006). Those making above the median family income for the area could spend more than 30% of their income on their housing costs, which would put them into the category of having a high housing-cost burden, even though they could likely find housing that would be affordable that would not use up more than 30% of their income. Although the availability of affordable housing is a problem

for middle-income groups as well (Anderson et al. 2004), this research is concerned with the availability of affordable housing for low-income households.

Related to this point is that a sufficient amount of housing for the low-income group does not mean that those households occupying those units are all low-income households (Nelson 1994). Some units considered affordable for low-income households are occupied by residents earning a higher income than low-income households because they are choosing to spend less on housing costs. This syphoning of available housing by higher income groups causes shortages for the low-income cohort because they are unable to access housing on the private market when they are outbid by households with more purchasing power.

5.3 The Private Housing Market and Affordable Housing

Units that exist on the private housing market can contribute to the stock of affordable housing and most low-income households have to try to find housing through this avenue (Cohen 1998; Galster 1996). About 75% of low-income families who qualify for federal housing programs are turned away due to lack of available units (*New York Times* 2012). Private-market affordable housing refers to units that are available for rent or purchase that meet the requirements to be considered affordable housing. In other words, it is housing in which the occupant does not pay more than 30% of their total household income on costs associated with housing. This burden does not apply to just low-income households, as those making above the area's median family income could also pay more than 30% of their income on housing, even though they are not considered low-income (HUD 2013a). Thus, there are several housing

markets that can exist simultaneously in an area, depending on the price of the homes available (Galster 1996).

Private-market households are most susceptible to change in rents and home values because there are no mechanisms in place to guarantee that a certain number of affordable housing units exist at various income levels. The costs of these units are most susceptible to changes in supply and demand because there are no restrictions on owners to keep rents or home prices at a certain level. As more people move into an area, demand most likely increases. There is often a lack of new units for low-income groups because most private developers choose to build homes for higher-income groups due to the ability to charge a higher price. The lack of new units can leave areas without any affordable housing stock for lower-income groups. In addition, the potential for larger profit margins encourages developers to market their units to more affluent buyers, further discouraging the adequate supply of affordable housing on the private market (Byrne and Diamond 2006).

The value of a unit is also tied to the quality of housing stock, which depreciates over a long period of time if no improvements are made to the structure (Galster 1996). Some neighborhoods with high-quality housing stock may have very few options for low-income groups. Through neighborhood filtering, units that were previously occupied by higher-income groups become successively occupied by lower-income groups as the quality of the housing stock declines without additional improvements and as higher-income groups begin to move to more desirable neighborhoods (Galster 1996). For neighborhoods close to the city center, rents and home values are still high and force low-income city dwellers to crowd into high-value properties because they are unable to buy into the suburban life.

Third-sector housing also consists of privately owned units, but these homes are controlled by nonprofit or community groups that control the price of this housing stock. These units are often built for low-income groups to make up for shortfalls in the availability of affordable housing that is not provided through public housing programs or other privately-owned homes. Mechanisms such as rent control or contractual obligations to keep a unit within a predetermined price range when the owner-occupier sells their home help to ensure that a certain number of units are available for low-income households. In the U.S., however, the third sector is relatively small when compared to other industrialized countries (Oretsky 2010). In Pittsburgh, organizations like ACTION-Housing and the FHLBank Pittsburgh's Affordable Housing Program help to fund the construction of new units, facilitate the purchase of affordable homes, or provide rent and mortgage assistance to at-risk families and provide another source of affordable units in the area.

5.4 Publicly-assisted Affordable Housing

To make up for the shortcomings of the market in providing affordable housing, publicly-assisted housing is another form of housing for lower-income groups (Bratt, Stone, and Hartman 2006). Most of these programs are geared towards very low- and extremely low-income groups seeking rental assistance (Cohen 1998). Federal programs were the primary sources for supplying affordable housing for groups that could not meet their needs within the private housing market after World War II (Epp 1996).

Like many public programs, federal government budget cuts during the later 20th century (Wallace 1995) forced local governments and community groups to fill the gap as federal monies

were siphoned away from housing (Byrne and Diamond 2006). Between 1976 and 2004, HUD's budget authority was reduced by 45% (Schwartz 2006). Over the past two decades, the proportion of federal dollars spent on housing programs for low-income households declined by 20% (ICPH 2012). Due to this shift to neoliberal housing policies, the private sector is now the main source for answering the affordable housing shortages in the United States (Stone 2006b).

During the 1950s and 1960s publicly-funded housing came primarily in the form of large-scale, public-housing projects (Cohen 1998). These projects became the face of concentrated poverty, crime, and deplorable housing conditions in many inner-city areas (Massey and Kanaiaupuni 1993). As many studies (Bickford and Massey 1991; Massey and Kanaiaupuni 1993; Quercia and Galster 1997) illustrated, the problems associated with the concentration of low-income households in these projects were exacerbated when federal funding for public housing was cut, and new programs for providing affordable housing were developed by the federal government to try to correct the existing issues while working with smaller budgets. One such project was the HOPE VI project, in which funds are provided for the demolition of old, physically-deteriorated housing projects and replacing them with new, usually mixed-income housing communities (Byrne and Diamond 2006; Joseph, Chaskin, and Webber 2007). Unfortunately, these new communities often have few housing units for low-income families (Popkin et al. 2004), resulting in the displacement of some of the original residents.

HUD awards funds to local housing authorities to carry out the HOPE VI project. Often these housing authorities work with outside community groups or development companies to create the new housing communities. This private-public partnership has become a common manifestation of the neoliberal policy changes of the late twentieth and early twenty-first centuries (Brenner 2005). While the resulting mixed-income communities help to break up the

concentration of poverty of the previous project-based communities, the amount of housing available for the populations most at need for affordable housing was reduced (Byrne and Diamond 2006).

Other types of publicly-assisted housing available for low-income groups consist of site-based projects, which are tied to a particular location, and tenant-based assistance that moves around with the recipient. Site-based programs, like Low-Income Housing Tax Credits (LIHTC), are locationally permanent in that once the assistance is given it stays in that neighborhood (Cohen 1998). LIHTC are used to build new or rehabilitate existing developments that agree to offer a certain number of low-income units (HUD 2011). Projects that received assistance from the LIHTC make up a significant portion of low-income housing today (Buron et al. 2000; GAO 1997). As local labor markets change and the need for workers shifts from one location to another, site-based housing can cause problems for those low-income groups most vulnerable to losing their jobs. They may not be able to find work near their existing homes or be able to find housing closer to new sources of employment and become unable to support themselves, creating a spatial mismatch between the local supply and demand for labor.

Tenant-based assistant housing programs attach the subsidies to the households themselves, so there is much more geographic variability associated with them than with project-based programs. Recipients of housing vouchers seek housing in the private market and can choose where they want to live as long as their chosen unit does not exceed the program's maximum allowable rent, it complies with the program's standards of housing quality, and the owner is willing to participate in the program (Schwartz 2006). This program was designed to allow low-income residents the ability to live in neighborhoods with mixed-incomes in an

attempt to provide recipients the chance to live in safer, more affluent communities (McClure 2011a).

Although the assistance is not tied to a specific location, those receiving assistance through tenant-based programs are most susceptible to changes in rents and home values within the private housing market (Schwartz 2006). Rents must be below a certain federally-mandated amount in order for the tenant to receive approval, but no mechanism exists to ensure that a certain amount of private-market housing is available for these voucher recipients. As certain areas become more desirable or investments are made in previously devalorized neighborhoods through processes like gentrification, housing voucher recipients may be priced out of new markets or forced to move from their existing neighborhoods and away from sources of employment and social networks.

5.5 Who is Considered Low-income?

In order to separate households who voluntarily choose to pay more for their housing when they could find more affordable housing in other areas, it is necessary to look at affordable housing according to different income groups. Like the term "affordable housing," it is important to operationalize the term "low-income" so that it is comparable to other studies and in line with conventional understandings of what low-income means. HUD has put forth guidelines for how to determine the poverty line for an area, and thus, the parameters for determining the low-income population for that place.

The federal government mandated the poverty line to be 80% of the area's median family income, so that any household that falls below that line is considered to be in poverty. Note that

family income is different, and usually higher, than household income (McClure 2011b). For the Pittsburgh MSA, the median family income for 2005-2009 was $60,901. The poverty line would be 80% of that value, making $48,720 the threshold for the low-income population. Any household making less than $48,720 was considered low income.

The low-income cohort can be broken down further into very low income and extremely low income groups. Very low income is any household that makes less than 50% of the area's median family income, or $30,450. Extremely low income is any household that makes less than 30% of the area's median family income, or $18,270. All three levels of low-income were used in this study. Table 5.1 shows the median family income for the Pittsburgh MSA and the income thresholds for each of the low-income groups.

Table 5.1. Low-Income Thresholds in Pittsburgh, 2000-2009.
(Source: Census Bureau 2000, 2010)

	Median Family Income	*Low Income*	*Very Low Income*	*Extremely Low Income*
2000[8]	$59,210.22	$47,368.17	$29,605.11	$17,763.06
2005-2009[9]	$60,901.00	$48,720.80	$30,450.50	$18,270.30
Change	$1,690.78	$1,352.63	$845.39	$507.24

5.6 Affordable Housing in Pittsburgh

Pittsburgh is the quintessential example of a post-industrial city that has shifted from a manufacturing to a service-based economy (Lopez 2004). At the height of Pittsburgh's steel

[8] In 2009 inflation-adjusted dollars.
[9] The ACS collects data about income by asking the respondent what their income was over the past 12 months. This means that the median family income for the 2005-2009 5-year estimate reflects incomes over the period of 2004-2009 (Census 2012).

production during the early 20th century, the city produced one-third of the nation's steel (Lorant 1991) and it was at one time the eighth largest metropolis in the United States (Bauman and Muller 2006). Facing devastating waves of deindustrialization, the city began losing population starting in the 1950s (Crowley 2005) and underwent massive layoffs during the later 20th century (Lubove 1996). Between 1953 and 1995, manufacturing as percentage of total employment fell from 44.1% to 11.3% (Crowley 2005). Today manufacturing employment makes up 7.6% of the metropolitan workforce (Bureau of Labor Statistics 2013).

This shift from the industrial to post-industrial economy exacerbated the problems associated with increased concentration of poverty, widening income gaps, and increased housing shortages (Anderson et al. 2003). Higher-paying manufacturing jobs have either been eliminated or moved out of the central city to suburbs or other countries and have been replaced with low-paying jobs in services (Crowley 2005). Many of those low-income households located within the inner city have few opportunities for climbing out of entrenched areas of poverty. Table 5.2 shows how the labor market was restructured in Pittsburgh.

Table 5.2. Changes in Employment by Economic Sector, 1990-2010.
(Source: Bureau of Labor Statistics 2013)

	Total			**Percent**		
	1990	2000	2010	1990	2000	2010
All Employees (nonfarm) (000s)	1039.9	1147	1125.3	-	-	-
Manufacturing	130.6	129.7	87.4	12.5%	11.3%	7.8%
Information	21.2	25.9	18.5	2.0%	2.3%	1.6%
Financial Activities	59.1	67.3	68.3	5.7%	5.9%	6.1%
Professional and Business Services	126.6	139.2	157.9	12.2%	12.1%	14.0%
Educational and Health Services	160.2	198	236	15.4%	17.3%	21.0%

The continued loss of manufacturing jobs and people from the area has created a weak housing market for the Pittsburgh MSA. This trend, which began in the 1950s, has persisted into the 21st century. Between 2005 and 2009, there were 980,834 households in the Pittsburgh MSA and 1,095,831 housing units, resulting in a housing unit surplus of 114,997 homes. Between 2000 and 2009 the number of households shrank by 0.4% while the number of housing units rose by 2.7%. There are differences between owner-occupied and renter-occupied in the number of units available. While the number of units for sale increased by 3,730 between 2000 and 2009, the number of units for rent decreased by 904, which may indicate that there were more households converting from home-owners to renters than vice versa (Table 5.3). This change could be explained by the national housing bubble burst, starting in 2008, which caused home prices to decline and a subsequent credit crisis that was the primary cause of the 2007 to 2009 recession (Holt 2009). The increase in renters could be explained by the housing crisis.

Table 5.3. Pittsburgh Housing Market Changes, 2000-2009.
(Source: Census Bureau 2000, 2010)

	2000	2005-2009	Change	Percent Change
Total Households	995,505	991,278	-4,227	-0.42%
Total Housing Units	1,078,481	1,107,310	28,829	2.67%
Occupied-Housing Units	995,505	991,278	-4,227	-0.42%
Owner-Occupied	711,382	708,563	-2,819	-0.40%
Renter-Occupied	284,123	282,715	-1,408	-0.50%
Vacant Housing Units	82,976	116,032	33,056	39.84%
For Sale	12,462	16,192	3,730	29.93%
For Rent	26,949	26,045	-904	3.35%

In 2000, Pittsburgh had a higher percentage of households with a higher housing-cost burden than compared with the United States. For the period of 2005-2009, Pittsburgh fell below the United States average. This holds true for both renters and owner-occupiers. While the U.S. saw an increase in the number of households with a high housing-cost burden, the Pittsburgh MSA saw a decrease between 2000 and 2009 (Table 5.4). Pittsburgh's housing market fared better than much of the United States during the recession that occurred from 2007 to 2009 (Schooley 2013), so the drop below the national average could be explained by some of the economic issues occurring towards the end of the decade.

Table 5.4. Households with High Housing Cost Burdens in Pittsburgh, PA, 2000-2009. (Source: Census Bureau 2000, 2010.)

Percentage of Households with High Housing-Cost Burdens	2000	2005-2009	Change
United States			
Total	27.7%	36.4%	8.7%
Owner-occupied	21.8%	30.1%	8.3%
Renter-occupied	36.8%	50.0%	13.2%
Pittsburgh MSA			
Total	43.3%	29.8%	-13.5%
Owner-occupied	36.4%	23.8%	-12.6%
Renter-occupied	56.2%	46.3%	-9.9%

It is important to keep in mind that these numbers represent a high housing-cost burden for all income levels. Those making above the median family income for the area could spend more than 30% of their income on their housing costs, which would put them into the category of having a high housing-cost burden, even though they most likely could find housing that would be affordable. Although the availability of affordable housing is a problem for middle-income

groups as well, this research is mainly concerned with affordable housing changes for low-income households. If there is a significant amount of housing available for low-income groups, than by definition there would be a large amount of housing available for middle-income groups because they can afford to pay higher housing costs.

5.7 Measuring Affordable Housing

The number of units considered to be affordable at each income level is determined by measuring the households in which occupants are not paying more than 30% of their income on housing costs. The index combines the percentage of owner-occupied and renter households that pay 30% or less of their gross income on housing to create a percentage of total occupied housing units that are considered affordable within a census tract. This index does not include vacant units or households considered to be homeless or within assisted housing programs in which they pay no rent. It does include households that receive some sort of housing assistance through either project-based or tenant-based housing programs.

Data were obtained from the American Community Survey 5-Year Estimates for 2005-2009 (http://factfinder.census.gov). Due to changes in the way the U.S. Census Bureau collects socio-economic data, I used a 5-year estimate in order to analyze fluctuations at the census-tract level. In addition, alterations of tract boundaries in 2010 prohibited an analysis that would allow for a longer range of years. Further studies will need to be carried out in order to identify changes that have occurred over a lengthier period of time in the Pittsburgh MSA housing market.

Low-Income Households

Low income households in Pittsburgh are determined by the HUD guidelines regarding low, very low, and extremely low-income thresholds. The median family income for the Pittsburgh MSA in 2009 was $60,901. This is a fairly high threshold for determining low-income, so most households in this group may not experience extreme financial stress. Low-income households made less than 80% of the area's median family income, or $48,721. Over half of the Pittsburgh MSA was considered low-income in 2009 (Table 5.5).

Table 5.5. Low-Income Households in the Pittsburgh MSA, 2000 - 2009.
(Source: Census Bureau 2000, 2010)

Low-Income	2000	2005-2009	Change
Income Threshold	$47,368	$48,271	$903
Households			
Total	464,026	512,963	48,937
Percent	47.1%	52.3%	5.2%
Average per Census Tract	619	691	72
Maximum per Census Tract	1,825	2,436	611
Minimum per Census Tract	18	16	-2
High Housing-Cost Burden			
Total	-	248,762	-
Percent of Low-Income Households	-	48.5%	-
Affordable Units			
Total	520,350	557,292	36,942
Percent	52.9%	56.8%	3.9%
Average per Census Tract	742	795	53
Maximum per Census Tract	1,818	2,480	662
Minimum per Census Tract	12	22	10

While nearly every community has a large proportion of low-income households, the high threshold for determining who belongs to this group results in some neighborhoods not experiencing as much concentrated poverty as other areas. The average census tract had 54.8%

of its households considered to be low income, with the highest concentration of low-income households within a tract at 100% and the lowest at 14.4%. The average percentage of low-income households rose between 2000 and 2009 by 5.8%. The average census tract had 732 households considered to be low income, up 53 units since 2000, with a maximum of 2,436 and a minimum of 16 low-income homes per census tract.

Extreme concentration of low-income households is largely an inner-city issue in that the neighborhoods within the city limits have the highest proportion of low-income households. In 2000, the tracts with the largest concentrations of low-income households were located in the city, primarily in the East End with the exception of the wealthy Squirrel Hill area (Figure 5.1). The suburbs clearly have the lowest proportions of low-income households. Outside of the city the rural areas and neighborhoods along the rivers also have high concentrations of low-income residents. Nine years later, the pattern is similar with the highest proportions located within the city, along the rivers, and in the rural areas. Neighborhoods with high concentrations, between 75% and 100% of the tract, were near the inner-city area and along the Ohio, Allegheny, and Monongahela Rivers (Figure 5.2). Large areas within Fayette, Westmoreland, and Armstrong counties had over half of their tracts considered low-income. While the concentration of poverty is a bigger issue for the city, some of the more rural parts of the MSA also face this problem to a lesser degree. The map of change in percentage of low-income households illustrates that most of the MSA experienced an increase of low-income residents, particularly in tracts near gentrifying areas and on the south side of the city (Figure 5.3).

Figure 5.1. Percentage of Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

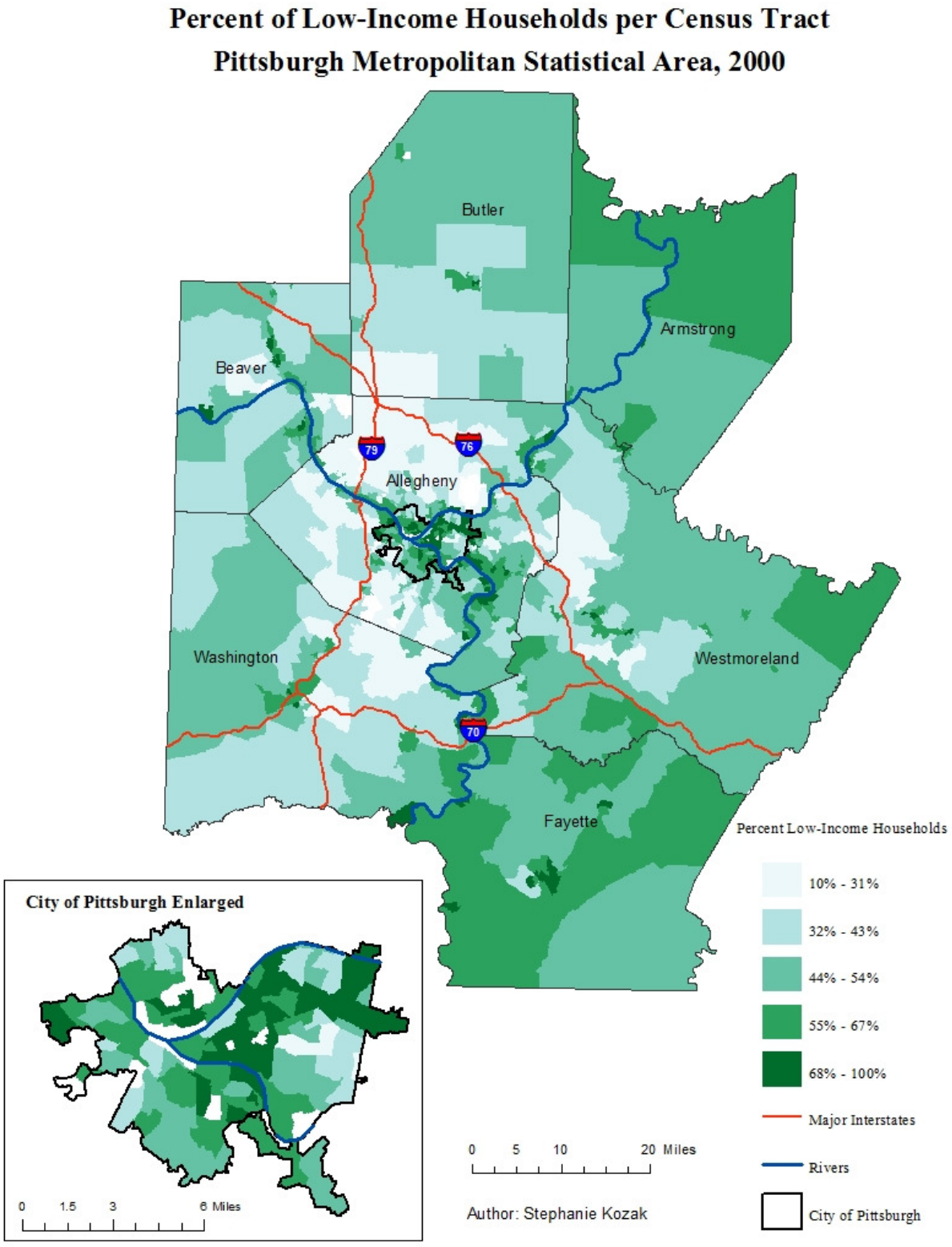


Figure 5.2. Percentage of Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

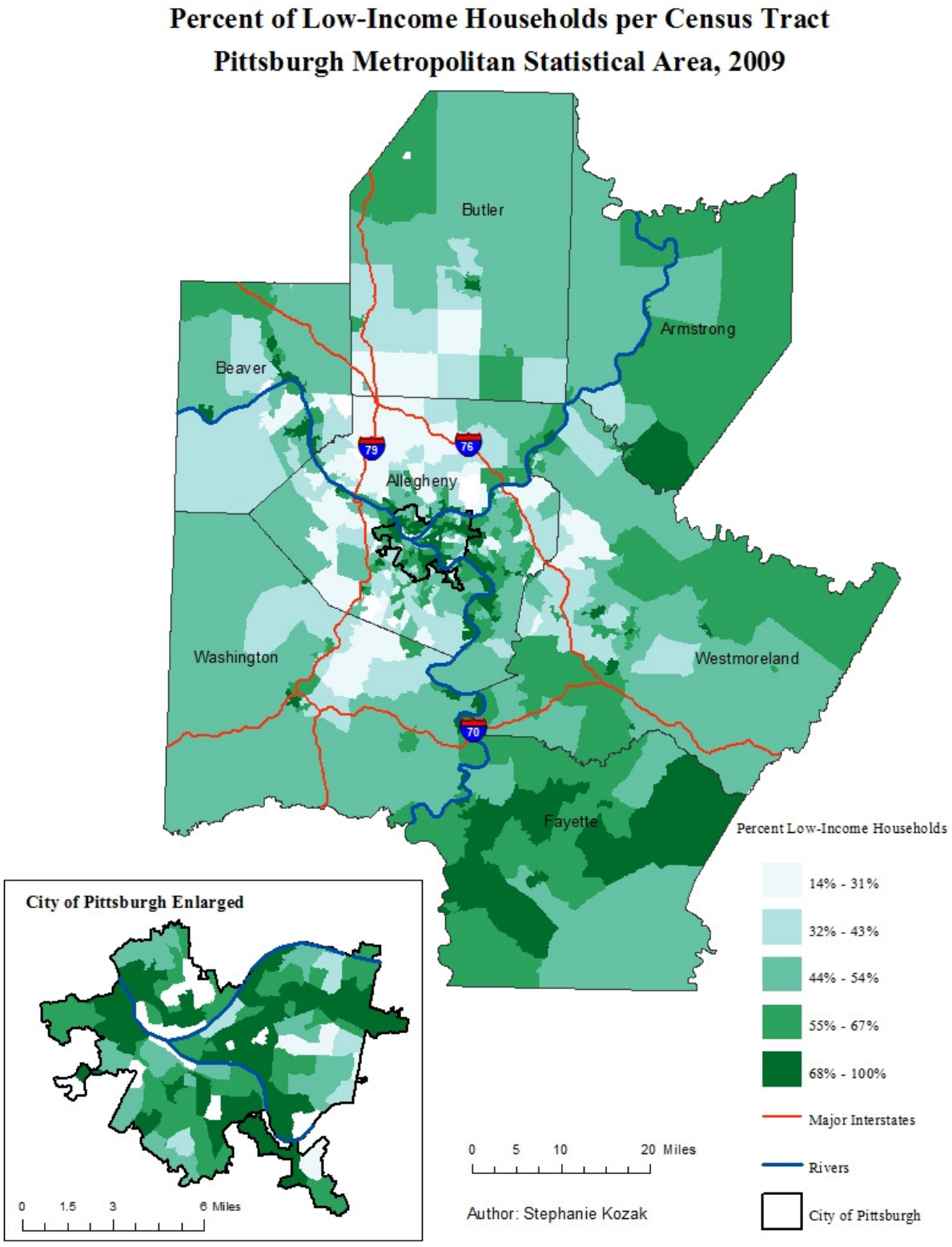


Figure 5.3. Change in Percentage of Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.

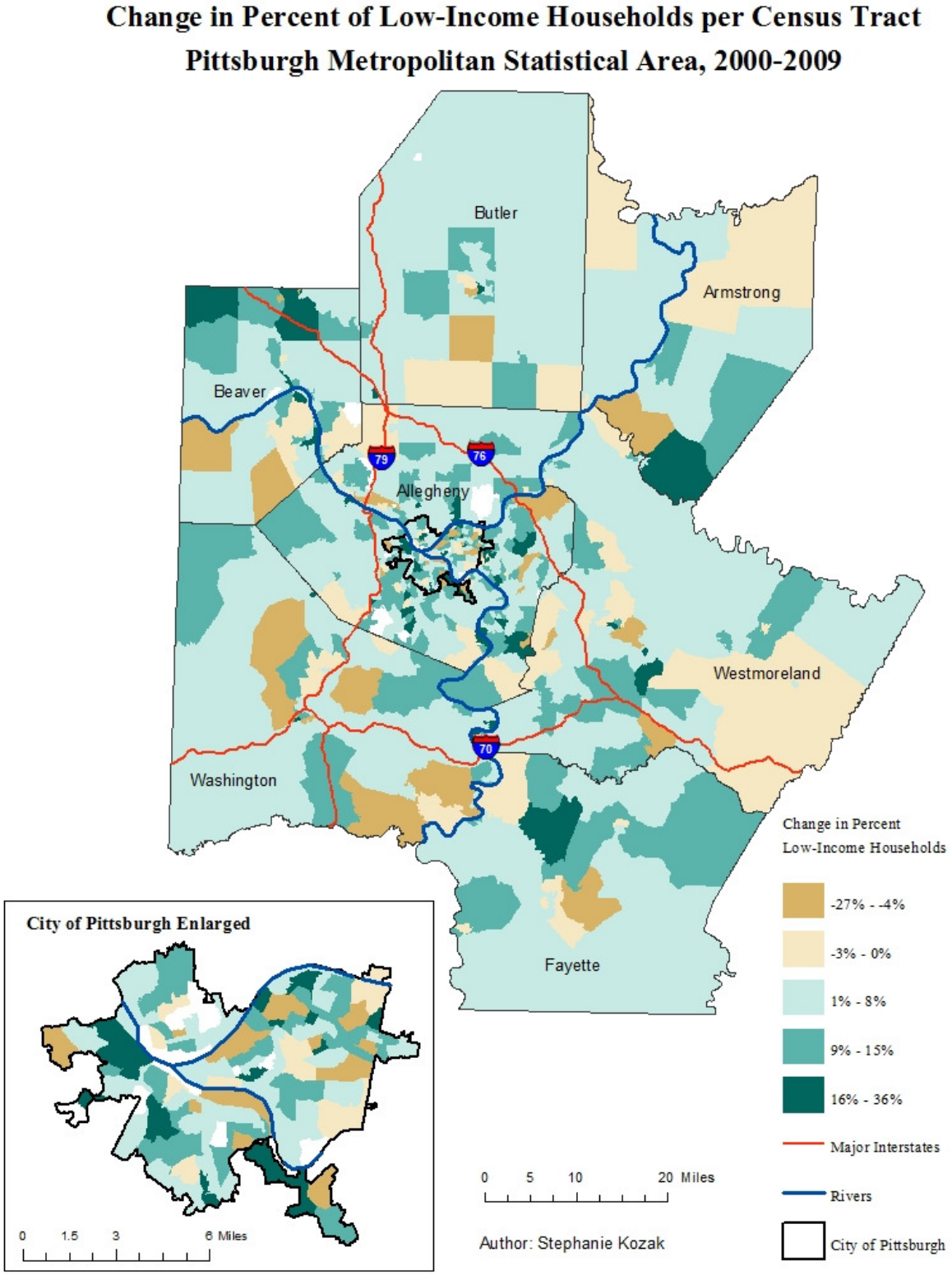


Figure 5.4. Number of Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

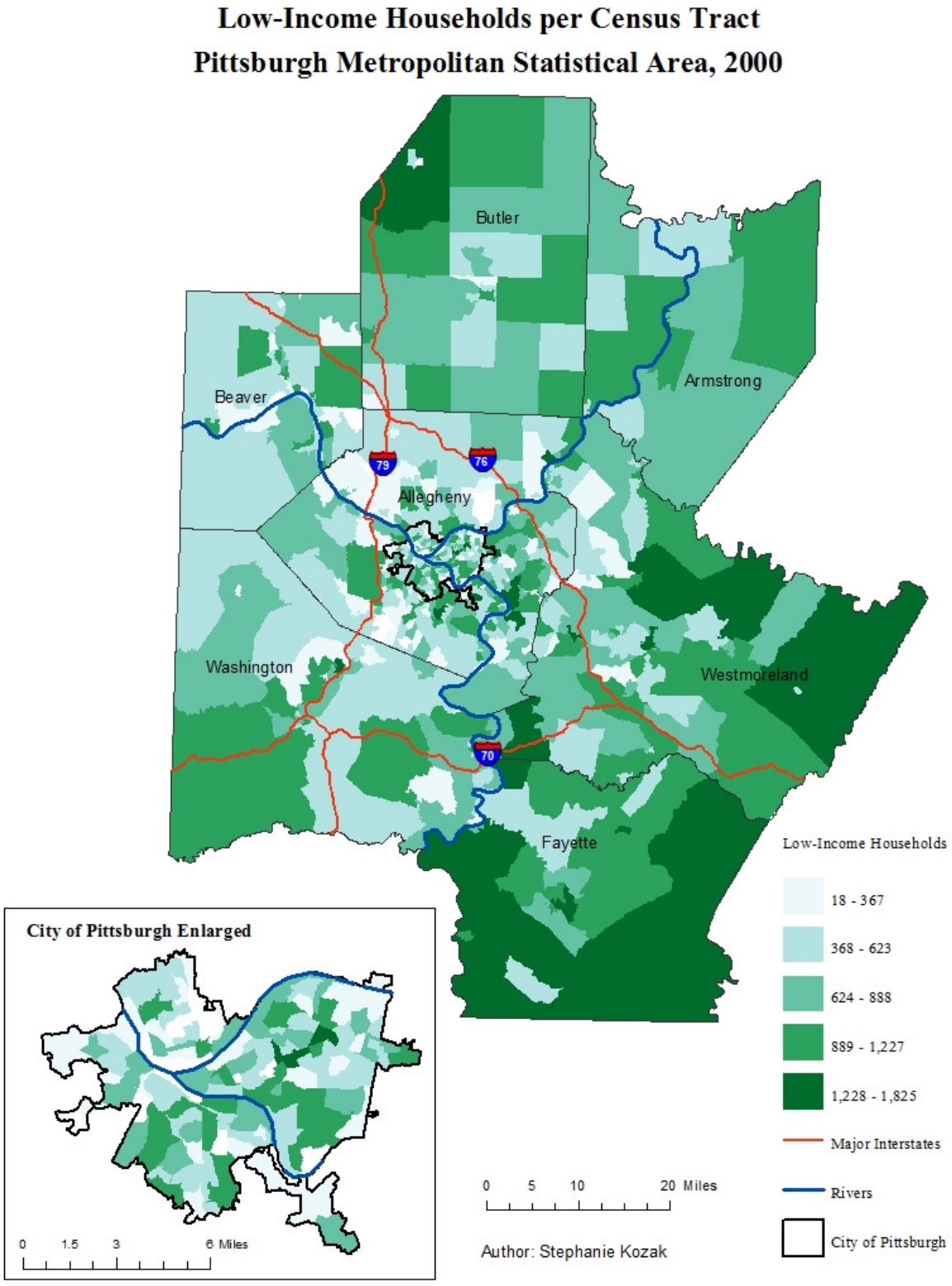


Figure 5.5. Number of Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

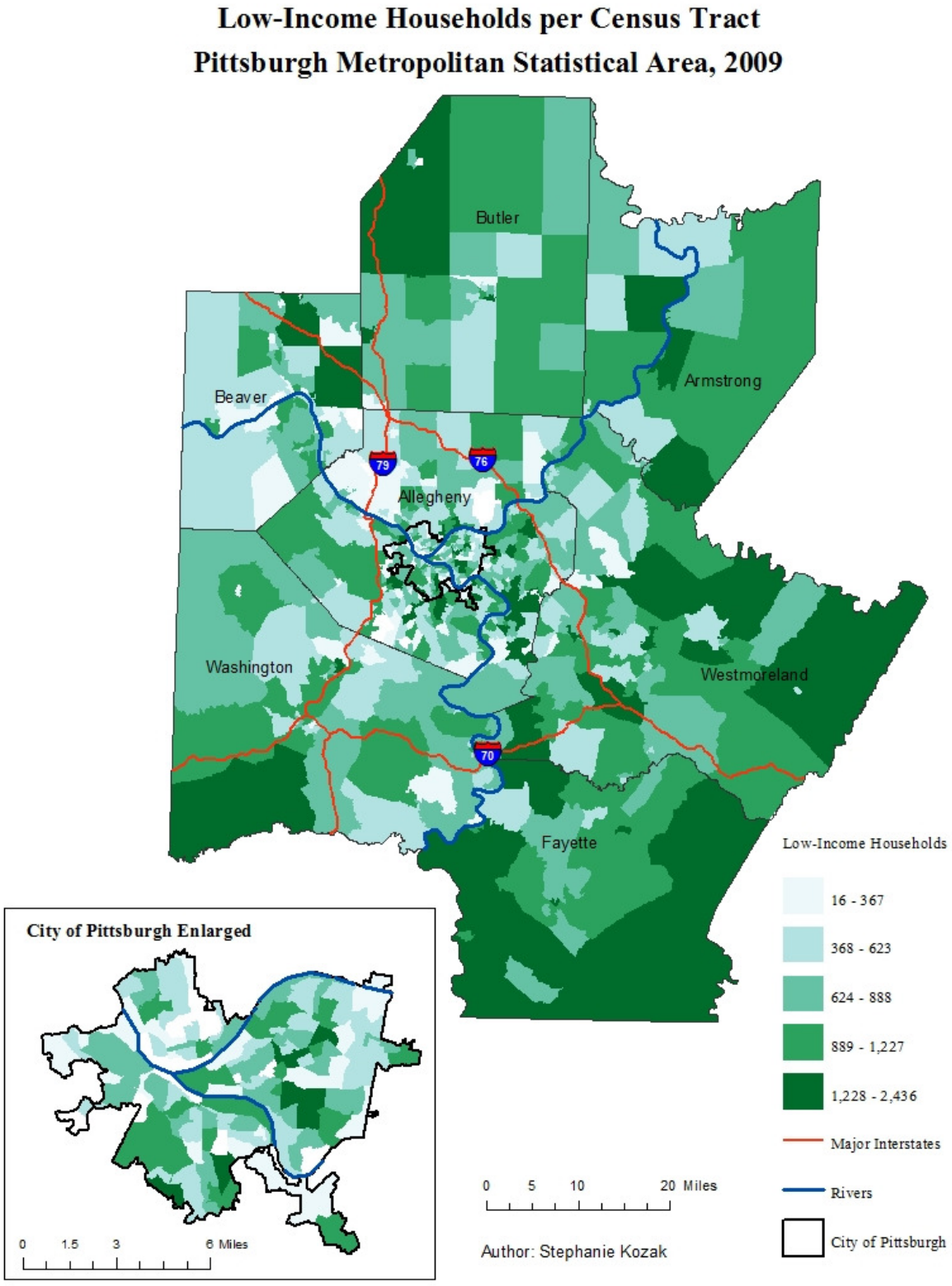
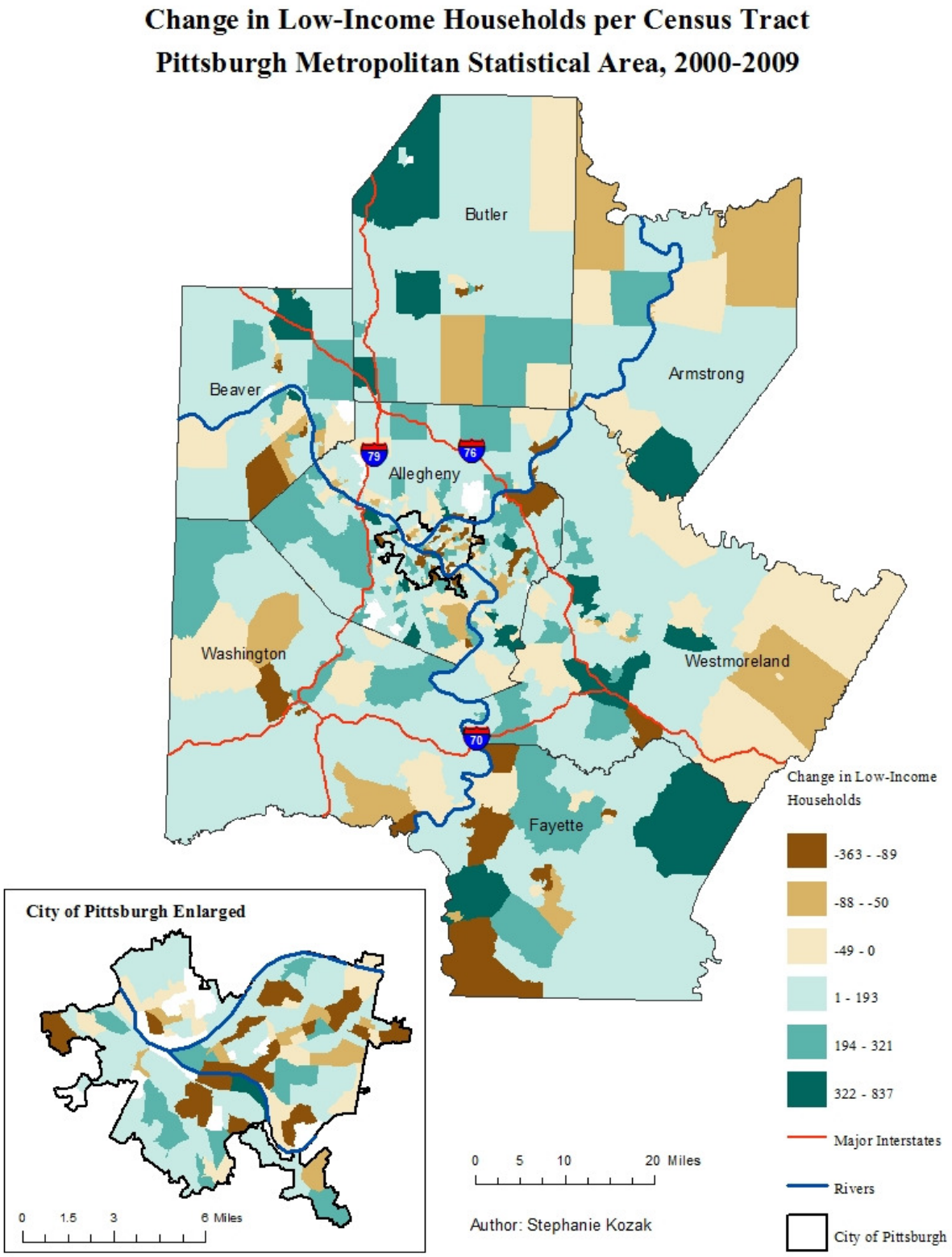


Figure 5.6. Change in Number of Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.



The maps of number of low-income households show that the rural areas of Westmoreland and Fayette counties have the most low-income residents in 2000, along with a few tracts in the East End (Figure 5.4). However, in 2009 some of the tracts within the city that exhibit high numbers of low-income households are actually in some of the wealthiest neighborhoods (Figure 5.5). The differences in the size of the tracts and the population densities are causing higher numbers of low-income households even though these residents make up a small proportion of the neighborhood. The change between 2000 and 2009 suggests displacement is occurring because low-income neighborhoods within the city that have undergone development experienced large losses in the number of low-income households while nearby tracts experienced an increase (Figure 5.6).

Pittsburgh has enough affordable units to house its low-income households, but they are not located in the areas where they are most needed and many are being occupied by higher-income families. Fifty-seven percent, or 557,292, of all occupied housing units in the Pittsburgh metro region were considered affordable for low-income households in 2009. With 512,963 low-income households, there was a surplus of 44,329, or 8%, affordable units for low-income households. However, not all of the low-income affordable units were occupied by low-income households. There were 248,762 low-income households under a high housing-cost burden, so almost half of low-income households are not occupying the affordable units.

Census tracts with the highest percentage of affordable housing available were scattered throughout the inner city and in Armstrong and Fayette counties for 2000 and 2009 (Figures 5.7 and 5.8). Areas surrounding the city of Pittsburgh had the lowest percentages of affordable housing available, especially in the northwest corner of Allegheny County. Most census tracts with the highest total number of affordable units for low-income households were located

outside of Allegheny County in Fayette and Westmoreland counties. So while the neighborhoods with the greatest concentration of poverty are located mostly within the city limits, most of the affordable units are located in the poorer suburbs and rural areas.

The change in affordable units between 2000 and 2009 is similar to the pattern from the change in low-income households and provides support for the argument that development causes exclusionary displacement. Areas within the city that experienced gentrification have some of the largest declines in the proportion of affordable units while the rest of the MSA experienced an increase in affordable homes (Figure 5.9). The maps showing the number of low-income affordable units have patterns similar to those showing percentage of affordable homes, but there is a slight exaggeration of the concentration of poverty in rural areas in the map of raw numbers because of the size of census tracts (Figures 5.10, 5.11, and 5.12).

Figure 5.7. Percentage of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

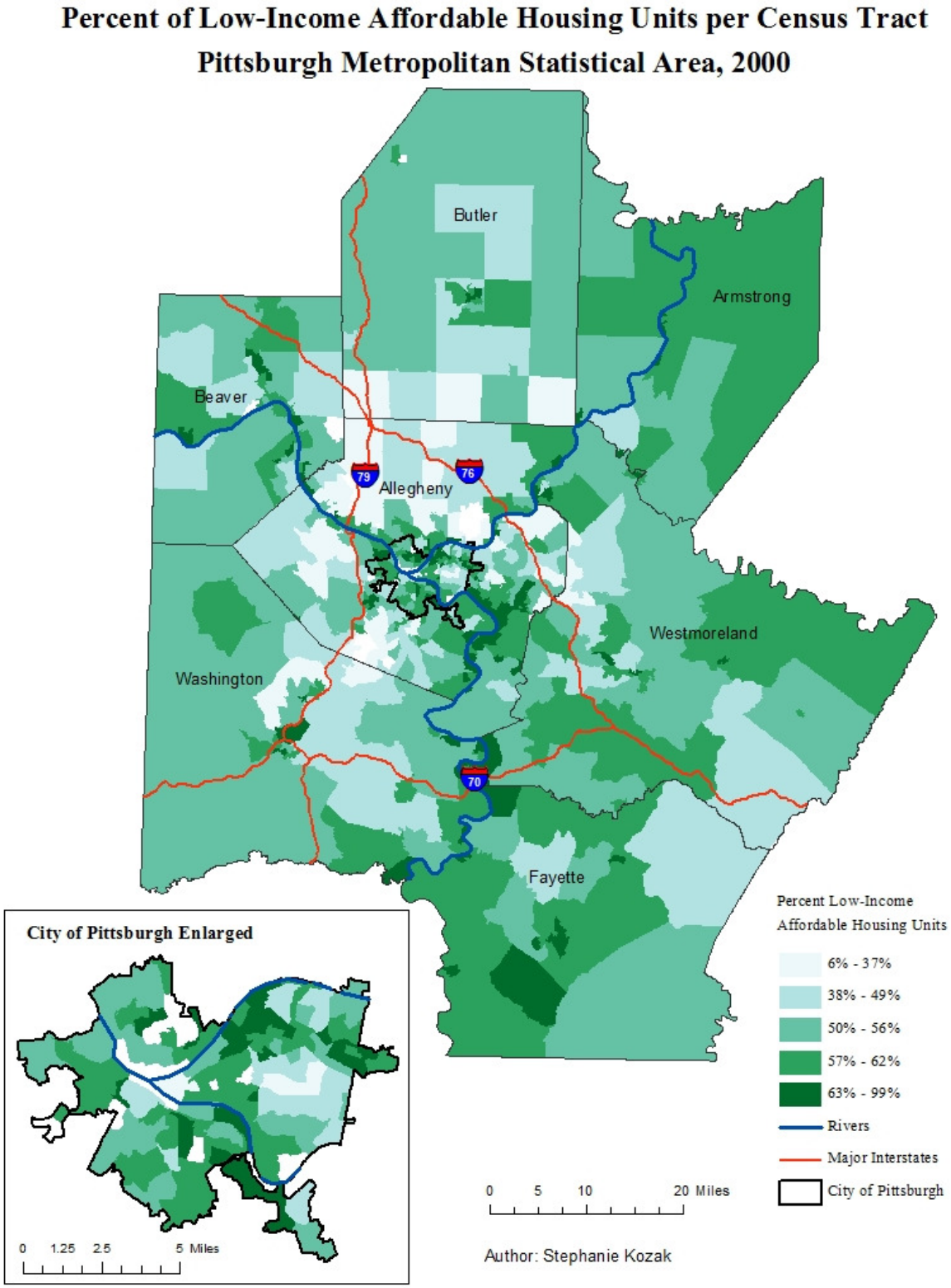


Figure 5.8. Percentage of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

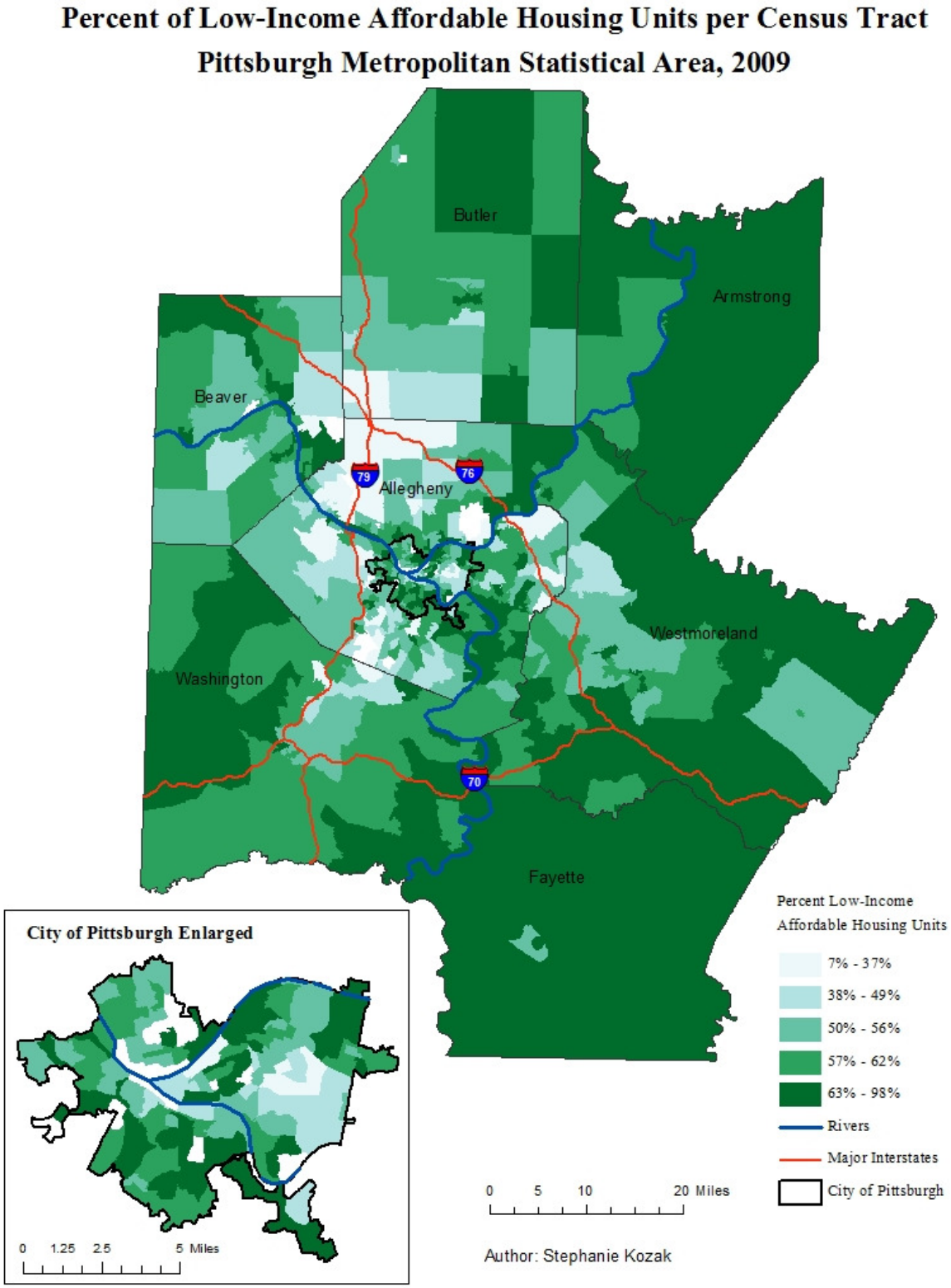


Figure 5.9. Change in Percentage of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.

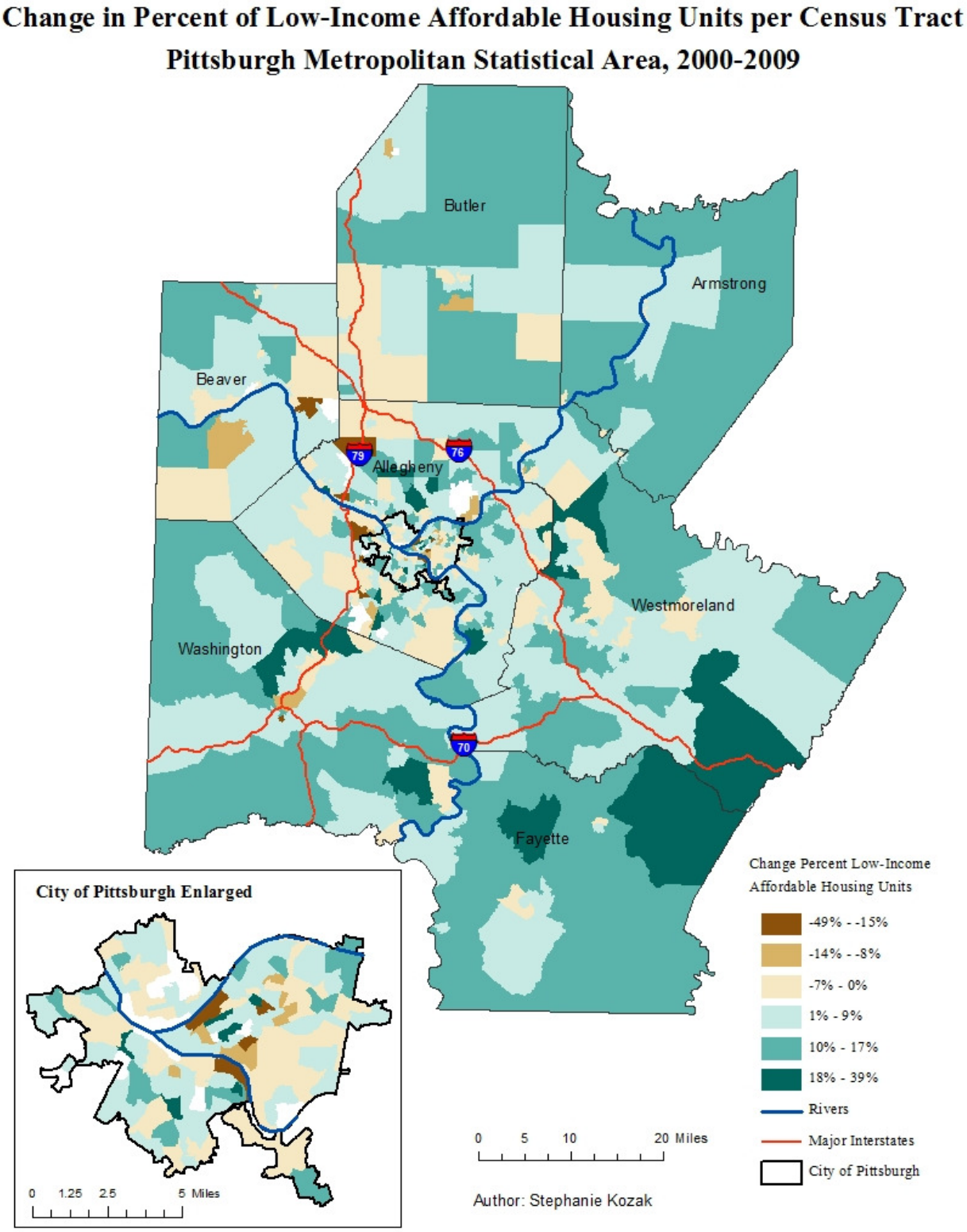


Figure 5.10. Number of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

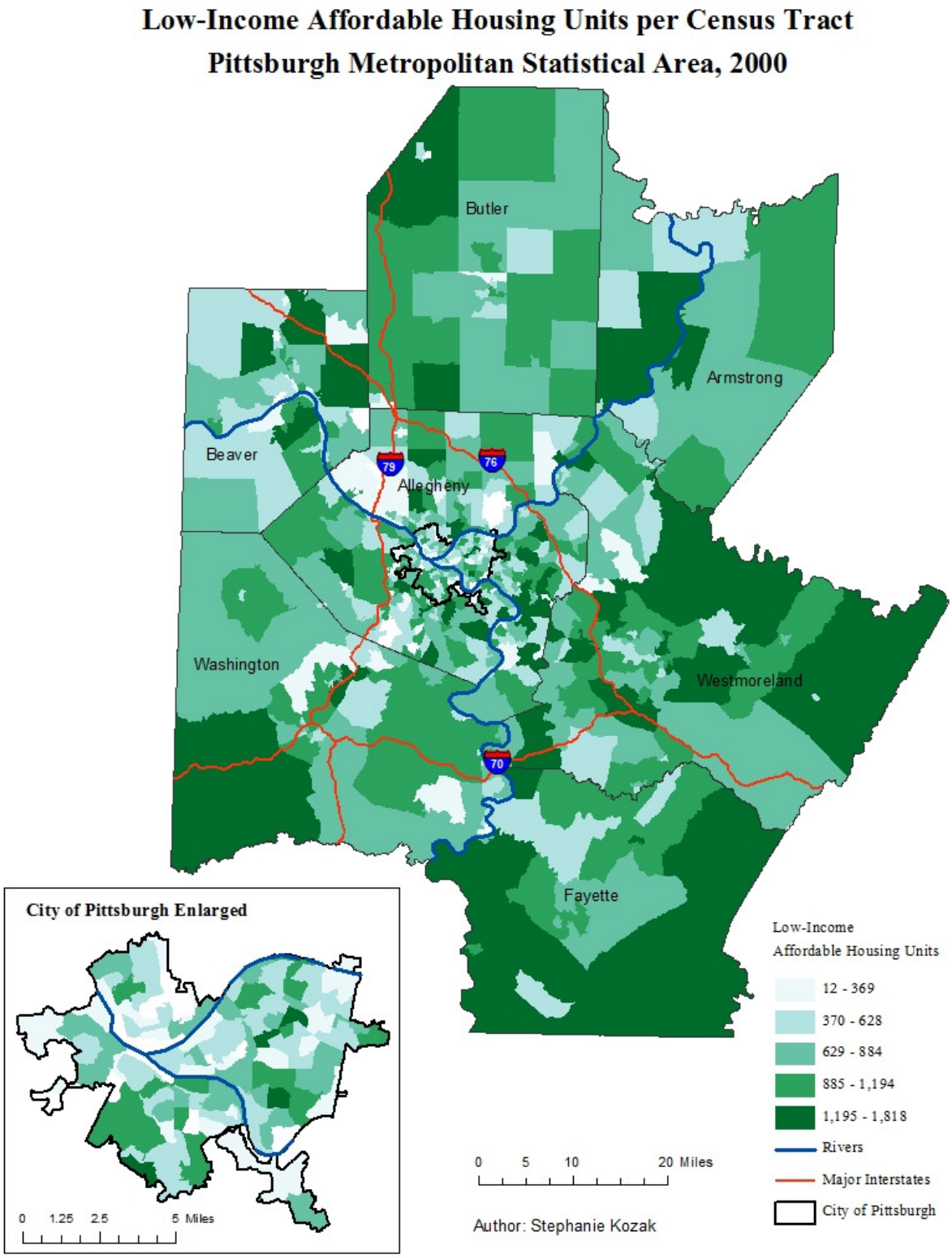


Figure 5.11. Number of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

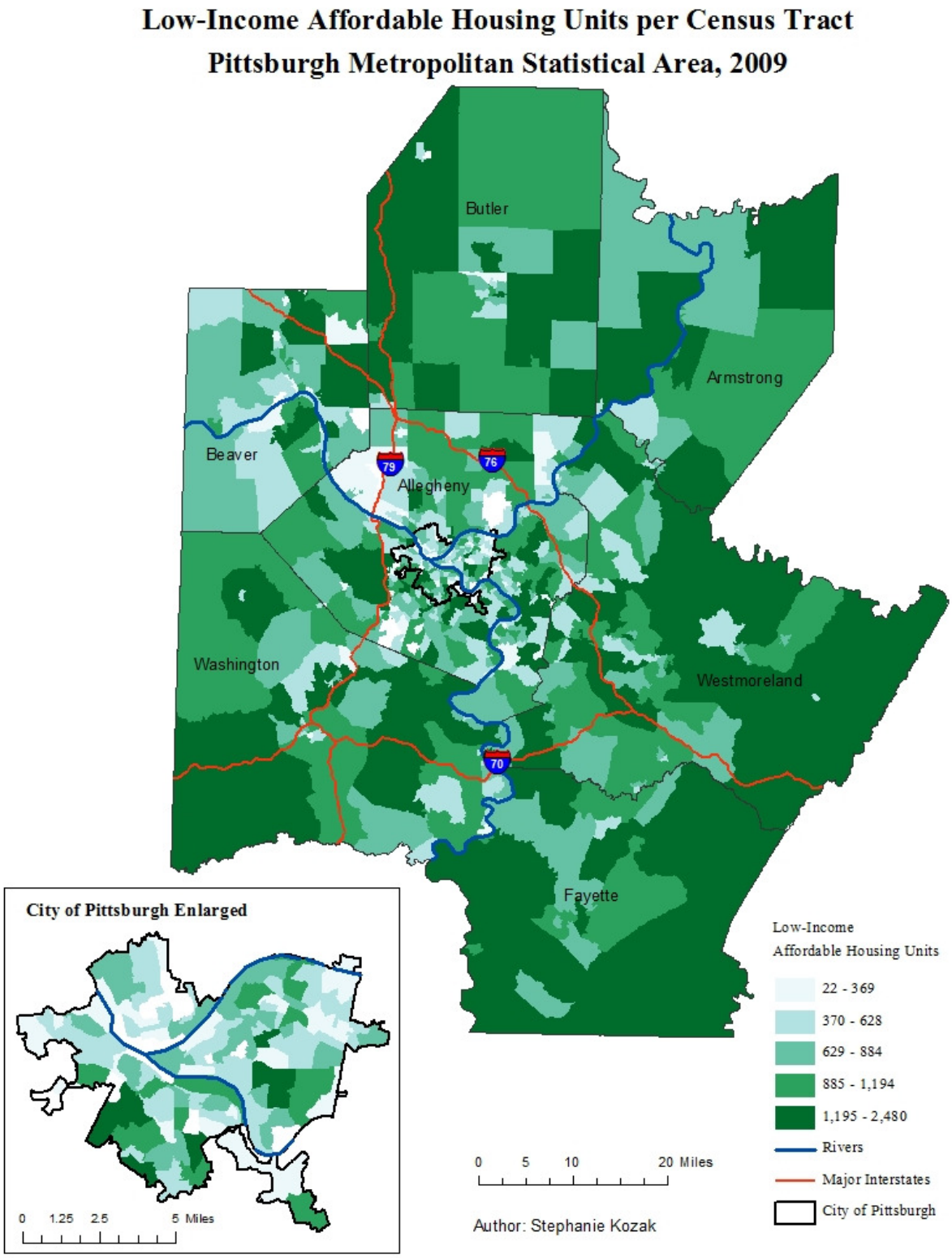
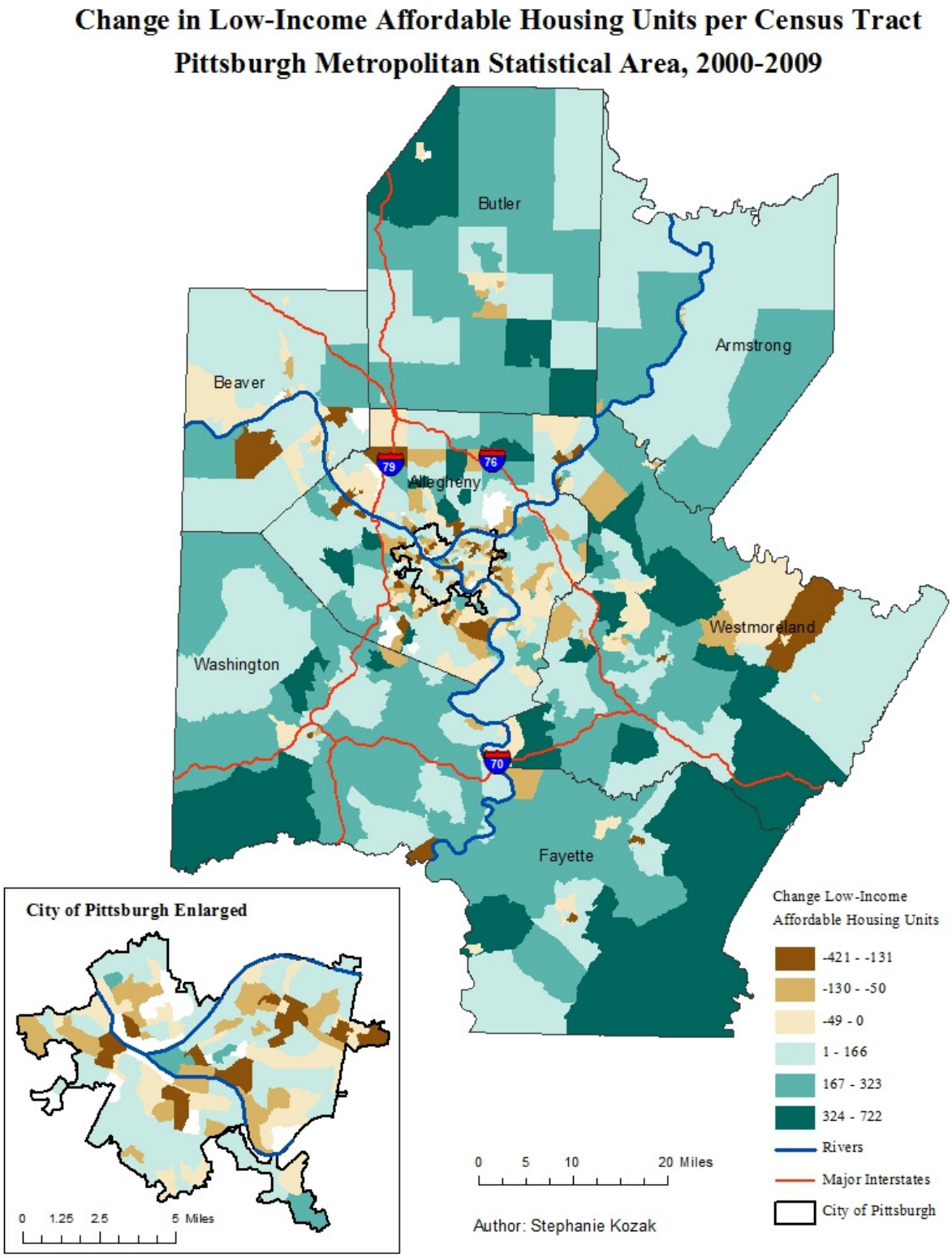


Figure 5.12. Change in Number of Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.



Very Low-Income Households

While there are relatively few very low-income households, which form one-third of the population in the Pittsburgh area, compared to low-income households, the lower income threshold that is used to determine who is considered very low-income means that these households are under more extreme financial stress than most low-income households. These households have an annual income less than 50% of the area's median family income, or $30,451 for the Pittsburgh MSA in 2010. For 2005-2009, the percentage of households considered very-low income was 33.5%, or 328,755 households.

Because fewer communities are faced with large proportions of very low-income households compared to just low-income households, the issue of providing assistance to this group may not seem as pressing in some neighborhoods. The average proportion of very low-income households in a census tract was 35.6%, with a maximum of 90.4% and a minimum of 4.7%. The distribution of the proportion of very low income households in a census tract was positively skewed with more census tracts tending to have a lower concentration of these households, which supports the possibility that many Pittsburgh residents may see the need to help very low-income households as a problem that does not exist in their own backyard because small concentrations of very low-income residents spread throughout the area make the presence of poverty less visible than if there were more tracts with larger concentrations. There was an average of 469 very low-income households per census tract, with the highest total per census tract at 1,555 households and the lowest at nine households (Table 5.6).

Table 5.6. Very Low-Income Households in the Pittsburgh MSA, 2000 - 2009.
(Source: Census Bureau 2000, 2010)

Very Low-Income	2000	2005-2009	Change
Income Threshold	$29,605	$30,451	$846
Households			
Total, Pittsburgh MSA	285,013	328,755	43,742
Percent, Pittsburgh MSA	28.9%	33.5%	4.6%
Average per Census Tract	407	469	62
Maximum per Census Tract	1,274	1,555	281
Minimum per Census Tract	13	9	-4
High Housing-Cost Burden			
Total	-	195,145	-
Percent of Low-Income Households	-	59.3%	-
Affordable Units			
Total, Pittsburgh MSA	322,594	372,114	49,520
Percent, Pittsburgh MSA	32.8%	37.9%	5.1%
Average per Census Tract	460	531	71
Maximum per Census Tract	1,529	1,760	231
Minimum per Census Tract	5	3	-2

In 2000, this group exhibits the same spatial distribution as low-income households in that the highest concentrations are in neighborhoods along the Ohio and Monongahela rivers and in the central city (Figure 5.13). Much of the housing in the suburbs to the west and east of the central city had very low concentrations of very low-income households. Pittsburgh's urban landscape is like most cities throughout the U.S. in that low-income groups are concentrated in the inner city and the suburbs have low concentrations of poor households. Pittsburgh also has areas along the river that were the sites of massive industrial complexes during the height of the steel age, and are also riddled with poverty. In post-industrial cities, the former sites of manufacturing mimic the pattern of the inner cities by concentrating poverty in areas that have been left after the industrial activities ceased. The pattern is similar in 2009, although there are some rural areas with higher concentrations (Figure 5.14).

Between 2000 and 2009, most of the MSA experienced an increase in very low-income households with an increase of 15% from 285,013 in 2000 to 328,755 in 2009 (Table 5.6). Most tracts throughout the metro area show an increase, but there are some rural tracts that did have a decline in percent very low-income households (Figure 5.15). Within the city there is a similar process occurring for very low-income households as the one observed for low-income residents. The lower-income neighborhoods experienced the largest drop in very low-income households and some of the largest increases were in the nearby neighborhoods. Development occurring in economically-depressed areas of the city is reducing the proportion of lower-income residents.

Size of areal unit is playing a role in the different patterns between percentage and number of very low-income households. The tracts with the largest number of very low-income households in 2000 were in the rural areas and in some tracts in the East End of the city (Figure 5.16). The suburbs clearly had the lowest number of households. This pronounced difference between the suburbs and the urban and rural areas was less evident in 2009 (Figure 5.17). Tracts with some of the highest numbers within the city are located in some of the wealthiest neighborhoods because of the high population densities. Total numbers do show the largest growth in number of very low-income households occurred in rural areas while the largest declines were in the lower-income areas of the city (Figure 5.18).

Figure 5.13. Percentage of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

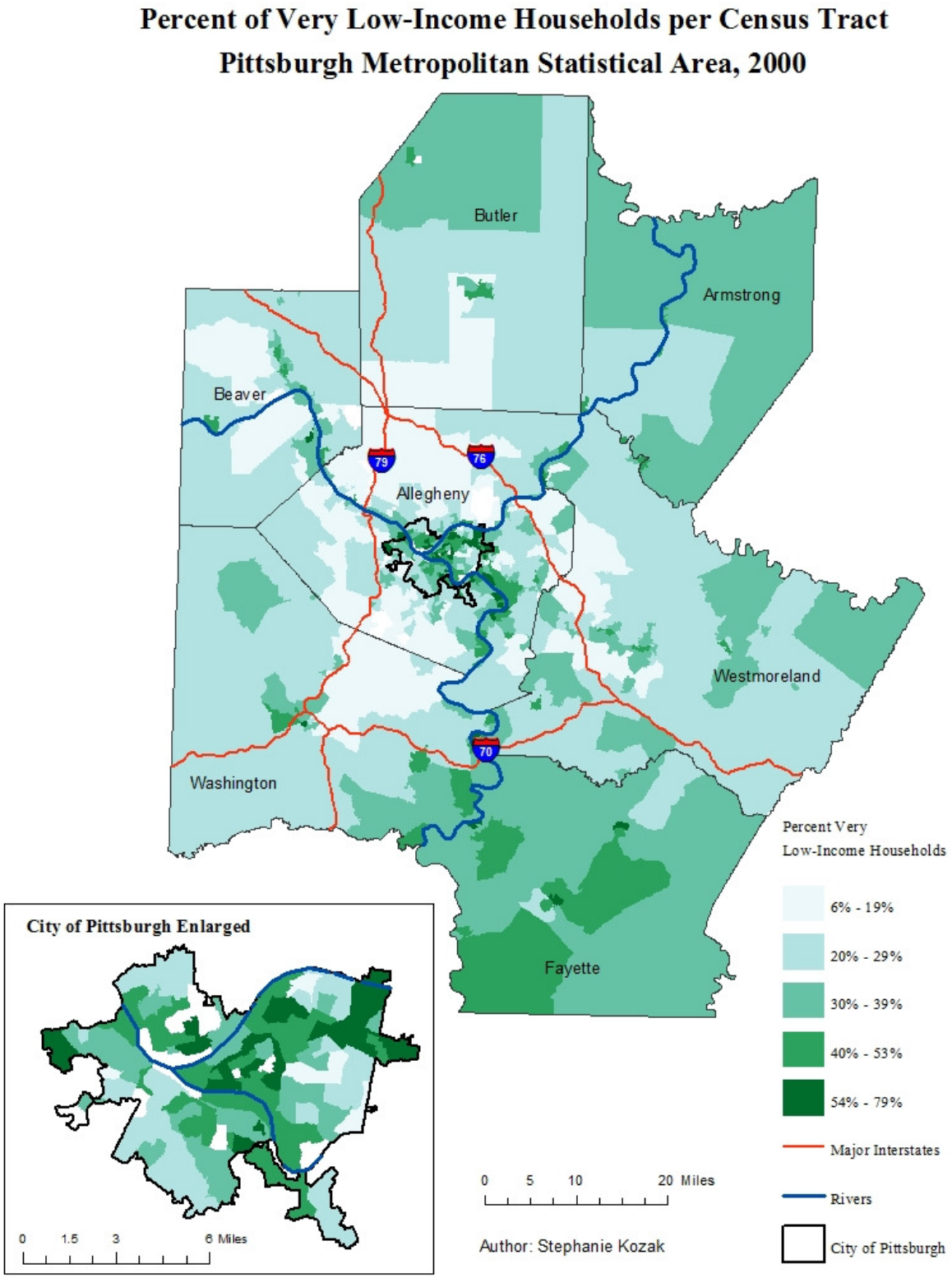


Figure 5.14. Percentage of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

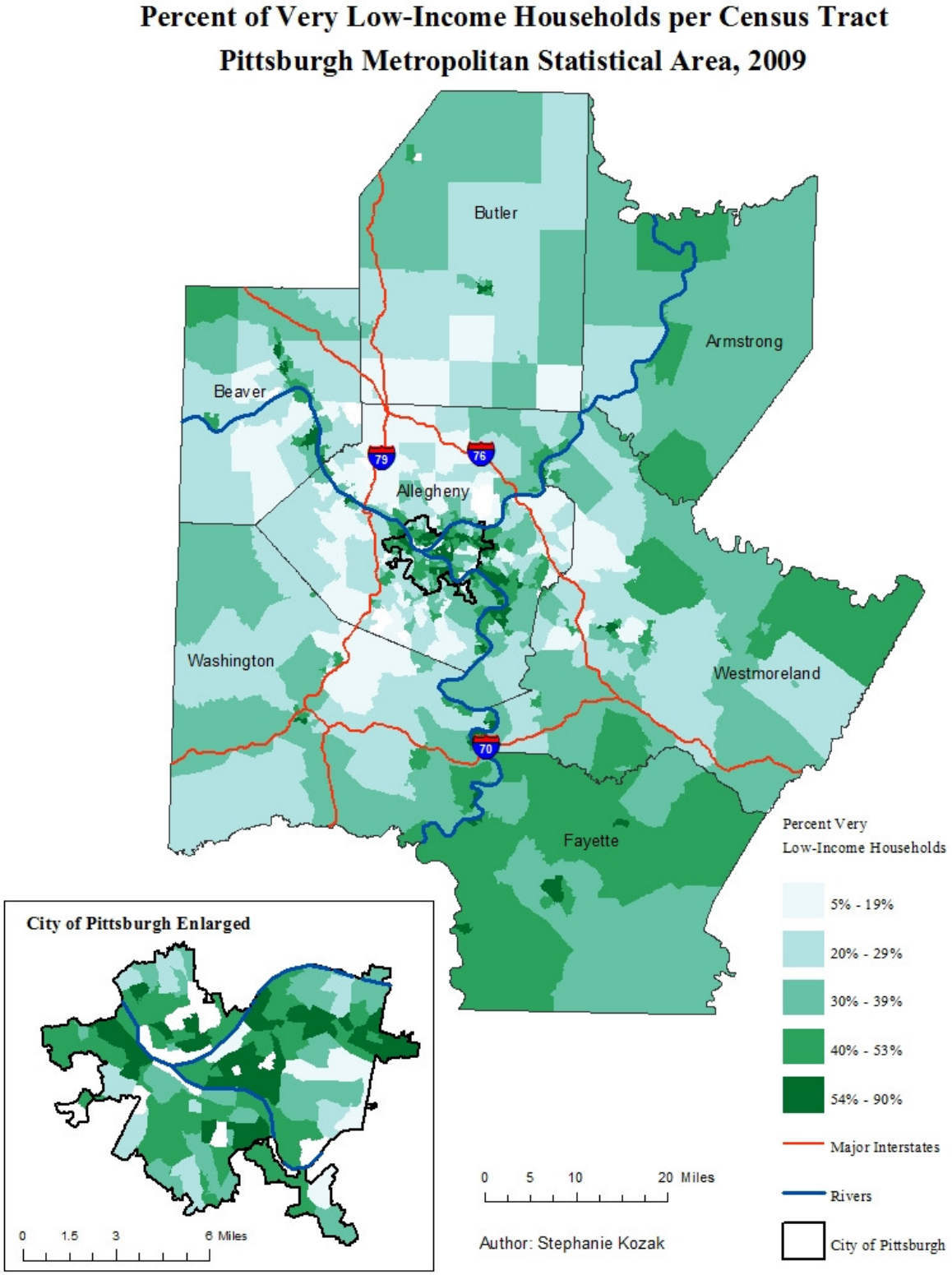


Figure 5.15. Change in Percentage of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.

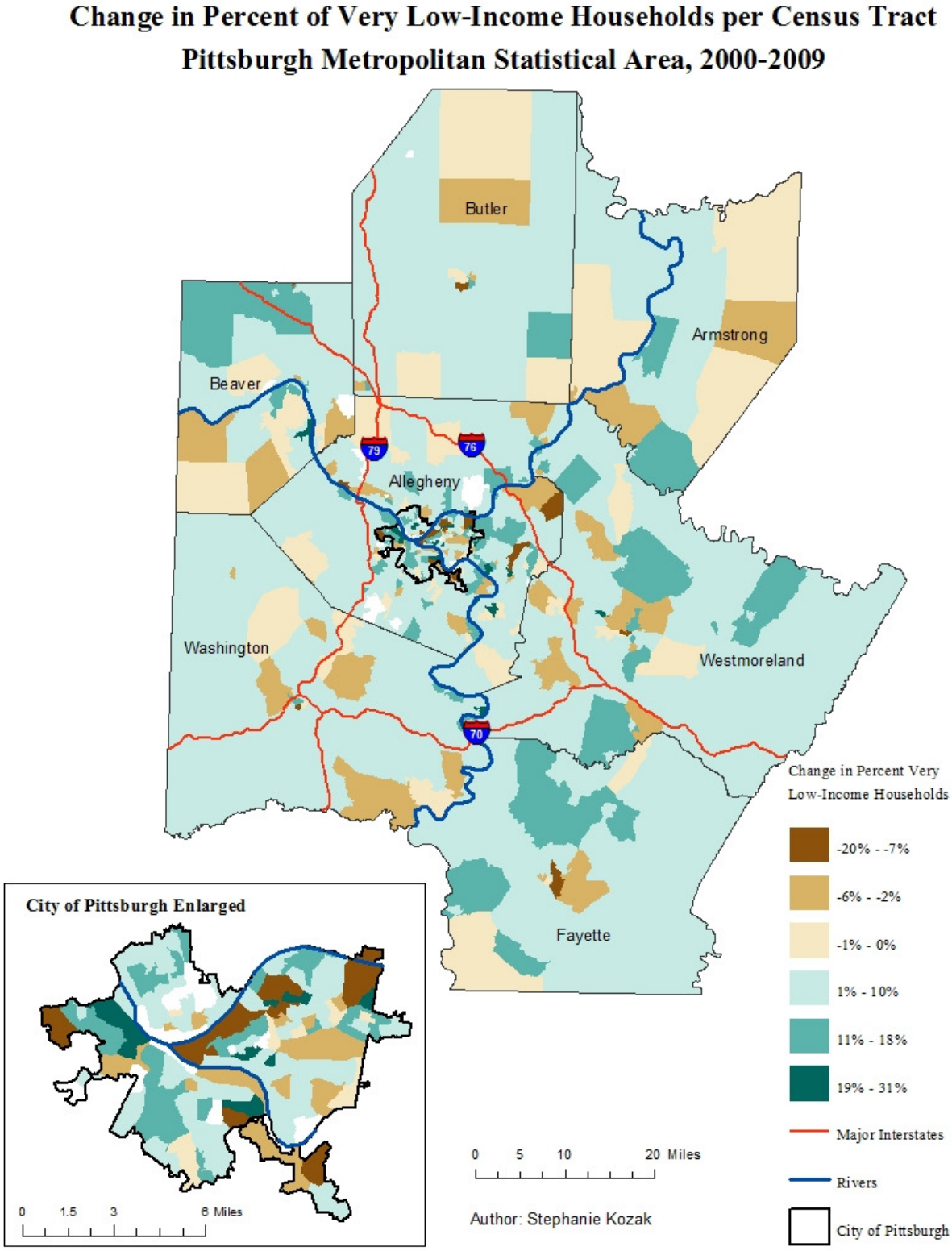


Figure 5.16. Number of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

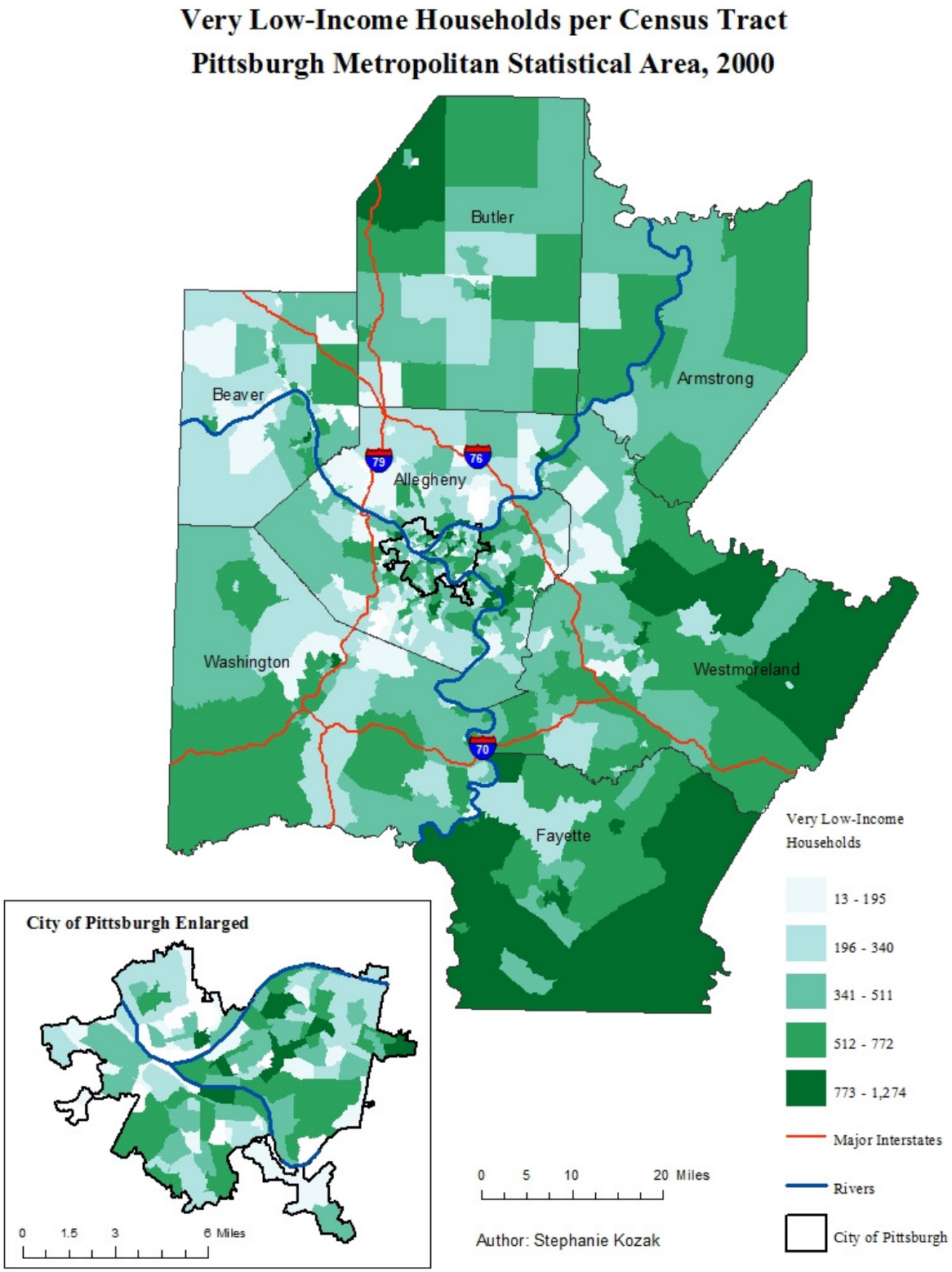


Figure 5.17. Number of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

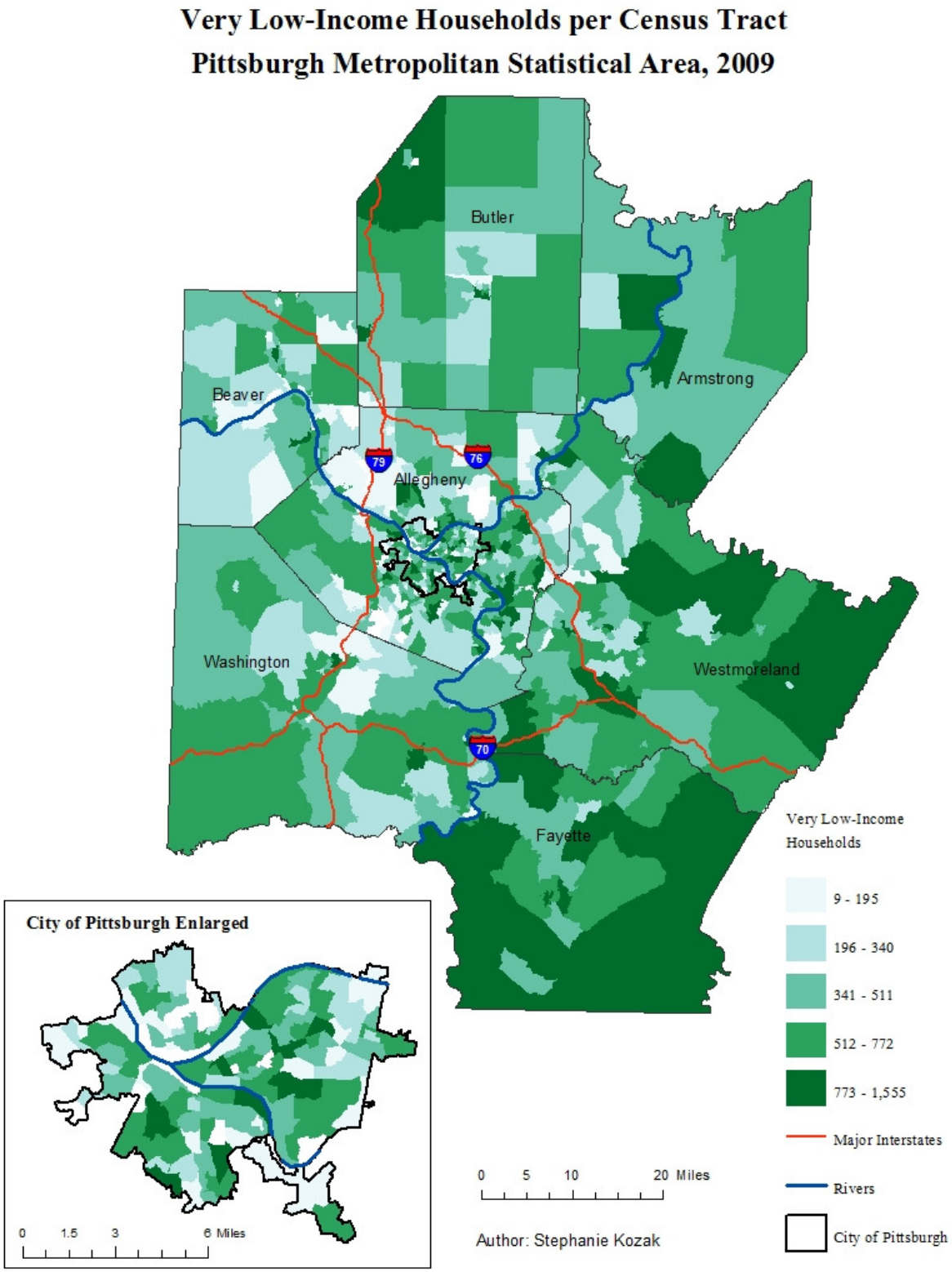
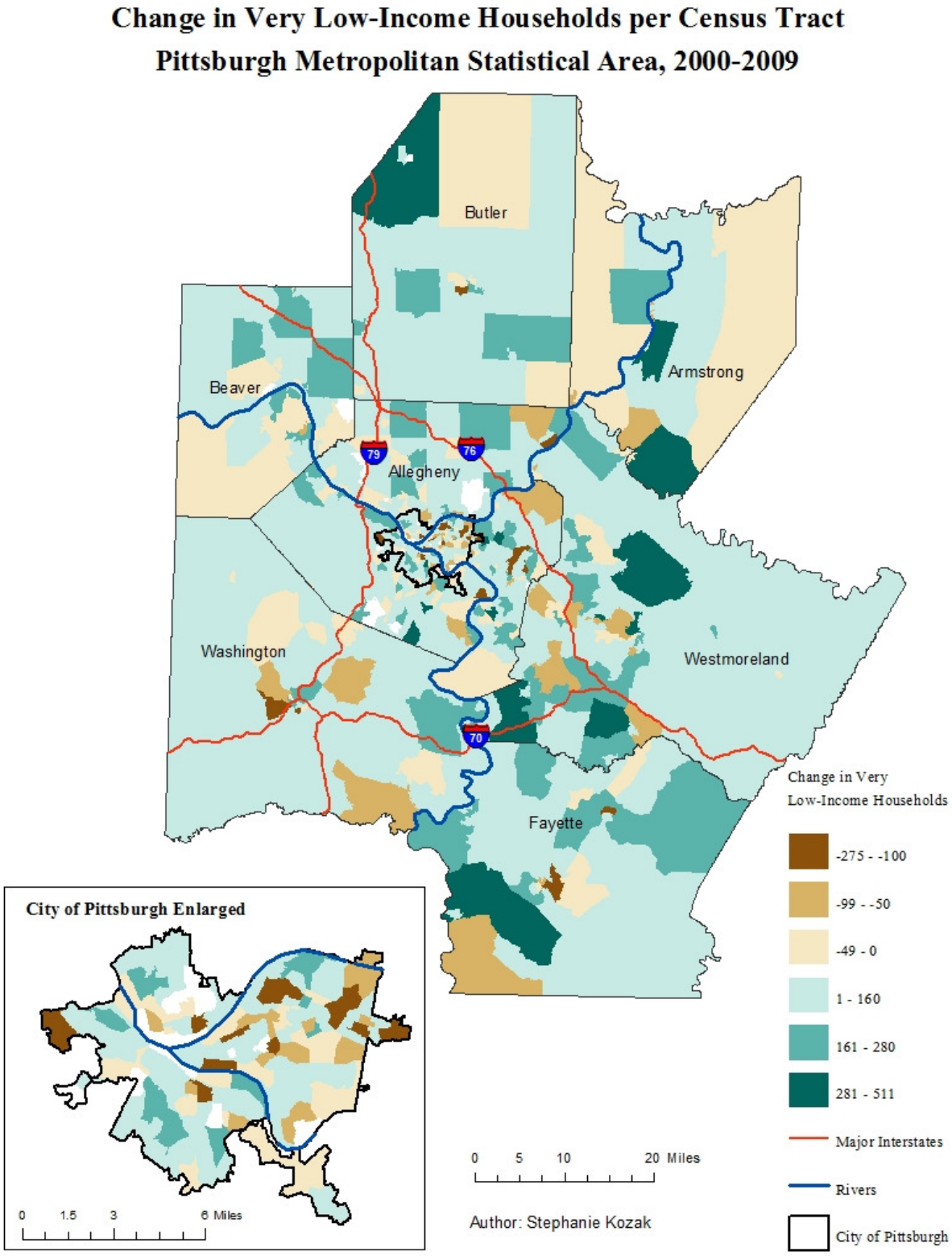


Figure 5.18. Change in Number of Very Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.



Like low-income households, there should be enough affordable units for very low-income groups but most of those homes are being occupied by higher-income families. The amount of affordable housing for very low-income households in the Pittsburgh MSA was 37.9%, or approximately 372,114 occupied housing units. Considering there were 328,755 households considered very low-income, there was a small surplus of housing that was considered affordable for this cohort. There were 195,145 very low-income households, or almost 60% of very low-income households, which were under a high-housing cost burden. More than half of the affordable units for this cohort are being occupied by households that could afford more expensive housing.

Very low-income affordable units are concentrated in certain neighborhoods, just like the distribution of very low-income households. In 2000, the lowest proportions of affordable units for the very low-income cohort were in the suburbs and some areas of the city (Figure 5.19). The lower-income neighborhoods within the city and tracts throughout the rural areas had some of the highest proportions of affordable units. The pattern was similar in 2009 (Figure 5.20). The average amount of affordable housing available for very low-income households in each census tract was 38.8%. The maximum concentration in a census tract of very-low income affordable housing was 79.4% and the minimum was 0.3%. The distribution of affordable housing for very low-income households was negatively skewed, i.e., there were few census tracts with small proportions of affordable housing. So most communities do not have an abundant supply of affordable units for this cohort, which would limit the available neighborhoods for very low-income households to live in and those that they could afford would have higher concentrations of other low-income households. The average total number of affordable units for very low-income households per census tract was 531 units, with the maximum at 1,760 units and the

minimum at three affordable units. While on average there should be more affordable units per tract than the number of very low-income households, there was clearly a spatial mismatch occurring due to the large number of very low-income households experiencing a high housing cost burden.

Most tracts experienced a growth in the proportion of very low-income affordable units throughout the MSA (Figure 5.21). This increase was most pronounced outside of the city where lower population densities help to keep property values low. The largest declines in percent of very low-income affordable homes were in the lower-income areas of the city and in the wealthier suburbs. Development within the city is creating lower proportions of lower-income residents and affordable units, which is creating a new residential pattern for Pittsburgh. As downtown neighborhoods become more desirable for middle to upper-income residents, the lower-income households will be pushed out of their homes.

Figure 5.22 shows that the number of affordable units for very low-income households is already small in the suburbs and parts of the city in 2000. By 2009, there are a few more suburban and urban neighborhoods with more affordable units available (Figure 5.23). However, the change between 2000 and 2009 shows that the largest declines in number of units were in areas of the city that experienced development (Figure 5.24). Overall the MSA experienced a growth of 15% in the number of affordable units, but the largest growth was in the rural areas far from the employment opportunities of the city and suburbs.

Figure 5.19. Percentage of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

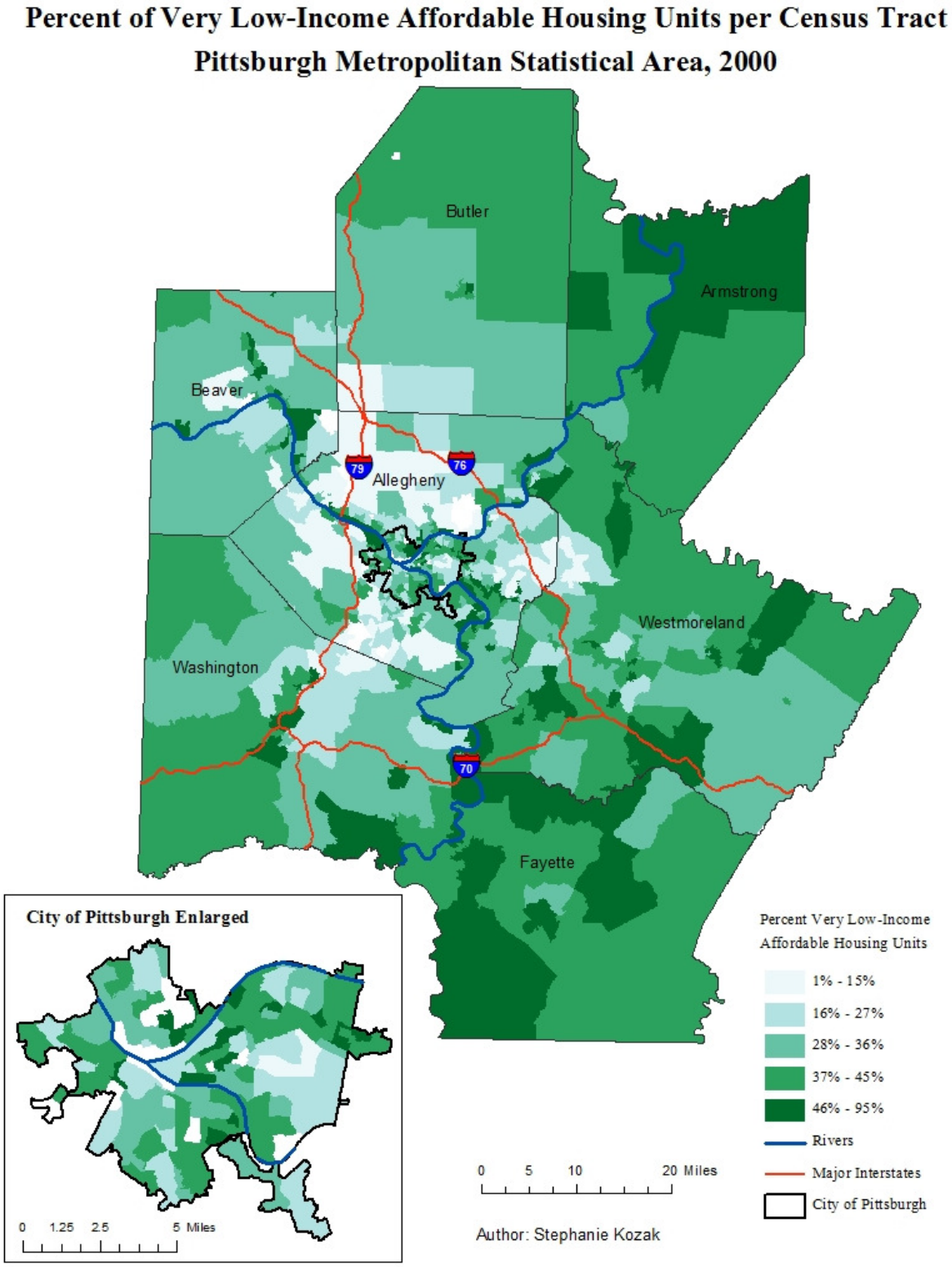


Figure 5.20. Percentage of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

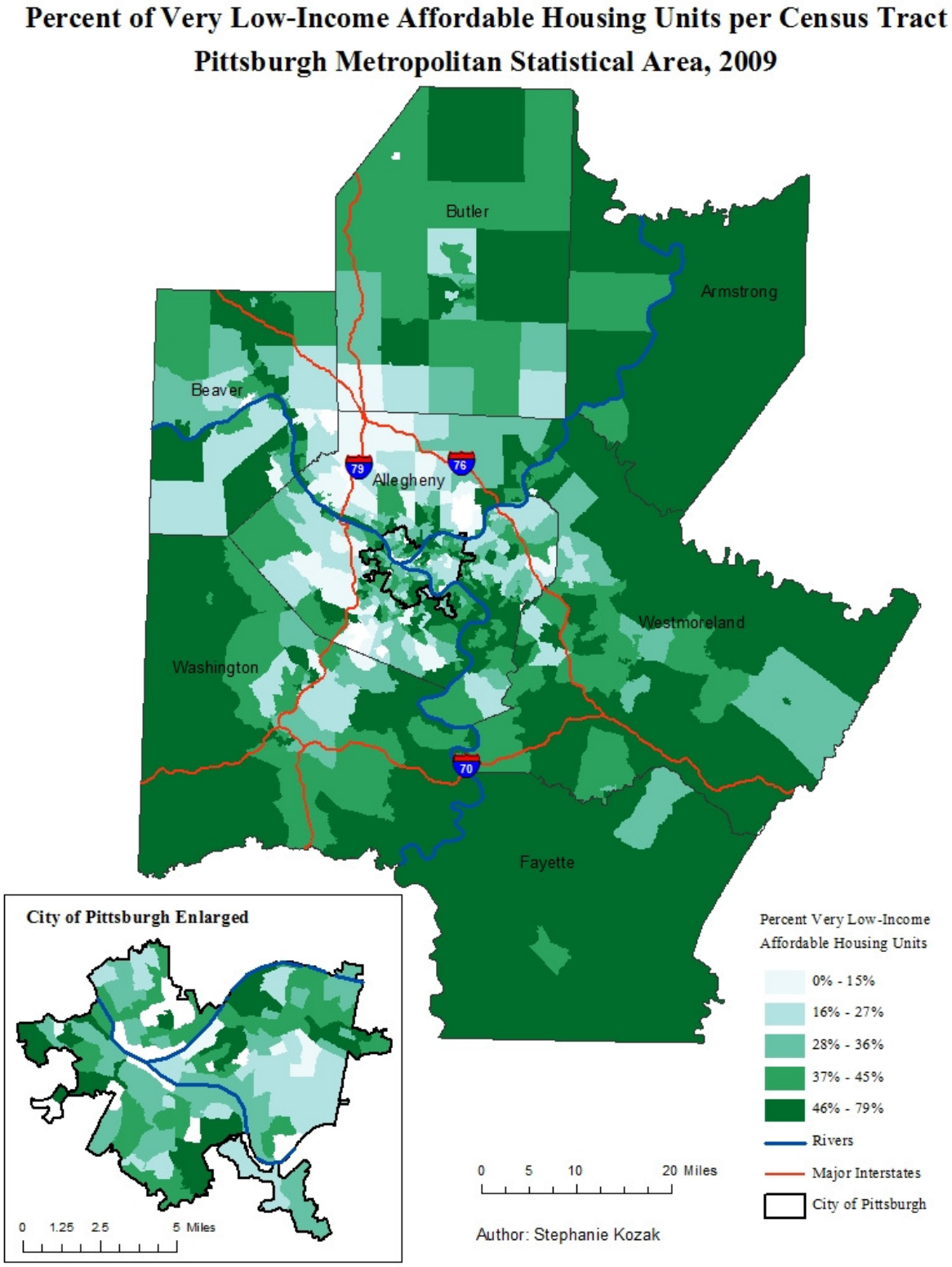


Figure 5.21. Change in Percentage of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.

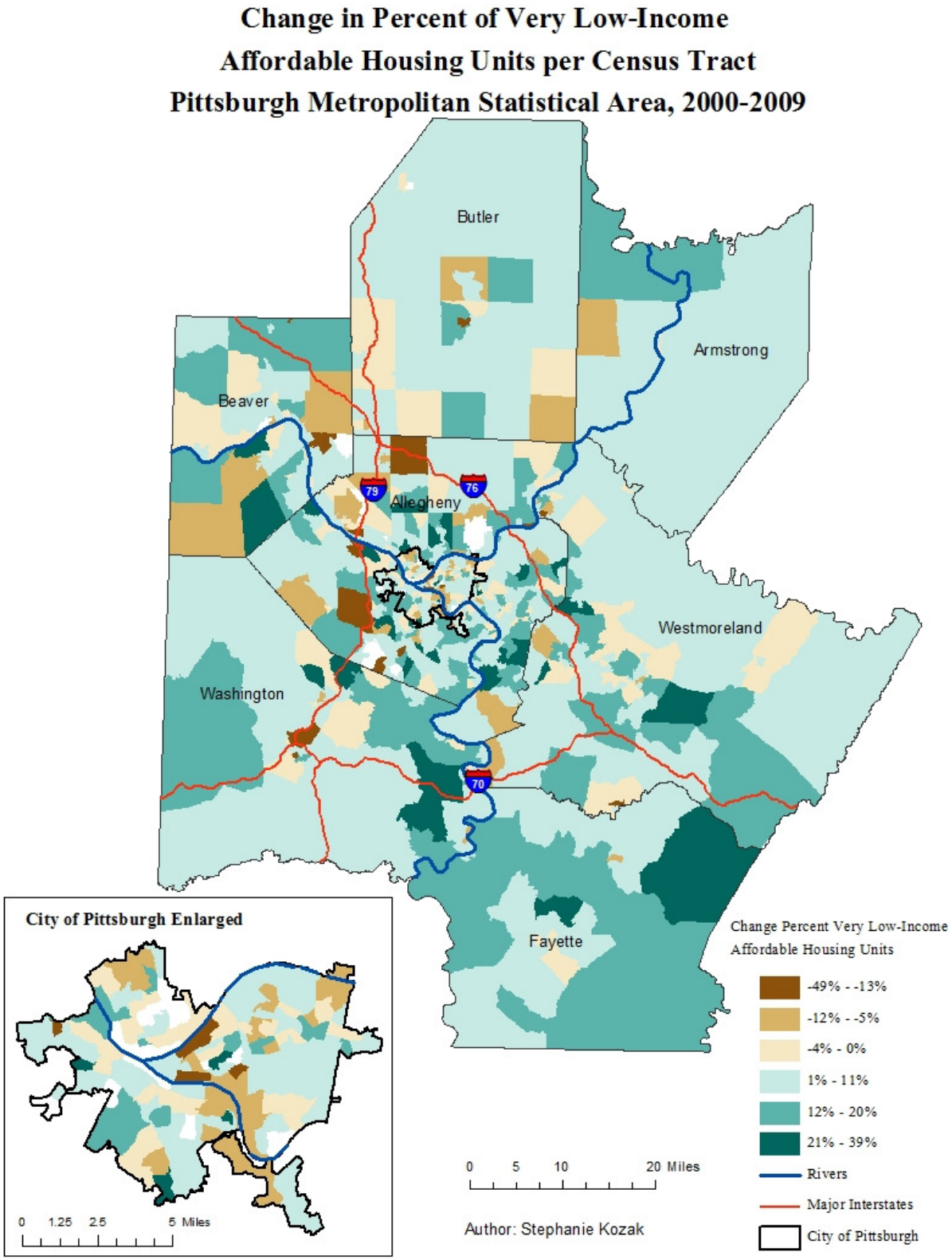


Figure 5.22. Number of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

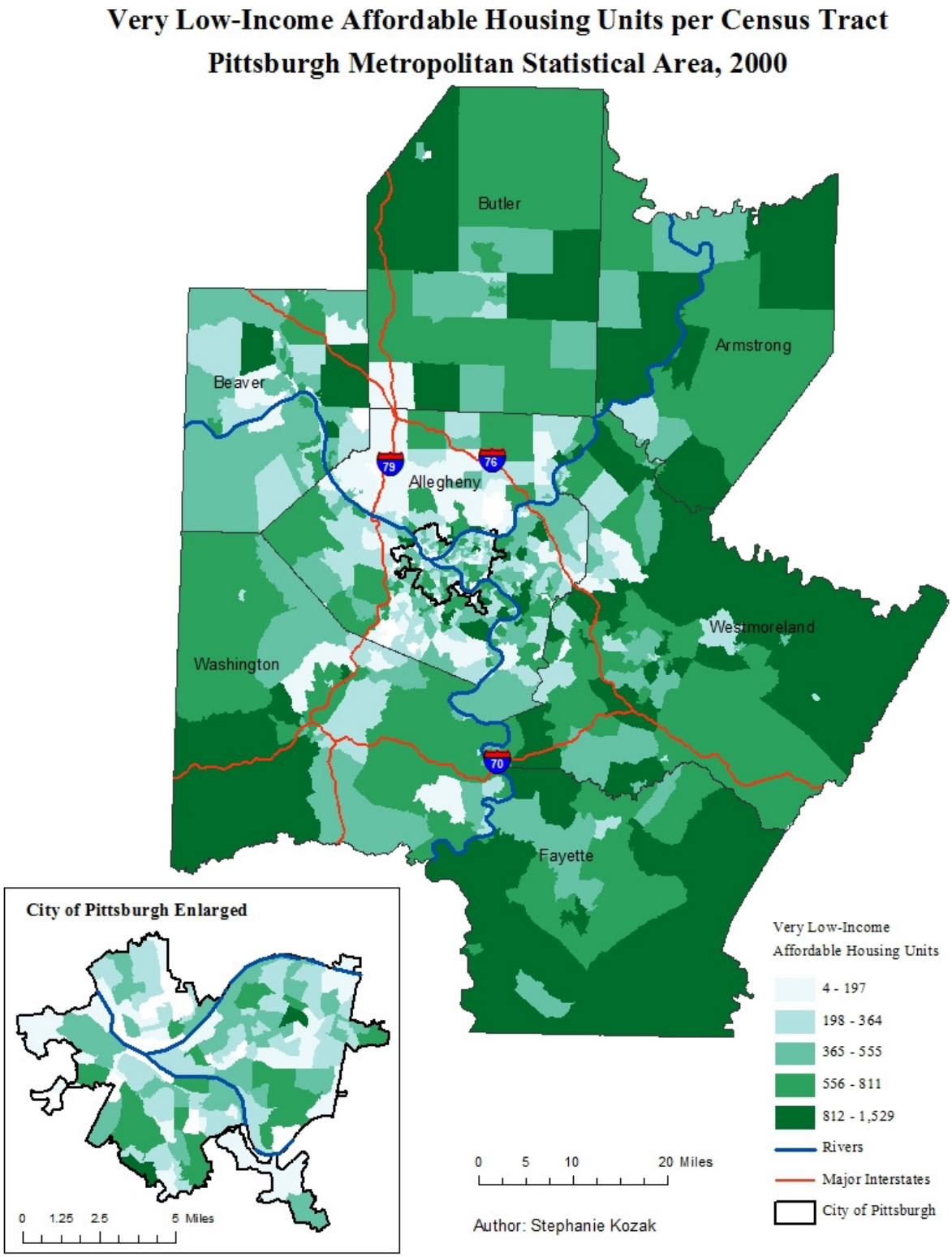


Figure 5.23. Number of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

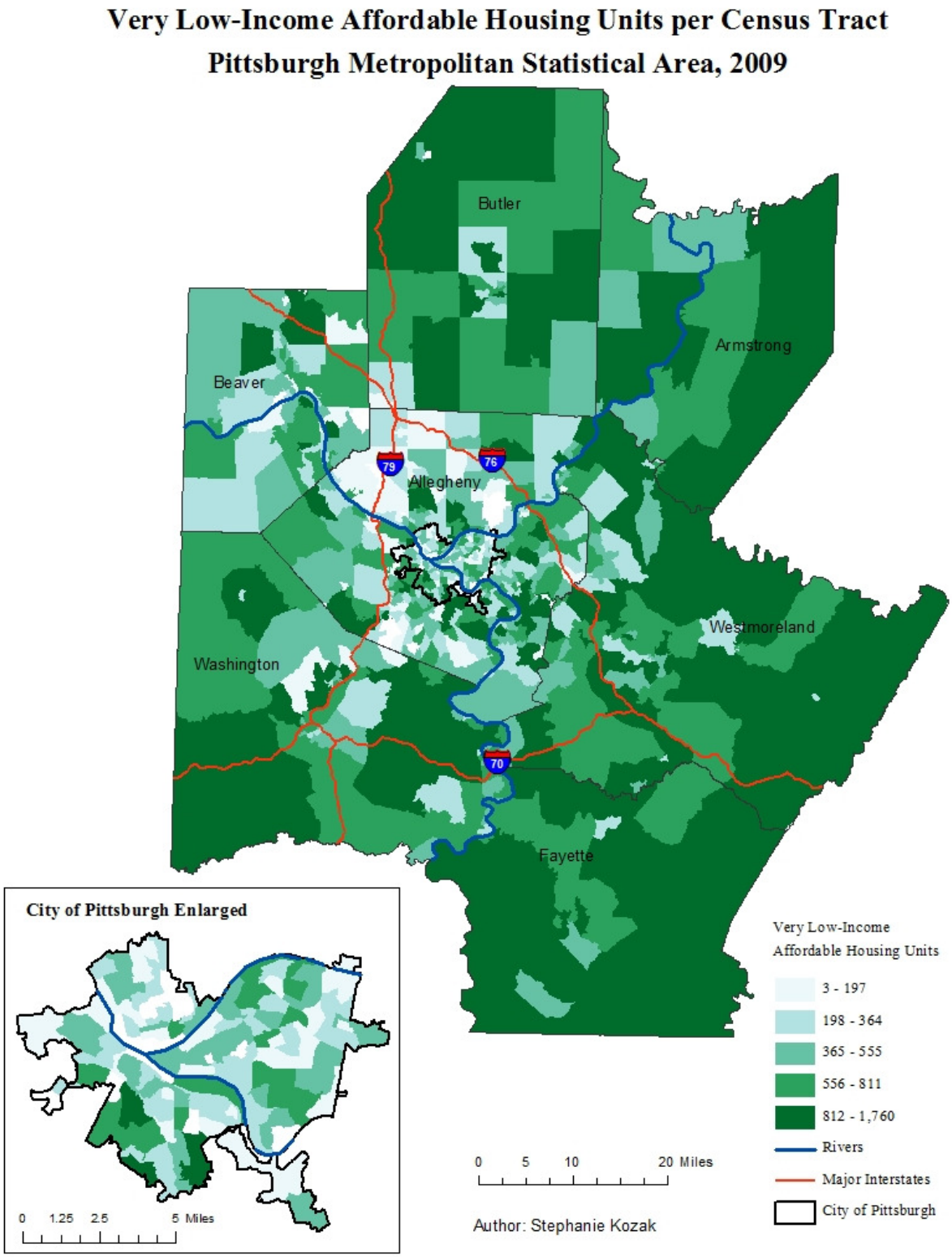
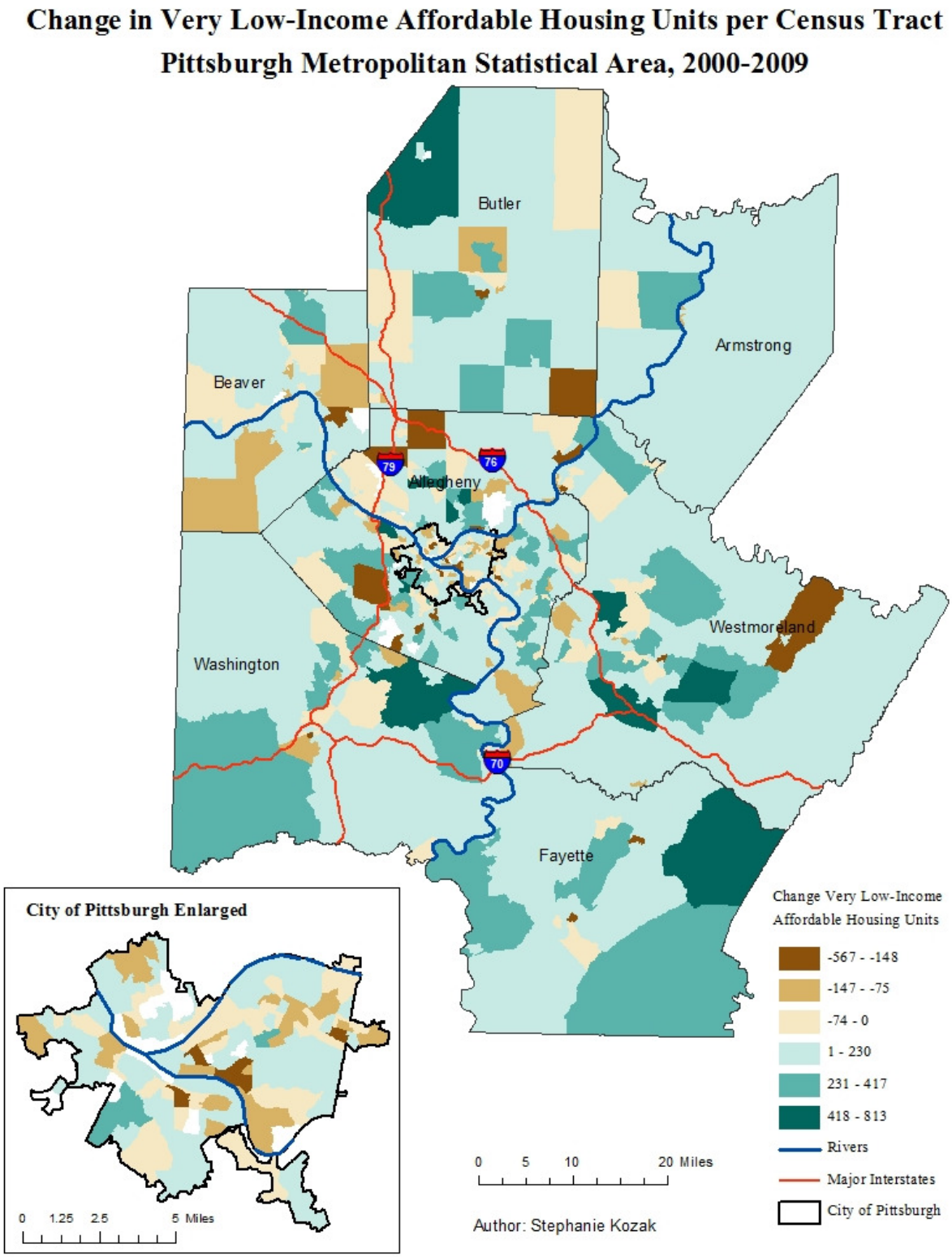


Figure 5.24. Change in Number of Very Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.



Extremely Low-Income Households

The extremely low-income cohort faces the most severe financial restraints and represents a sizable proportion of the metropolitan population. Extremely low-income households are those whose annual income is less than 30% of the area's median family income, or $18,270 in 2009. Between 2005 and 2009, the percentage of Pittsburgh area households considered extremely-low income was 18.7%, or 183,184 households (Table 5.7). The maximum number of households per census tract from this group was almost 1,000, so there are neighborhoods in which a large amount of residents face extreme poverty conditions.

In 2000, neighborhoods with high concentrations of extremely low-income households were found mostly in the inner city and along the waterfront, a pattern that the other low-income groups exhibited as well (Figure 5.25). Poverty disproportionately affects the inner city. While most neighborhoods must deal with the issue of poverty, areas near the central city face the largest challenge with extreme concentrations of low-income households. The only change by 2009 is that the extremely low-income tracts along the river are more pronounced (Figure 5.26). The average proportion of extremely low-income households per census track was 20.3%, meaning the average tract had 20% of its households considered extremely low-income, and the average census tract had 261 extremely low-income households. The highest proportion in a census tract was 72.7%, or 964 households, and the lowest proportion is 2.7%, or five households. Considering the very restrictive budget constraints this group faces when searching for affordable housing, the high proportions of over 50% of households in some census tracts shows that there were areas of extreme concentration of poverty within Pittsburgh. Also, there was no census tract that did not have at least a few households considered to be extremely low-income.

Table 5.7. Extremely Low-income Households in Pittsburgh MSA, 2000-2009.
(Source: Census Bureau 2000, 2010)

Extremely Low-Income	2000	2005-2009	Change
Income Threshold	$17,763	$18,270	$957
Households			
Total	155,308	183,184	27,876
Percent	15.8%	18.7%	2.9%
Average per Census Tract	222	261	39
Maximum per Census Tract	947	964	17
Minimum per Census Tract	4	5	1
High Housing-Cost Burden			
Total	-	133,144	-
Percent	-	72.8%	-
Affordable Units			
Total	100,570	126,616	26,046
Percent	10.2%	12.9%	2.7%
Average per Census Tract	144	181	37
Maximum per Census Tract	746	863	117
Minimum per Census Tract	0	0	0

The number of extremely low-income households increased between 2000 and 2009 by 18% from 155,308 to 183,184 households (Table 5.7). The increase was spread throughout the MSA, but some areas did experience a decline in the proportion of extremely low-income households (Figure 5.27). Tracts with the largest declines were in the lower-income areas of the city and the surrounding neighborhoods had some of the largest increases of this cohort. This pattern adds support to the claim that development occurring in lower-income areas of the city is pushing out or excluding lower-income residents.

Maps of the number of extremely low-income households in 2000 (Figure 5.28) and 2009 (Figure 5.29) show areas in the city and in some rural tracts, mostly in Fayette County, as having the highest number of households for this group. The difference between the suburbs and

the urban and rural areas is not as pronounced when looking at the number of very low-income households compared to the proportion of these residents per tract, but there are still lower numbers in most of the suburban areas. The change in number of units between 2000 and 2009 also shows that the pattern of change is not as clear as the pattern observed for proportion of households per tract because of differences in the size of tracts in rural areas compared to the city (Figure 5.30).

Figure 5.25. Percentage of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

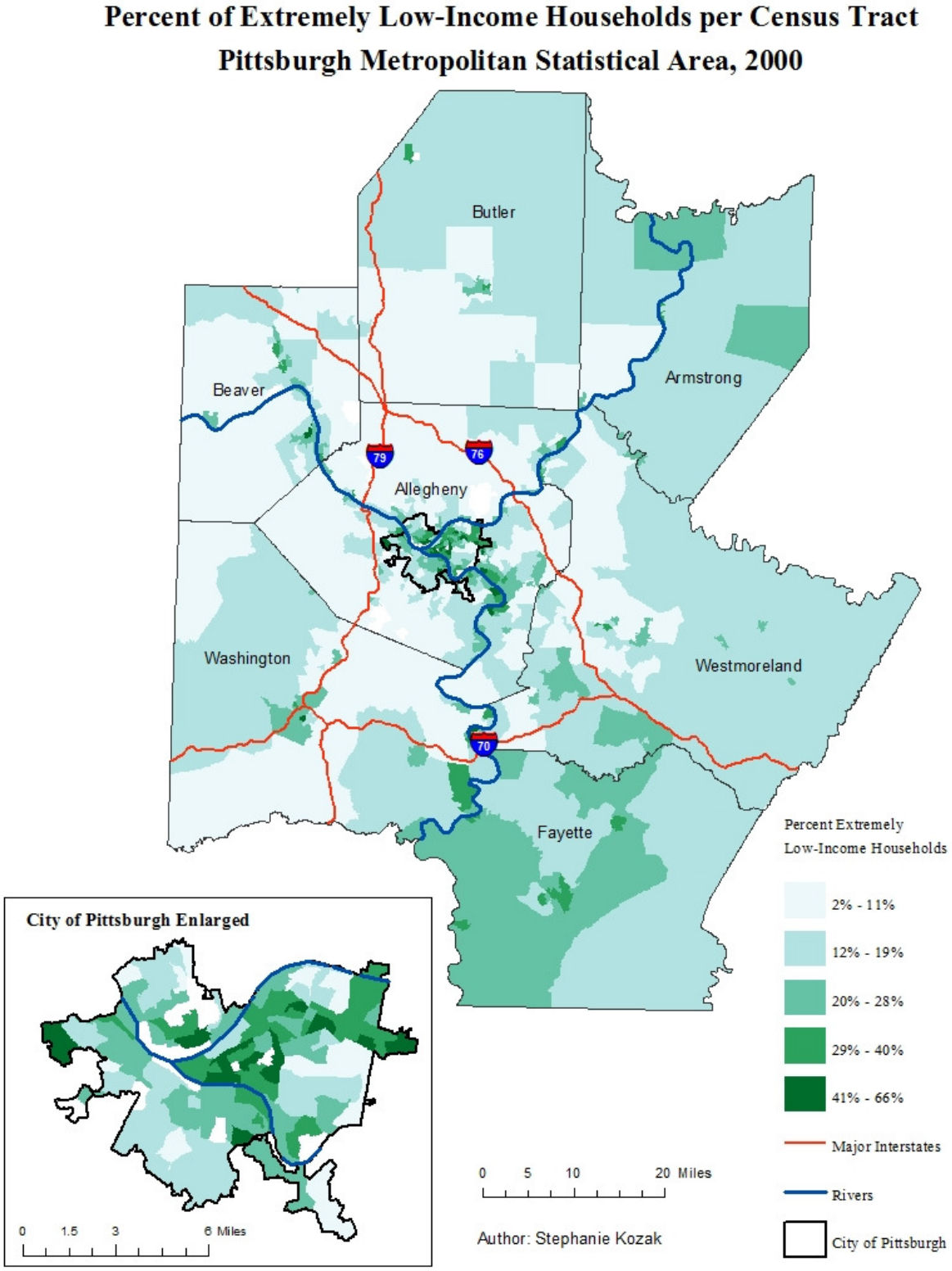


Figure 5.26. Percentage of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

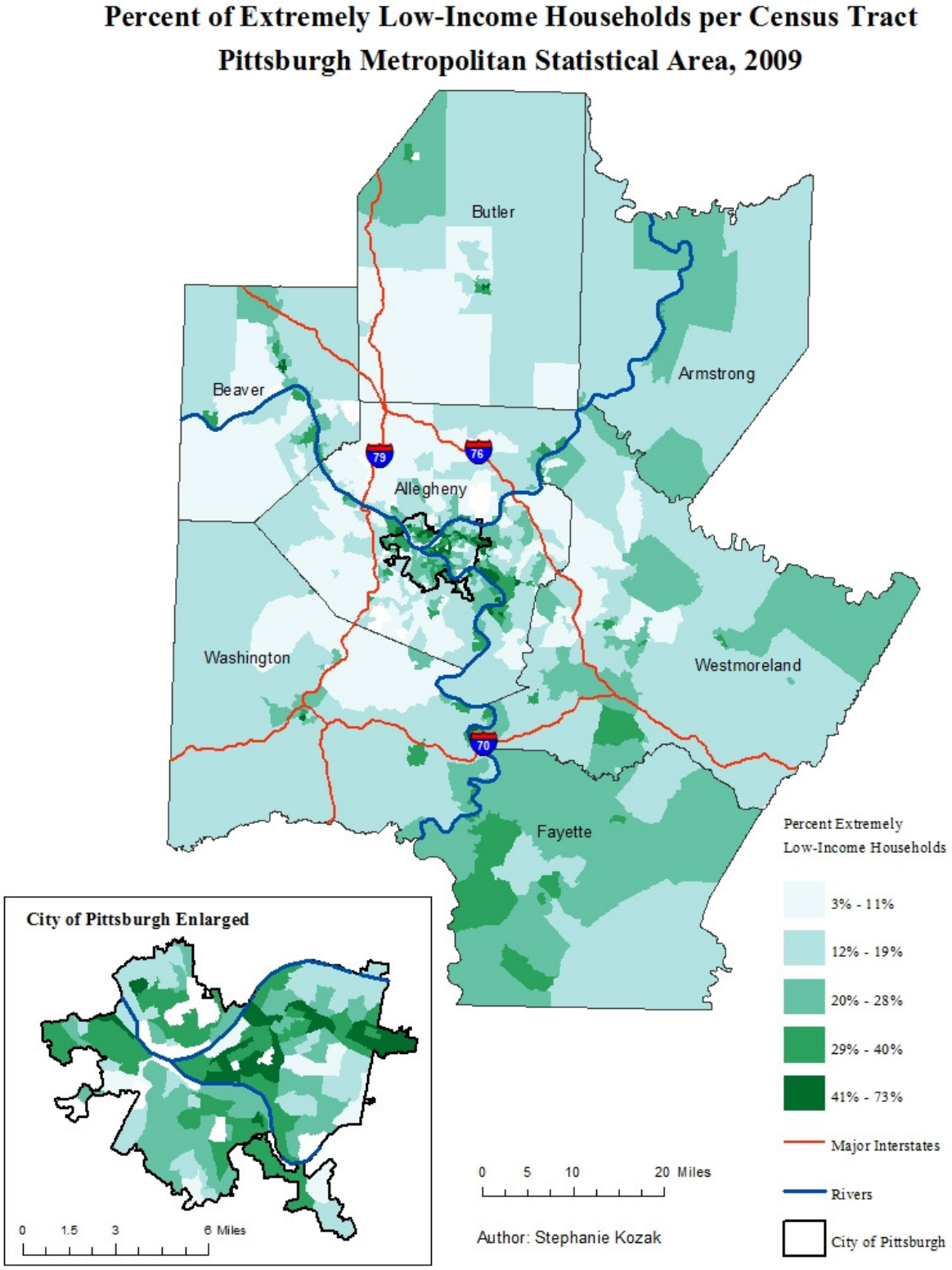


Figure 5.27. Change in Percentage of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.

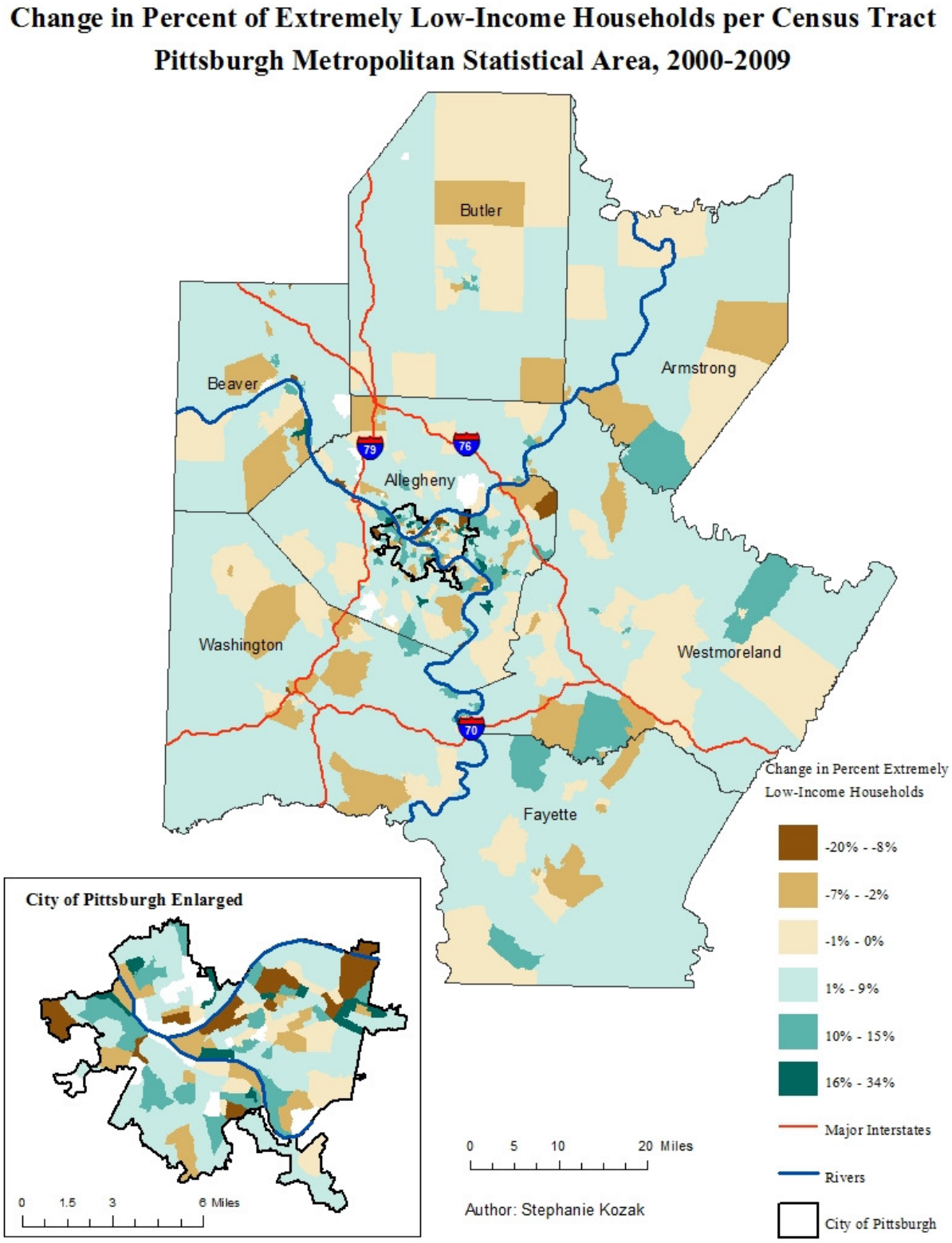


Figure 5.28. Number of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2000.

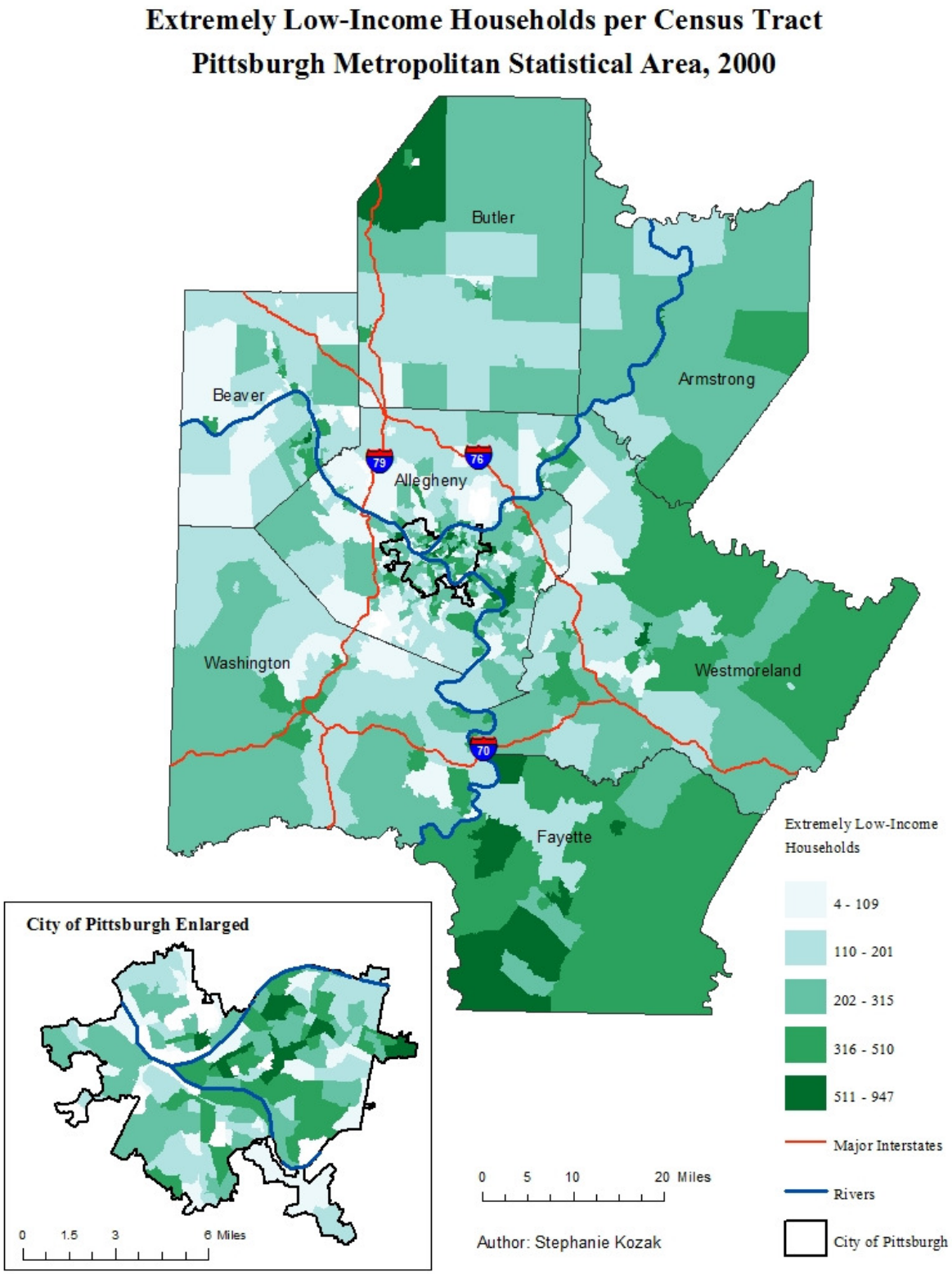


Figure 5.29. Number of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2009.

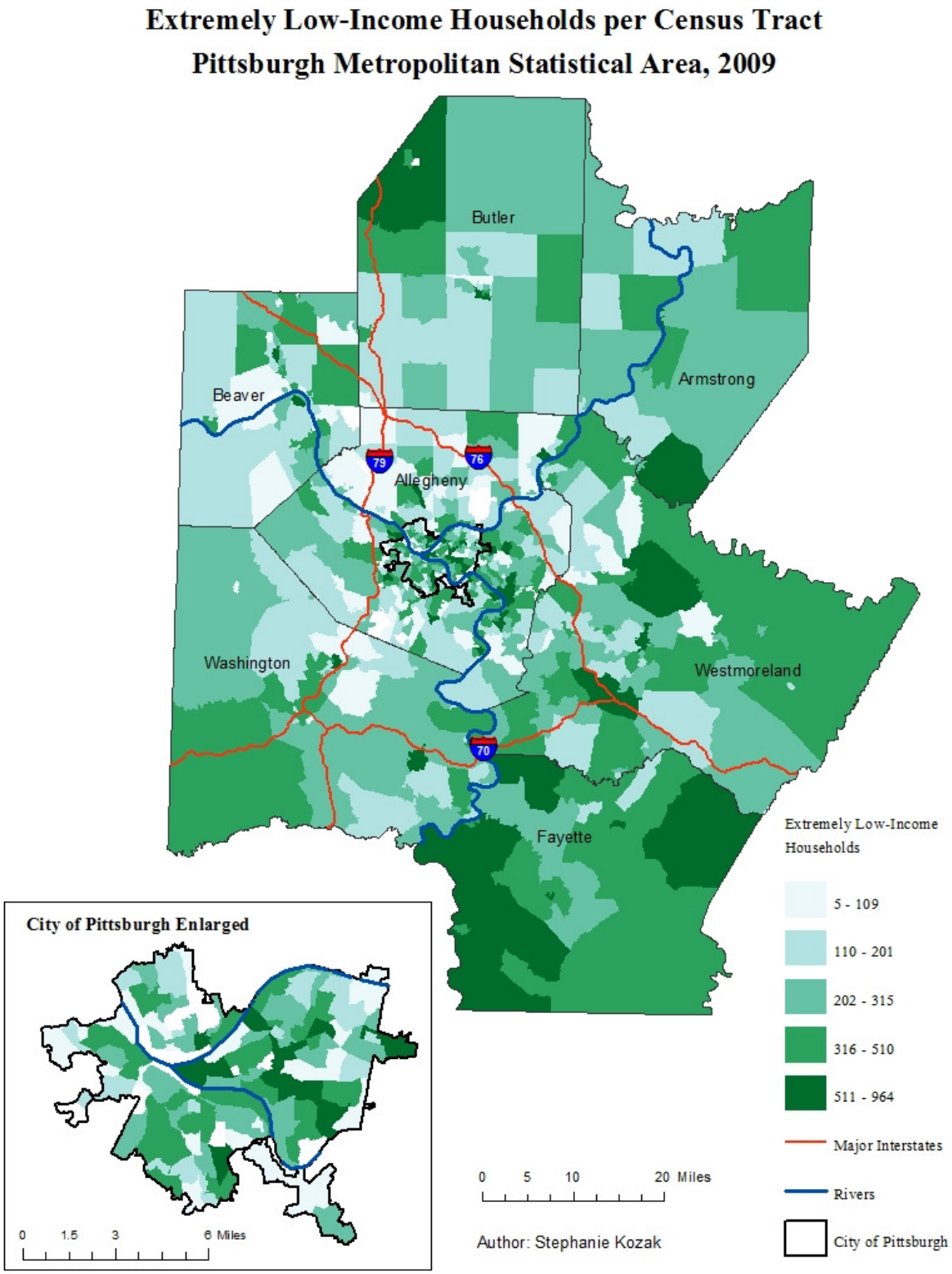
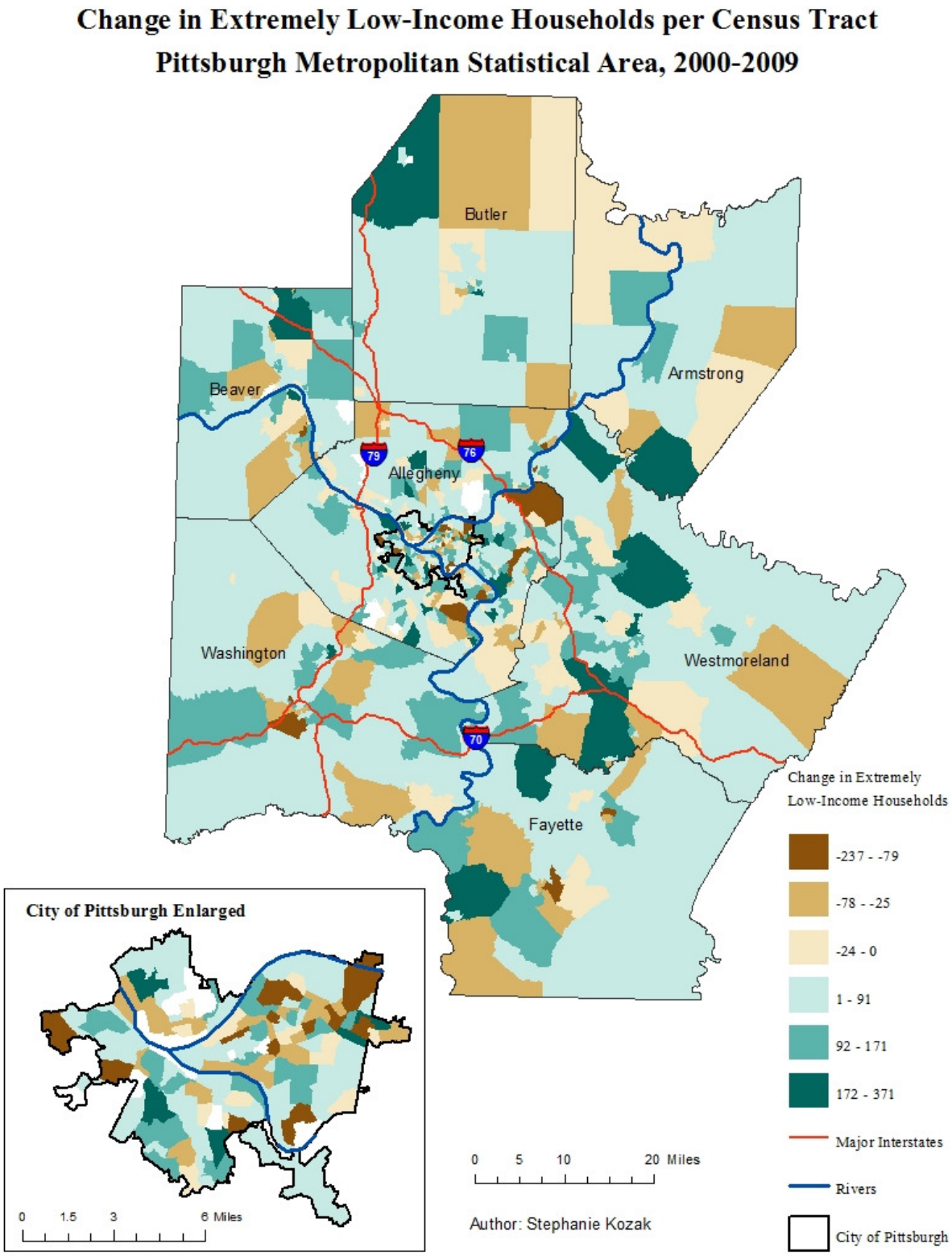


Figure 5.30. Change in Number of Extremely Low-Income Households per Census Tract in Pittsburgh MSA, 2000-2009.



Extremely low-income households are not only under tighter budget constraints than the other income groups, limiting their options in finding affordable housing, but they also face a deficit of affordable units rather than a surplus. Only 12.9%, or 126,616, of the occupied housing units were considered affordable for the extremely low-income cohort. That means that there was a deficit of 56,568 affordable units for extremely low-income households. There were 133,444 households experiencing a high housing-cost burden in the area. That means that a little less than 40% of the affordable units for this cohort were actually being occupied by extremely low-income households.

Some census tracts near the inner city had higher proportions of affordable housing but the amount quickly subsides as one moves towards suburban areas with very low concentrations, especially west of the CBD (Figures 5.31 and 5.32). Fayette, Westmoreland, Washington, and Armstrong counties also had census tracts that exhibited higher concentrations of affordable housing available for this group. For total number of affordable occupied units for this group, most of the census tracts with high values were found in these outer, rural counties and not within Allegheny County (Figures 5.34 and 5.35).

Even though the proportion of extremely low-income households appeared to be less so than the low-income or very low-income groups, there was even more of a difference in the proportion of housing available for this group. The average census tract had 13.4% of its households considered extremely low-income. However, the highest concentration of affordable housing available for extremely low-income households in a census tract was 47%, which was much lower than the highest concentration of extremely low-income households, 72.7%. These observations imply that there were areas in which there were large concentrations of extremely low-income households but not large concentrations of affordable housing. The minimum

proportion of affordable housing for this group in a census tract was 0%, even though there was no census tract that did not have at least 2% of its households considered extremely low-income housing.

The rural areas of the MSA experienced the largest increase of both proportion of extremely low-income affordable units per census tract (Figure 5.33) and the total number of affordable homes (Figure 5.36). In the suburbs where the lower proportions of affordable units exist there was a decrease in affordable homes, which means that this area continues to offer few opportunities for the most economically-depressed households to secure housing. There was also a decrease in affordable units in developing tracts and upper-income neighborhoods of the city. This cohort clearly faces the largest housing shortage and the least opportunities for affordable housing both within and outside of the city.

Figure 5.31. Percentage of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

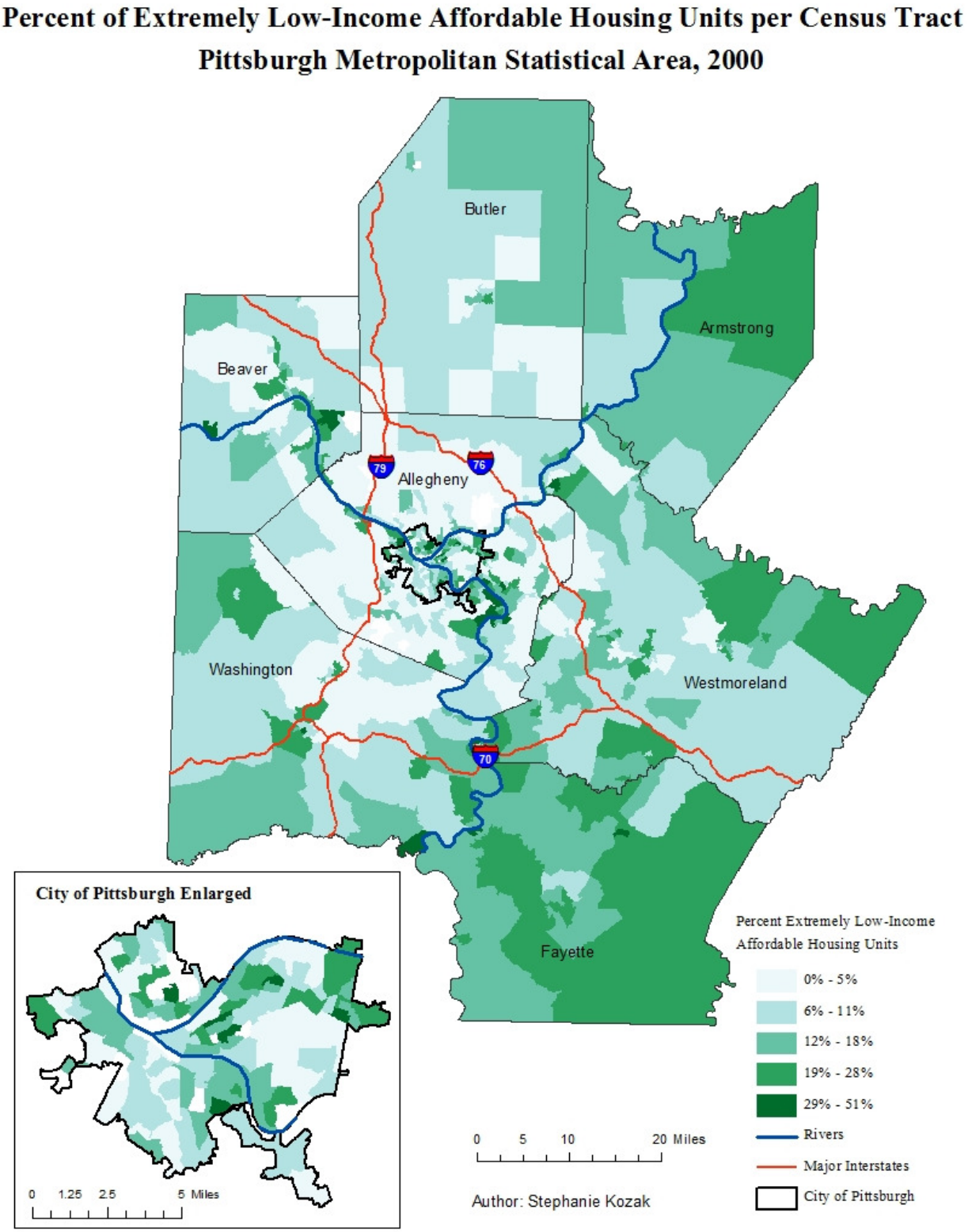


Figure 5.32. Percentage of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

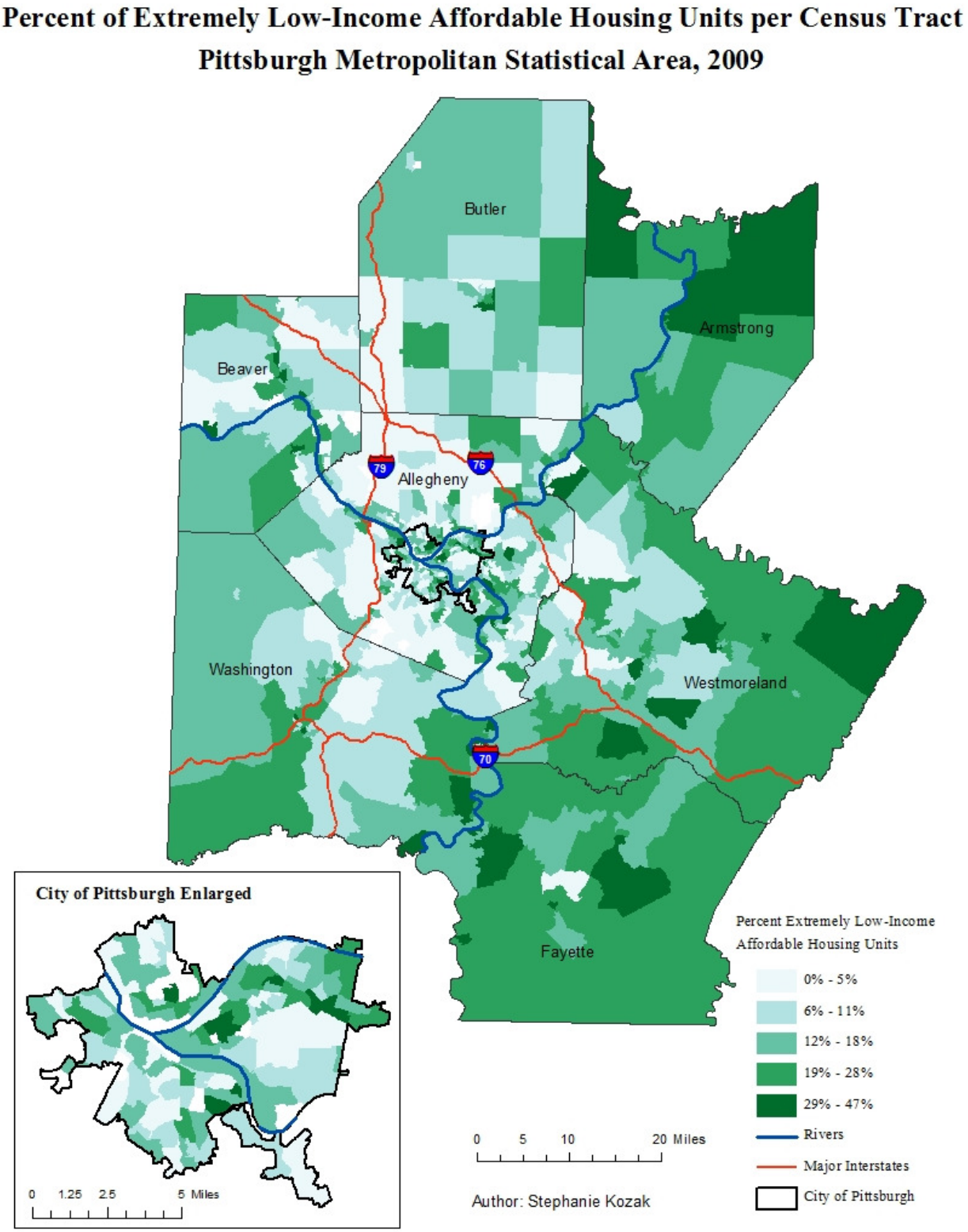


Figure 5.33. Change in Percentage of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.

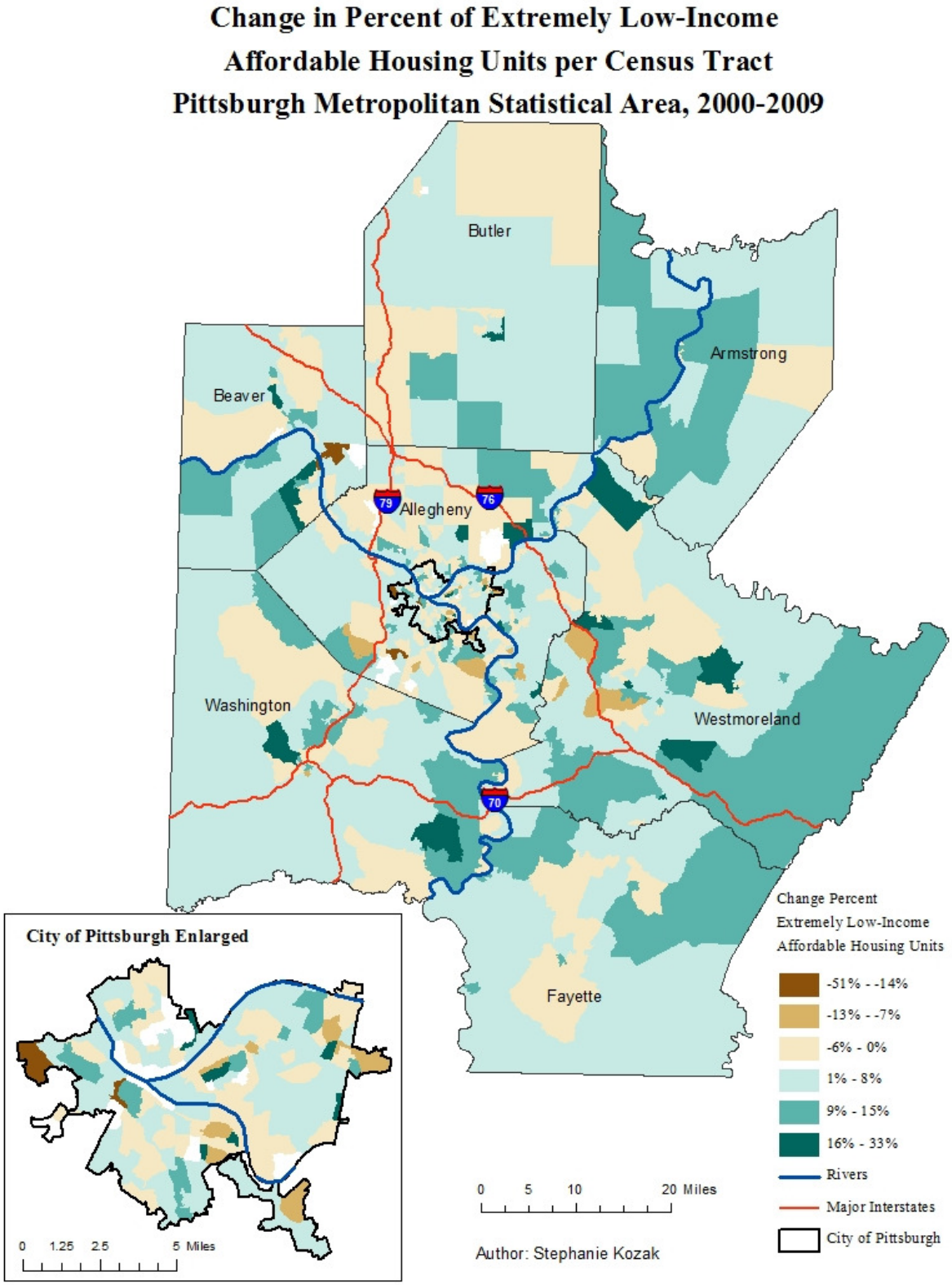


Figure 5.34. Number of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000.

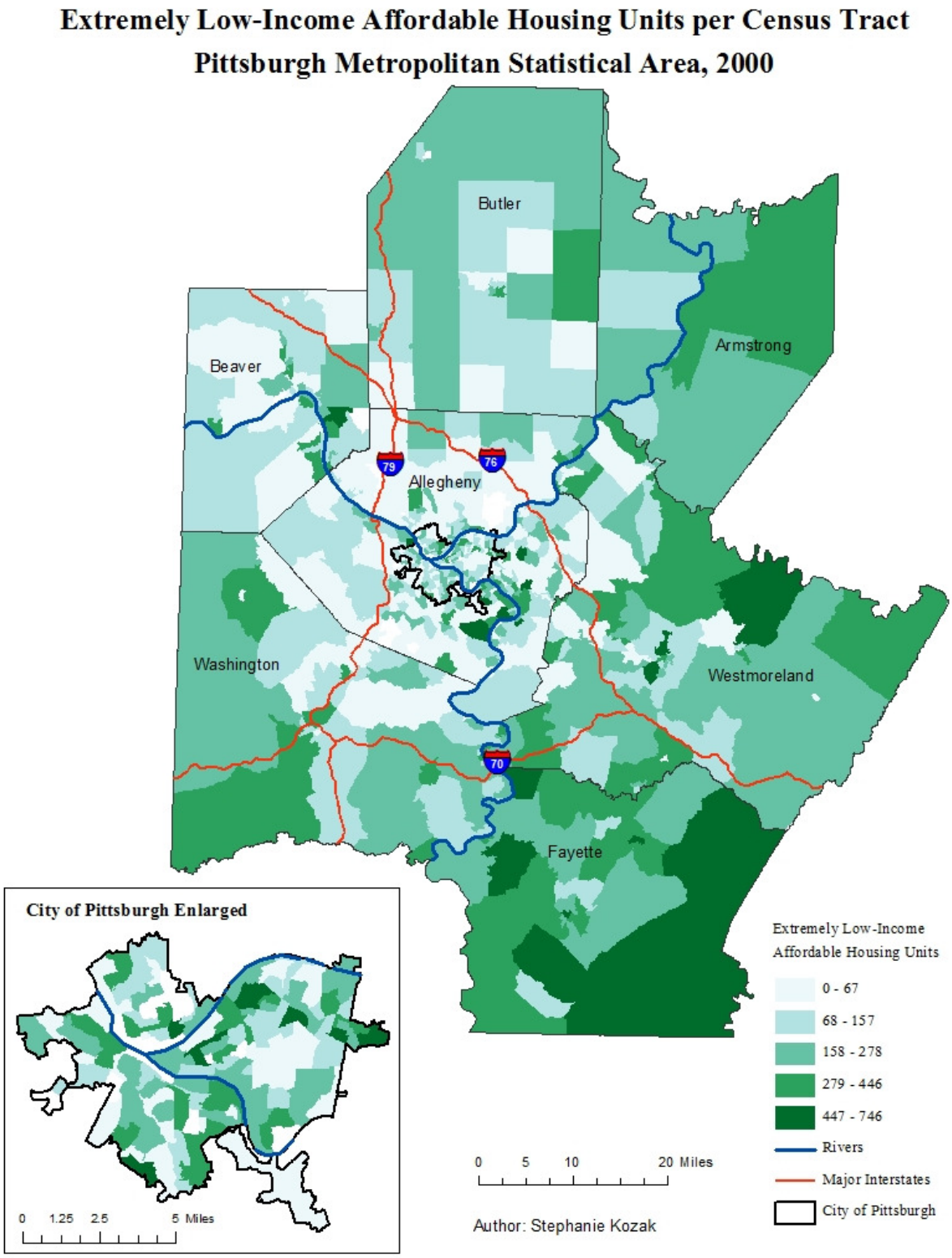


Figure 5.35. Number of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2009.

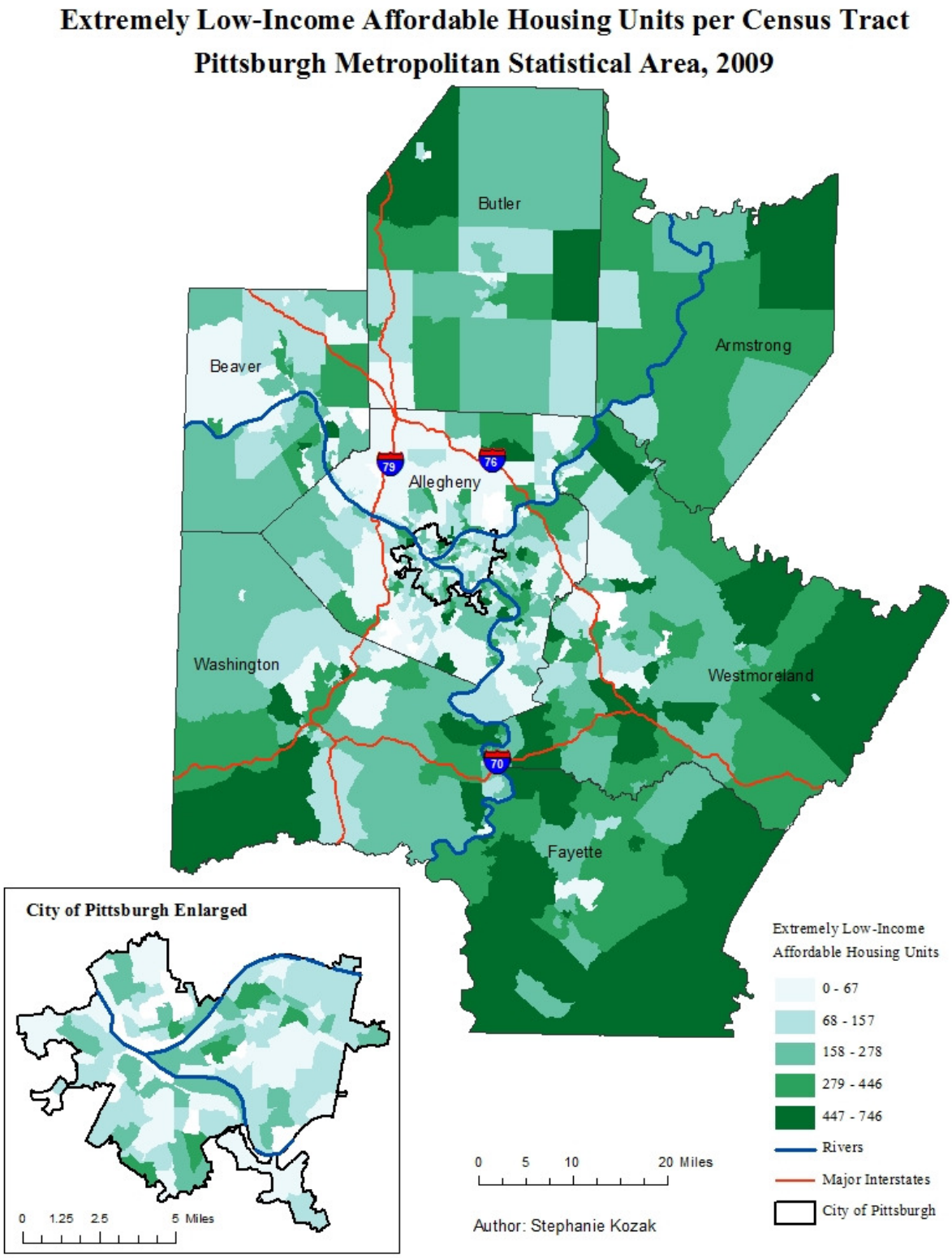
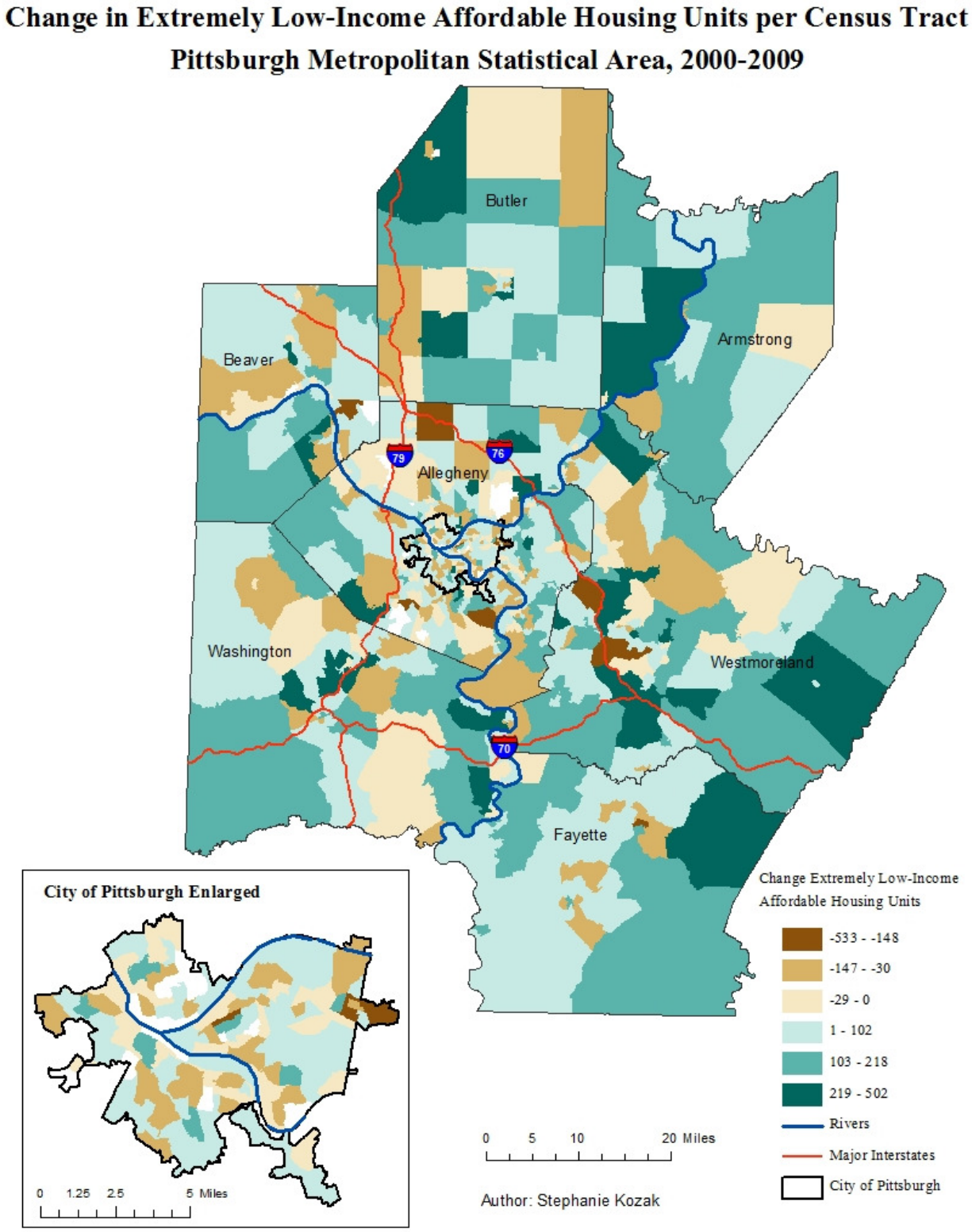


Figure 5.36. Change in Percentage of Extremely Low-Income Affordable Housing Units per Census Tract in Pittsburgh MSA, 2000-2009.



5.8 Why the *Where* of Affordable Housing is Important

Edward Soja (2000) explains that the urban inequality that exists throughout postindustrial cities can be largely attributed to the market forces that restructure urban space in favor of the wealthy and facilitate control of labor pools, but that other processes are at work and need to be explored. The role of ideologies regarding race and gender, local context, and governmental policies are some ways that the current urban inequalities that exist today are formed by complex processes. The concentration of poverty, segregated neighborhoods, and lack of locational access to employment are examples of how current urban spaces suffer from spatial inequalities (Frazier, Margai, and Tettey-Fio 2003).

Pittsburgh is no exception and the area suffers from a spatial mismatch in affordable housing for poor households. Low-income and very low-income households should theoretically have enough affordable housing in the metropolitan area to alleviate the high housing-cost burden for every household. However, not all neighborhoods had the same needs for affordable housing. Some neighborhoods had more low-income households than housing available, whereas other neighborhoods had a surplus of affordable housing compared to the demand. In this analysis, affordable housing surpluses and shortages were calculated by subtracting the number of households considered low income from the number of housing units considered to be affordable for that group. The following discussion examines these differences through each income group.

Low Income Households

A small portion of the Pittsburgh MSA had a deficit of affordable housing for low-income households. There was a housing shortage for these households in 254 out of 701 census

tracts in the Pittsburgh MSA (Table 5.8). On average, there was a shortage of 105 housing units in tracts with a deficit in affordable housing, with the largest at 619 units. Out of the 447 tracts that had a surplus in affordable housing for low-income households, tracts had on average a surplus of 159 units with a maximum surplus of 799 units. As would be expected, areas with a shortage of affordable units tend to have fewer affordable units on average than tracts with a surplus of affordable homes.

Table 5.8. Surplus and Deficits of Affordable Units for Low-Income Households in Pittsburgh MSA, 2000-2009.
(Source: Census Bureau 2000, 2010)

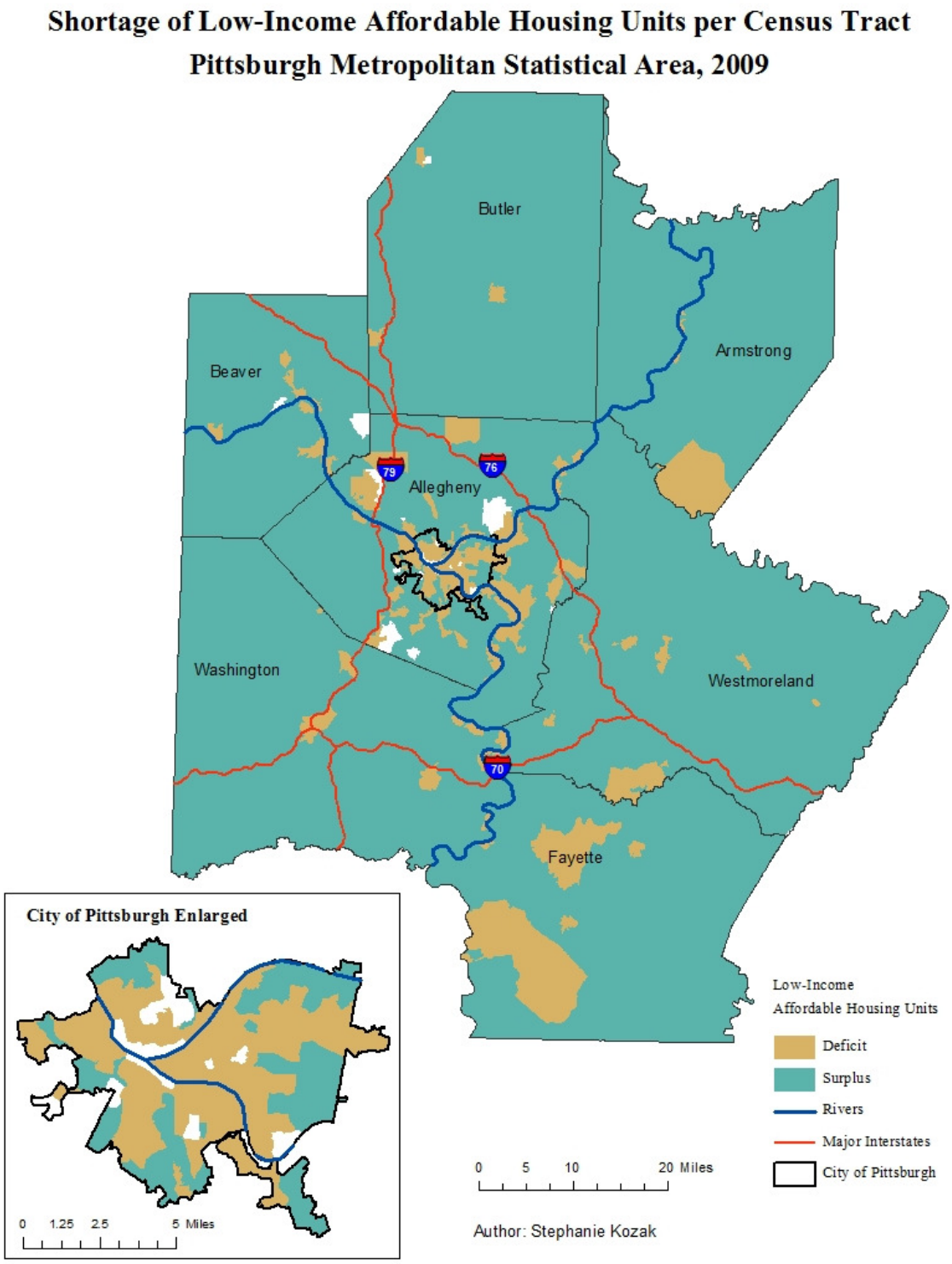
Low-Income	2000	2005-2009	Change
Tracts with Deficit in Affordable Units			
Number of Tracts	203	254	51
Average Shortage of Units per Tract	81	105	24
Maximum Shortage of Units per Tract	643	619	24
Average Number Affordable Units per Tract	698	708	10
Average Percent Affordable Units per Tract	56.5%	59.6%	3.1%
Average Percent Affordable Renter-Occupied per Tract	85.6%	91.1%	5.5%
Average Percent Affordable Owner-Occupied per Tract	27.5%	28.1%	0.6%
Tracts with Surplus in Affordable Units			
Number of Tracts	498	447	-51
Average Surplus of Units per Tract	146	159	13
Maximum Surplus of Units per Tract	721	799	78
Average Number Affordable Units per Tract	760	844	84
Average Percent Affordable Units per Tract	52.7%	56.8%	4.1%
Average Percent Affordable Renter-Occupied per Tract	84.1%	91.1%	7%
Average Percent Affordable Owner-Occupied per Tract	21.%	23.%	2%

Affordable rental units are much more prevalent in all areas than affordable owner-occupied homes. Differences in the rental and housing markets between the tracts with deficits and surpluses were relatively small. For owner occupied housing units, tracts with a deficit had an average of 28% affordable homes per tract compared to an average of 23% for areas with a surplus. For rental units, the average percentage of affordable rental units per tract was much higher than owner-occupied units, but the difference between tracts with a surplus of affordable housing and tracts with a deficit was the same at 91%.

Of the 254 tracts with a deficit in affordable housing, 95 fell within the city of Pittsburgh, which accounts for 70% of all tracts within the city limits (Figure 5.7). The tracts farthest from the core and the wealthy Squirrel Hill neighborhood were the only areas with a surplus. The areas stretching northwest and southeast from the city along the rivers and scattered tracts throughout the metropolitan region also experienced deficits in affordable units. Overall, the housing shortage is mostly an issue in the central city and along the industrial spaces hugging the waterways coursing through the area.

Figure 5.37. Shortage of Low-Income Affordable Units per Census Tract in Pittsburgh MSA, 2009.

Note: Tracts with a shortage have more low-income households than affordable units.



Very Low-Income Households

The housing shortage looks fairly similar for the very low-income group as it did for the low-income households in that the majority of neighborhoods have a surplus of affordable housing. There were 262 tracts that had a deficit in affordable housing for very low-income households (Table 5.9). Of those areas, the average deficit was 115 units of affordable housing, compared to an average surplus of 167 units. The maximum deficit was 557 affordable units and the maximum surplus was 1,045 units. For tracts with a deficit of affordable units for very low-income households, the average tract had 55% of its renter-occupied units considered affordable, compared to 73% in areas with a surplus. Owner-occupied units had relatively no difference in the amount of affordable owner-occupied units.

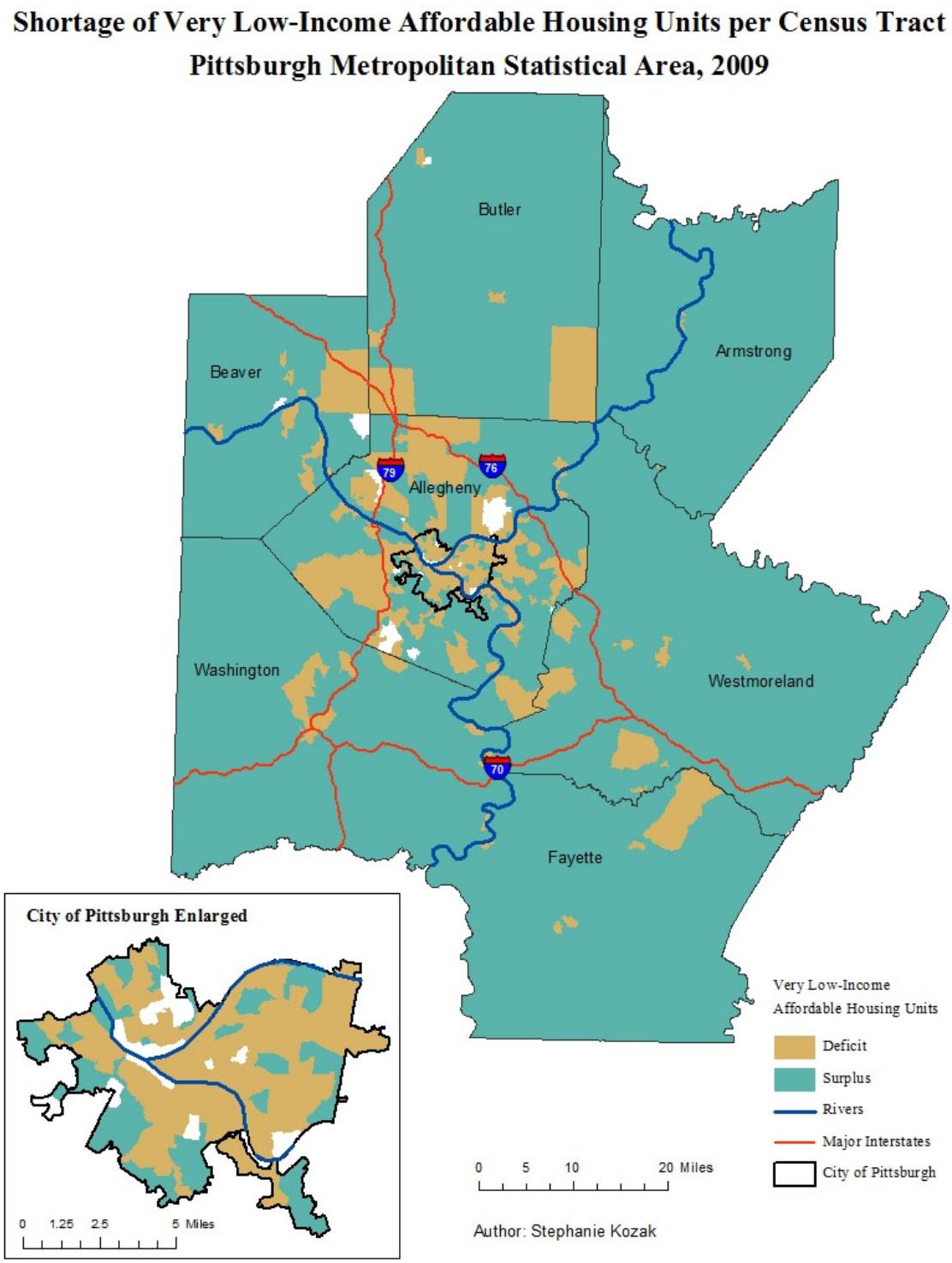
Of the census tracts that had a deficit in affordable housing units for very low-income households, most units were located either in the central city or in the suburbs of Pittsburgh in Allegheny County (Figure 5.38). The other surrounding counties had a few isolated pockets of census tracts with housing deficits, but an overwhelming number had a surplus in affordable housing units. Ninety-seven of the deficit census tracts were located within the city. The shortage is spilling over into the suburbs surrounding the city limits, so while low-income households are overwhelmingly able to secure affordable housing in these locations, very low-income families are not.

Table 5.9. Surplus and Deficits of Affordable Units for Very Low-Income Households in Pittsburgh MSA, 2000-2009.
(Source: Census Bureau 2000, 2010)

Very Low-Income	2000	2005-2009	Change
Tracts with Deficit in Affordable Units			
Number of Tracts	227	262	35
Average Shortage of Units per Tract	99	115	16
Maximum Shortage of Units per Tract	637	557	-80
Average Number Affordable Units per Tract	325	399	74
Average Percent Affordable Units per Tract	28.4%	33.5%	5.1%
Average Percent Affordable Renter-Occupied per Tract	47.1%	55.2%	8.1%
Average Percent Affordable Owner-Occupied per Tract	9.7%	11.7%	2%
Tracts with Surplus in Affordable Units			
Number of Tracts	474	439	-35
Average Surplus of Units per Tract	127	167	40
Maximum Surplus of Units per Tract	667	1,045	378
Average Number Affordable Units per Tract	525	610	85
Average Percent Affordable Units per Tract	36.2%	41.9%	5.7%
Average Percent Affordable Renter-Occupied per Tract	61.9%	73.2%	11.3%
Average Percent Affordable Owner-Occupied per Tract	10.5%	10.7%	0.2%

The location of tracts with a deficit in very low-income affordable units compared to where this same cohort reported a high housing-cost burden was much like the pattern observed for the low-income households. Within Pittsburgh and immediately surrounding the city limits, areas with the largest proportions of high housing-cost burdens were also the same tracts with a deficit in affordable housing. Areas in the surrounding counties that reported higher proportions of a housing burden generally did not exhibit a deficit in affordable units. Residents in the more rural areas of the MSA choose to spend more on their housing costs since affordable units are available in the outer areas of the metro.

Figure 5.38. Shortage of Very Low-Income Affordable Units per Census Tract in Pittsburgh MSA, 2009.
Note: Tracts with a shortage have more very low-income households than affordable units.



Extremely Low-Income Households

The situation changes drastically for extremely low-income households in that the majority of the area has a shortage of affordable units for this group (Table 5.10). There were 558 tracts with a deficit and, on average, those with a deficit had a shortage of 124 affordable housing units. The largest shortage of housing units in a tract was 591. The average was 86 units for areas with a surplus and the maximum 143 units. The average surplus was smaller for this cohort compared to the other low-income groups, so there are fewer opportunities for these households to move to areas in order to secure affordable housing. Since there is an overall shortage of affordable homes for extremely low-income households, the spatial mismatch is much more severe.

While the rental situation for extremely low-income households is much bleaker than compared to the other income groups, the ability of these households to purchase affordable homes is virtually non-existent. The average percent of rental units considered affordable for extremely low-income households in deficit areas was 19% and the average for owner-occupied units was 3%. For tracts with a surplus in affordable housing, the average had 39% of its renter-occupied units and 4% of its owner-occupied units considered affordable.

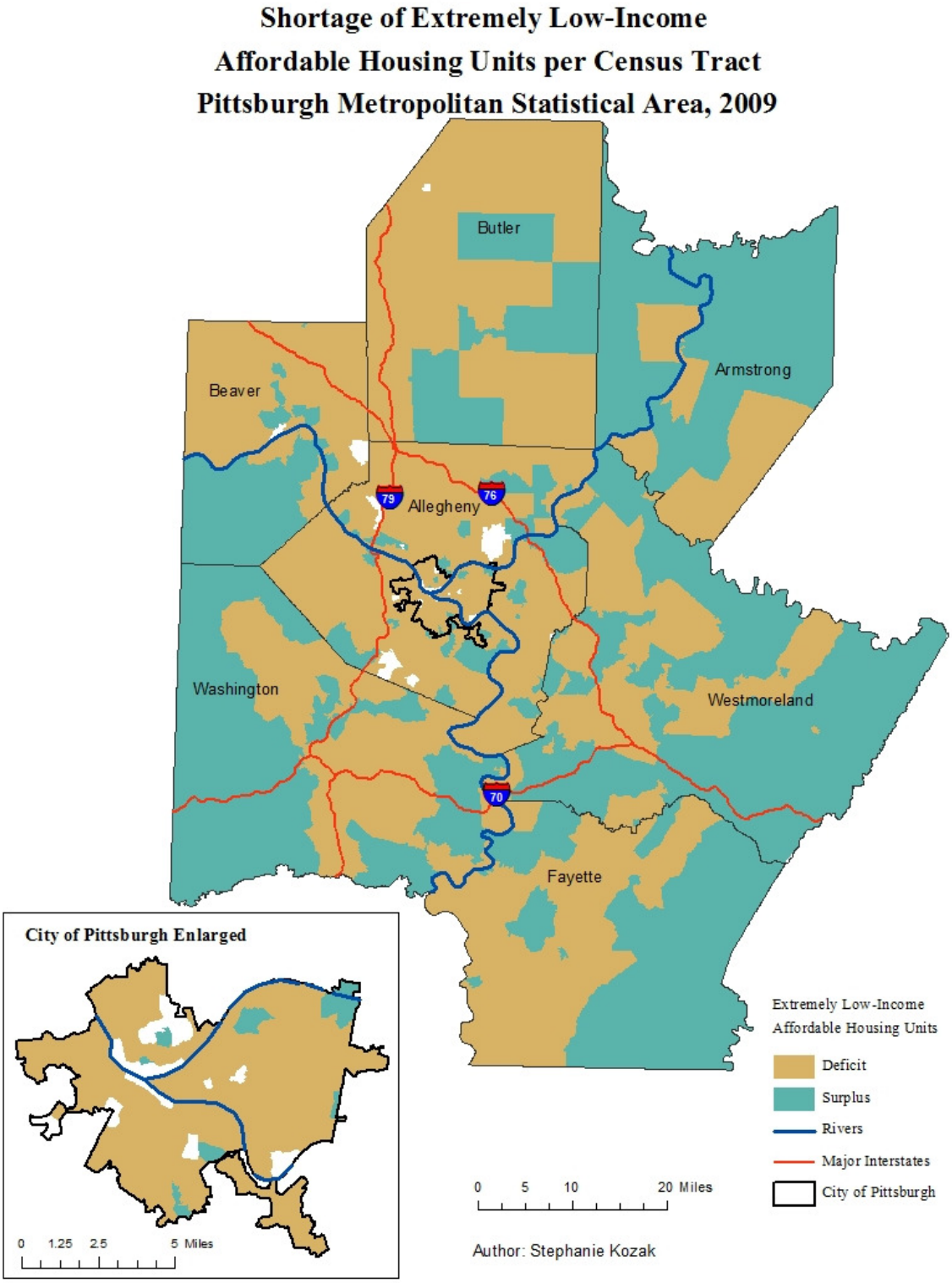
The housing shortage for extremely low-income households is found almost everywhere in the Pittsburgh MSA (Figure 5.39). Tracts that had a surplus in housing for this cohort tended to be located farthest from the city in more rural areas of the region. Many of these tracts are located within park or recreation areas of the Appalachian Mountains, so they have fairly low population densities. This is the same area that had the highest proportion of affordable housing and the lowest proportions of extremely low-income households, so the surplus is due to lack of

demand for the units in these rural areas. All but eight tracts within the city of Pittsburgh had a housing deficit. Neighborhoods with a surplus in affordable housing were located along the edges of the city limits. Areas with high and low proportions of extremely low-income households experienced housing shortages, so not only is there not enough housing in the neighborhoods with high concentrations of poverty, there is also no affordable housing in mixed-income neighborhoods.

Table 5.10. Surplus and Deficits of Affordable Units for Extremely Low-Income Households in the Pittsburgh MSA, 2000-2009.
(Source: Census Data 2000, 2010)

Extremely Low-Income	2000	2005-2009	Change
Tracts with Deficit in Affordable Units			
Number of Tracts	610	558	-52
Average Shortage of Units per Tract	100	124	24
Maximum Shortage of Units per Tract	680	591	-89
Average Number Affordable Units per Tract	123	146	23
Average Percent Affordable Units per Tract	9.6%	11.3%	1.7%
Average Percent Affordable Renter-Occupied per Tract	15.9%	19.2%	3.3%
Average Percent Affordable Owner-Occupied per Tract	3.2%	3.4%	0.2%
Tracts with Surplus in Affordable Units			
Number of Tracts	91	143	52
Average Surplus of Units per Tract	68	86	18
Maximum Surplus of Units per Tract	506	143	-363
Average Number Affordable Units per Tract	284	317	33
Average Percent Affordable Units per Tract	17.9%	21.4%	3.5%
Average Percent Affordable Renter-Occupied per Tract	32.6%	39%	6.4%
Average Percent Affordable Owner-Occupied per Tract	3.2%	3.8%	0.6%

Figure 5.39. Shortage of Extremely Low-Income Affordable Units per Census Tract in Pittsburgh MSA, 2009.
Note: Tracts with a shortage have more extremely low-income households than affordable units.



5.9 Conclusion: Mending the Housing Problem

While Pittsburgh has transitioned into the postindustrial economy, its geography is still heavily dominated by its industrial past and suburban flight in that low-income households are most heavily concentrated near former industrial sites and within the central city. A clear image of the spatiality of low-income housing emerges concerning where low-income groups are located within the Pittsburgh MSA. The highest concentration of low-income households is found within the central city and along the three rivers flowing through the region. Industrial activity was highly concentrated along these transportation routes in the past. The abundance of low-income households within the central city is similar to the pattern seen in cities across the Western world. As capital and higher income populations fled the city for the suburbs, those who could not afford to leave were left in physically deteriorating neighborhoods. For these postindustrial cities, that pattern has not changed.

As Pittsburgh's economy improves and the city undergoes more development, the lower-income groups within the city are most at risk of suffering from affordable housing shortages. While there are many neighborhoods along the rivers with high proportions of affordable units for low-income household, the city is noticeably void of neighborhoods with abundant opportunities for those families to find adequate housing. Some of the places with the highest percentages of affordable units are in rural areas and small towns far from the job opportunities and economic growth of the urban center and the suburbs are fairly desolate in terms of housing options for these groups.

A spatial mismatch exists within the Pittsburgh MSA in that the affordable units are not found in the same neighborhoods as those families that need to access those homes. This

problem is most severe for the extremely low-income households because there is an overall shortage of affordable units throughout the area for this group. Places that do have a surplus of affordable homes are found in the most rural areas of the region that are located far from the social networks and job opportunities of the urban core or surrounding suburbs. Programs need to be put into place to expand the housing stock for this group and initiate mechanisms that ensure those units stay available for extremely low-income households.

The affordable housing shortage for the low and very low-income groups is found almost exclusively in the city or surrounding suburbs. Much of the affordable housing stock in deficit areas is occupied by higher-income households who want to live close to the city center. New development has been occurring close to the downtown and is attracting residents that are living in units that lower-income households need. The situation is different in more rural areas because many low-income households under a high-housing cost burden are choosing to live in units beyond their means since a surplus of affordable units exists in these places.

As national studies show and data from this local example reiterates, current housing programs and the stock provided on the private market are insufficient to meet the housing needs of low-income groups. Why these current efforts fall short, however, varies depending on the low-income group and the location of local housing markets within the larger urban area. Housing policies need to address the spatial mismatch that exists within metropolitan areas that may appear to have enough affordable housing for a group at the metropolitan level, but suffer from local housing shortages at the local level. In addition, sufficient amounts of affordable housing may still not meet the needs of a group due to higher income households choosing to live in these less expensive units.

Chapter 6

Gentrification in the Rust Belt

Things are looking up for cities in the Rust Belt, which have been hemorrhaging residents since deindustrialization ravaged their downtowns in the mid-20th century. Places like Pittsburgh, Detroit, and Cleveland are receiving more attention for the urban renewal taking place in their downtowns (Kapp and Armstrong 2012). All three cities are included on *Forbes*' list of "15 U.S. Cities' Emerging Downtowns" (Brennan 2013), mostly due to their recently growing populations, innovative development projects, and embracing of new urbanism concepts to attract people back to the city. The growth that is transforming some neighborhoods looks much like gentrification, but is the process playing out the same for these postindustrial cities as it has in other places throughout the United States?

This chapter examines the process of gentrification in Pittsburgh to determine if gentrification is reducing the amount of affordable housing. The debate over whether the revitalization of working-class neighborhoods by middle and upper-income households is a benefit or detriment to the city has been taking place for quite some time with mixed results (Freeman 2005; Slater 2006; Lees et al. 2008). The influx of tax dollars, businesses, and improved property values could help to socially and economically stimulate an impoverished neighborhood, but are the original residents benefitting from this process as well? By looking at the ability for lower-income groups to access gentrifying neighborhoods in Pittsburgh, this research not only adds to the debate regarding the effects of gentrification on urban

revitalization, but also helps us to understand what is happening in these revitalizing Rust Belt cities.

6.1 The Changing Nature of Gentrification

The character and extent of gentrification has changed, largely due to broader urban restructuring trends that are taking place in cities across the Western world (Davidson and Lees 2010). Now gentrification is occurring in smaller cities, such as Detroit and Cleveland, where the industrial past still hangs over the city like a dark cloud (Hsu 2014). The agents involved in the gentrification process have also changed. Whereas early gentrifiers used to include individuals and families working independently, now the state and private developers are working together to redevelop areas of the city that result in the displacement of original residents (Lees and Ley 2008). While lifestyle preferences and changing trends in food, sustainability, and the arts may help to attract people into these new developments, it is ultimately the need for new locations of capital that is driving investors to build and revitalize rundown neighborhoods in the city (Smith 1996).

The development of brownfields in Pittsburgh exemplifies how neoliberal policies are paving the way for private developers to change the face of the city. Several brownfield projects along Pittsburgh's riverfront have resulted in the redevelopment of the area. Between 1994 and 2006, Mayor Tom Murphy aggressively purchased former industrial sites to cleanup along the river in an effort to track private developers. Washington's Landing, the Pittsburgh Technology Center, and the Southside Works are three examples of such projects (Figure 3.5).

Morris (2010) investigated the development of these three brownfield sites. Washington's Landing is located on the island previously known as Herr's Island near the north bank of the Allegheny River. Many industrial activities were located on the island, including an oil refinery, stockyard, and meat-packing plant. The cost to the city was close to $26 million to acquire and restore the property (Ackerman 2001). The site is now a mixed-use community with several office buildings, commercial sites, and a residential development on the south end. After an old railroad bridge was converted into a pedestrian bridge to connect residents to downtown, the development became so popular there was a waiting list to move into the area.

The Pittsburgh Technology Center is a 48-acre site along the Monongahela River where the Jones and Laughlin Steelworks had one of their furnaces and various office buildings (Toker 2007). The close proximity to the University of Pittsburgh and Carnegie Mellon University made the location attractive to the universities to expand and attract new development to the area (Morris 2010). The Urban Redevelopment Authority (URA), a consortium of area business owners, purchased the property in 1983 and the city finished the construction of the first building, the University of Pittsburgh's Center for Biotechnology and Bioengineering, in 1993 (Porter 1993). Private developers soon came in and began constructing office and research space for other firms.

Southside Works is a brownfield site located close to the historic, traditionally working-class South Side neighborhood. On the southern bank of the Monongahela sat the LTV Steel Plant and the owners began dismantling the property during the 1980s (Gannon 1991). The 124-acre site was purchased by the URA in 1994 for $9.3 million, which ensured that the city would have a say in the redevelopment of the area (Morris 2010). The plan was to construct a mixed-use, residential, commercial, and light-industrial complex on the former site, much like the one

found on Washington's Landing. The South Side neighborhood was very involved in the planning process to try and limit the competition with existing business owners in the neighborhood. Most of the construction was completed by 2007. The showcase of the Southside Works is a complex with a mix of retail, office space, and entertainment and is now home to many large chain firms (Morris 2010). With residential sale prices in adjacent neighborhoods increasing by as much as 225% between 2000 and 2007, compared to the city-wide average of an 18% increase (URA 2009), the potential for displacement in the surrounding neighborhoods is strong.

Public forces have also been active agents of gentrification in recent years through the restructuring of public housing. Under the auspices of the need for social mixing, the state has implemented various programs, most notably HOPE VI, in an effort to remove existing public housing projects and replace those with new, mixed-income communities. Scholars are still trying to measure the success of the HOPE VI program (Boston 2005; Manzo et al. 2008; Cisneros and Engdahl 2009), but some gentrification opponents argue that the restructuring of public housing is displacing low-income households on a large scale that harkens back to the slum clearance programs of the 1950s and 1960s (Jones and Popke 2010). "HOPE VI and its related programmes of social mixing constitute what Wacquant (2008: 199) calls the 'literal and figurative effacing of the proletariat in the city…'. This effacement is about population displacement on both a micro (neighbourhood) and a macro (central city) scale" (Davidson and Lees, 2010, p. 397).

The restructuring of public housing is happening in cities across the United States, including Pittsburgh. Several HOPE VI projects have transformed large, public-housing projects into new, mixed-income communities, including the Oak Hill, Bedford Hill, and Manchester

projects. These projects are cited as a success (Murphy 2004; Turbov and Piper 2005; HACP 2011) due to the deconcentration of poverty, involvement of the community in planning and implementation, and the integration of the new housing into the surrounding communities. The Housing Authority of the City of Pittsburgh has undergone several other projects in which new, mixed-income housing has been constructed through various private partnerships with developers (HACP 2011).

While it is important to uncover the driving forces behind the current wave of urban restructuring and gentrification in American cities, it is even more pressing to assess the effects. Displacement of low-income households can occur whether the state, private developers, or individual residents are responsible for the development of devalorized areas of the city or suburbs. While the ontological debate rages on regarding the mechanisms fueling gentrification, the squabble overshadows a key component to understanding the process—displacement (Slater 2006). The detrimental effects of urban development have been difficult to measure (Lees et al. 2008). Rather than focus on whether the original residents of a neighborhood are displaced, if gentrification results in creating neighborhoods that are inaccessible to both original and new city dwellers then policies need to be put in place to ensure that spaces within the city become and remain accessible to all. Exclusionary displacement in which low-income households are displaced because of an inability to access gentrifying neighborhoods, first identified by Marcuse (1986), needs to be fully explored in order to add to the understanding of the displacement process.

Discussing and analyzing displacement is a difficult task since accurately measuring the rate of displacement is difficult. Recent studies largely ignore the degree to which low-income groups are relegated to the fringes of developing neighborhoods (Slater 2006). Atkinson (2000)

documents the process in London and Newman and Wyly (2006) do so in the case of New York City, but both papers assert the difficulty in actually counting residents that have been forced to leave their neighborhood. Because of this ambiguity, many scholars have shied away from studying the working class and have instead turned their focus to the gentrifiers.

Slater (2006) and Newman and Wyly (2006) argue that understanding the negative psychological effects are just as important as quantifying it. Betancur (2002) uses the case study of West Town in Chicago to discuss the negative impacts gentrification has on neighborhoods, particularly for racial minorities, by contributing to the loss of civic organizations and the decline in the population in public schools. The push for state-led gentrification in the hopes of increasing the social mix has also proven to be abysmal for lower-income groups (Walks and Maaranen 2008; Goetz 2011).

Freeman has gained the attention of policy makers for his claims that gentrification can be positive for working-class individuals (Lees et al. 2008). In a study by Freeman and Braconi (2004), the authors argue that little displacement is occurring in gentrifying neighborhoods, results that were also echoed by Feeman (2005) in another study of gentrifying versus non-gentrifying neighborhoods. He has also contended that gentrification does not reduce the social mix of a community (Freeman 2009) along the lines of race and class. Slater (2008) has criticized Freeman for ignoring the socially detrimental effects of the process and has argued that exclusionary displacement has not received enough attention in the debate regarding displacement.

6.2 "Classing Up" Pittsburgh Neighborhoods

Cases of gentrification have been documented in many post-industrial cities of the Rust Belt, including St. Louis, Cleveland, and Indianapolis (Wilson and Wouters 2003). The same process was documented in Pittsburgh as early as the 1970s (Stevens 1987). Even as the downtowns of Rust Belt cities were experiencing a flood of residents heading for the suburbs, some central-city neighborhoods were getting an injection of capital, with residents moving into areas that were characteristic of first-wave gentrification. Today, most of the gentrification that is occurring in the Pittsburgh metropolitan area can be attributed to the private developments made possible by the neoliberal environment of the region. Hackworth (2000, p. 170) argues that the neoliberal city today serves as an "aggressive vehicle for business" and the City of Pittsburgh has been instrumental in facilitating private development throughout many neighborhoods in the region.

One such example of gentrification can be seen in Pittsburgh's Lawrenceville neighborhood. It has been touted by Richard Florida as an example of the "next neighborhood" (Hamman 2009). The neighborhood was traditionally a working-class area located on the southern bank of the Allegheny River. Throughout the first decade of the 21st century, many new stores, restaurants, and bars opened and there were reports of artists and academics snatching up properties that have since increased in value (Hamman 2009). Lauren Byrne, executive director of the advocacy group Lawrenceville United, says that displacement of original residents is occurring. "There's a concern that we're seeing some families displaced as property owners learn you can get $1,400 instead of $500 a month in rent" (Conti 2013).

An article published in 2002 in the *Baltimore Sun* documented the rise of middle-class, black gentrifiers in the traditionally African-American Hill District (Clemetson 2002). More than 500 new residents moved into the neighborhood between 1998 and 2002, most of them black professionals coming from the suburbs of Pittsburgh, Cleveland, and other cities throughout the area. Clemetson says there are concerns about how the influx of middle-class families will affect the lower-income households in the area.

Bergman (2011) documented a different type of displacement process in the upscale Squirrel Hill neighborhood in which moderate to middle-income residents, mostly artists and members of the "creative class," living in a series of courtyard complexes were pushed out due to redevelopment efforts in the neighborhood. Bergman admits that most would not consider this gentrification since the majority of displaced people are not lower-income, but Bergman's research adds to the debate regarding what is gentrification. Issues of class have been central to the definition of this displacement process, but Bergman argues that the restructuring of capital occurring today also results in middle-income groups being forced to leave their neighborhoods due to the infusion of capital into certain urban spaces.

Both direct and exclusionary forms of displacement are concerns for lower-income residents of Pittsburgh and other Rust Belt cities. Although the process has been documented in larger cities like New York City and Washington, D.C., the historical context, residential trends, and current state of the housing markets in Rust Belt cities may spell out a different pattern of displacement for residents. This chapter will show how gentrification is affecting the neighborhoods in the Pittsburgh MSA to determine whether development in the area is displacing or excluding low-income households from these gentrified neighborhoods.

6.3 Methodology

The Department of Housing and Urban Development (HUD) defines gentrification as the "process by which a neighborhood occupied by lower-income households undergoes revitalization or reinvestment through the arrival of upper-income households" (HUD, 1979, p. 4). Independent variables that have been used to identify gentrifying neighborhoods were incorporated into various regression models to in order to explain variability in affordable housing (Hammel and Wyly, 1996; Freeman, 2005, 2009). The following regression model was used:

$$\Delta\%AAH = \Delta\ MEDRENT + \Delta\ MEDHOMVAL + MAGE + \Delta\ \%PVTY + \Delta\ \%HED + \Delta\ \%\ WHT + \Delta\ \%\ WCLS + POPDEN + error$$

% AAH: percentage of change in affordable housing for low-income groups

MEDRENT: median gross rent

MEDHOMVAL: median home value

%PVTY: percentage of households considered low, very, or extremely-low income

%HED: percentage of heads of households with bachelor's degrees

%WHT: percentage of heads of households who are white

%WCLS: percentage of heads of households considered working class

POPDEN: population density of tract in 2009

Based on previous research, I hypothesized that the amount of affordable housing would decrease in areas where median rents, median home values, percent white, and percent with a bachelor's degree or higher increased, while percent of low-income households and percent working class decreased. The variable for population density was also included because preliminary research suggested that there was a difference between areas with high and low

population densities. Some models included all census tracts while others used just those tracts that showed signs of disinvestment to compare differences in changes in the amount of affordable housing.

Affordable housing consists of units that are available to low-income households without spending more than 30% of their income on housing costs (HUD 2011). Affordable housing can be broken down into units available for low, very low, or extremely low-income households. These categories use the MSA median family income to determine if a household is below 80%, 50%, or 30% of the area's median income (HUD 2011). Each level of low-income households was tested with the respective level of affordable housing available (e.g., percentage of extremely low-income households tested with percentage of extremely low-income housing available).

Changes in rents and home values between 2000 and 2009 were used to show investment within a tract because we would expect housing prices and rents to increase as properties are improved. Gentrifiers have traditionally been white, educated professionals, so the variables for change in amount of education, change in percent working class, and change in percent white were used to capture the presence of gentrifiers within a tract. Change in percent of households considered to be low, very-low, or extremely-low income were used to approximate income changes that would suggest changes in class structure of a neighborhood. Population density worked as a control variable to determine if there was a difference in how the gentrification process affected the availability of affordable housing in rural, suburban, and urban areas.

My project examined changes in the Pittsburgh Metropolitan Statistical Area (MSA) between 2000 and 2009. The unit of analysis was census tracts, which has been shown to be a

suitable representation of the neighborhood level (Massey et al. 1994). There were 721 census tracts in 2000 for the MSA (Fig. 1.1). However, 20 of those census tracts did not have complete data, which reduced the sample to 701 tracts. A sample size of ten observations per each independent variable is a typical rule to ensure adequate power for a statistical procedure (Maxwell and Delaney 2004). Power of a statistical test refers to the probability of rejecting the null hypothesis if the alternative hypothesis is true. This sample size meets that rule, indicating that there was enough power to detect a statistically significant relationship if one exists. This sample also included areas outside of the inner-city area. Although gentrification has traditionally been thought of as an inner-city phenomenon, recent research suggests that this term can be used to apply to this same process in suburban and rural areas, as well (Lees et al. 2008).

The housing and socio-economic data came from the 2000 Decennial Survey and the 2005-2009 American Community Survey (http://factfinder.census.gov). The Census Bureau discontinued collecting socio-economic data with the 2000 decennial census, instead opting for an annual sample of data called the American Community Survey. In order to get data at the census tract level, a five-year estimate from 2005-2009 was used. Those data were compared to data from the 2000 census to identify changes in socio-economic and housing characteristics of neighborhoods in the study area.

6.3.1 Testing Statistical Assumptions

All of the variables used in the models were normally distributed, except for the population density variable. I tested whether the inclusion of the population density variable was changing the results of the models by running regression on models with the population density and without. There was little difference in the coefficients or r^2 values with or without the

population density variable, so I decided to include the variable to show that I was accounting for differences in population throughout the metro. The residual analysis is covered after the discussion of the results of each model, which further addresses whether the models violate any statistical assumptions.

Among the independent variables, there were some significant correlations, suggesting issues of multicollinearity with the model. If multicollinearity exists among the independent variables, it may inflate the variance of the coefficient estimates and make these estimates sensitive to change. One way to assess the degree of multicollinearity is by examining the tolerance of a variable, or the amount of variance in an independent variable that is not explained by the other independent variables (O'Brien 2007). The variance inflation factor (VIF) is the reciprocal of tolerance and it is accepted that any VIF measurement over five suggests issues of multicollinearity. All of the VIF values are below 2.0, which indicates multicollinearity is not a problem in the models.

Table 6.1 shows the coefficients of the dependent variable with individual explanatory variables. Change in affordable housing for each income group is significantly correlated at the 0.05 alpha level with the variables change in median rent and change in percent low, very low, or extremely low income households. There is an inverse relationship between affordable housing and changes in rent, which is expected as increasing rents would lower the availability of affordable housing. Conversely, the direct relationship between changes in affordable housing and percentage of low-income households makes sense because less affordable housing would push poorer residents from the neighborhood.

Table 6.1. Coefficients and P-Values for Dependent and Independent Variables.

Affordable Units	*Low-Income*		*Very Low-Income*		*Extremely Low-Income*	
	Pearson Coefficient	P-Value	Pearson Coefficient	P-Value	Pearson Coefficient	P-Value
Change median rent	-.295	.000*[10]	-.558	.000*	-.421	.000*
Change median home value	-.131	.000*	-.098	.009*	-.024	.521
Change % with bachelor's or higher	-.108	.004*	-.071	.061	-.081	.032*
Change % White	-.027	.474	-.002	.965	-.046	.222
Change % working class	.053	.164	.099	.009*	.078	.039*
Change % low, very low, or extremely low-income households	.220	.000*	.189	.000*	.178	.000*
Population density	-.269	.000*	-.194	.000*	-.093	.015*

Change in percent working class is not significant for the low-income cohort but is for the other groups. A possible reason for this result is that the low-income threshold of $48,720 could consist of residents who are employed in other sectors of the economy that do not fall under the categories used by the Census Bureau to classify as working class, but still have an income that classifies them as low-income. Income groups with lower income thresholds are more likely to have people employed in jobs considered to be working-class. Population density was significantly correlated with the dependent variable in all three cases. This means that there are differences in how the change in affordable housing occurs in the more densely-populated

[10] * Indicates correlation is significant at the 0.05 alpha level.

city compared to the suburbs or rural areas. As population density increases, the availability of affordable housing decreases. This observation makes sense because higher population densities increase competition in the housing market, which causes a decrease in the availability of affordable housing if there were no mechanisms in place to ensure an adequate supply of housing.

Change in percent white is the only variable that did not have a statistically significant correlation with the dependent variable. Eighty-nine percent of the Pittsburgh MSA is white and almost all census tracts in which the percent white is below 80% are found within or right outside the city of Pittsburgh. The high proportion of whites in the area could suggest that gentrification could occur with little change in racial composition of a census tract. The example of the gentrification that is occurring in the Hill District described at the beginning of the chapter offers another explanation for the behavior of the race variable. If African Americans are gentrifying neighborhoods in low-income areas, the amount of non-white residents could increase with gentrification.

Although the correlation coefficients appear to be low between the dependent variable and independent variables, this is not uncommon for large datasets. When a sample size is greater than 30, $2/\sqrt{n}$ is approximately equal to the *r* value needed for significant results (Roger 2006). In this case with a sample size of 701, the approximate minimum absolute *r* value for a significant model would be 0.076.

6.4 Results

The statistical analysis will discuss the results for each low-income group by type of regression model: OLS regression, spatial regression, and geographically weighted regression.

6.4.1 OLS Regression Analysis

The first part of the statistical analysis involved creating a regression equation for each low-income group. All three models were statistically significant with a p-value of 0.000. The F-values and r^2 values were 25.75 and 0.21 for the low-income model, 58.54 and 0.37 for the very low-income model, and 25.69 and 0.21 for the extremely low-income model. The very low-income model did the best job at explaining variations in affordable housing, but all three models have fairly low r^2 values. The results suggest that there are some other independent variables that would explain the change in the availability of low-income housing. A possible explanation for this observation is that the weak housing market in the area allows the gentrification process to take place within a census tract without producing a great deal of change in the amount of affordable housing available. Due to the surplus of affordable housing that is available in the area, there may be a tipping point that occurs once affordable housing is reduced to a certain point, after which it then increases the effect of gentrification.

Tables 6.2, 6.3, and 6.4 show the coefficients for the low, very low, and extremely low-income models, respectively. I expected the variables for median rent, median home values, percent with bachelor's degree or higher, and percent white to all increase as affordable housing decreased if gentrification was reducing the availability of units. This is the relationship observed for rents and home values in all three models and supports the theory that rising rents and home values in gentrifying neighborhoods would decrease the availability of affordable housing. The

coefficients for median rent and home value are also statistically significant for every model, except for the median home value in the extremely low-income model. The difference for the extremely low-income model is due to the lower proportions of owner-occupied units in extremely low-income neighborhoods and that the lower home values in these areas may not be rising as quickly as they would in low or very low-income tracts.

Table 6.2. Coefficients for Low-Income OLS Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Low-Income Households
P-value	.000*	.002*	.475	.689	.926	.000*	.000*
Unstandardized Coefficients	-.015	-.000041	-.037	.019	.003	-.001	.213
Standardized Coefficients	-.246	-.110	-.027	.014	.003	-.280	.188

Table 6.3. Coefficients for Very Low-Income OLS Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Very Low-Income Households
P-value	.000*	.003*	.557	.062	.058	.000*	.000*
Unstandardized Coefficients	-.037	-.000038	.031	.093	.073	.000	.194
Standardized Coefficients	-.528	-.094	.019	.059	.061	-.184	.144

Table 6.4. Coefficients for Extremely Low-Income OLS Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Extremely Low-Income Households
P-value	.000*	.809	.499	.673	.304	.008*	.000*
Unstandardized Coefficients	-.019	-.000002	-.028	.016	.031	.000	.154
Standardized Coefficients	-.397	-.008	-.025	.015	.037	-.093	.145

The change in percent with a bachelor's degree coefficient was not statistically significant for any of the models, which means that the education variable does not have a large impact on the availability of affordable housing. Tracts can experience a change in percent with a bachelor's degree or higher without affecting the amount of affordable housing. This observation suggests that gentrifiers are not necessarily more educated than the residents of the lower-income neighborhoods into which they are moving. The entire metro area experienced an increase in education and the number of underemployed adults, or people employed in jobs requiring minimum qualifications well below the education and skills of the employee, has risen during the first decade of the 21st century (Abel et al. 2014). The restructuring of the labor market and increase in education is changing how gentrification affects neighborhoods.

The coefficients for change in percent white were also not statistically significant, indicating race has little to no impact on changes in availability of affordable housing. This relationship may be explained by the high proportion of whites in the area overall or it may suggest that gentrifiers in Pittsburgh are not exclusively white.

The variable population density had a statistically significant, inverse relationship for all three models. The amount of affordable housing available for low-income households will decrease as population density increases. This relationship is what is expected because a higher population density would increase competition for available units. The analysis of the mapped standardized residuals below will further explore these spatial patterns in the MSA.

It was also expected that the variables for change in percent working class and change in percent of low, very low, or extremely low-income households would have a positive relationship with the dependent variable. As affordable housing decreases with gentrification, the working class and lower income households would be pushed out due to lack of available units. This relationship was observed in each model, but the relationship for change in percent working class was not statistically significant.

The statistical analysis shows that changes in rent, home value, and percent low, very low, or extremely low-income households, as well as population density, have the largest effect on the availability of affordable housing. Gentrification is reducing the availability of affordable housing in the most densely populated areas where rents and home values are rising and proportion of low-income residents is declining. Changes in rent affect the availability of affordable housing the most: for every $50 that the median rent increases, the percentage of affordable units available decreases by a range of 0.75% to 1.85%. Considering that most tracts within the city are experiencing a deficit in affordable housing for low-income groups, small changes in rent will only exacerbate the problem.

The model also suggests that the concept of gentrification needs to be adapted to address changes in racial and economic patterns. Chapter 4 showed that the Pittsburgh MSA is becoming

more racially diverse overall, although there are certain tracts where racial segregation is increasing. The statistical analysis revealed that change in the proportion of white residents does not influence the availability of affordable housing and that an increase in the proportion of heads of households with bachelor's degrees does not necessarily decrease the availability of affordable housing. It would be naïve to dismiss the importance of race and education in gentrification, but this study suggests that more research should be undertaken to look at how race and education affect the availability of affordable housing in other cities in order to re-theorize how these forces play out in the gentrification process.

The analysis of the residuals supports the validity of the model. There were no more than ten tracts that were considered outliers because they had standardized residuals that were more than three standard deviations from the mean of the residuals. Those cases represent less than 2% of the data, which is a very small proportion. The standardized residuals were also normally distributed for each model. The regression models tend to overestimate the change in affordable housing in rural areas and underestimate the change in the suburbs (Figures 6.1, 6.2, and 6.3). The low population densities in the rural areas allow for more affordable units being available because of the lower demand for housing. Suburban areas have the lowest availability of affordable housing because these areas tend to have higher incomes and home values, as well as fewer rental units. Few tracts within the city have very high or low standardized residuals and there is a mix throughout the area of under and over estimation. These patterns show that the model is most accurate at detecting gentrification within the city and predicting how the process affects the availability of affordable housing.

Figure 6.1. Standardized Residuals for Low-Income OLS Regression Model.

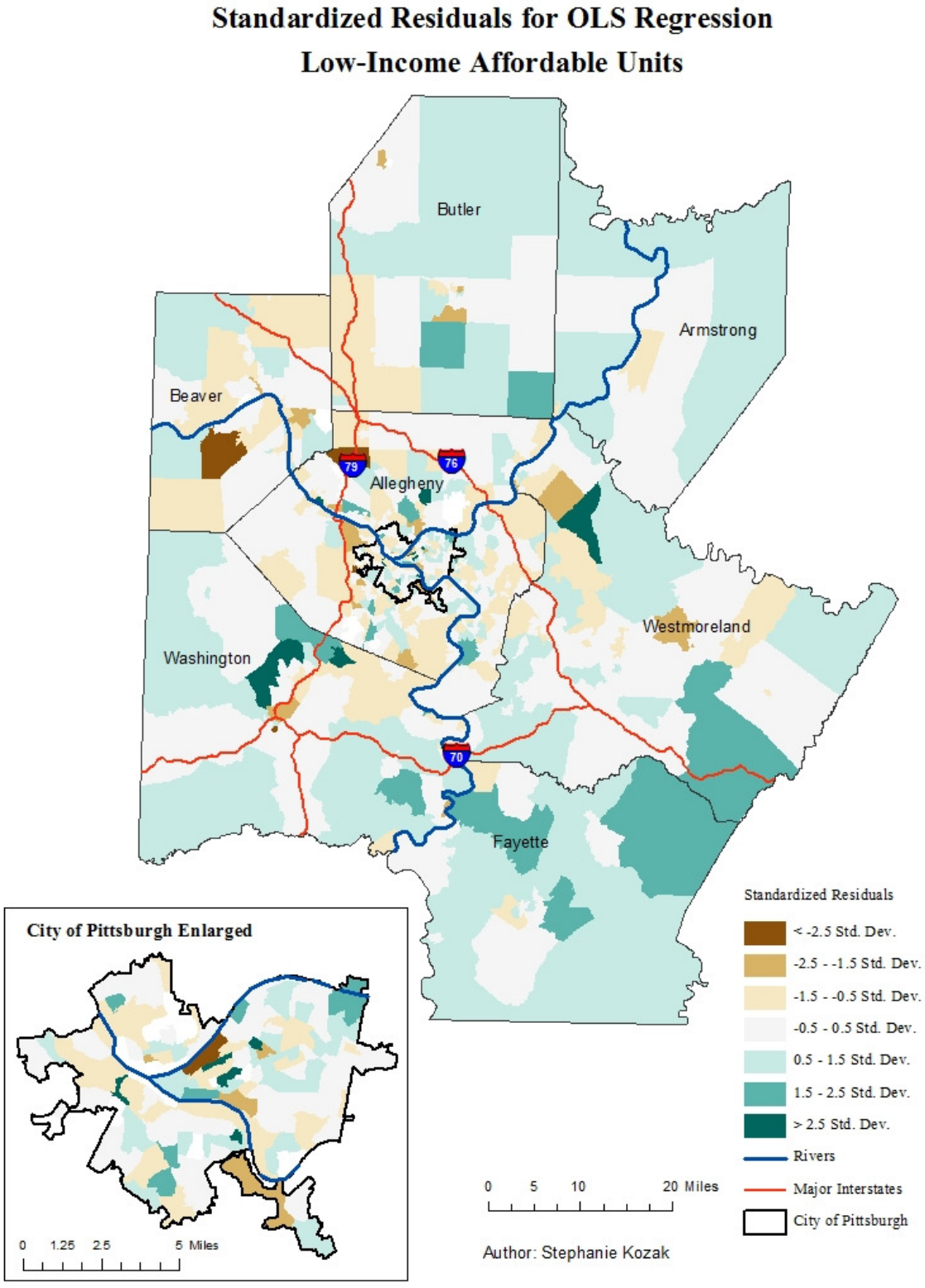


Figure 6.2. Standardized Residuals for Very Low-Income OLS Regression Model.

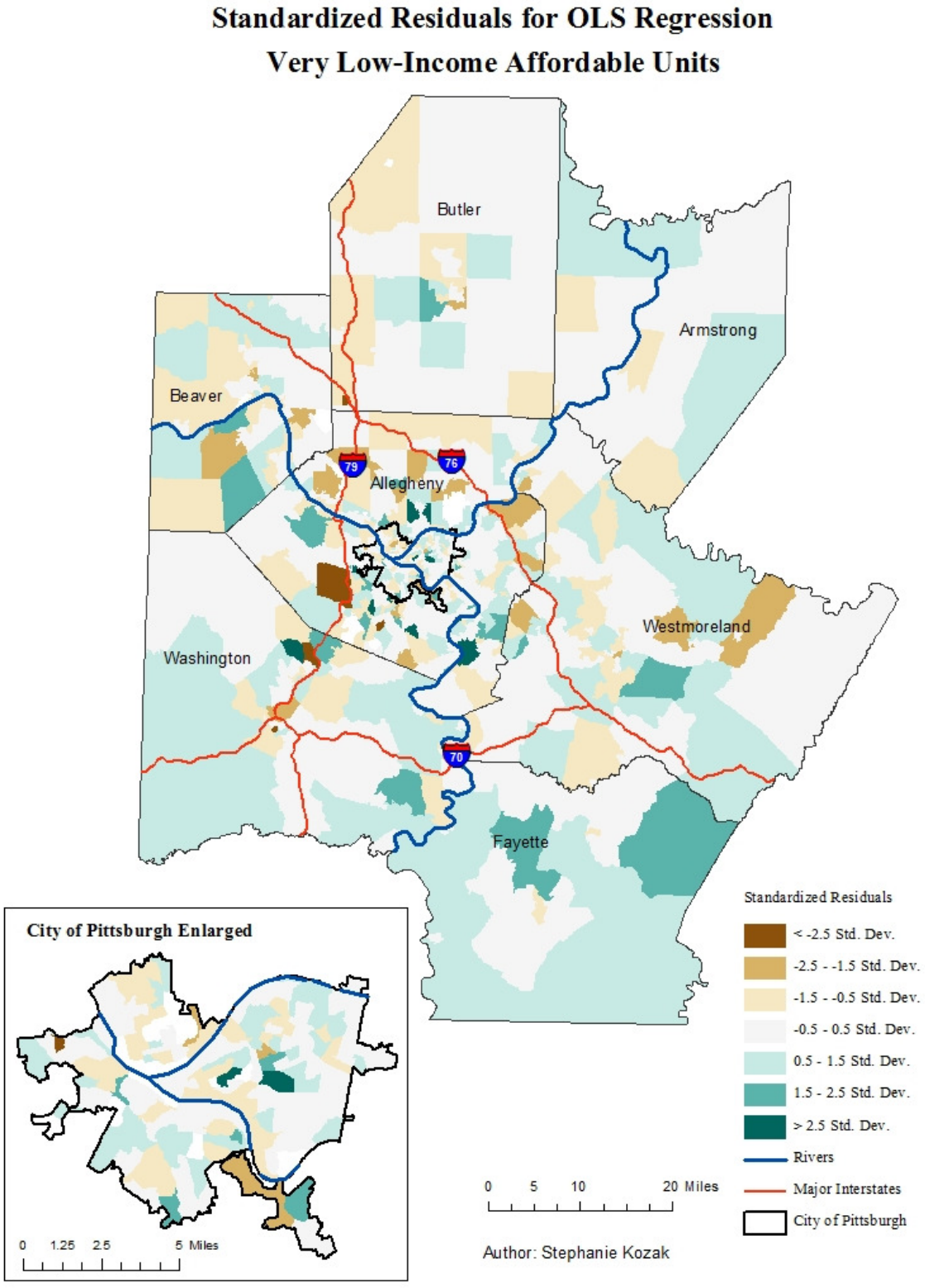
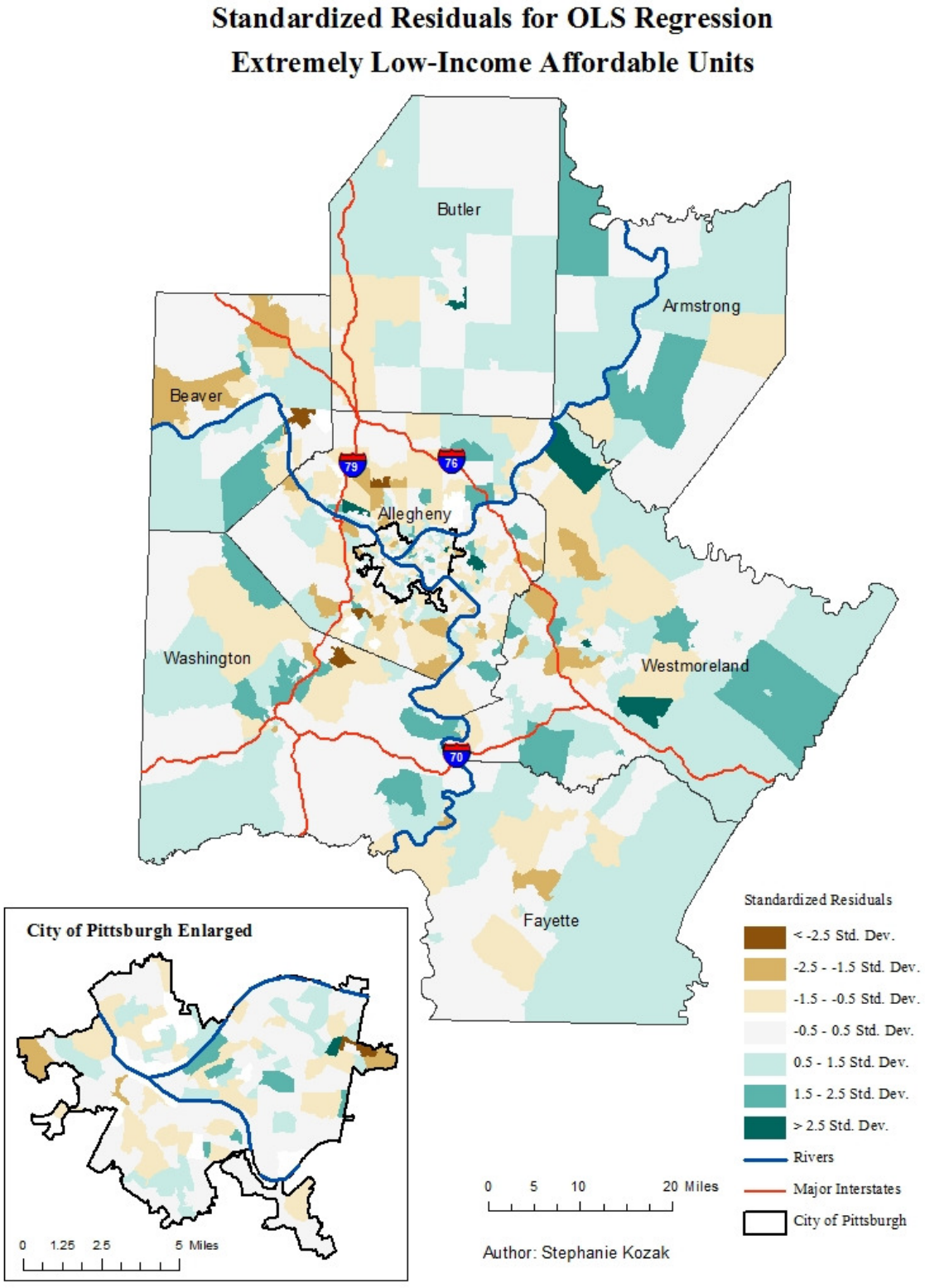


Figure 6.3. Standardized Residuals for Extremely Low-Income OLS regression Model.

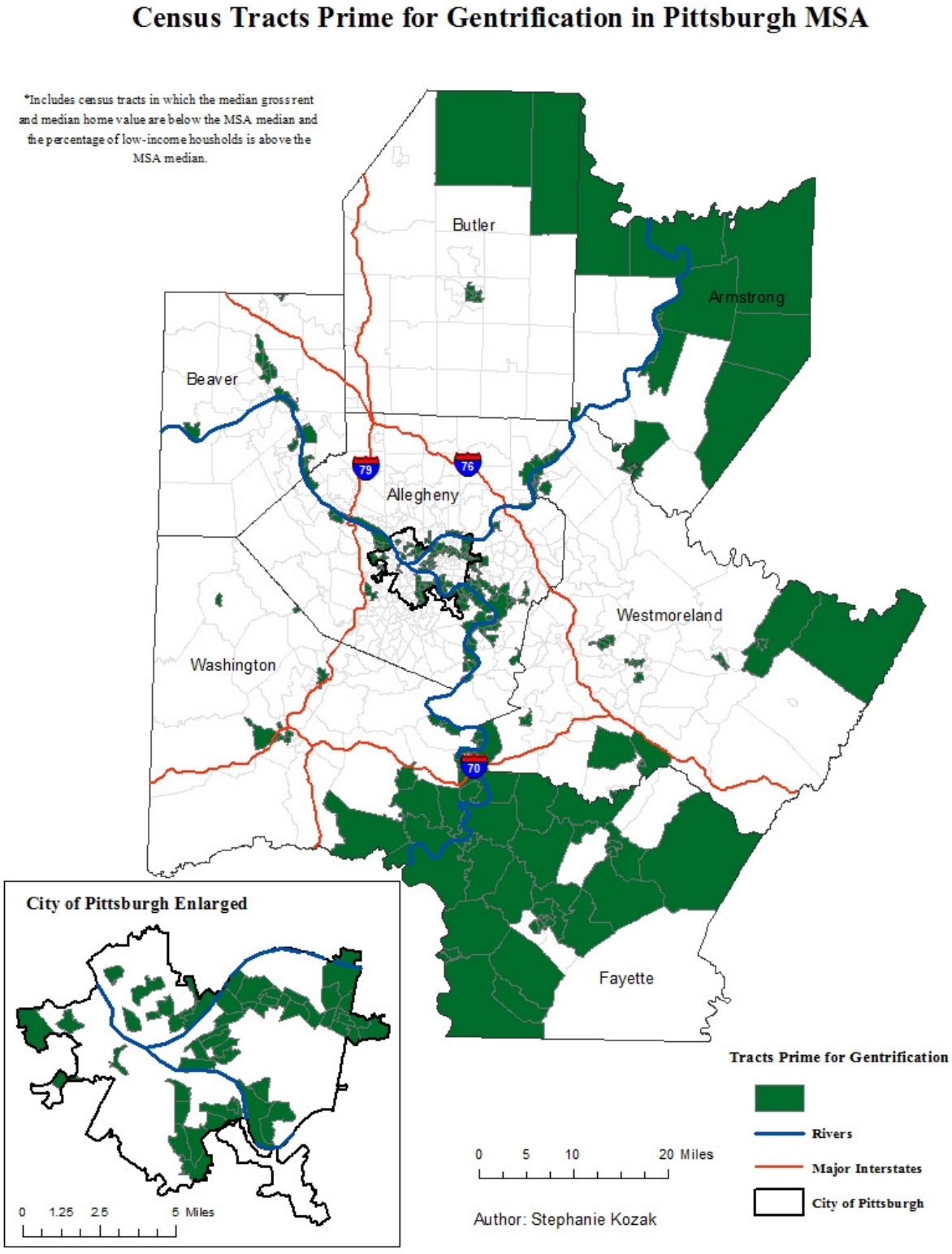


6.4.2 Gentrifying Tracts

An alternative reason for the low r^2 values of the models in the previous section is that the models included census tracts that were not undergoing gentrification. In order to try to separate out those tracts that were ripe for gentrification, a subset of the data were tested. Tracts that had median gross rents and home values that were lower than the median for the MSA and tracts where percent of low-income households was above the area median were selected for the sample. There were 235 tracts that met the criteria, most of which were in the city, along the rivers flowing through Pittsburgh, and in some of the rural areas (Figure 6.4).

All three of the models were found to be significant with a p-value of 0.000. The F-values and r^2 values were 10.01 and 0.24 for the low-income model, 13.78 and 0.30 for the very low-income model, and 43.53 and 0.57 for the extremely low-income models. The r^2 values were higher for the low and extremely low-income models, specifically when looking at the extremely low-income group. However, the model for the very low-income group did a worse job explaining the variation in the availability of affordable housing when just the tracts ripe for gentrification were included.

Figure 6.4. Tracts Included in Regression Models for Gentrifying Tracts.



The coefficients for the independent variables behaved differently with the smaller sample than they did for all 701 tracts. For the low-income model, change in median rents is no longer statistically significant, while change in percent with bachelor's degree is significant (Table 6.5). In addition, change in percent with a bachelor's degree or higher exhibited a direct relationship with the dependent variable, which is not what is expected to happen with gentrification. Change in percent working class is also no longer statistically significant. The change in percent low-income households and the population density variables have the highest standardized coefficients, meaning they play the largest role in explaining the variation in the dependent variable.

Table 6.5. Coefficients for Low-Income OLS Model of Gentrifying Tracts.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Low-Income Households
P-value	.054	.012*	.023*	.329	.055	.000*	.000*
Unstandardized Coefficients	.010	.000	.208	.063	.103	-.001	.351
Standardized Coefficients	.115	-.161	.152	.061	.121	-.354	.334

The very low-income model had change in median rent, percent with a bachelor's degree of higher, population density, and change in percent very low-income households having significant coefficients (Table 6.6). All of those variables behave as expected, except for the education variable. This supports the idea that the theoretical understanding regarding how education levels change with gentrification may not be correct because education actually

increases as the availability of affordable housing increases for both low and very low-income models. Change in median home value, percent white, and percent working class are not significant, although the home value and working class variables are fairly close to the 0.05 threshold. Race continues to behave as if it has no relationship to the availability of affordable housing, while most of the other variables support the finding that gentrification is reducing the availability of affordable housing.

Table 6.6. Coefficients for Very Low-income OLS Model of Gentrifying Tracts.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Very Low-Income Households
P-value	.000*	.053	.006*	.208	.067	.000*	.000*
Unstandardized Coefficients	-.020	.000	.244	.079	.096	-.001	.324
Standardized Coefficients	-.222	-.119	.175	.075	.111	-.337	.334

The extremely low-income model had significant coefficients for the change in median rent, home value, percent working class, and percent extremely low-income households (Table 6.7). Those significant variables show a relationship in which affordable housing decreases when median rent and home value increases and percent working class and extremely low-income households decrease, which describes the classic process of gentrification. Population density is no longer significant for this model, which may be explained by the rural census tracts, mostly in Fayette and Armstrong counties, which have low population densities. The variables for change in percent with bachelor's degree or higher and percent white did not exhibit a significant

relationship. These variables continue to behave unexpectedly in that they either fail to explain variations in the dependent variable or they have statistically significant relationships but change in ways that do not support the theoretical understanding regarding gentrification.

Table 6.7. Coefficients for Extremely Low-Income OLS Model of Gentrifying Tracts.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Extremely Low-Income Households
P-value	.000*	.008*	.646	.978	.014*	.257	.023*
Unstandardized Coefficients	-.054	.000	.027	-.001	.085	.000	.097
Standardized Coefficients	-.702	-.125	.023	-.001	.117	-.052	.111

The models show that gentrification is reducing the availability of affordable housing both across the metro, and in tracts that are most likely to experience gentrification. There are similarities and differences between the models that include all census tracts in the MSA and those with just tracts with lower home values and rents and higher proportions of low-income households. The models that include just the tracts prime for gentrification have the highest r^2 values for the low and extremely low-income groups, while the model with all of the tracts does the best job at explaining the variation for the very low-income cohort. The extremely low-income model of only gentrifying tracts has the highest r^2 value overall at 0.573. The model performs best when predicting changes in affordable housing for the most economically depressed census tracts, which is where gentrification would be most likely to occur and would have the largest impact on neighborhood change.

The variables for change in rent, home value, population density, and percent low, very, or extremely low-income households did the best job in explaining the variation in the dependent variable. These variables tend to be significant for each model and almost always behaved as expected. The variable for change in rent tends to have the highest standardized coefficient values, which means that changes in rent explain most of the variation in the dependent variable compared to the other independent variables. However, since most standardized coefficients are small, with only change in rent having values over 0.5, it appears that the process of gentrification is complex in that no single variable is able to account for a large proportion of the change in affordable housing.

The variables for change in percent of head of household with bachelor's degree or higher, percent white, and percent working class were not good at explaining the variation in affordable housing. The variable for race never exhibited a significant relationship, which is not expected since previous gentrification research suggests that gentrifiers tend to be white and are more likely to push out minority, working-class residents. This finding means that race is either not as important to the gentrification process as previously thought, or that Pittsburgh, and other Rust Belt cities with similar racial patterns, present a unique situation in which race works differently within gentrifying neighborhoods.

The maps of median household income and percent working class were similar to those in Chapter 4, which suggests that the variable for working class should have done a good job in trying to pick up a proportion of the population that had lower incomes. However, this variable was only significant in one model, the extremely low-income model for gentrifying neighborhoods. The variable could be insufficient for capturing the presence of working-class. Another explanation is that economic restructuring, both within the metro area and at a larger

scale, is changing what it means to be "working-class." The decline of manufacturing jobs in the area and the rise of employment in the service sector are changing what is considered a working-class employee (Zweig 2012). More work needs to be done to look at this idea of class in light of this restructuring to conceptualize how a shift from a manufacturing-based to a postindustrial economy changes our theorization of gentrification in regards to class. The variable reflecting education supports this idea in that it was also non-significant or displayed a relationship that was not expected within the models. Underemployment and increased participation in lower-end service jobs may explain why education did not behave as expected and should be studied further by examining how this variable plays out in the gentrification process in other Rust Belt cities.

6.4.3 Spatial Regression

Census tracts were used as the unit of analysis in the models above. Using spatial data in regression models runs the risk of violating the assumption of independence among variables because locations adjacent or close to one another may be more related than those farther away. The model needs to be tested for spatial autocorrelation because the presence of spatially dependent data could cause coefficients to be statistically significant even when there is no analytically significant relationship (Ward and Gleditsch 2008).

Moran's *I* statistic measures the degree of spatial autocorrelation across the entire area by cross-multiplying some measure of spatial proximity between an observation and its neighbors with a measure of the similarity of values for those observations (Ward and Gleditsch 2008). The expected value for Moran's *I* is -1/(*n*-1) and does not have a fixed metric. Using first-order polygon contiguity as the measure of spatial relationships (only neighboring polygons that share

a boundary with the observation in question will be included in the computation), the expected Moran's *I* was -0.001429 and the observed was 0.122064 for change in percent of affordable housing for low-income households, the dependent variable (Table 6.8). When converted into a z-value, the test statistic had a z-score of 5.47 and was found to be statistically significant with a p-value of 0.000. The results show that the clustered pattern displayed by the dependent variable is very unlikely to be the result of random chance. The Moran's *I* statistic was also significant for the change in very low-income affordable housing with a p-value of 0.001 and a z-value of 3.32. The z-value for the change in extremely low-income affordable housing was -0.62 and a p-value of 0.536, suggesting that there is no spatial auto correlation affecting this variable.

I also calculated a Moran's *I* statistic for the residuals of the OLS model for each low-income level. By calculating this statistic on the residuals for each of the income categories I determined if there appeared to be spatial autocorrelation among the residuals, meaning that a clustering of high absolute residual values would be present (areas in which the model was not as successful in predicting the observed value) or low absolute residual values (areas in which the model was more successful in predicting the observed values). Only the standardized residuals for the low-income model had a Moran's *I* value that was statistically significant with a p-value of 0.009. This suggests that the results for the extremely low-income cohort, p-value of 0.158, are not affected by spatial autocorrelation and that the while the amount of affordable housing for the very low-income group, p-value 0.863, may exhibit spatial autocorrelation, that the ability to predict the amount of affordable housing by the model is not necessarily affected by it.

Table 6.8. Moran's *I* Values for OLS Models.

	Low-Income Dependent Variable	Standardized Residuals Low-Income Model	Very Low-Income Dependent Variable	Standardized Residuals Very Low-Income Affordable Units	Extremely Low-Income Dependent Variable	Standardized Residuals Extremely Low-Income Affordable Units
Expected Value	-0.001429	-0.001429	-0.001429	-0.001429	-0.001429	-0.001429
Observed Value	0.122064	0.057665	0.073663	0.002477	-0.015369	0.030511
Z-Score	5.47	2.62	3.32	0.17	-0.62	1.41
P-Value	0.000*	0.009*	0.001*	0.863	0.536	0.158

One way to deal with spatial autocorrelation is to include a spatially lagged dependent variable as an independent variable. The spatially lagged dependent variable is created by taking the average values of the dependent variable of all neighboring census tracts for census tract *x* and including the average value as an independent variable. This is done for all census tracts so that model is measuring the effect of having neighboring census tracts with high or low changes in affordable housing on the change of affordable housing on the central census tract.

The OLS regression model for the low-income group with the spatially lagged dependent variable included as an independent variable was significant at the 0.05 level with a p-value of 0.000. The r^2 value for spatial regression model was 0.216, which was slightly higher than the r^2 value for the OLS model of 0.206, but the change was very small. The same independent variables (population density and change in rent, home value, and percent low-income households) that were significant for the OLS model with all of the tracts were also significant for the spatial regression model (Table 6.9). In addition, the spatial lag variable that was included as an independent variable was also significant. The results support the finding that the low-income OLS model had spatial autocorrelation and adjacent tracts influence the change in

affordable housing. While the influence of adjacent tracts is not as large as that of the population density and change in rents and percent low-income households, it does support the idea that low-income neighborhoods are most likely experiencing changes in their housing markets that exist on a larger scale than very or extremely low-income neighborhoods. The coefficients also support the claim that gentrification is reducing the availability of low-income affordable housing.

Figure 6.5 shows that the spatial regression model tends to overpredict changes in rural areas and underpredict in the suburbs. The city has a mix of neighborhoods above or below the predicted values, but that most tend to be within one standard deviation of the predicted values. Exceptions to this are located downtown where the Strip District experienced a large underprediction and the nearby, low-income neighborhoods of the Hill District that experienced large overpredictions. Warehouses within the Strip District have recently been transformed into downtown loft apartments, while the Hill District is an historically African-American neighborhood that is home to various public housing projects. The Strip District has fewer affordable units than the model predicts, while the Hill District has more affordable units than should be present based on the model. The Strip District is experiencing gentrification in an area that had few units to begin with, which exacerbates the shortage of affordable housing there. On the other hand, the Hill District has mechanisms in place through the public housing programs that ensure more affordable housing is available than what would be expected based on neighborhood change throughout the metro area.

Table 6.9. Coefficients for Low-Income Spatial Regression Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Low-Income Households	Spatial Lag
P-value	.000*	.005*	.683	.841	.903	.000*	.000*	.004*
Unstandardized Coefficients	-.015	.000	-.021	.009	.004	-.001	.214	.220
Standardized Coefficients	-.242	-.099	-.015	.007	.004	-.231	.188	.110

The model for the very low-income group was also statistically significant with a p-value of 0.000 and an r^2 value of 0.372, which was the same as that for the OLS model without the spatially lagged variable included (Table 6.10). The same independent variables were also significant and behaved as expected. While the spatial regression reduced the absolute values of some of the standardized residuals in tracks in rural and suburban areas, there was less of a change within the city of Pittsburgh (Figure 6.6).

Table 6.10. Coefficients for Very Low-Income Spatial Regression Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Low-Income Households	Spatial Lag
P-value	.000*	.003*	.559	.062	.058	.000*	.000*	.947
Unstandardized Coefficients	-.037	.000	.031	.093	.073	.000	.194	-.004
Standardized Coefficients	-.528	-.094	.019	.059	.061	-.185	.144	-.002

The extremely low-income spatial regression model was statistically significant with an r^2 value of 0.21. The r^2 value was the same as with the OLS regression model of all census tracts, the same pattern as was observed for the very low-income models. This observation supports the analysis of the Moran's *I* statistic in that neither the very or extremely low-income neighborhoods tend to have changes in affordable housing that are influenced by surrounding neighborhoods. The spatial lag variable was also found to be not significant for both the very and extremely low-income spatial regression models (Table 6.11). It appears that changes in low-income affordable housing tend to occur on a larger scale, in which multiple neighborhoods or areas of the city experience changes in affordable housing, while changes in very and extremely low-income housing occur on a neighborhood-by-neighborhood basis.

The spatial regression model for extremely-low income affordable units also supports the finding that home values in the most economically depressed areas are not changing at a rate fast enough for changes in home value to predict shortages in available affordable units. Change in rent is the best indicator of gentrification for extremely low-income neighborhoods and the largest proportion of residents are renters in these areas. While Freeman (2005) and Hartley (2013) claim that gentrification is good for a neighborhood, this study shows that gentrification does reduce the availability of affordable housing, specifically for renters in extremely low-income neighborhoods. In places like Pittsburgh where there is no rent control to ensure that rents keep from rising with gentrification, these residents will be forced to either pay more and have a high housing-cost burden or have to move to a new neighborhood. Figure 6.7 shows that the model does a good job predicting the change in affordable housing within the city of Pittsburgh, so the effect of gentrification on these neighborhoods is consistent throughout the urban core.

Table 6.11. Coefficients for Extremely Low-Income Spatial Regression Model.

	Change in Median Rent	Change in Median Home Value	Change in Percent with Bachelor's Degree or Higher	Change in Percent White	Change in Percent Working Class	Population Density	Change in Percent Low-Income Households	Spatial Lag
P-value	.000*	.807	.496	.666	.306	.008*	.000*	.837
Unstandardized Coefficients	-.019	.000	-.028	.017	.030	.000	.154	-.016
Standardized Coefficients	-.396	-.010	-.025	.015	.037	-.094	.145	-.007

I again calculated the Moran's *I* statistic on the residuals of the spatially lagged models to determine if the spatial regression models reduced the degree of spatial autocorrelation (Table 6.12). The Moran's *I* statistic was not significant for any of the models. The r^2 values were also either similar or lower than the OLS models, so while there may be some spatial autocorrelation for the low-income model, it does not appear to affect the validity of the OLS model. The spatial regression model also helped to show that there are differences in the scale of neighborhood change in that changes in low-income affordable housing tends to happen across multiple neighborhoods, while changes for very and extremely low-income units is restricted to individual neighborhoods.

Table 6.12. Moran's *I* Values for Spatial Regression Models.

	Standardized Residuals Low-Income Model	Standardized Residuals Very Low-Income Affordable Units	Standardized Residuals Extremely Low-Income Affordable Units
Expected Value	-0.001429	-0.001429	-0.001429
Observed Value	-0.020855	0.004013	0.036254
Z-Score	-0.86	0.24	1.67
P-Value	0.389	0.810	0.095

Figure 6.5. Standardized Residuals for Low-Income Spatial Regression Model.

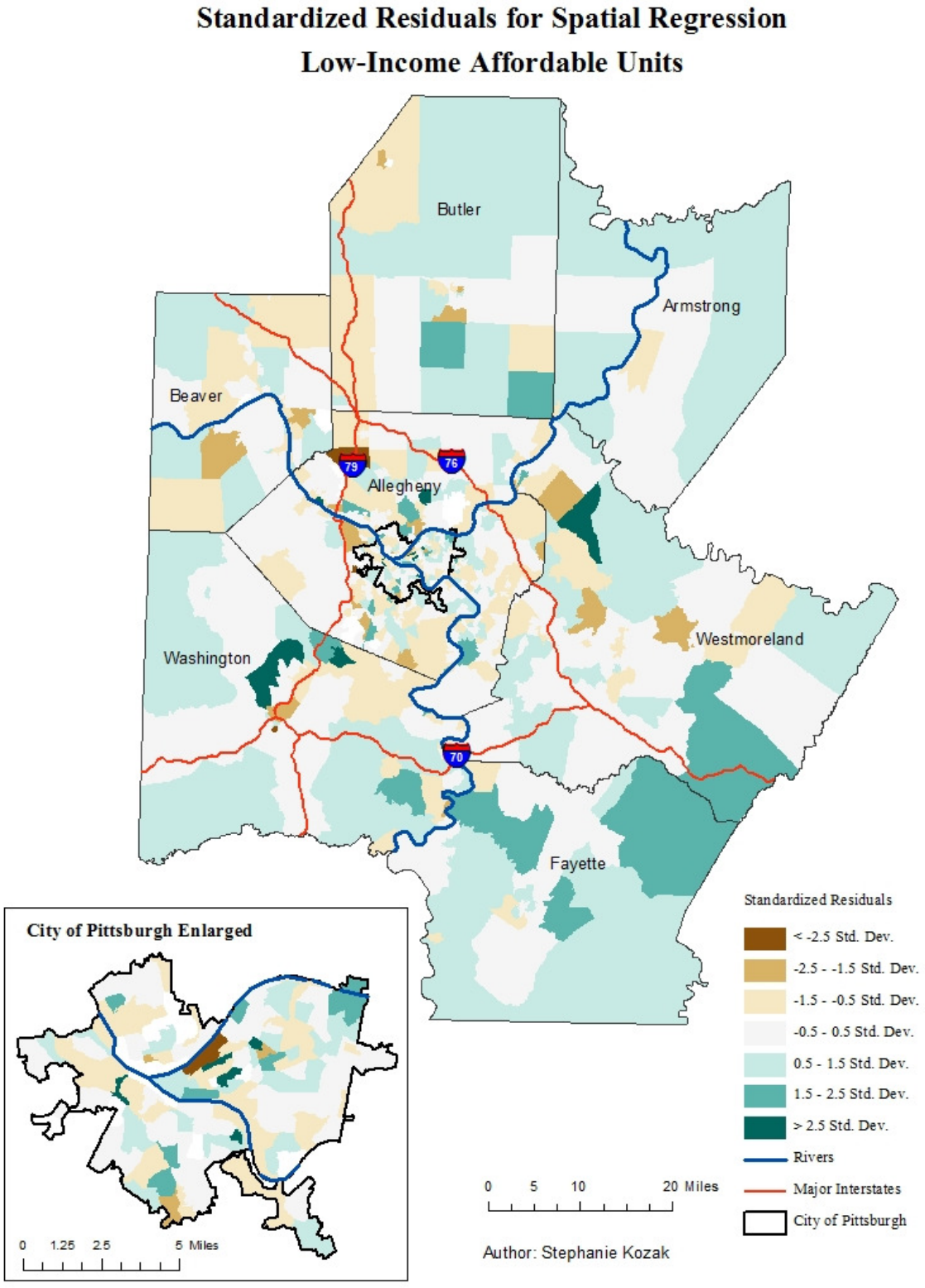


Figure 6.6. Standardized Residuals for Very Low-Income Spatial Regression Model.

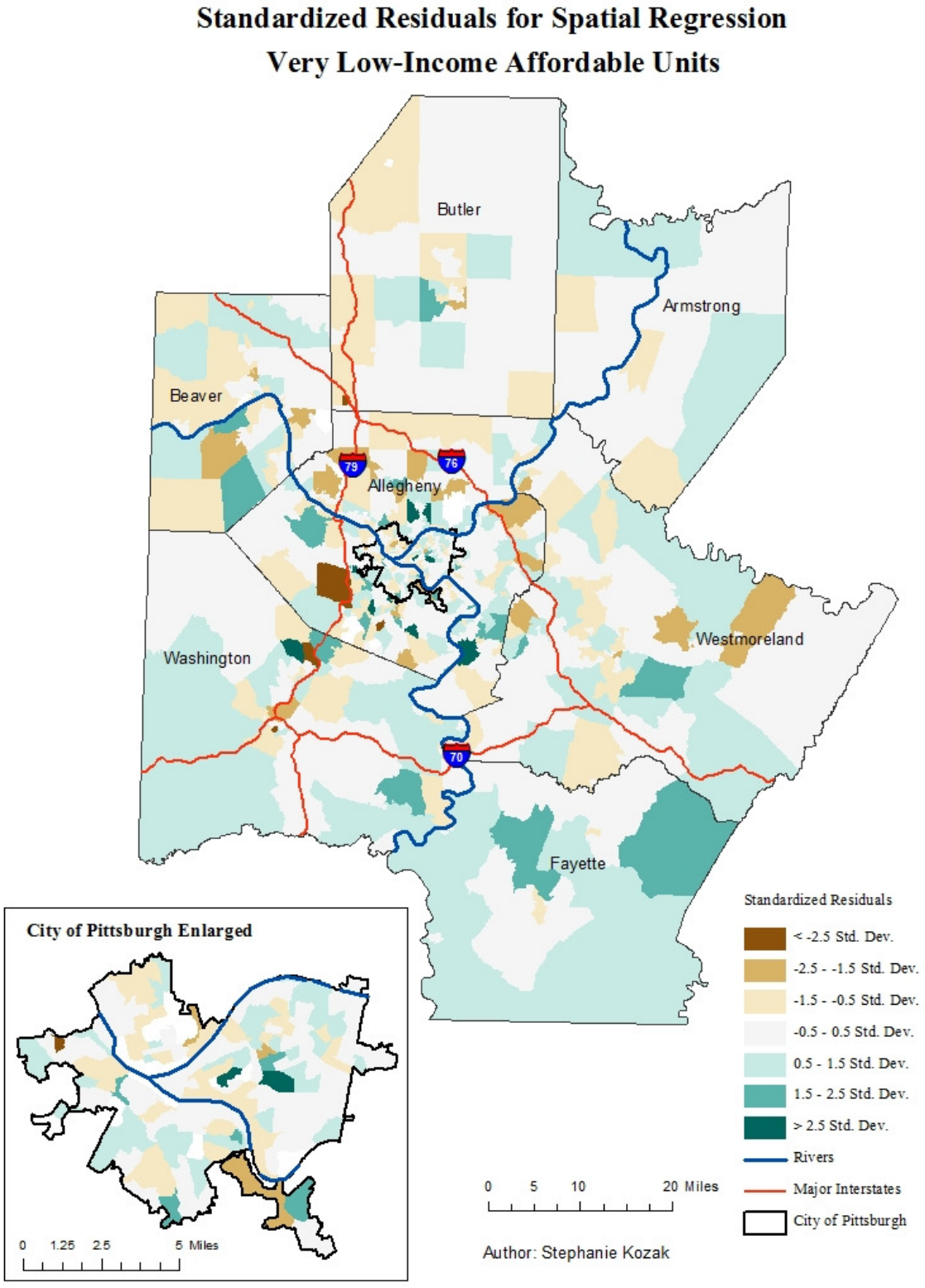
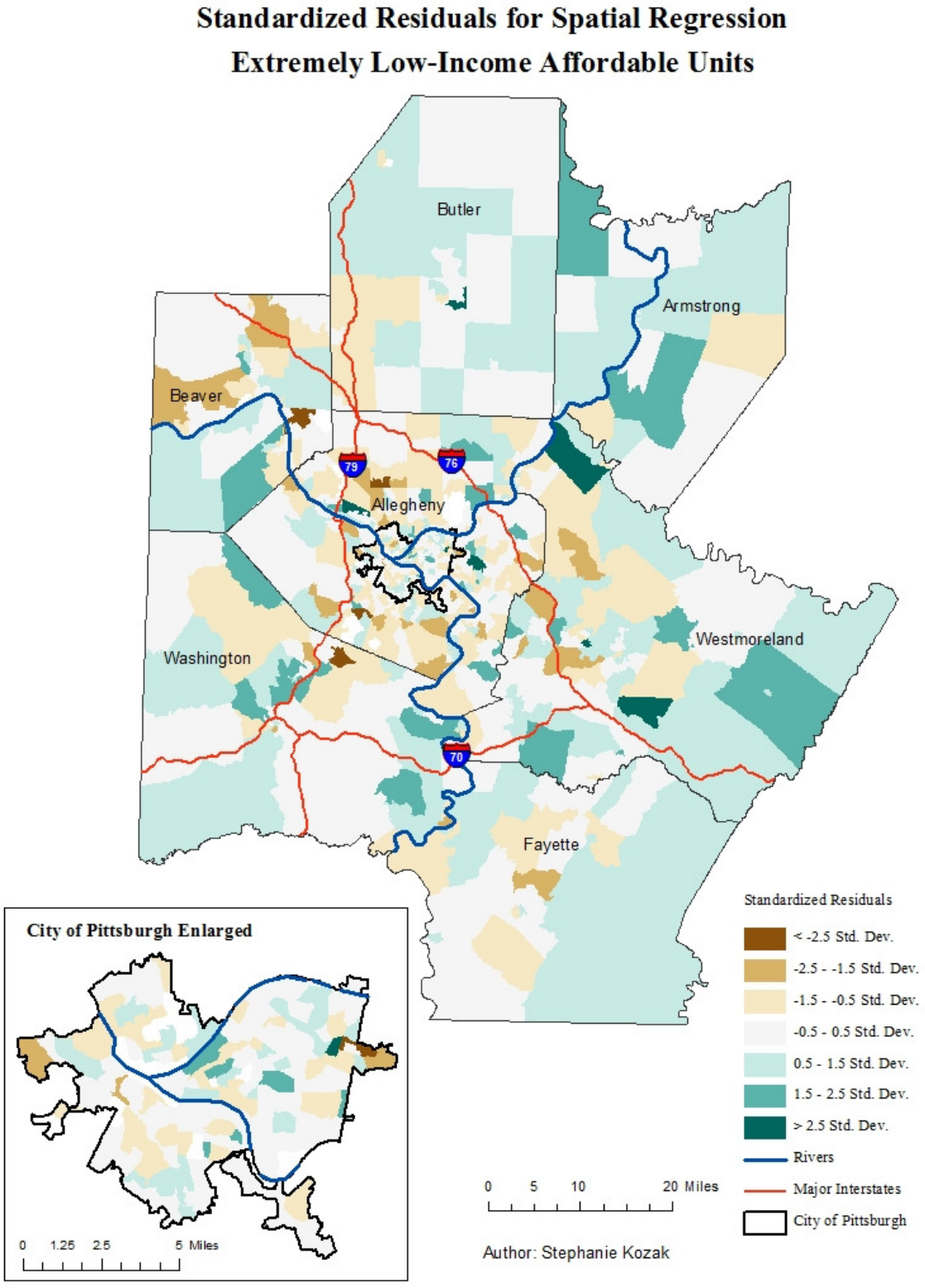


Figure 6.7. Standardized Residuals for Extremely Low-Income Spatial Regression Model.



6.4.4 Geographically Weighted Regression

Both OLS and spatial regression are global models in that they are assuming that the same spatial relationships are happening across the entire Pittsburgh metro area. In reality, there are most likely differences in how the independent variables are working in different neighborhoods. For example, there are some parts of the study area in which public housing or non-profit housing may provide affordable units that are not affected by gentrification, whereas other neighborhoods do not have these types of homes available and would not affect the availability of affordable housing. In a global regression model it is assumed that the relationships are stationary, or that they do not vary across space. Social processes tend to be non-stationary, meaning that they may not occur everywhere in the same way.

There are multiple reasons for why the relationships among variables vary across space. Fotheringham, Brunsdon, and Charlton (2002) outline three explanations for these local differences. The first refers to variation in sampling in that if subsets of a sample have different models created for each subset, we would expect those models to vary somewhat due to sampling variation. The second possible cause is that some relationships may be different across space. For example, while changes in education levels and type of occupation may depict gentrifers moving into an area and rehabilitating housing, in other areas this same group may have no interest in adding sweat equity to their properties to raise their home values. This cause takes into account variations in geographical context and importance of local processes (Thrift 1983).

Finally, there may be a global pattern that exists uniformly across an area, but the model itself is not adequate in detecting those relationships. In this case, a low r^2 value would indicate

that the large amount of spatial error is due to the model not having the appropriate independent variables to detect what is causing changes in the dependent variable. In some cases, using local models may help determine what variables are missing in order to understand the pattern occurring. In other instances, it may not be possible to collect data for modeling all of the variation in the dependent variable. In this case, local modeling allows us to determine if there is a misspecification problem with the global model.

Geographically weighted regression (GWR) is a statistical method that allows local differences in spatial relationships to be taken into consideration when trying to fit a model to a set of variables (Fotheringham et al. 2002). In OLS regression, geographic variation is confined to the error term. This does not allow us to determine if the high amount of error is due to a problem with the model or if there are local variations in how the parameters of the model are functioning. In GWR, local regression models are fit to the data at various regression points so that the coefficients can vary for each model depending on the relationship that is occurring there.

In a GWR equation, the coordinates of a regression point are used to estimate the parameters and a predicted value for that particular regression point, which allows for coefficients to vary spatially. The surrounding data points are given weights to reflect the proximity of the data point to the regression point and these weights are used in estimating the coefficients and predicted values for that regression point. When the observations are areas rather than point data, a point is selected and the coordinates of that point are used as the regression point. The weights allow the observations that are closer to the regression point to have more weight because it is assumed that those locations would have more influence on the values at the

regression point than values further away. The weighting process fits a spatial kernel to the data according to the distance a data point falls from the regression point.

I applied GWR to the data in ArcGIS using an adaptive spatial kernel method (Fotheringham et al. 2002). Spatial kernel refers to the area that is used to delineate the data points to be included in a regression equation. In GWR, the kernel is continuous in that it includes all of the points, but the kernel changes where it is centered for each regression equation, and thus the shape of the kernel changes. An adaptive method allows the bandwidth, or the distance used in determining the weights used in the model, to vary according to the number of neighbors. In areas where there is a higher density of neighbors, or census tracts, the bandwidth is smaller, like within the city. In the more rural counties surrounding Allegheny County, the bandwidth will be larger to account for the fact that the census tracts are larger and less dense than in the central city.

The bandwidth method that was used to specify the extent of the kernel was based on the Akaike Information Criterion (AICc) (Hurvich et al. 1998). This method for determining the bandwidth is a general method that is often used in various types of regression and it chooses the bandwidth parameters by minimizing the AIC_c (Fotheringham, Brunsdon, and Charlton 2002). For the low-income model, this method resulted in using a bandwidth of 282 neighbors. This means that the nearest 282 census tracts will be used when calculating the regression parameters for each regression point. Any observation outside that group will receive a weight of zero in fitting the GWR model. The bandwidth was 346 for the very low-income model and 262 for the extremely low-income model.

One way to determine if it the GWR model is better at explaining the variation in the dependent variable is by comparing the AIC_c in both models (Hurvich, Simonoff, and Tsai 1998; Burnham and Anderson 2002). While ArcGIS only computes AIC for the OLS model, it is appropriate to compare AIC to AIC_c with a large enough dataset. If there is drop of at least three units between AIC values than the lower value suggests that the model is a better fit. The AIC for the OLS model was 4728 compared to an AIC_c value of 4668 so the OLS model does a better job of explaining the variation in the dependent variable.

For the low-income cohort, the GWR model had an r^2 value of 0.384, which was better than the OLS r^2 of 0.206. The wealthy suburbs northwest of the city have the highest r^2 values while parts of the city have the lowest values (Figure 6.8). These results support earlier observations regarding changes in low-income affordable units occurring on a larger scale. If most of the very and extremely low-income households are in located the city, along the rivers, and in some of the more rural areas of the metro, then other areas like the suburbs would experience changes in affordable housing that occur uniformly across a larger area. Tracts within the city are experiencing both increases and decreases in affordable units, while the suburbs overall tend to have few affordable units. So r^2 values would be highest in the suburbs where the change in affordable housing is happening in the same way in multiple tracts. The Moran's *I* value for the standardized residuals of the low-income model had a p-value of 0.637 and a z-score of -0.47, which means that it did not show a clustered distribution (Table 6.13). The map of the standardized residuals (Figure 6.10) shows that the GWR model exhibits less of a clear distinction between patterns in the city, suburbs, and rural areas.

Table 6.13. Moran's *I* Values for Geographically Weighted Regression Models.

	Standardized Residuals Low-Income Model	Standardized Residuals Very Low-Income Affordable Units	Standardized Residuals Extremely Low-Income Affordable Units
Expected Value	-0.001429	-0.001429	-0.001429
Observed Value	-0.012099	-0.027031	-0.026133
Z-Score	-0.47	-1.13	-1.09
P-Value	0.637	0.257	0.274

The very low-income GWR model was statistically significant and had an r^2 value of 0.458 and an AIC_c value of 4754. The OLS model had an AIC value of 4728, which was slightly lower than that of the GWR model. While the r^2 value was higher for the GWR model than it was for the OLS model, the difference in the AIC values suggests that the OLS model was a better fit. The map of r^2 values shows that the model does the best job of explaining the variation in affordable units in the northwestern region of the metro, while the model performed the worst in the rural areas of Washington, Fayette, and Westmoreland counties (Figure 6.10). There is a mix of tracts within the city where the model either overpredicted or underpredicted, while it appears that areas within the suburbs tend to have fewer units than the model would predict and more units in the rural areas than would be expected (Figure 6.11). This trend is similar to the pattern of the standardized residuals for the OLS model.

The extremely low-income GWR model was significant and had an r^2 value of 0.370 and an AIC_c value of 4363. The AIC value was lower than that of the OLS model, which was 4428. Both of these statistics suggest that the GWR model was a better fit for the extremely low-income affordable models than OLS. The model has the highest r^2 values in the city and in some of the rural areas of the metro, where there are the largest proportions of extremely low-income

households (Figure 6.12). The map of standardized residuals has a similar pattern in that some of the highest absolute values of those residuals are outside of the metro area surrounding the city (Figure 6.13). The differences in the GWR models shows that the gentrification process unfolds differently across the metro area and that the model does the best job in explaining the variation in affordable housing for extremely low-income households.

Figure 6.8. R^2 Values of Low-Income Geographically Weighted Regression Model.

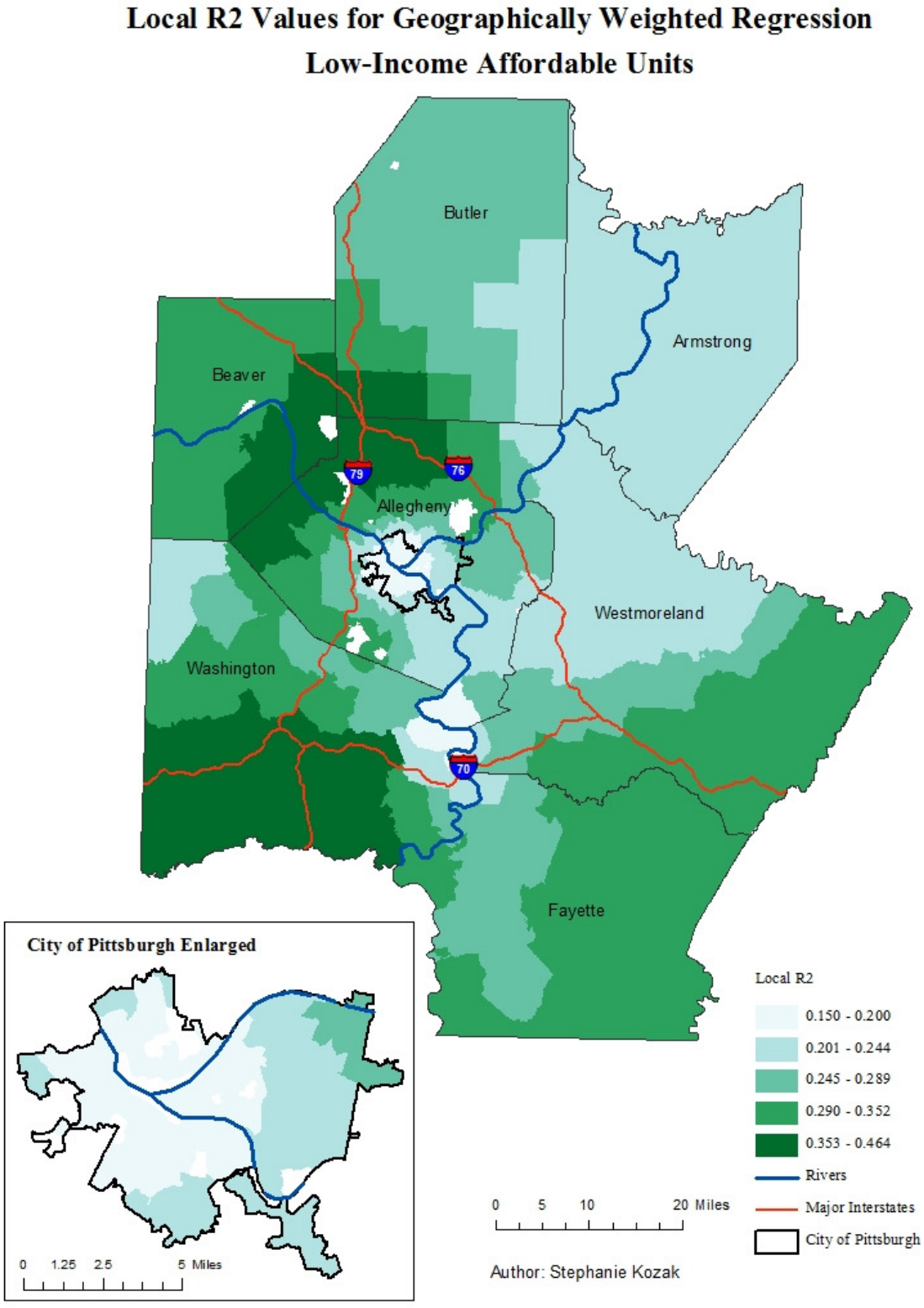


Figure 6.9. Standardized Residuals for Low-Income Geographically Weighted Regression Model.

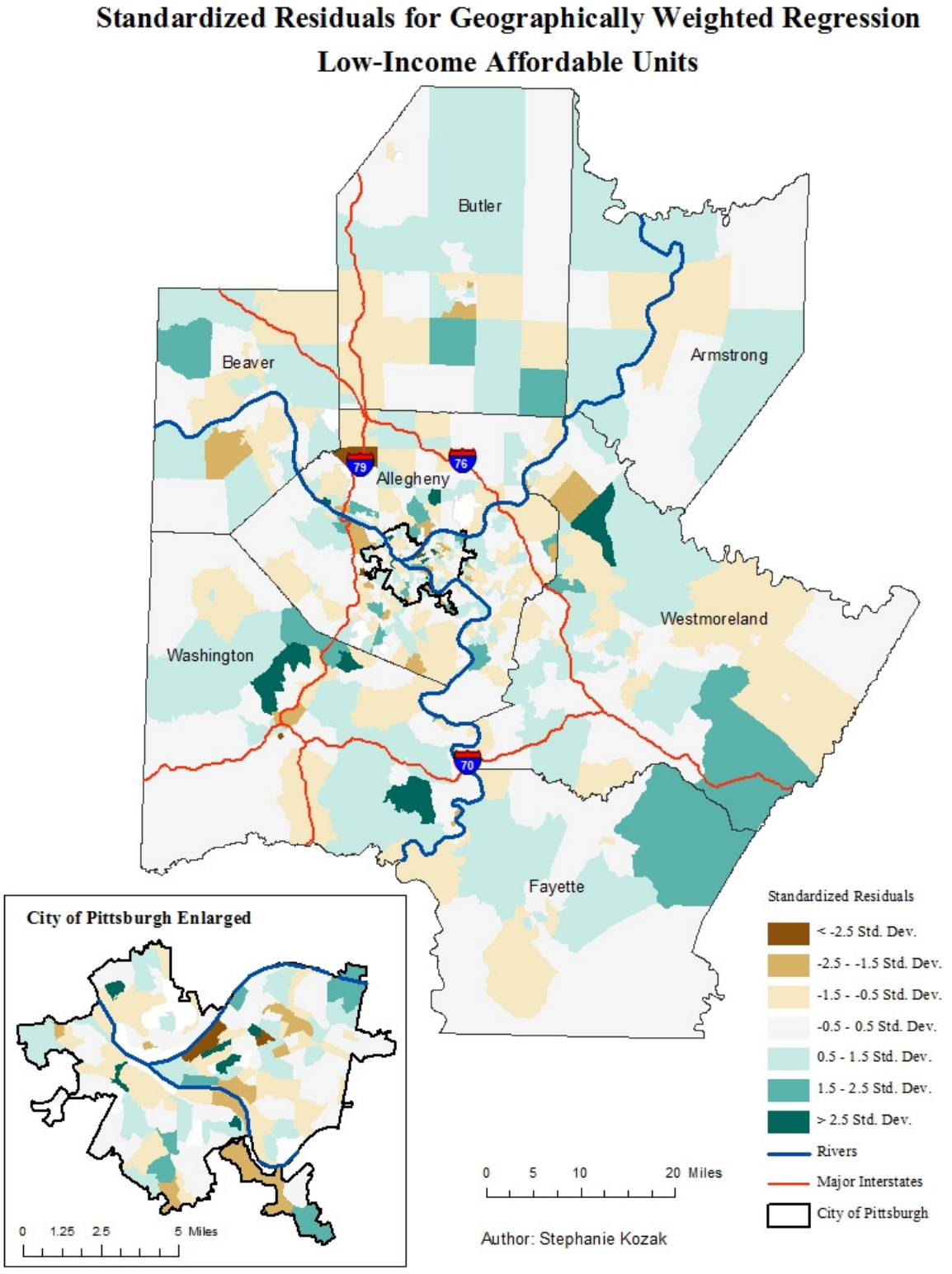


Figure 6.10. R^2 Values of Very Low-Income Geographically Weighted Regression Model.

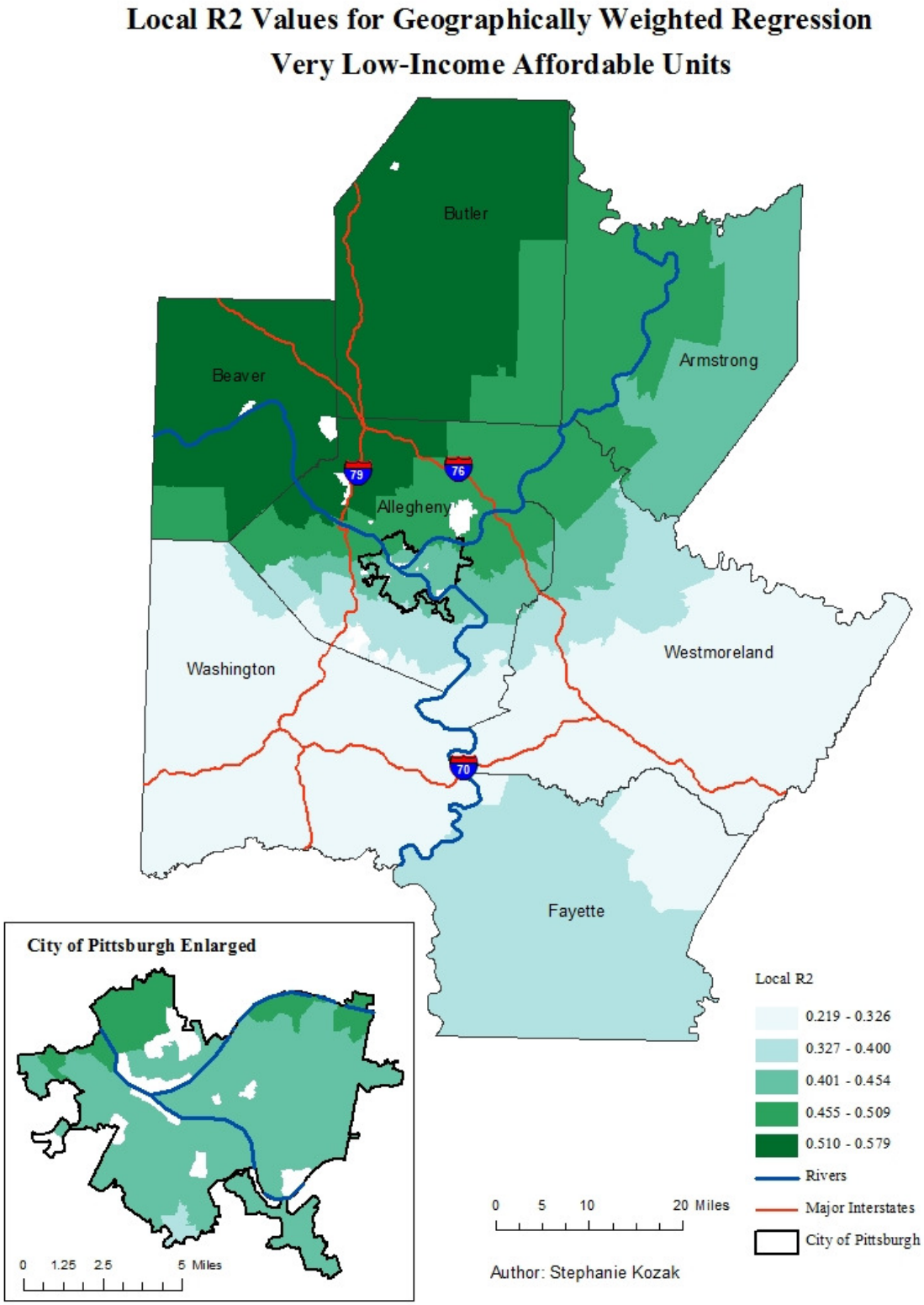


Figure 6.11. Standardized Residuals for Very Low-Income Geographically Weighted Regression Model.

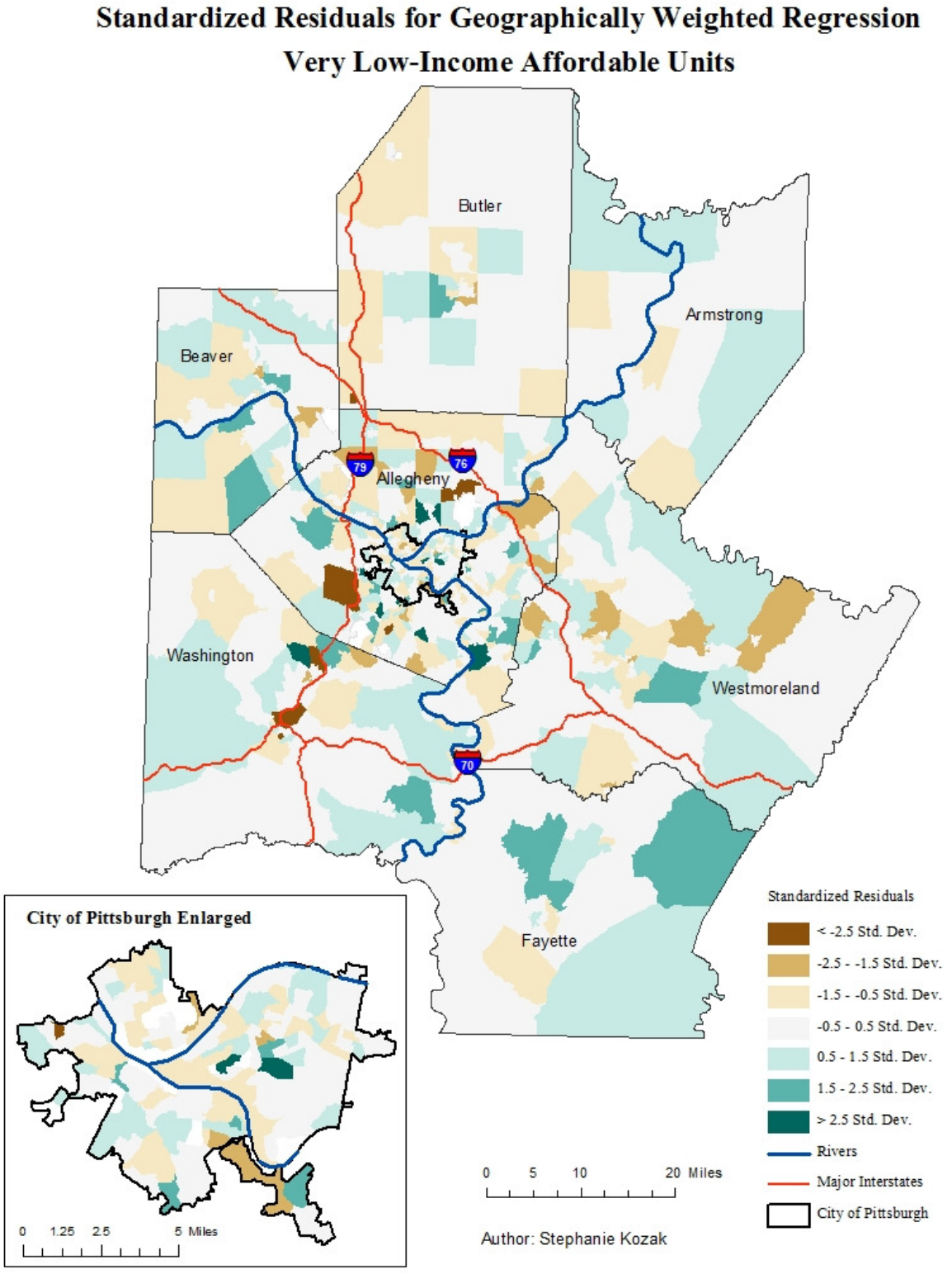


Figure 6.12. R^2 Values of Extremely Low-Income Geographically Weighted Regression Model.

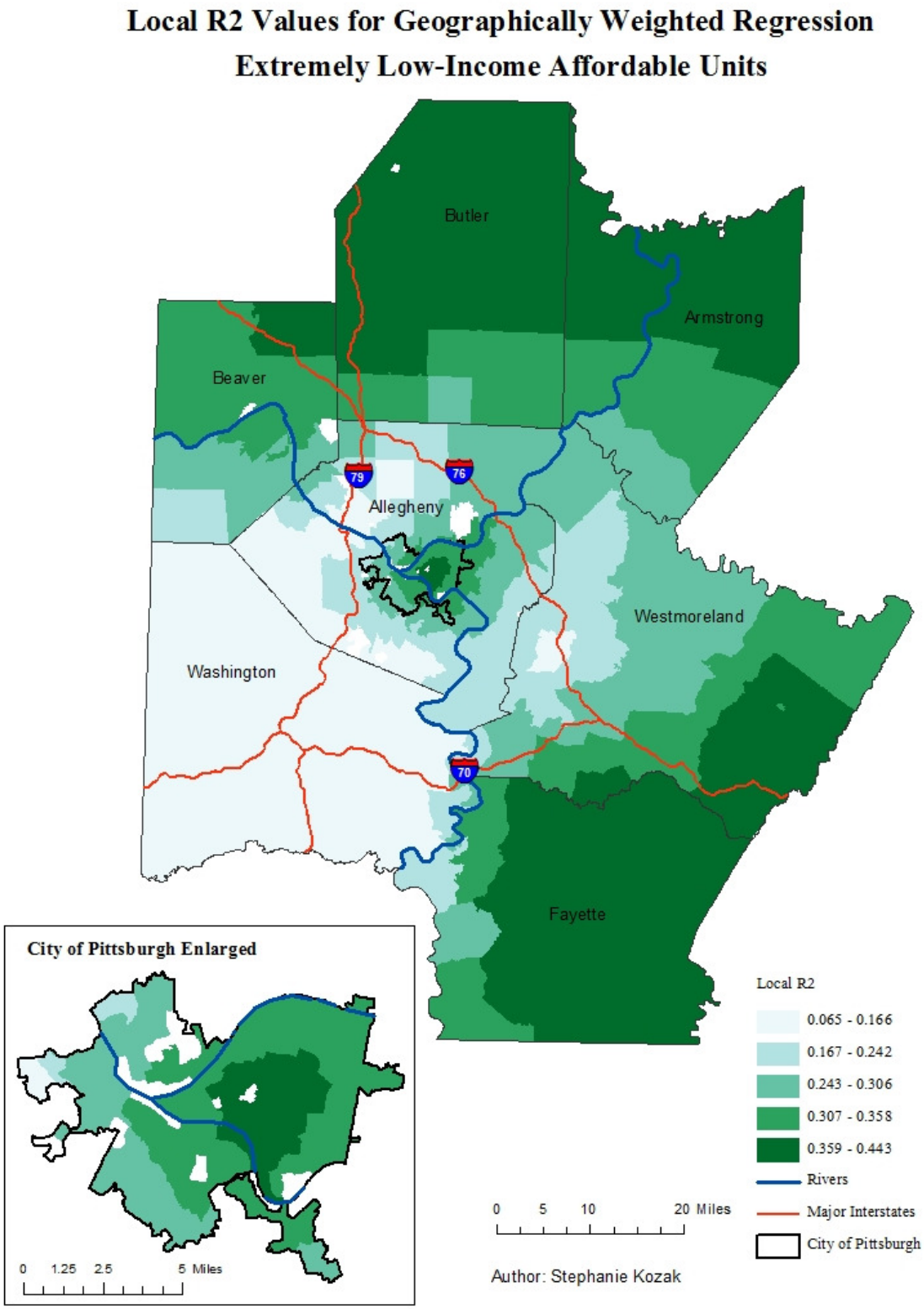
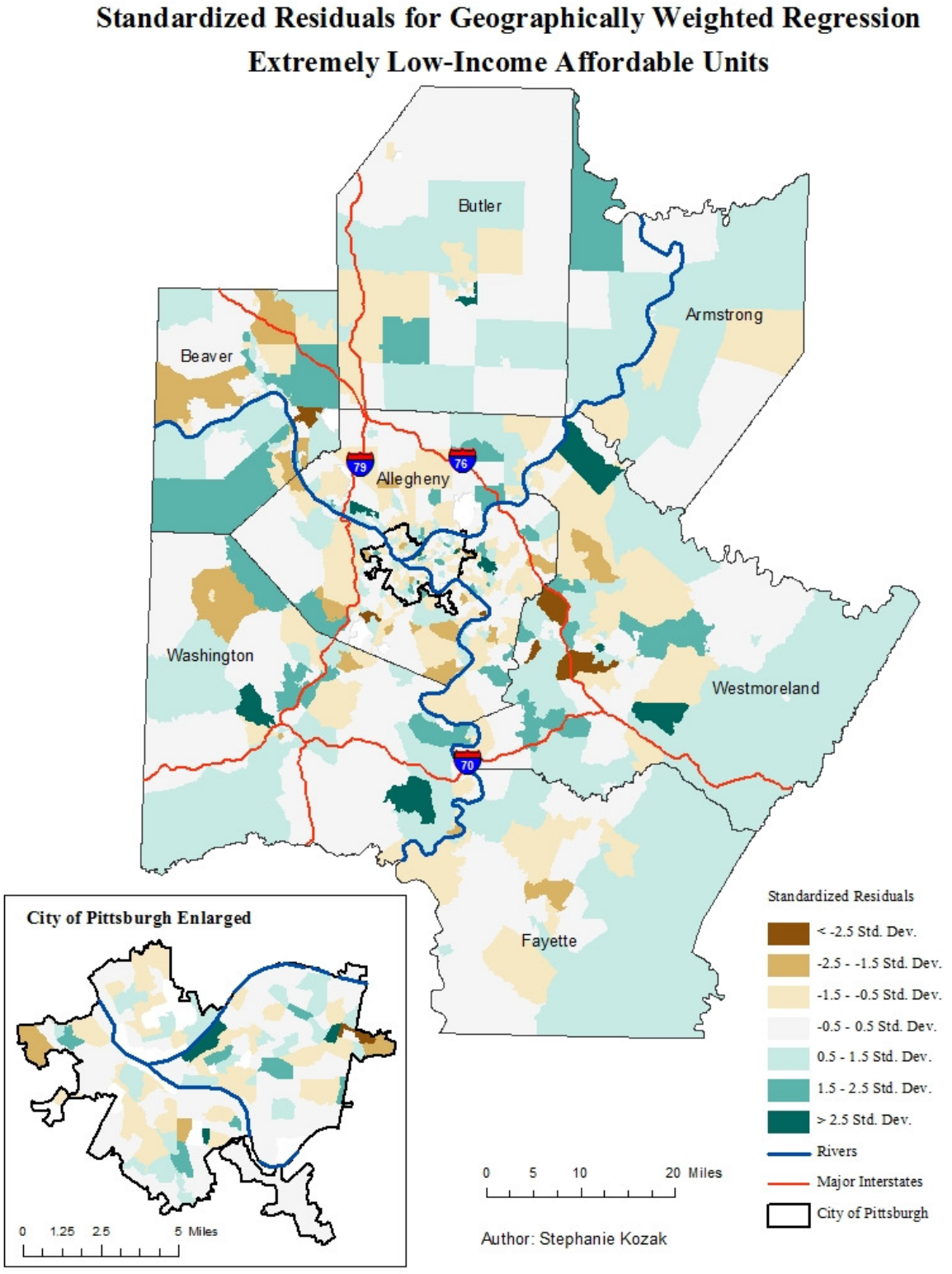


Figure 6.13. Standardized Residuals for Extremely Low-Income Geographically Weighted Regression Model.



6.5 Conclusions

The statistical analysis shows that gentrification is indeed reducing the number of affordable units in the Pittsburgh MSA. All three of the regression models that included all of the tracts in the metro were significant and had independent variables that generally behaved as expected. The r^2 values were low, which is expected with such a large sample, but this is most likely because of the soft housing market in the area. The high vacancy rates in the city and the increase in vacant units throughout the entire MSA have created a buffer between losses in affordable housing and rising rents and home values. Although the number of affordable units does decrease as rents and home values increase, it appears that home values are rising slowly due to an abundance of available units in the area and the lack of owner-occupied units in the most impoverished neighborhoods. Declines in proportions of low-income residents supports the conclusion that gentrification is reducing the amount of affordable housing units in the metro. As the development trend continues in Pittsburgh, the loss of affordable units will only accelerate and cause exclusionary displacement for the large proportion of low-income residents living in the city.

In addition, the lack of a correlation between affordable units for extremely-low income households and home values suggests that development is not yet affecting home values. A recent study of gentrification (Hartley 2013) claims that it is good for home owners because they can sell their homes for a profit due to rising property values. However, if home values in the poorest neighborhoods are taking the longest to rebound, gentrification may push out the high proportion of low-income renters and disrupt the social fabric of the neighborhood before other residents start to see any return on their investments.

Race does not seem to play the same role in gentrification in Pittsburgh as it has in other cities throughout the United States. The variable for percent white is not correlated with the amount of affordable housing and the variable did not have an inverse relationship with the change in affordable units as was expected. One reason for this could be extremely high proportions of whites in the metro area. Tracts that have larger proportions of minorities are located almost exclusively in lower-income areas of the city. While one would expect those same neighborhoods to be the most susceptible to gentrification, the results suggest that there is more social mixing occurring in these neighborhoods than the simple theory that most gentrifiers are white. Reports of African American gentrifiers moving into some of the neighborhoods within the city support the notion that race is not playing as large of a role in gentrification as previously thought (Clemetson 2002). However, more research needs to be conducted in order to understand the racial implications of gentrification in Pittsburgh. Because the racial residential patterns in this area are similar to other Rust Belt cities, it would be helpful to examine how race is affected by gentrification in these cities as well.

The models that include only tracts ripe for gentrification and the analysis using spatial regression and GWR suggest that the reduction in affordable units is not happening in the same way across the entire area. Neighborhoods with the lowest incomes and highest proportions of extremely low-income households are most sensitive to losses in affordable units due to gentrification. Quantitative models provide a way to pull out trends in data from a large area and test assumptions regarding how gentrification is occurring in the city. This study suggests that the next step in understanding the changing neighborhood dynamics requires a study that includes a qualitative assessment of local changes to examine how gentrification is playing out in individual neighborhoods and a comparison of the gentrification process in other types of cities.

Chapter 7

Theorizing Gentrification and Affordable Housing in the Rust Belt

Gentrification is a powerful force transforming cities across the world. The process has taken on many forms, from classic gentrification, in which individuals move into an area to revitalize homes, to state-led gentrification where public and private forces combine to transform entire neighborhoods through large-scale development projects. While the driving forces of gentrification have changed since Ruth Glass first coined the term in the 1960s, the debate regarding whether gentrification displaces the original working-class residents has raged on (Lees et al. 2008). Scholars have emerged on both sides of the argument, some claiming that displacement is occurring and is negatively affecting lower-income groups and minorities (Slater 2006; Walks and Maaranen 2008), while others arguing that gentrification stabilizes neighborhoods and increases the diversity within the city (Duany 2001; Freeman 2005, 2009).

My work adds to the debate by examining gentrification in a deindustrialized city of the American Manufacturing Belt, an urban form that is often overlooked in the gentrification research, and by trying to determine if displacement is occurring by measuring changes in affordable housing. Pittsburgh is an ideal case study because it provides insight into how postindustrial cities in the Rust Belt are evolving in the 21st century. One of the driving forces behind that transformation is gentrification and this research shows that it is reducing the availability of affordable housing for low-income groups. Housing is already in short supply in some areas of the metro area due to spatial mismatch, even though there should be adequate housing for most low-income households in the area. In addition, the gentrification occurring in Pittsburgh has revealed startling observations that will change the understanding of

gentrification. The following sections recap the research results and explain how these findings inform the theoretical debates regarding gentrification and affordable housing.

7.1 The Postindustrial City in the 21st Century

Urban geographers have long been interested in the form that cities take (Harris and Ullman 1945; Griffith 1949). As the world has urbanized, different cities have taken on different forms that were largely driven by the social and economic forces shaping those areas (Kostof 1991). The postindustrial city is one that has emerged in many places throughout the Western world as entire urban economies have shifted from a focus on manufacturing to service-oriented activities. This change has not simply resulted in differences in where people go to work, but has reshaped the urban form of entire metro areas (Byrne 2001). This dissertation adds to our understanding of deindustrialized cities in the U.S. and how those urban areas are transitioning into postindustrial economies by analyzing the changes in Pittsburgh at the turn of the 21st century.

The first research question laid out in Chapter 1 asked how the Pittsburgh metro area had changed from 2000 to 2009. What does the postindustrial city look like as it begins to bounce back from population loss and the shift in focus to the suburbs? Urban forms are always changing, and while suburbanization may have dominated the residential patterns of the latter half of the 20th century, there are signs that those patterns are shifting and will create a metro area that looks different in the next 100 years. Capital is re-entering the city. This process has been documented by gentrification researchers for quite some time (Smith 1979; Zukin 1982), but Rust Belt cities have been feeling the pain of disinvestment in downtowns while other cities

were already experiencing the return of the middle-class. In Pittsburgh the return of the middle-class is taking place through both classic gentrification and state-led gentrification, but the large-scale development projects seem to be having the largest effect on population changes in the city. The state plays a large role in helping private developers to secure large areas of land and often helps to rehabilitate those sites in the case of brownfield development (Morris 2010). If the state continues to facilitate this private development, the injection of capital will only accelerate neighborhood changes.

This movement of capital back to the city does not mean that the suburbs are dead. The wealthy suburbs northwest of the city continue to grow along important interstate transportation corridors. Transportation has played an important role in the transformation of urban form and will do so in the future, as well. However, not all suburbs are created the same. Older suburbs that are not located near busy interstate highways are declining in both population and income. These older suburbs will become part of the metropolitan filtering process as more lower-income groups are pushed out of the city and forced to find affordable housing elsewhere.

These new patterns are going to break down traditional conceptions of urban, suburban, and rural spaces. Differences between these areas will be less stark than they have been in the past. While some suburbs will continue to grow, particularly along significant transportation corridors, others are going to be the location for the next wave of devalorization. Declining areas will be in older suburbs and in rural areas far from access to transportation. Spatial patterns will be created by temporal and economical differences that will look more like a mosaic of investment and disinvestment, rather than the traditional differences between city and suburb. This new pattern of disinvestment in older suburbs is similar to what Hackworth (2007) observed in deindustrialized cities. There are already signs that lower-income groups are moving into these

suburbs and into rural areas. Population change does not differ simply along simple urban/suburban lines, but along economic and class lines throughout the entire MSA.

The new urban form, in which differences within suburbs or cities will become more prominent than those between urban and suburban, is already evident across the Pittsburgh landscape. Some places within the city have capital that never left residential neighborhoods, particularly in the wealthy, Squirrel Hill area. Neighborhoods in this area have high incomes, home values, and rents unlike other areas of the city. An interesting question is why did the capital never leave, while surrounding areas experienced waves of disinvestment? Are the differences within the various urban scales evidence of the networks Cox (1998) describes as uneven connections between those with power and the state? Further studies need to be completed to determine if there are certain economic activities or conditions that allowed part of the urban core to remain vibrant. Uncovering the answer to that question will not only help inform our understanding of urban morphology in the 21st century, but will also help to predict changes in the future. These wealthy urban areas are the least-densely populated compared to other neighborhoods in the city and they are quickly growing. Wealth is attracting more capital here. As Smith (1979) has shown, capitalism continually spurs the redistribution of capital to new areas of the city, but that does not appear to be happening in this area, which has remained a wealthy neighborhood for quite some time.

Pittsburgh has a racial pattern similar to other Rust Belt cities (Frazier et al. 2003). These cities are racially segregated, but there is hope that the configuration may reverse itself as both the suburbs and urban areas are becoming more racially heterogeneous. However, this increase in social mixing is a trend in that not all areas of the city show signs of increased diversity. Some inner-city neighborhoods have had an increase in non-whites in areas with already high

proportions of minority residents. Gentrification appears to be pushing non-whites into other minority-dominated neighborhoods, but this is happening on a very local scale. Research suggests that there is increasing segregation within U.S. cities along racial and income lines (Carr and Kutty 2008). While segregation for the metro area is declining, individual neighborhoods may actually be experiencing increases in socio-economic and racial segregation.

Deindustrialized cities face a unique problem because former industrial sites riddle the urban landscape. Most factories were located on rivers, so they were not traditionally sites of large residential neighborhoods (Rivers of Steel National Heritage Area 2014). While these areas were ignored by commercial and real-estate developers for quite some time, an increased desire for inner city living has prompted them to take a closer look. Riverfront development is playing a key role in the revitalization of downtown Pittsburgh, but many of these areas are brownfield sites that require a lot of money for cleanup (Morris 2010). Brownfield development requires two things: a public interest in natural amenities and extensive funds to pay for the cleanup. Most of those funds in Pittsburgh come from private-public partnerships where the city foots most of the cleanup bill while the developers then pay for the new commercial and residential infrastructure. Outside of the city, brownfield development is not occurring and some of the highest proportions of low-income residents are located near former industrial sites in these areas. The lack of interest from public or private entities may mean that these industrial areas are never revitalized. As lower-income households are pushed out of the city by gentrification, these deindustrialized towns along the rivers could experience an increase in proportion of lower-income residents, further concentrating poverty in these former industrial sites.

Pittsburgh has embraced the mixed-use urban development scheme. Southside Works and Washington's Landing are examples of this mixed-use development where residential,

commercial, and industrial spaces are being incorporated into large projects which have been successful at attracting new residents and businesses (URA 2009). These developments are spurring a rise in property values and rents. While some of these projects were built where there was little to no residential activity, the new urban amenities are affecting property values in nearby neighborhoods. Areas that are gentrifying appear to be more prone to piecemeal mixed-use development in that there often was already a mix of residential, commercial, and industrial activity before gentrification began to occur. As the mixed-use development continues to be embraced by urban planners and city governments, it is important to note its propensity for spurring gentrification.

The Pittsburgh MSA displays signs of a growing economy. Unemployment levels dropped for the area between 2000 and 2009. Downtown development caused increases in income levels in some downtown neighborhoods, which will add to the tax base in those areas, and some suburbs showed continued growth. While the economy is getting stronger for the entire area, the city has the farthest to climb in order to overcome the losses of population and industry during much of the 20th century. The city of Pittsburgh did not fare as well as the rest of the metro area. Even though unemployment rates fell in the city between 2000 and 2009, the tracts with the largest proportions of unemployed are located downtown and show a pattern of concentrated poverty. Development is still very localized, improving neighborhoods for some and increasing poverty for others.

The housing market is soft throughout the entire metro, which means that there are high vacancy rates, particularly in the city, and that the abundance of units drives down real-estate values. The soft market also means that neighborhoods can see changes in the income-level of residents with gentrification without raising the home values and rents as quickly as would be

expected in a tight housing market. The slow increase in rents and home values may be changing as the housing market gets stronger. Newer suburbs had an increase in units over the first decade, but a rise in vacancy rates suggest that growth might slow. The highest vacancies are in low-income areas where neighborhoods are actually losing housing units. The reduction in units is going to cause a housing squeeze for this group, pushing them to older suburbs with increasingly lower property values. Capital is being reorganized towards the city center and away from older suburbs, but there is still extensive development in suburbs along interstate highways. There is already an increase in renters in the older, middle-income neighborhoods towards the end of the city and in older suburbs just outside the city boundary. This growth of the low-income cohorts in these older neighborhoods is exacerbated by working-class residents being pushed out of the city due to gentrification.

Carter (2012) writes about the future problems associated with Sun Belt cities, like auto-dependency and urban sprawl, but there are similar issues with Rust Belt cities. These problems will be amplified in areas where lower-income households have been pushed into the urban fringes. Rust Belt cities tend to have more affordable housing in the city compared to other urban areas in the U.S. (Florida 2012), but those prices are going to increase as more people move into the city. This restructuring of capital will continue as these cities gain in favor while other cities fall out of favor because of expensive real estate markets, causing housing shortage in the postindustrial city.

7.2 Spatial Mismatch and Affordable Housing Problems at the Local Level

Providing adequate housing for low-income residents is a problem that every municipal government faces. There are multiple ways in which that housing can be provided, such as public programs or the private housing market, but many cities have problems meeting those needs. Pittsburgh is no exception. While there should be enough affordable units for all of the low-income households, there is a gap on a local level between where the affordable units are located and where the low-income households live. The most poverty-stricken, extremely low income households have the hardest time securing affordable housing, and there are not enough units to meet the demands of that cohort. If the increase in low-income households continues as it did between 2000 and 2009, the problem will only grow larger.

Across the United States there is a shortage of affordable housing for low-income groups. The Institute for Children, Poverty, and Homelessness (2012) found a shortage of about 50% of affordable units for families making less than $12,000 annually. The gap is widening between available units and households that need them, so the problem will only persist into the future (HUD 2013a). There are many disadvantages associated with not being able to afford proper housing, including poor nutrition, education, healthcare, and savings. Governments, community organizations, and developers need to address this issue in order to ensure that all residents have their needs met.

The low-income cohort in Pittsburgh is large since it comprises over half of the households in the MSA, but the income threshold for defining this group is fairly high at $48,271. Almost every community has a large proportion of affordable housing. However, almost half of households in the group are under a high housing-cost burden. Since there are

more affordable units available than needed for both the low and very low-income cohorts, there are families with higher incomes who are occupying those affordable units. There are also areas experiencing a deficit of affordable units, so the local housing market is not meeting the needs of the population by providing an adequate supply of affordable units. Those with the lowest incomes are most at risk. Extremely low-income households make up almost one-fifth of the population of the metro area and there are not enough affordable units for those households. Exacerbating that problem is the fact that there are families with higher incomes who are occupying units considered affordable for those extremely low-income households.

The Pittsburgh metro area exhibits concentrations of poverty, which makes it difficult for citizens to raise their income levels in these areas and residents there tend to be exposed to crime and poor living conditions (Bartlett 1998; Crowley 2003; HUD 2013a). Most low-income neighborhoods are located in the city, along the rivers, and in rural areas. The concentration along rivers is tied to Pittsburgh's industrial past and shows the effects of deindustrialization. These mill towns are left with little economic opportunity and large masses of poverty. In the city, the cluster of impoverished neighborhoods is a result of the suburbanization process that gutted the tax base as wealthier residents left. This concentration will most likely increase because poor tracts near gentrifying areas are experiencing an increase in low-income households, suggesting displacement from nearby neighborhoods. Exclusionary displacement is also occurring in gentrifying areas because these neighborhoods are experiencing the largest declines in affordable housing, so low-income groups will not be able to live in those areas in the future and access the benefits that gentrification could bring.

Proponents of gentrification suggest a rise in average home values would benefit low-income residents (Bryne 2003; Hartley 2013), but this increase in property values is not going to

help the lowest-income groups. The national trend is that more low-income renters are under a high housing-cost burden (ICPH 2012), a pattern also evident in Pittsburgh. Rental rates are highest in the city, where there are large proportions of extremely low-income households and very few affordable homes for this group. A widening income gap suggests continued stress on rental markets in the future as the low-income groups expand and place a larger demand on affordable units. Low-income households grew during the study period, even though unemployment rates declined, which supports the idea that the income gap is widening.

The metro area suffers from spatial mismatch of affordable units and low-income groups because there should be enough housing throughout the metro area for low-income households, but it is often not located in areas that need it the most. The private market is not working to meet the demands of the lower-income groups. The largest supply of housing should exist where demand is highest, but this is not the case for low-income cohorts. Few developers produce new housing units for low-income buyers because the return on investment is not as large as it would be for higher-income groups (Byrne and Diamond 2006). While the affordable units tend to be located in the city and rural areas, where the proportion of low-income households is high, there are not enough units in these areas. The small proportion of affordable homes in the suburbs cuts off access for low-income groups to these areas. The largest deficits exist within the city in lower-income and middle-income areas, in older suburbs surrounding the city, and along the rivers. These shortages exist within the city and older suburbs because of higher demands and in the wealthier suburbs because of lower supplies. Surpluses only exist for extremely low-income households in rural areas, far from sources of employment. Tracts where there is a surplus of affordable housing are located far from employment centers and the public transportation infrastructure needed to help residents get to jobs.

The process of filtering suggests that availability of units is going to be determined on a neighborhood-by-neighborhood basis (Galster 1996). According to this theory, large supplies of affordable housing should be found in low-income areas and little affordable housing would be available in high-income areas, unless the neighborhood is in transition through secession or gentrification. While some of the highest proportions of low-income affordable units are located in neighborhoods with large proportions of low-income households, there are still deficits of affordable housing. The filtering process is not sufficient at providing enough affordable units for low-income households. The filtering process posits that low-income households will move into neighborhoods of middle-income families as those wealthier families move into more attractive neighborhoods. This phenomenon is occurring in Pittsburgh because of an increased interest in living downtown, which is pushing lower-income households out into these older suburbs.

Most families rely on private-market housing to meet their shelter needs (Cohen 1998). Private-market housing is most susceptible to price changes, and thus shortages of affordable housing for low-income families. Public housing is not adequate for meeting the needs of low-income households, so there needs to be some type of mechanism in place to ensure that enough housing is available via the private market for low-income groups. However, the trend towards neoliberal, federal government policies suggests that demand on the private market is only going to increase (Hackworth 2007). Public housing programs need to focus on extremely low-income households because this group is most at risk to shortages in affordable housing, but other solutions must be pursued in order to place regulations on the private market. Policy suggestions will be explored further towards the end of this chapter.

This analysis offers a conservative estimate of the housing problem. The metric used for affordable housing does not take into consideration the quality of housing stock, so the number of affordable units is most likely lower due to some homes not being fit for habitation. Since there is a shortage of units for extremely low-income groups throughout the metro area and a local shortage for all three low-income cohorts, the fact that this is a conservative estimate suggests that the problem is larger and that there may actually be metro area-wide shortages for all income groups.

7.3 Gentrification, Exclusionary Displacement, and Loss of Access to the City

As the Rust Belt gradually recovers from the deindustrialization of the 20th century, gentrification is occurring in cities across the region (Kapp and Armstrong 2012). Since the urban function and form of these cities are different from that of other Western cities, it makes sense to question whether the gentrification process is occurring in the same way. In addition, there have been claims that the gentrification process is not as detrimental to low-income residents as was once thought (Freeman 2005; Hartley 2013). While it is difficult to trace the displacement of individual residents, it is possible to measure the availability of affordable housing to determine if low-income households will be pushed out of or unable to access gentrifying neighborhoods.

Gentrification is reducing the availability of affordable housing. All of the statistical models tested were significant and showed that a rise in median rent, median home values and a decline in low-income households caused a reduction in affordable housing. Gentrification is not the only process that is causing this drop in affordable housing. The low r^2 values suggest that

there may be something else occurring that can explain more of the variation in the change in affordable housing. The weak explanatory power of the model is most likely due to the soft housing markets in the area. Future studies should explore options for variables that will account for the variation in affordable housing that is not explained by the independent variables in this model.

Gentrification is taking place differently in the city than it is in the surrounding suburbs or rural areas. Population density is significantly correlated with change in affordable housing and as population density increases, the amount of affordable housing decreases. Even though the city has a higher population density when compared to the rest of the metro area, vacancy rates are also higher downtown. As more people move into the city to gentrify neighborhoods, high population densities will exacerbate changes in the housing market and cause an increase in the decline of affordable housing.

Gentrification in Pittsburgh includes both traditional gentrifiers and the new neoliberal gentrifiers enabled by partnerships between the state and private developers. Brownfield development is a great example of this state-sponsored gentrification. While this is a different type of gentrification because it does not directly cause displacement in the area in which the development is taking place, it is helping to make the downtown more attractive, which leads to gentrification and displacement in other neighborhoods. Traditional gentrification in neighborhoods downtown, like Lawrenceville, is also resulting in displacement because the availability of affordable housing in these areas is declining and nearby neighborhoods are experiencing an increase in low-income households. The reduction in affordable housing will cause exclusionary displacement because low-income households will no longer be able to afford to live in those neighborhoods.

The difference in the rental and housing markets plays a role in trying to detect gentrification using Census data. Extremely low-income neighborhoods have a higher proportion of renters and are less likely to have a large pool of owner-occupied units. Changes in rent almost always accounted for the most variation in the amount of affordable housing in the regression models, so areas in the city where there are high proportions of renters, and extremely low-income neighborhoods in particular, are going to be most susceptible to gentrifying forces. Home values are rising slowly due to an abundance of available units in the metro area and the lack of owner-occupied units in the most impoverished neighborhoods. By the time home values start to rise, most of the extremely low-income households may be pushed out by rising rents, so low-income households in the most impoverished neighborhoods will not be able to benefit from rising property values.

The race variable is not behaving as expected in that it had no significant relationship in any of the regression models, suggesting that the existing theories regarding race and gentrification are not playing out in Pittsburgh as they are in other places or that those theories fall short of explaining the role of race in gentrification. None of the models showed a relationship between change in percent white and change in affordable housing. The racial composition of the Pittsburgh area is similar to other Rust Belt cities, so more research needs to be done to see if the same pattern is occurring there. Race and gentrification may have a different story to tell in these northern, postindustrial cities.

The story is also unclear regarding changes in education because the variable did not behave as expected because there was often a positive correlation between education and change in affordable housing, or no significant relationship at all. Who is gentrifying is changing in that education and race are not behaving as expected. Is state-sponsored gentrification attracting

different types of people downtown? Are large-scale, societal changes causing the gentrification process to play out differently than it has in the past? In other words, is race becoming less of an identifier for gentrifiers because of the increased social mixing in the area? Is education behaving differently in the model because of a surplus of underemployed residents? These issues need to be examined more in future studies to determine what is happening in the Rust Belt.

The models suggest that the idea of class also needs to be re-examined in regards to the gentrification process. The variable used to detect working-class residents exhibited a pattern similar to that for median household incomes. This similarity between the two variables was to be expected since income is often used to discuss differences in class. However, the variable rarely exhibited a statistically significant correlation in the models, suggesting that either the variable does not properly pick up the presence of working-class residents or that the idea of who is thought to be working-class should be reconceptualized. The types of employment that have traditionally been equated with working-class people, like manufacturing, construction, services, and primary-sector activities, do not appear to play a role in the gentrification process depicted in the models. The bifurcation in the service industry of lower and higher-end service positions and underemployment due to higher unemployment rates and the recent economic recession may mean that using the economic sector categories provided by the Census Bureau may not be sufficient for identifying a working-class cohort.

Gentrification is a local process and does not occur across the metro area in the same way. The spatial regression and GWR models, as well as models using only tracts ripe for gentrification, show that there are differences in how the gentrification process plays out, but that the reduction in affordable housing is still occurring everywhere. Those neighborhoods with the

lowest incomes and the highest proportions of extremely low-income households are most sensitive to losses in affordable units due to gentrification.

7.4 How to Create the Equitable City

Policies need to be put in place that will address the shortcomings of the private market in providing adequate housing for low-income groups and to stop the displacement of those poorer households in gentrifying neighborhoods, which would be counter to the neoliberal environment currently in place. The shortage of affordable housing in various neighborhoods is not a small problem. Roughly 25% of the metro area is considered to be low-income and under a high housing-cost burden. The shortage of affordable units in neighborhoods with the largest proportions of low-income households, coupled with higher-income households occupying lower-income affordable units, is causing a housing squeeze for low-income residents.

The city needs to encourage an increase in the supply of units considered affordable for low-income groups in the neighborhoods that need those units the most. While there are shortages in rural areas, those neighborhoods are located farther from employment opportunities or public transportation to help residents get from their homes to work. The city needs to encourage development in low-income neighborhoods downtown, but in a way that will also ensure an adequate supply of affordable units. Since public-private partnerships have been popular with the Pittsburgh leadership over the past century, this model could be used to encourage development in low-income neighborhoods by having the city help to secure properties that could then be developed by private entities. In exchange for the assistance provided by the city, developers could agree to build a certain number of low-income units for

each low-income cohort. There could then be stipulations applied to the unit that ensure the price does not rise above a pre-determined level that would ensure the adequate supply of affordable housing. This is a model often used in third-sector housing and could be incorporated into the practices of the city and private developers.

While these public-private partnerships may help to provide affordable housing for new development projects, there is still an issue of higher-income groups occupying units that are affordable for lower-income households. How can the city deal with middle-income groups taking low-income affordable housing? The problem of adequate housing needs to be addressed at all levels to make sure that one income cohort that is experiencing a shortage is not causing a shortage for another cohort. Urban planners should be assessing shortages and surpluses by census tract for the metro area and making that information available to local housing authorities, municipal governments, and private developers. This information could then be used to develop a strategy for planned residential growth in areas throughout the city that would provide a balanced mix of affordable housing for all income levels.

While many neighborhoods appear to be protected from large reductions in affordable housing in the city because of high vacancy rates, that vacancy bubble will only last for so long. As more people start to move into the city in the future, vacancy rates will fall and the high population densities that already exist in Pittsburgh will only increase the shortage of affordable housing. The city needs to take steps to encourage the construction of units with mechanisms in place that will keep home values and rents affordable for low-income households. Rent control could be implemented in some areas to help ensure an adequate supply of affordable units since rental rates are highest in the city and the most impoverished households tend to be renters.

Another issue that the entire metro area will need to address is the shifting wave of devalorization taking place in some of the older suburbs. If the city and surrounding municipal governments work to develop a public transportation infrastructure in older suburbs, it will help to keep lower-income households from becoming isolated in these areas. While most transportation plans are trying to improve public transit in the high-density cities, the lower-income households will start to get pushed out to these areas and it will be most beneficial to start addressing the issue now.

More research needs to be conducted on gentrification in the Rust Belt and the spatial mismatch of affordable housing. The behavior of the variables for race and education were very surprising and it appears that the metro area may become more heterogeneous in the future. However, racial segregation and concentration of poverty still exist in Pittsburgh. The gentrification process needs to be examined in other Rust Belt cities to determine if education and race behave the same way there. An examination of how education, race, and income are linked in the Pittsburgh area would create a more nuanced picture of how race and class are structured, which would add to our understanding of these subjects within geography.

The spatial mismatch of affordable housing that occurs in Pittsburgh is very localized and tied to the deindustrialized history of the region. An examination of the spatial mismatch that occurs in other cities, both within and outside of the Rust Belt, could help to shed some light on why shortages of affordable housing are concentrated in certain areas, while other areas have a surplus. What is stopping low-income households from moving to areas with these surpluses? Looking at the issue in multiple cities will help to uncover some of the roadblocks that exist to evening out the spatial mismatch of affordable housing.

The development occurring in Pittsburgh appears on the surface to be a boon to the region's economy. More people are beginning to take interest in living downtown and neighborhoods throughout the area are experiencing gentrification. This restructuring of capital back towards the central city is not new and has been occurring in urban areas since the mid-20th century. However, the historical context of Pittsburgh as a city that has undergone deindustrialization and a shift towards postindustrialism has created urban patterns that are unique when compared to other cities in the Western world. The development that is now occurring in Pittsburgh will continue to reshape the urban structure of the area.

It is important to be aware of how changes in the urban economy, shifting interests among metro residents in regards to city living, and the shuffling of low-income neighborhoods will reshape the metro area in the next century. Gentrification is raising rents and home values in some neighborhoods, while also reducing the proportion of low-income residents there. The increase in the amount of low-income households in nearby tracts shows that the gentrification process is not a tide that is lifting all boats, but is causing affordable housing shortages for a large proportion of the metro, low-income households. As gentrification continues in the city, exclusionary displacement will continue as shortages of low-income affordable units will block residential access to some areas of the city, increasing the concentration of poverty in some already impoverished, urban neighborhoods and start to push low-income households into older suburbs farther from the urban core. If steps are not taken to provide an adequate supply of affordable units in gentrifying neighborhoods, then this process of neighborhood transformation will only reproduced urban poverty rather than help to improve it.

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