THE BEST DEAL IN TOWN? ASSOCIATIONS BETWEEN PUBLIC HOUSING AND LABOR MARKET INEQUALITY IN THE NEW ORLEANS-METAIRIE-KENNER MSA

by

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ABSTRACT

SARA GLEAVE. The best deal in town? Associations between public housing and labor market inequality in the New Orleans-Metairie-Kenner MSA. (Under the direction of DR. QINGFANG WANG)

Economic inequality for racial and ethnic minority groups, exacerbated by their spatial segregation, has been a central focus in urban geography. While there is accumulating research examining the socio-spatial process of urban labor market inequality, there are few systematic, geographic analyses incorporating public housing into examinations of this process. What is the role of public housing developments in racial and ethnic minorities' labor market experiences? How have public housing approaches changed over time, especially given the impacts of the storm? How have possible impacts of public housing developments on labor market outcomes changed before and after Hurricane Katrina?

In addressing these questions, the objective of this study is to determine how public housing developments interact with residential segregation and employment decentralization in forging racial and ethnic labor market inequality along three dimensions: opportunities for employment, occupational concentration in various levels of the labor market hierarchy, and job earnings. The analyses are conducted in the New Orleans-Metairie-Kenner Metropolitan Statistical Area (MSA) where disparities between African Americans and whites have been long rooted in its regional history. Since Hurricane Katrina in 2005, however, the social, economic, and demographic landscapes in this region have gone through tremendous changes. In particular, Hurricane Katrina forced the large-scale redevelopment of New Orleans' public housing to a mixed-income

model which has dramatically transformed many former, current, and very likely future residents' lives in many ways.

Data used in this study are extracted from three sources: confidential long form microdata from the 2000 decennial census and 2007-2011 American Community Survey (ACS) with special approval from the U.S. Census Bureau; public housing data from the U.S. Department of Housing and Urban Development's (HUD) A Picture of Subsidized Households 2000 and 2011; and a spatially enabled raster dataset measuring the extent and depth of flood water in New Orleans as of September 5, 2005. For each dimension of the labor market outcomes measured in this study (employment status, occupational concentration, and job earnings), multilevel modeling is employed to examine the interaction between public housing developments and labor market processes in relation to racial inequalities.

The results suggest that public housing and Section 8 voucher/Housing Choice Voucher units in the tract of residence are negative predictors for the likelihood of employment for African Americans and whites before Hurricane Katrina. Similarly for occupational concentration, before Katrina living near public housing was related to negative outcomes for both African Americans and whites in terms of occupational concentration. For job earnings, no significant relationships are found to exist between subsidized housing programs and job earnings before the storm.

After Hurricane Katrina, the presence of public housing and Housing Choice Voucher units are no longer found to be significant predictors for employment. African Americans living near public housing are more likely to have lower job earnings compared to whites and those living further from these developments. Whites living in

tracts with higher shares of Housing Choice Voucher units are more likely to have lower job earnings compared to African Americans, who are more likely to have higher earnings. In terms of employment likelihood, while public housing does not demonstrate a positive relationship with these outcomes after the storm, it is no longer associated with negative outcomes, which was the case before Katrina and the conversion to mixed-income developments began.

Examining the likelihood for occupational concentration, the percentage of Housing Choice Vouchers units are found to be associated with negative outcomes for both African Americans and whites, so that with more voucher units in the tract of residence whites are less likely to be concentrated. This is a negative outcome based on the predominantly professional occupations whites are typically concentrated within, and African Americans are more likely to be concentrated in predominantly low-wage, low-skill industries. The presence of other subsidized housing programs is also associated with a greater likelihood for concentration for African Americans. Coupled with changing neighborhood dynamics related to residential segregation and employment decentralization, namely local industrial structure, racial and ethnic composition, and accessibility, these public housing results indicate a significant shift in New Orleans' neighborhood dynamics in the wake of Hurricane Katrina.

Other characteristics at the neighborhood-level are significantly associated with differences in labor market outcomes between whites and African Americans as well. For instance, the amount of construction employment in a tract is associated with lower employment rates for African Americans and lower earnings for both African Americans and whites. Differential earnings levels based on the amount of construction employment

is significant before and after Katrina. Earnings of whites are also negatively related to the size of the African American workforce pre-Katrina, although this relationship is not significant post-Katrina. Higher educational attainment of a tract's population leads to higher earnings for African Americans and whites post-Katrina.

Racial and ethnic composition of neighborhoods also matters: pre-Katrina, higher shares of both African American and Hispanic populations lead to higher earnings for African Americans and whites, although these relationships are not present after the storm. The African American tract population also has a positive effect on African American occupational concentration (discouraging concentration), which is typically in the lower levels of the labor market hierarchy, both before and after Katrina. In terms of employment accessibility, pre-Katrina the share of a tract's population utilizing public transportation leads to lower job earnings for both African Americans and whites; there is no observed relationship between public transportation usage and the likelihood for employment or occupational concentration before or after the storm.

There are several potential explanations for the neighborhood change suggested in this study's models following Katrina. Return rates to the region following the storm, a changing racial and ethnic population composition (namely an increase in the Latino population), differential physical neighborhood recovery rates, and public housing redevelopment to mixed-income neighborhoods are all offered as potential explanations for the changing dynamic of New Orleans' neighborhoods after Hurricane Katrina.

This study will make significant theoretical and policy contributions. While few labor market studies have explicitly included public housing developments in their analyses, this study represents a unique contribution to understanding racial labor market

inequality from a spatial perspective, with a particular focus on the interrelationship between public housing and labor market outcomes. Further, this study examines labor market inequality between white and African American residents in their residential neighborhoods, contributing to our understanding of the importance of local context in perpetuating racial inequality in urban labor market processes. Through the analyses of confidential census microdata, this study attempts to disentangle the role of public housing in local and metropolitan labor market processes by examining both individual- and neighborhood-level characteristics, an approach not widely adopted in existing studies due to data constraints.

This study provides empirical analyses of labor market impacts from public housing and mixed-income developments. In particular, HUD has shifted its mixed-income redevelopment focus from HOPE VI to Choice Neighborhoods, which takes a community-encompassing approach to redevelopment. One facet of this expanded approach undoubtedly must focus on how mixed-income developments impact local labor markets. This study provides insights for scholars and policymakers alike to understand potential impacts of these neighborhoods on residents' economic upward mobility.

Disclaimer: Any opinions and conclusions expressed herein are those of the author(s) and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

DEDICATION

I dedicate these years of work to the living, breathing, all-encompassing being that is New Orleans. From the second I set foot on your streets, I knew I would never really leave. To the city, its culture, its tradition, its people: thank you for the constant inspiration to finish this thing.

"We finally cleaned up public housing in New Orleans. We couldn't do it, but God did."
–Rep. Richard H. Baker (R-Baton Rouge, La.), as published in the Wall Street Journal 9/4/05

"And if you come from under that water then there's fresh air
Just breathe, baby, God's got a blessing to spare
Yes I know the process is so much stress
But it's the progress that feels the best
Cause I came from the projects straight to success
And you're next, so try they can't steal your pride it's inside
Then find it and keep on grinding
Cause in every dark cloud there's a silver lining, I know."
-Lil Wayne, Tie My Hands

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CHAPTER ONE: INTRODUCTION

In the United States, the African American labor force has historically experienced much more difficulty in achieving socioeconomic upward mobility than their white counterparts. This historic inequality has been magnified during the economic recession that started in early 2008, as the entire country experienced dramatic increases in unemployment and underemployment, diminished income and savings, and plunging home values and subsequent skyrocketing foreclosures (Taylor et al. 2010). Nearly one-in-five (18%) African Americans report not having enough money to meet their basic expenses, compared to 11% of the total population (Taylor et al. 2010, 47).

Inequality between African Americans and the larger labor force, particularly whites, is a long-studied topic in the social sciences. The locations of residences and jobs are among the most important factors in perpetuating labor market inequality across racial/ethnic groups (Wyly 1999; Kaplan and Woodhouse 2004; Ellis et al. 2007; Hanson and Pratt 1991; Parks 2005). Since many racial and ethnic minority workers, especially African Americans, are highly segregated in inner cities in the United States, the urban geographies of the labor force and of jobs play particularly significant roles in labor market outcomes for these groups (Wilson 1987; Kain 1968; Krivo et al. 1998; Jargowsky 1996; Darden 1987). Concentrated poverty, crime, lower educational attainment, and weak social ties combine in these segregated areas to further negatively impact labor market performance (Krivo et al. 1998; Wagmiller, Jr. 2007). Residentially segregated areas act as a mechanism impacting labor market processes through limited

human and social capital formation and are often characterized by fewer employment opportunities, increased concentration in occupations in the lower levels of the labor market hierarchy, and lower job earnings compared to individuals, including racial and ethnic minorities, who do not live in residentially segregated neighborhoods (Krivo et al. 1998; Wilson 1987; Massey and Fong 1990; Massey et al. 1987; Peterson and Krivo 1999; Peters and Skop 2007).

The local context, including both residences and workplaces, has multiple impacts on the labor market outcomes of individuals in these areas. While residential and workplace locations can affect the formation of racial identity, human capital, and social capital for people who live and work there, they also provide the physical, social, and cultural environments in which labor market processes play out and are sometimes segregated within (Wilson 1987; Kain 1968; Kaplan and Woodhouse 2004). In addition, as the connecting force between residential and workplace locations, employment accessibility frequently mediates opportunities in labor markets (Kain 1968; Holzer 1991; Ihlanfeldt 1995), and accessibility is limited with increased employment decentralization. Employment accessibility can be manifested both socially and physically. Social separation occurs through signaling processes, in which residential locations act as signals to potential employers regarding an employee's desirability, quality, or qualifications, who may have chosen their business location to avoid particular segments of the workforce (Tilly et al. 2001; Fernandez and Su 2004; Hanson and Pratt 1995). Physical separation from employment opportunities occurs through employment decentralization from urban to suburban locations within MSAs, whereby low-income, mostly minority workers are physically separated from viable job opportunities, an effect

exacerbated by transportation modes and commute time and costs (Fernandez 1994, 390; Stoll 2005; Shen 2001; Mouw 2000; Stoll 1999).

Although there is a sophisticated literature on the spatial dimensions of labor market processes, including a consistent focus on residential and workplace locations, we still know little about how public housing developments, where racial and ethnic minority residents are highly concentrated, factor into these processes. Central to the current examination is the presence of public housing developments and how they too play an important role in influencing labor market outcomes. In the United States, modern public housing programs are designed to promote mixed-income developments to reduce residential segregation, deconcentrate poverty, and improve residents' human and social capital levels (Salama 1999; Brophy and Smith 1997; Epp 1996; Joseph 2006). Over time, public housing developments have been shaping the geographies of residence and employment that are divided along race, ethnicity, and class lines; at the same time, they also contribute to the social and spatial accessibility of employment for their residents (Mahoney 1990; Curley 2005; Joseph 2006). Therefore, public housing developments are not merely the product of local socioeconomic conditions, but also interact with the processes of residential segregation and employment restructuring in forging labor market inequality across racial groups.

Research on the role of public housing in labor market processes is surprisingly absent. To advance our understanding of public housing's role in labor market inequality, the objective of this study is to address: What, if any, role do public housing developments play in labor market outcomes, especially for the racial and ethnic minority labor force? The association between public housing and labor market outcomes is

particularly examined for African Americans in comparison to whites in the New Orleans-Metairie-Kenner Metropolitan Statistical Area (MSA). Using confidential microdata from the U.S. Census Bureau, this study measures labor market outcomes along three dimensions: employment status, occupational segregation, and job earnings.

Employment status is a straightforward marker of labor market outcomes, and in some cases inequality. The models related to employment status measure whether an individual is employed or not, so that as the independent variables change direction and magnitude, so changes the likelihood for an individual to be employed. The second labor market outcome examined, occupational segregation, measures specific occupations African Americans and whites are concentrated within in comparison to the larger labor force and relative to the size of their racial group representation in that occupation. The types of occupations, high- or low-skill, have a great impact positively or negatively on the overall socioeconomic standing and likelihood for advancement of individuals concentrated within them, and different individual and neighborhood characteristics, including the location of public housing, can influence the likelihood for concentration measured in the models. The third outcome is job earnings, which is a direct indicator of economic health and of labor market inequality. Job earnings can be impacted by a variety of factors, including individual and neighborhood characteristics, and the earnings models measure increases or decreases in job earnings in relation to these characteristics. Specifically, the following three sets of questions are answered:

1. How do individual- and neighborhood-level characteristics influence individual opportunities for employment (i.e. employed or not) in relation to the presence of public housing developments? Are employment opportunities for African Americans more likely

to be negatively impacted by the presence of public housing developments than for whites? These questions involve identifying the factors that influence employment status (i.e., employed or not) for African Americans in comparison to whites in the MSA and in relation to their residential location's proximity to public housing developments.

2. Are we more likely to observe occupational concentration or segregation in lower levels of the labor market hierarchy for employed individuals living in or near neighborhoods with large-scale public housing developments? How does this relationship differ between African Americans and whites? These questions attempt to determine whether public housing developments are located in areas where individuals, and particularly African Americans, experience higher than average occupational segregation, which may indicate the presence of disproportionate employment accessibility or employer discrimination. To answer these questions, levels of occupational concentration for African Americans in comparison to whites in the MSA must be determined before measuring the dependence of these concentration effects on the presence of public housing.

3. Does the employed labor force living in or near neighborhoods containing public housing developments tend to fare worse in job earnings, controlling for individual and neighborhood characteristics? How do job earnings differ between African Americans and whites in relation to the presence of public housing? These questions are aimed at determining differential job earnings levels for individuals in the labor force living in or proximate to census tracts containing public housing developments.

The selected geographic area, New Orleans, Louisiana, has unique geographic, socioeconomic, and public housing attributes and lends itself to a study of the interplay

between labor market inequality and public housing. With a majority African American population in the region's urban core, New Orleans has historically experienced high levels of residential and economic segregation between African Americans and whites. This segregation is magnified by the location of the region's public housing developments, which are largely confined to the city of New Orleans, and increasingly suburbanizing employment opportunities. In 2005, Hurricane Katrina forced the large-scale overhaul of much of the city's public housing stock from traditional to mixed-income developments, which are intended to reduce residential segregation and encourage upward economic mobility for residents. These local characteristics provide a useful perspective to examine how the new development of mixed-income public housing, along with other individual- and neighborhood-level socioeconomic characteristics, influence labor market inequality for the racial and ethnic minority labor force.

While not focusing on the impacts from the hurricane, this study hypothesizes that Katrina could have complicated these relationships. Therefore, for each set of the above questions, the association between public housing and labor market outcomes along the three dimensions are examined before and after Katrina. This study also attempts to determine whether some racial groups, particularly African Americans, have been negatively impacted after the storm more than others. Additionally, the storm forced the large-scale overhaul of much of the city's public housing stock from traditional to mixed-income developments, allowing for some insights to be gained about the individual- and neighborhood-level impacts of these conversions, especially with regard to labor market inequality for African Americans.

This research represents a unique contribution to studies of both labor markets and public housing, with a particular focus on racial inequality in urban settings. Few, if any, labor market analyses have included a consideration for public housing, and a better understanding of its role in labor market processes will advance our understanding of the interplay between people and place. Further, by measuring disparities in outcomes between African Americans and whites at the intraurban scale, this study improves our understanding of the importance of local context in perpetuating urban labor market inequality. This study disentangles these relationships by incorporating both individual- and neighborhood-level characteristics in a single model, which is a tactic not widely adopted due to data constraints. Additionally, the New Orleans region is rarely the focus of labor market and public housing research. While having experienced the exogenous shock of Hurricane Katrina, New Orleans provides a valuable context for understanding the impact of public housing programs on individuals and neighborhoods. Particularly, the region's substantial African American population contributes to an appealing context in which to examine how labor market inequality is produced, sustained, or mediated due, in part, to the presence of public housing in local labor markets.

Given the current fiscal environment in which social welfare programs operate, increasing pressure is being placed on these types of programs to quantify their effectiveness. This research provides empirical analyses of labor market impacts related to the location of public housing before Katrina, and mostly mixed-income developments after, contributing to the case for or against the success of these programs in a context requiring a massive overhaul of a city's public housing stock. This study also provides insights for scholars and policymakers alike for crafting better-informed programs to

support the economic upward mobility of residents, particularly programs with a local, neighborhood-level focus and scope. Finally, this study provides timely data to local practitioners in New Orleans regarding the current state of the local labor market, personal economic recovery, and the continued redevelopment of public housing into mixed-income neighborhoods, a unique concept in a historically segregated city.

This dissertation is organized as follows. Chapter 2 is a literature review focusing on labor market inequality and public housing, in particular the effects from residential segregation and employment decentralization on these issues. Chapter 3 describes the New Orleans region, discussing its historic residential segregation, ongoing employment decentralization, and brief history of public housing. The focus of Chapter 3 is on describing New Orleans up to Hurricane Katrina and the immediate recovery efforts, while a later chapter focuses on present-day New Orleans in relation to the major takeaways from the model results. Chapter 4 describes the data, variables, and models utilized in the analysis chapters, and focuses on the confidential microdata utilized in addition to the hierarchical generalized and linear models employed. Chapter 5 depicts New Orleans in relation to the study's dependent variables (employment status, job earnings, and occupational concentration), individual-level independent variables, and neighborhood-level independent variables, including public housing.

Chapter 6 summarizes the employment likelihood model results and provides brief descriptions and discussion. Chapter 7 summarizes the job earnings model, providing the results and offering some discussion of the results. Chapter 8 focuses on the occupational concentration model, which discusses model results based on the types of occupations African Americans and whites tend to be concentrated within. Chapter 9

focuses on New Orleans today and relates the major model findings to current conditions in the city and region, namely return rates of displaced residents after the storm, a changing population demographic composition, differential neighborhood recovery, and public housing's continued transformation to mixed-income developments. Finally, Chapter 10 provides conclusions, limitations, and possible future work related to the interplay between labor markets and public housing at the local level, as well as future work identifying effects of mixed-income redevelopment in local contexts.

CHAPTER 2: LITERATURE REVIEW: LABOR MARKET INEQUALITY AND PUBLIC HOUSING

The focal discussion of this chapter is how public housing developments impact labor market processes at multiple scales. However, this interrelationship has to be considered within the context of socioeconomic characteristics at the local neighborhood-level. Therefore, first, residential segregation and employment decentralization are presented as shaping labor market processes at the individual, household, and macro-socioeconomic levels, contributing to labor market inequality between African Americans and whites. Employment accessibility is particularly highlighted at both the geographic and social levels and acts to mediate or compound the effects of place on labor market inequality. Then, with an understanding of local contexts, the mechanisms through which public housing impacts labor market processes are discussed, contributing to understanding the overall research questions of this study.

Residential Segregation and Employment Outcomes

Spatial components of labor markets have been extensively examined in a variety of contexts, including the locations of residences, workplaces, social networks, job information networks, and racial and ethnic concentrations of residents and employees. Both economic and racial residential segregation play important roles in shaping the social and economic environments impacting local labor market outcomes and employment accessibility (Darden and Kamel 2000; Hanson and Pratt 1988; Jargowsky

1996; Ellis et al. 2007; Parks 2005; Iceland and Wilkes 2006; Iceland, Sharp and Timberlake 2012).

Concentrated poverty emerges as an important spatial component in residential segregation, with generally negative impacts on overall socioeconomic indicators and labor market outcomes for residents of these typically inner-city areas, especially African Americans (Wilson 1987; Charles 2003; Jargowsky 1996). Residentially segregated areas with concentrated poverty have been empirically linked to social issues such as crime, high school drop-out rates, male joblessness, teen childbearing, and weak social networks and community organization, all of which combine to further negatively impact labor market performance (Krivo et al. 1998; Wagmiller, Jr. 2007).

Segregated areas are also characterized by economic inequality, such as high unemployment and low status and low paying jobs. African Americans are typically disproportionately impacted by poverty and related social and economic issues compared to the larger metropolitan area's population, and this disadvantage is manifested both socially and economically in racially segregated residential locations through lower levels of labor market performance for these individuals (Iceland and Wilkes 2006; Holloway and Mulherin 2004). Low-income African American neighborhoods have been observed to contain fewer job opportunities than white neighborhoods of similar geographic locations, allowing residential segregation to manifest itself directly in disproportionate employment opportunities for African Americans (Kaplan 1999). Segregated neighborhoods also provide a mechanism through which personal characteristics of residents, social networks, and ethnic or racial resources interact within the local context

and thereby directly impact labor market outcomes, which in many contexts translates to concentration in the lower levels of the labor market hierarchy (Wang 2006, 86).

Residential segregation of inner-city African Americans acts as a mechanism impacting their labor market processes through limited human and social capital formation, along with less employment accessibility in suburban areas. Residential segregation typically concentrates low-income individuals, particularly minorities, in urban areas with less access to human capital promoting amenities, including higher quality schools, leading to decreased labor market performance (Krivo et al. 1998; Wilson 1987; Massey and Fong 1990; Peters and Skop 2007). These areas are also characterized by fewer employment opportunities, unfavorable peer interaction, weak social networks and community organization, and higher rates of crime, high school drop-out rates, and teen childbearing; these forces act to inhibit human and social capital development in individuals living in residentially segregated neighborhoods (Krivo et al. 1998; Massey et al. 1987; Peterson and Krivo 1999).

Educational attainment has received particular attention in studies of residential segregation, with lower levels of education in childhood found to be associated with areas demonstrating high levels of residential segregation, which in turn impacts labor market outcomes for African American residents of these typically urban areas (Howell-Moroney 2005). Neighborhood social and job information networks are widely accepted to have positive impacts on individual labor market performance in urban areas; however, residentially segregated individuals have less access to these networks than residents of more socioeconomically mixed neighborhoods (Ioannides and Loury 2004; Bayer et al. 2008). Areas with limited human capital and employment opportunities do not typically

foster the formation of social and job information networks, preventing residentially segregated African Americans from leveraging these resources to improve their own employment outcomes, whether through employment, occupational status, or earnings (Ioannides and Loury 2004; Holzer 1991; Bayer et al. 2008). Social capital within co-ethnically concentrated neighborhoods is believed to play a role in providing a social network in these neighborhoods in which members of the same ethnic group interact closely and share information about employment opportunities that leads to ethnic concentrations in particular occupations (Wang 2006).

Socioeconomic characteristics have been found to influence residential segregation levels between racial and ethnic groups and economic classes, which can lead to differential employment outcomes in metropolitan areas. Massey et al.'s (1987) study of Philadelphia neighborhoods in 1980 establishes a relationship between residential segregation and socioeconomic well-being of African Americans in comparison with their white counterparts. While African Americans attempt to improve their neighborhood status with rising socioeconomic status, barriers to residential mobility exist to segregate these households in neighborhoods with fewer amenities, poorer quality public schools, and higher rates of crime, poverty, dependency, and mortality (1987, 29; Peterson and Krivo 1999). Income gains alone do not improve neighborhood characteristics for African Americans, and Massey et al. find that education is an important mediating factor in combating institutional barriers to residential mobility.

The ability of minority groups to translate human capital, such as income and education, into favorable neighborhood-level outcomes, such as lower poverty and higher employment rates, is similarly examined by Massey and Fong (1990) in the context of

San Francisco. The study's results indicate African Americans are more disadvantaged than other racial and ethnic groups in translating human capital into residential benefits, primarily through the social and economic limitations of residential segregation, and education is found to be the major explanatory variable in explaining spatial differentiation and class stratification (1990, 15). Studying exposure to whites and income levels of African American households in Oakland, Hansen (1996) finds higher-income African American households have better residential mobility and accessibility and more exposure to whites than do lower-income households.

Residentially segregated areas can also negatively impact labor market outcomes through limited employment accessibility, which is manifested as both social separation through signaling processes and physical separation from employment. Space acts as a signal in suburban employment opportunities through discriminatory hiring practices and firm location decisions in areas geographically removed from inner-city, residentially segregated neighborhoods (Tilly et al. 2001). Space also acts as a measure for the quality or desirability of a prospective employee, with some residential locations viewed more favorably than others, impacting employment accessibility through preferential hiring decisions (Fernandez and Su 2004; Hanson and Pratt 1995). Signaling processes produce social separation from employment opportunities which may relegate individuals to occupations concentrated by gender, race or ethnicity, reinforcing the separation between residential and employment locations (Hanson and Pratt 1991; Tilly et al. 2001). These signaling processes can also lead to disproportionate pay rates for racial and ethnic minority groups, if not employment rates altogether.

In addition, unfavorable employment accessibility can be manifested as physical separation, which creates a "mismatch" between residentially segregated inner-city African Americans and employment opportunities in suburban areas, leading to negative labor market outcomes for these individuals (Kain 1968; Holzer 1991; Ihlanfeldt 1995; Ihlanfeldt and Sjoquist 1998; Preston and McLafferty 1999). Barriers to employment for inner-city residents interact along both social and economic dimensions, allowing for individual and household characteristics such as race, ethnicity, gender and household composition to promote the mismatch between residentially segregated neighborhoods and viable employment opportunities (Preston and McLafferty 1999; Bayer et al. 2004). This "mismatch" may lead to negative labor market outcomes, such as unemployment, lower wages, and longer commutes to suburban employment for inner-city African Americans (Kain 1968; Ihlanfeldt and Sjoquist 1998; Holzer 1991). This mismatch may also lead racial and ethnic minorities to have limited spatial mobility and be concentrated within specific occupations and industries located near their residential locations, which are often low-skill, low-paying opportunities. Physical separation is often manifested as social separation between groups of different socioeconomic status and human and social capital levels, further inhibiting favorable labor market outcomes and encouraging concentration in occupations at the bottom levels of the labor market hierarchy (Wang 2008).

Employment Suburbanization and Accessibility in Urban Areas

The relationship between residential location and employment has flowed from historical housing discrimination and segregation to a lack of access to employment (Mahoney 1990; Kain 1968). This lack of employment accessibility is due, in part, to

employment suburbanization[1] caused by the economic restructuring of metropolitan areas and markets which has contributed to fewer employment opportunities and lower wages in inner-city areas, especially for African Americans (Wilson 1987; Yang and Jargowsky 2006; Reingold 2001; Kaplan 1999). Low-density, geographically dispersed patterns of employment growth act to magnify the geographic separation of inner-city African American residents from employment opportunities (Stoll 2005). In effect, jobs for low-skill workers suburbanize but the individuals qualified for those jobs do not necessarily do the same, perpetuating the effects of concentrated poverty for inner-city African Americans (Wilson 1987; Curley 2005). These individuals also incur higher time and commuting costs and possess less information about suburban jobs due to lower levels of social capital and job information networks (Mahoney 1990).

Areas demonstrating large-scale employment suburbanization tend to exhibit a greater spatial divide between employment opportunities and African American residents in relative geographic locations, causing African Americans to be more geographically isolated regardless of a metropolitan area's size or share of African Americans in the total population (Stoll 2005). Additionally, metropolitan areas characterized by higher levels of employment sprawl may also contain severe residential segregation between African American and white residents, indicating increased residential sorting as metropolitan areas expand and suburbanize (Stoll 2005).

[1]Employment suburbanization is also referred to as job sprawl and employment decentralization throughout, as the terms are synonymous with one another for this study's purposes.

Employment suburbanization is another spatial mechanism impacting labor market processes, and accessibility emerges as an important contributing factor in the relationship between residential and workplace locations. Residential segregation coupled with employment decentralization leads to negative social and physical employment accessibility for inner-city residents. Many of these residents rely on social capital and job information networks to assist them in finding employment, and these networks may not be accessible in suburban or otherwise spatially removed locations (Mahoney 1990; Preston and McLafferty 1999). Further, due to inner-city residential segregation, suburbanizing employment opportunities lead to longer commuting times for inner-city African American residents, and these individuals may be greatly dependent on the availability and utilization of different transportation options.

Differential employment outcomes attributed to the spatial disconnect between residential and employment locations are often thought of not as a measure of distance but rather as a measure of commuting time (Shen 2001). Longer commutes for inner-city residents to suburban employment increase the overall cost of job searches and eventual employment for these individuals, effectively lowering actual earned wages leading to higher joblessness (Fernandez 1994, 390; Mouw 2000; Stoll 1999). Employment accessibility, be it a social or spatial process, leads to lower employment rates, lower earnings, and a greater likelihood for negative occupational concentration for racial and ethnic minority groups, particularly African Americans in traditionally residentially segregated neighborhoods.

In examining differential spatial access to employment, transportation emerges as a proxy for job accessibility for residents, which is considered to be a major mechanism

in the separation of residential and workplace locations. The distance between residences and workplaces can have a large impact on overall labor market functionality, especially when decreased transportation access prevents complete worker mobility. Stoll's (2005) examination of employment decentralization's impact on the spatial mismatch between African Americans and employment opportunities found metropolitan areas with higher employment decentralization exhibit greater separation between jobs and African American residents in relative geographic locations, and this separation is more significant than for whites (Stoll 2005, 1). Stoll also finds African Americans are more geographically isolated from employment opportunities in highly suburbanized areas, and metropolitan areas characterized by higher levels of employment suburbanization exhibit more severe residential segregation between African Americans and whites (2005, 1). This indicates increased residential sorting and inequality in labor market outcomes and accessibility occurs as metropolitan areas expand and suburbanize their region.

Transportation characteristics also have important implications in analyzing employment accessibility, especially when considering differential job search modes and commuting times associated with various forms of transportation to work. Many studies testing the spatial relationship among employment, residential locations, and transportation focus on access to an automobile as a means of looking for or getting to work. In an analysis of job relocation and racial differences in unemployment in Chicago and Detroit, Mouw (2000) finds while car ownership affects unemployment rates, the spatial component of job accessibility remains an important aspect of the results, even if the exact causal mechanisms cannot be identified. Mouw's results suggest commuting costs and time do matter in determining labor market outcomes in metropolitan regions,

indicating transportation modes do play a mediating role in the separation between employment and residential locations.

Public Housing and Labor Market Outcomes

A large body of research has demonstrated public housing residents are more likely to experience less self-sufficiency, lower levels of labor market participation, and less favorable labor market outcomes, which are mediated by lower levels of human and social capital found in these typically residentially segregated developments (Krivo et al. 1998; Massey et al. 1987; Reingold et al. 2001). Both as a product of and major force in producing local geographies of residence and employment, public housing developments are expected to impact individual labor market outcomes negatively for the majority of the racial and ethnic minority groups who typically reside in these neighborhoods for a variety of reasons, summarized below.

Mixed-income public housing developments are the result of the U.S. Department of Housing and Urban Development's (HUD) Housing Opportunities for People Everywhere (HOPE VI) program. This program promotes developments containing fully subsidized, partially subsidized, and market-rate units in the same residential complex, often with a mixed-use component of retail, office space, and grocery or restaurant options. The goal of these mixed-income developments is to reduce residential segregation, deconcentrate poverty, and improve residents' human and social capital levels to improve the overall neighborhood context and, as a result, labor market outcomes for residents (Salama 1999; Brophy and Smith 1997; Epp 1996; Clampet-Lundquist 2004; Ludwig, et al. 2000; Ellen and Turner 1997; Joseph 2006; Goetz 2011a, 2011b).

Traditional public housing developments are typically characterized by extreme residential segregation of primarily low-income, African American residents; this decades long process has led to social isolation from higher-income individuals of different racial and ethnic groups (Joseph 2006; Curley 2005), which is believed to have an impact on the likelihood for positive labor market outcomes for these residents. In one study, Reingold (1997) finds public housing itself, independent of resident characteristics, has no impact positively or negatively on employment likelihood for its residents, emphasizing the importance of individual-level characteristics and social networks present in these developments. While social networks are formed by the residents of public housing neighborhoods, these networks may actively benefit residents through social support rather than social leverage, which is necessary to gain access to job information networks and human capital promoting activities (Curley 2005, 104).

Mixed-income developments reduce residential segregation of low-income minorities and attempt to improve or mediate long-standing negative neighborhood impacts on labor market outcomes, and a central premise of this strategy is to promote interactions with individuals of higher human capital levels (Reingold et al. 2001; Anil et al. 2010; Levy et al. 2010; Ziersch and Arthurson 2005; Pinkster 2009). These interactions are believed to improve labor market outcomes, such as employment likelihood and job earnings, through the formation of job information networks, thereby improving the socioeconomic conditions in previously residentially segregated neighborhoods (Saegert and Winkel 1998; Curley 2009; Tach 2009). While mixed-income developments are intended to promote positive gains in human capital, social capital, and more racially inclusive neighborhoods, all of which have the potential to

improve labor market outcomes for residents, little evidence has been presented that supports either concrete or perceived positive impacts in mixed-income communities for African American residents (Curley 2005; Reingold et al. 2001; Clampet-Lundquist 2004).

Anil, Sjoquist, and Wallace (2010) find, in one of the few examples of research related to labor market outcomes and the redevelopment of public housing, those who move to a new housing unit via HOPE VI or a housing voucher similar to the Section 8 program have a greater likelihood of being employed compared to those who chose to move to another traditional public housing development. While only providing evidence of impacts in one local labor market, Anil, Sjoquist and Wallace provide one of few empirical studies producing a significant, positive relationship between mixed-income housing and labor market outcomes.

Residentially segregated African Americans rely on formal and informal social and job information networks to support and improve their labor market performance, and residents of public housing utilize and interact with these networks in a number of ways. Informal social networks of African Americans in public housing are important to their labor market participation as they tend to provide services, such as child care, that support employment activity (Allen and Goetz 2010; Curley 2009; Reingold 1999; Tigges et al. 1998). However, job information networks for public housing residents are typically lacking which prevents access to suburban employment as a result of their neighborhood's social structure, leading to less favorable labor market outcomes (Curley 2005; Clampet-Lundquist 2004; Tigges et al. 1998).

Residents of public housing also suffer from social isolation as a result of their residential location, manifested in discriminatory hiring and firm location practices, whereby residence in inner-city public housing acts as a signal to employers preventing access to suburban employment opportunities (Van Ryzin et al. 2003; Reingold 1997; Thomas and Ong 2006; Tilly et al. 2001). This discrimination contributes to greater joblessness and lower wages for inner-city public housing residents, and may encourage employment in low-wage, racially concentrated occupations that have remained accessible to these residents. While strategies such as mixed-income redevelopment of traditional public housing reduce residential segregation for residents, it is unclear whether these developments are a viable tactic to promote favorable labor market outcomes in neighborhoods long characterized by inequality, discrimination, and economic distress (Van Ryzin et al. 2003; Clampet-Lundquist 2004; Tach 2009; Turney et al. 2006; Curley 2005; Galster and Zobel 1998; Varaday et al. 2005).

As residential segregation leads to negative socioeconomic and labor market outcomes for African Americans, residents of public housing are further negatively affected by the geographic location of these developments, especially relative to employment opportunities (Wilson 1987; Ihlanfeldt and Sjoquist 1998; Curley 2005). These developments, whether traditional or mixed-income, are typically located in inner-city locations and are distanced from suburban employment opportunities, creating physical and social accessibility barriers to improving socioeconomic conditions and labor market outcomes for African Americans (Mahoney 1990; Covington 2009). Physical barriers of public housing include poor public transportation facilities to reach suburban employment opportunities and inner-city neighborhoods characterized by

disinvestment that are absent retail and commercial economic presence that could act to promote labor market performance and beneficial outcomes (Van Ryzin et al. 2003).

Social isolation is manifested in discriminatory hiring and firm location practices, whereby residential location in inner-city public housing acts as a signal to potential employers and prevents access to suburban employment opportunities (Van Ryzin et al. 2003; Reingold 1997; Thomas and Ong 2006; Tilly et al. 2001). Both race and space play important roles in this process, and residential proximity to firms alone does not completely act to overcome barriers associated with employment discrimination in hiring and location practices (Taylor and Ong 2006, 524). Physical separation also contributes to indirect effects on residents from public housing's neighborhood conditions, such as concentrated poverty, which act to further distance residents from social services, education, and employment opportunities that could positively impact their labor market outcomes (Reingold et al. 2001, 489). The social and geographic isolation encountered by residents of public housing are believed to contribute to negative labor market outcomes for individuals living in or near these neighborhoods, particularly African Americans in comparison with whites, measured hereafter in terms of employment status, occupational concentration, and job earnings.

Overall Framework and Hypotheses

In sum, the multidisciplinary literature has suggested some association does exist between labor market outcomes and public housing, but seldom explicitly identifies these associations or determines how, if at all, these associations are altered after the conversion of public housing to mixed-income developments. While mixed-income public housing developments are proven to reduce residential segregation compared to

traditional public housing, the evidence is inconclusive as to whether they are a viable tactic to improve the labor market outcomes, social ties, and employment accessibility of inner-city African Americans (Van Ryzin et al. 2003; Clampet-Lundquist 2004; Tach 2009; Turney et al. 2006; Curley 2005; Galster and Zobel 1998; Varaday et al. 2005).

Putting these theoretical components together, the overall relationship between public housing and labor market outcomes can be expressed as follows. Public housing developments are shaping and being shaped by the local neighborhood context where labor market processes operate, in addition to impacting social identity and the formation of human and social capital at the individual-level. Intertwined in these processes is racial inequality, which has impacts at the individual- and neighborhood-levels, including public housing, before all of these components collectively influence labor market outcomes.

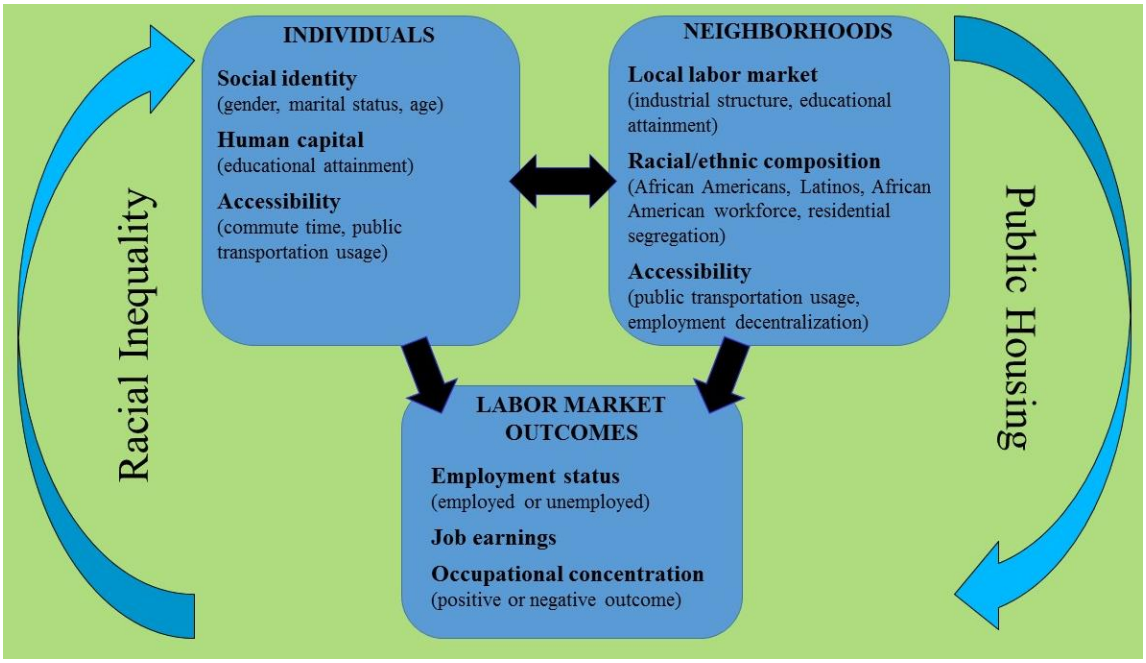


Figure 1: Overall research framework

Intertwined with the relationships with these local geographies, public housing developments are expected to interact with the processes of residential segregation and employment decentralization. Additionally, racial inequality has impacts on individuals and neighborhoods, and by association labor market outcomes for various racial and ethnic minority groups. The combination of individual, neighborhood, and broader contextual characteristics are believed to interact with public housing in forging labor market inequality across racial groups, particularly African Americans in comparison with whites.

Specifically, it is hypothesized that:

(1) residence in a neighborhood containing or near public housing developments is negatively associated with an individual's employment opportunities, and this negative relationship is stronger for African Americans than for whites;

(2) individuals living in or near a neighborhood containing a public housing development are likely to experience negative job earnings effects based on their residential location, and these effects are stronger for African Americans than for whites; and

(3) public housing residents or residents living near these neighborhoods are more likely to be segregated in lower levels of the labor market hierarchy, and this relationship is stronger for African Americans than for whites.

For each hypothesis, I am interested in both the individual and neighborhood characteristics that influence the particular labor market outcome, with the presence of public housing being the neighborhood characteristic of greatest interest. Each of these relationships is measured for African Americans and for whites separately to gain a clearer picture of each group's experience with that outcome and related independent

variables. Then the groups are combined into a single model and differences are measured in relationships between groups, so that we can determine whether the presence of public housing has a greater impact positively or negatively on African Americans in comparison to whites. Overall, I hypothesize that African Americans generally have less favorable labor market outcomes when compared with whites, and public housing's presence in neighborhoods near residential locations of African Americans further compounds their disadvantaged labor market outcomes.

CHAPTER 3: CASE STUDY AREA: NEW ORLEANS-METAIRIE-KENNER MSA

The New Orleans-Metairie-Kenner MSA is made up of seven parishes (Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. John the Baptist, and St. Tammany) and occupies approximately 3,755 square miles. The MSA is situated south of Lake Pontchartrain, on the east and west banks of the Mississippi River, and bordered to the south by the Gulf Coast, making the region a natural hub for manufacturing, shipping, and warehousing. The geographic location of New Orleans has proven historically to be a danger to its low-lying neighborhoods situated along the levee system, and the Mississippi River Delta has caused over 300 years of flooding in and around present-day New Orleans. Most notably, the region was impacted by Hurricane Katrina on August 29, 2005, affecting approximately 90,000 square miles of the Mississippi Gulf Coast, flooding nearly 80% of the city of New Orleans, and destroying over 182,000 homes and public infrastructure across the MSA (Liu and Plyer 2010, 1; Dynes and Rodriquez 2007).

Hurricane Katrina, by many accounts, was both a natural and social disaster, having impacts on social, environmental, and demographic characteristics in the city of New Orleans and the larger region (Stringfield 2010). "The combination of profound poverty coupled with geographic and spatial polarity of races and classes resulting from 'decades of politics and policies that directly or indirectly confined poor households, especially poor black ones, to economically isolated inner-city locales' (Brinkley 2006)

caused a disproportionate amount of damage upon disadvantaged population groups" (Stringfield 2010, 45).

According to the 2009 American Community Survey, Louisiana ranks third in overall percentage of total population that is African American alone (32%), and eighth in the nation in its percentage of residents living below the poverty line (17.3%) (U.S. Census Bureau 2009). While these state-level characteristics inform the larger context within which the New Orleans region's socioeconomic composition exists, pre- and post-Katrina statistics for the area also tell a compelling story about race distribution and economic conditions. Table 1 summarizes these statistics, with several important findings to note. From pre- to post-Katrina, a population decline occurred in both the New Orleans-Metairie-Kenner MSA and city of New Orleans: -14.6% and -40.9% respectively (U.S. Census Bureau 2000; U.S. Census Bureau 2010). Similarly the African American population as a percentage of the population also declined: the MSA experienced a decline from 37.6% to 34%, and New Orleans declined from 67.3% to 60.2% (U.S. Census Bureau 2000; U.S. Census Bureau 2010).

While total population and proportion of African American residents declined in the MSA and city of New Orleans, the total percentage of individuals living below the poverty line and the proportion of African Americans living below the poverty line also declined at both scales. In fact, the percentage of total residents living below the poverty line in New Orleans post-Katrina (23.4%) is the lowest this figure has been since at least 1979 (Liu and Plyer 2010, 5; U.S. Census Bureau 2009). While these poverty statistics may seem promising for the overall economic outlook of the New Orleans region, it is arguable these declines occurred as a result of the disproportionate impacts of Katrina on

the lowest income individuals, who had a higher tendency of being relocated out of the region in the storm's aftermath, thereby potentially causing the decrease in observed poverty impacted individuals. New Orleans' statistics depict an urban area with highly concentrated low-income African American residents in the central city, an indication of residential segregation and potentially negative labor market accessibility and performance.

Table 1: Pre- and post-Katrina statistics for New Orleans-Metairie-Kenner MSA

	New-Orleans-Metairie-Kenner MSA-*Pre-Katrina*	**New-Orleans-Metairie-Kenner MSA-*Post-Katrina***	**New Orleans-*Pre-Katrina***	**New Orleans-*Post-Katrina***
Total population	1,337,726	1,167,764 (14.6% decline)	484,674	343,829 (40.9% decline)
African American alone (% of pop.)	37.6%	34%	67.3%	60.2%
Individuals below poverty line (% of pop.)	18.4%	15.9%	27.9%	23.4%
African Americans living below poverty line (% of pop. living below poverty line)	66.7%	58.6%	84.2%	78.9%

Source: U.S. Census Bureau 2000, 2010

The statistics in Table 1 also tell a story of an area that experienced a significant population decline from 2000 to 2010, both at the city and MSA levels. This is also an area that has experienced a loss in African American residents as a percentage of total population and has demonstrated a de-concentration of African Americans in its central city. Additionally, this is a region that, regardless of the cause, has experienced a decrease in its overall poverty rate from 2000-2009, indicating some differences in labor market performance and outcomes could be expected to be observed over this time frame. These racial and economic characteristics, at multiple scales, may influence the overall socioeconomic composition of the population of New Orleans and provide a geographic

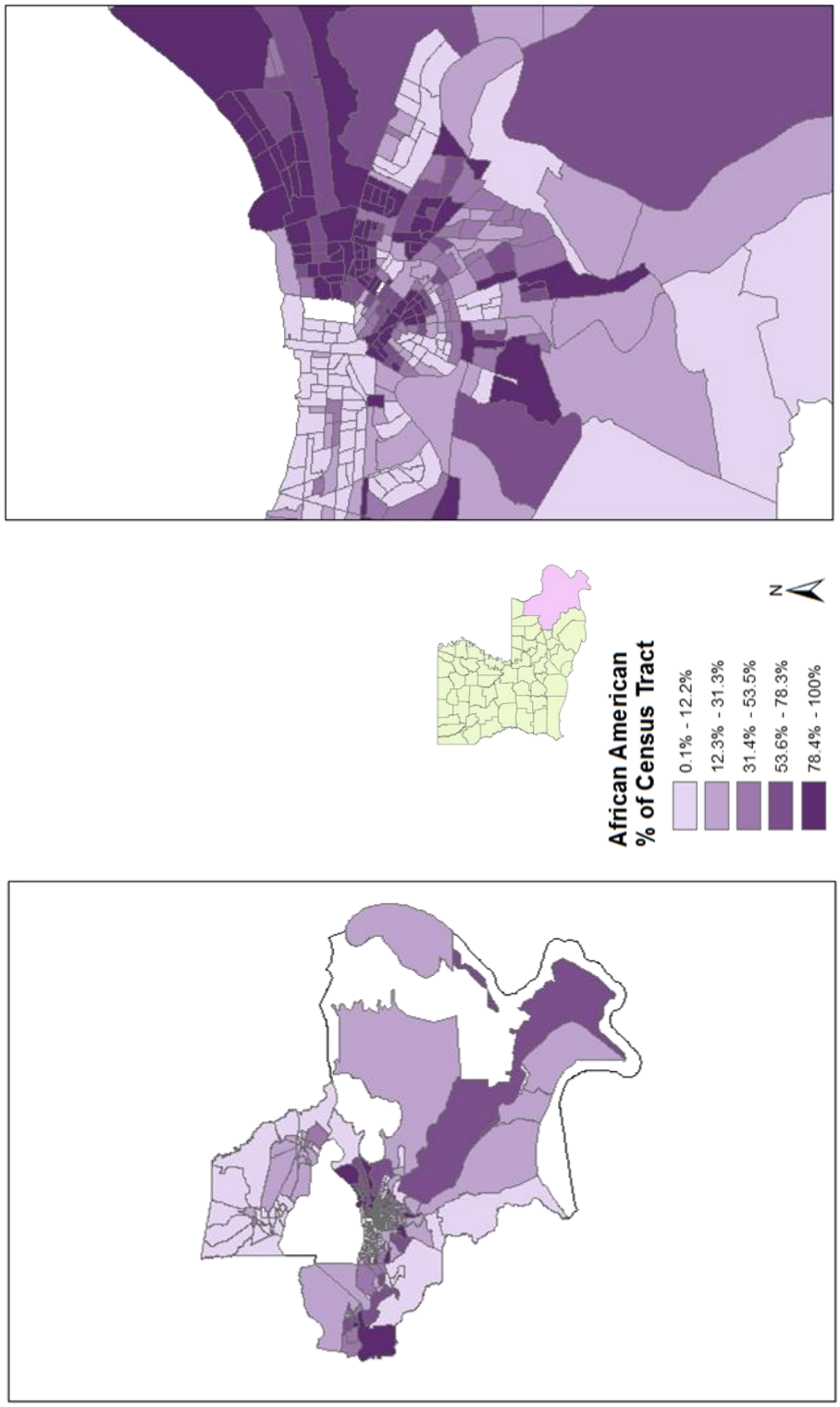
context in which various built, social, and natural environments influence the spatial distribution of employment (Preston and McLafferty 1999). Residential locations in central city areas have been hypothesized to create barriers to suburban employment accessibility, and New Orleans, with high concentrations of African American residents and high poverty levels in its central city, provides a useful context in which to study the interaction between employment outcomes and residential locations.

Map series 1 and 2 depict the African American population distribution at the census tract-level in the New Orleans-Metairie-Kenner MSA for both 2000 and 2010. The maps indicate a concentrated African American population in the areas immediately surrounding the CBD (maps on right) that appears to visually maintain a somewhat clustered pattern from 2000 to 2010. The suburban areas also appear to maintain their African American distribution from 2000 to 2010, with a somewhat less pronounced concentration in these suburban areas in the latter time period.

The maps also indicate a metropolitan area that has undergone significant change in how the population is geographically distributed from 2000 to 2010, with larger census tracts evident in addition to tracts showing no population in 2010 that were at least partially inhabited in 2000, no doubt a result of Hurricane Katrina and rebuilding efforts in the region.

Map series 1: 2000 African American population, percent of total census tract population
Source: U.S. Census Bureau, 2000

Map series 2: 2010 African American population, percent of total census tract population
Source: U.S. Census Bureau, 2010



Measures of Residential Segregation in the MSA

Residential segregation has persisted in the New Orleans region throughout the 19th and 20th centuries, due in part to the high African American presence in the region. As the 20th century has progressed, according to Spain, residential segregation in New Orleans has worsened, where social and economic conditions have combined to create large racially segregated areas (1979, 83). This increase in 20th century residential segregation is attributable to its relatively low levels in the late 19th century, as well as to the low income levels and socioeconomic status of the city's African American population who lack resources to follow decentralizing employment and residential markets (83).

Building upon studies examining both race and class in relation to poverty levels, Lauria and Baxter (1999) investigate racial segregation in New Orleans to determine whether housing foreclosure is a mechanism to explain the interaction of race and class as neighborhoods experience racial transition. Lauria and Baxter find housing foreclosure intensified the out-migration of whites from neighborhoods with increasing black populations during an economic downturn in the region (1999, 778). This finding supports the argument that economic conditions in the metropolitan area "catalyzed latent preferences of some whites to leave a neighborhood that was already in transition, thus increasing foreclosure rates and accelerating racial transition" (1999, 778), in addition to perpetuating residential segregation along racial and ethnic group lines. These patterns of development and localized migration that occurred over the twentieth century concentrated African Americans in the lower-lying sections of the city which were the

hardest hit when the levees broke and floodwaters inundated the low-lying neighborhoods (Fussell, Sastry and VanLandingham 2010, 38).

Two useful measures of residential segregation are the dissimilarity index and isolation index, used in this instance to examine the segregation of African Americans (Glaeser and Vigdor 2003; Massey and Denton 1993). The dissimilarity index measures the proportion of African Americans that would have to move across census tracts in order for the proportion of African Americans to be evenly distributed across the entire MSA (Glaeser and Vigdor 2003, 212). The isolation index measures the percentage of African American residents in a census tract in which the average African American lives (Glaeser and Vigdor 2003, 212; Massey and Denton 1993). Both of these indices can be customized to look at and compare other races and geographic areas, not necessarily African Americans at the census tract and MSA levels. Table 2 provides the African American and non-African American dissimilarity index and isolation index for 1990 and 2000 for the New Orleans-Metairie-Kenner MSA. The results show a small decrease in dissimilarity over the time period, in addition to three comparable southern metropolitan areas that have increased in dissimilarity, according to figures calculated by Glaeser and Vigdor (2003).

Table 2: Dissimilarity and isolation in selected MSAs 1990, 2000

MSA	**1990 Dissimilarity**	**1990 Isolation**	**2000 Dissimilarity**	**2000 Isolation**	**Change in Dissimilarity**	**Change in Isolation**
New Orleans-Metairie-Kenner	0.678	0.539	0.665	0.523	-0.013	-0.016
Baton Rouge, LA	0.641	0.488	0.641	0.477	0.001	-0.010
Biloxi-Gulfport-Pascagoula, MS	0.462	0.262	0.495	0.274	0.033	0.012
Tuscaloosa, AL	0.503	0.358	0.503	0.358	0.026	-0.013

Source: Glaeser and Vigdor 2003

To examine residential segregation in New Orleans since 2000, I calculated both the dissimilarity and isolation index for 2010, as well as the change in each score since 2000 (Table 3).

Table 3: Dissimilarity and isolation in New Orleans-Metairie-Kenner MSA 2000, 2010

MSA	**2000 Dissimilarity**	**2000 Isolation**	**2010 Dissimilarity**	**2010 Isolation**	**Change in Dissimilarity**	**Change in Isolation**
New Orleans-Metairie-Kenner	0.665	0.523	0.598	0.438	-0.067	-0.085

Source: U.S. Census Bureau 2010 (calculations by author); Glaeser and Vigdor 2003

These results indicate, not surprisingly given the other statistics presented, that these measures of residential segregation have improved from 2000 to 2010 in the New Orleans region. According to the 2010 figures, 59.8% of African Americans would have to move across census tracts so that African Americans are evenly distributed across the MSA, down from 66.5% in 2000 and 67.8% in 1990. Additionally, the average African American in 2010 lived in a census tract that has a 43.8% co-African American population, down from 52.3% in 2000 and 53.9% in 1990. These 2010 statistics indicate the overall African American population is becoming less concentrated across the New Orleans-Metairie-Kenner MSA, and residential segregation, while still high, is demonstrating decreases from decade to decade.

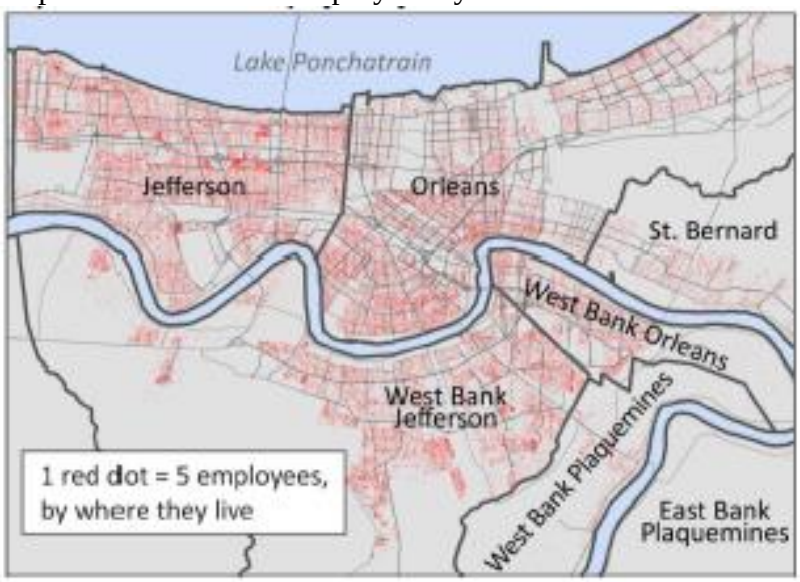
Employment Decentralization in the MSA

Employment has decentralized in the New Orleans-Metairie-Kenner MSA since the 1990s, with jobs moving out of the centrally located Orleans Parish and into neighboring, suburban parishes including Jefferson. Together, Orleans and Jefferson Parishes contain three-quarters of the jobs in the New Orleans region according to 2008 U.S. Census Bureau Local Employment Dynamics data (Plyer and Campanella, 2010, 1).

Jefferson Parish currently has approximately 43,000 low-wage jobs paying less than $1,250 per month, and nearly 22,000 of the workers holding these jobs commute into the parish for work (2010, 1). Orleans Parish has the second highest share of low-wage jobs in the region, and it too imports low-wage workers for these jobs, which could be due to the lower housing costs in nearby parishes such as St. John the Baptist and St. Bernard which leads to longer commuting times for low-wage workers in the region (2010, 1). Not only are more jobs located in the suburban Jefferson than in the central Orleans Parish, these jobs are more geographically dispersed in commercial corridors in the suburbs, leading to limited accessibility for low-wage workers dependent on public transit (2010, 6).

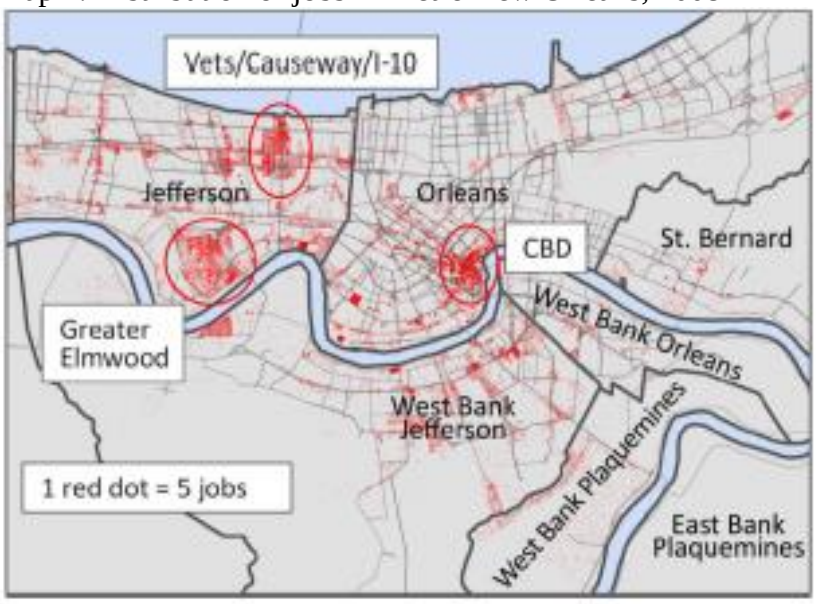
Maps 3 and 4 depict the distribution of employees by residences and jobs, respectively, in the areas surrounding the CBD. These maps depict a population that is not significantly concentrated in any one section of the city, while jobs do appear to be concentrated in three separate sections. Comparing these maps to the information in Map series 1 and 2, it is apparent the areas with higher African American concentrations are not in close proximity to two of the three areas with significant job concentrations in the city. This fact adds support to the hypothesis that African Americans' residential locations may lead to labor market inequality in the New Orleans MSA, in the form of disproportionate employment accessibility to suburbanizing employment opportunities.

Map 3: Distribution of employees by their residences in Metro New Orleans, 2008



Source: Plyer and Campanella 2010, 2

Map 4: Distribution of jobs in Metro New Orleans, 2008



Source: Plyer and Campanella 2010, 2

Public Housing in the MSA

The presence of public housing developments in New Orleans' central city area allows the impacts of these developments on urban labor market inequality to be

examined in the context of the massive overhaul of the city's public housing stock from traditional to mixed-income developments, due in part to damage caused by Hurricane Katrina. Map 5 depicts the location of public housing developments in the New Orleans region as of 2000, with the five largest developments highlighted: B.W. Cooper, C.J. Peete, Lafitte, St. Bernard, and St. Thomas.

Map 5: Public housing developments in New Orleans region, 2000

Source: HUD, 2000

It is evident from this map that a large proportion of public housing in the region is located near the central city area, and the five largest developments are in relatively close proximity to one another when examined at the regional scale.

Segregation in New Orleans' public housing can be traced to the vice districts of the late 19th and early 20th centuries, whose dissolution led to the location of several

poverty-filled neighborhoods and public housing sites in their place, namely Iberville and Lafitte in the former Storyville area (Long 2007). With the passage of the U.S. Housing Act of 1937, public housing became a federally funded program and New Orleans was the first city in the nation to qualify for funds, constructing six segregated public housing developments by 1940: two for whites and four for African Americans (Long 2007, 795; Mahoney 1990). Two of these projects were located Uptown, two were located close to the center of the city, one was located near an industrial site, and the final development was in an isolated area far from downtown (Mahoney 1990, 1269).

As more public housing opened in the mid-20th century near existing developments, they became more racially mixed and income eligibility limits were enforced more strictly. The enforcement of eligibility limits caused increased residential mobility and turnover for white tenants, where African American turnover and mobility decreased: the highest rate of African American turnover was lower than the lowest rate of white turnover, indicating African Americans tended to be more economically dependent on the city's public housing developments than were whites (Mahoney 1990). Between 1960 and 1970, suburbanization increased in New Orleans and whites gradually began to locate in more removed suburban locations, causing African Americans' presence in historically white or mixed neighborhoods to increase, causing large residential African American concentrations to emerge (Mahoney 1990).

While the housing stock "trickled down" to African American residents, employment opportunities followed decentralizing white residents, preventing African Americans from affording the private housing market and perpetuating reliance on public assistance and housing programs (Mahoney 1990). Throughout the 20th century, public

housing in New Orleans developed a negative image through expanded development size, decreased quality, and a simultaneous, ongoing segregatory process that reshaped the metropolitan area and distanced public housing residents from employment; these factors emphasize the importance of the urban context to understanding New Orleans' public housing today (Mahoney 1990, 1267).

Prior to 2005, most Housing Authority of New Orleans (HANO) properties were over 70 years old and in disrepair due to financial mismanagement, poor maintenance, and neglect (HUD 2007, 1), and 47% of HANO's public housing units were vacant at the time of Hurricane Katrina (Popkin et al. 2006, 2). These developments were characterized by racial and income segregation, concentration, and isolation, and violent crime and drug trafficking were rampant (Popkin et al. 2006). For more than 30 years, HUD had rated HANO as one of the country's worst-performing housing authorities (Popkin et al. 2006, 2), and in 2002 HUD took over HANO's operations in a receivership, a rare occurrence with fewer than 10 out of 3,200 public housing authorities nationwide currently under HUD control (HUD 2007, 1).

From 2002 to 2007, HUD redeveloped half of New Orleans' public housing complexes using a mixed-income, mixed-use strategy, including St. Thomas, Guste, Abundance Square (formerly Desire), Fischer and Florida, and claims to have provided residences for all displaced residents either through a voucher or a redeveloped unit (HUD 2007, 1). Hurricane Katrina significantly damaged an already sub-standard public housing stock in New Orleans through mold, wind, and flood damage, kept many residents homeless for months after the storm, and has led to extended redevelopment efforts. St. Thomas is the only revitalized development that effectively survived Katrina

without large-scale repairs necessary, and other HANO properties that had not yet been revitalized also suffered considerable damage (Popkin et al. 2006). According to HUD, it would have cost $130 million to make Katrina-related repairs to the "Big Four" major housing developments not yet redeveloped (St. Bernard, B.W. Cooper, C.J. Peete, Lafitte), $745 million to modernize these developments and correct pre-existing deficiencies and code violations, or $597 million to demolish and redevelop the properties (2007, 1).

HUD chose the latter option, and continues to redevelop New Orleans' public housing developments. Construction on the final of the "Big Four" housing communities not yet redeveloped prior to Katrina, B.W. Cooper, began in October 2009, marking one of the final pieces in the "overall plan to update, upgrade and improve public housing communities in New Orleans" (HUD 2009, 1). Post-Katrina, a holistic approach to community redevelopment has taken hold, with focuses on community infrastructure, quality, sustainability, and affordability (Liu and Plyer 2010, 7-8), while HANO has been making progress towards achieving these goals in public housing developments through its federal receivership.

Because individual and neighborhood elements combine to create the local context within which both labor markets and public housing programs operate, the geographic area that comprises this local context has major implications for the study being carried out. The New Orleans region not only has unique geographic, socioeconomic, and public housing attributes that inform a study of the interplay between labor markets and public housing, it also has experienced a major exogenous shock with the impacts borne onto the region by Hurricane Katrina. By examining the processes and

relationships of importance both pre- (2000) and post-Katrina (2007-2011), this study aims not to control for the impacts of the storm, but to evaluate how relationships between individual- and context-specific elements have impacted labor market performance over the course of the decade for African Americans in comparison with whites, and how labor market processes have been differently affected by the changing structure of public housing in the region. While a massive exogenous shock, Hurricane Katrina did allow for the wide-scale redevelopment of New Orleans' public housing to mixed-income developments, which would have been a more iterative process absent the effects from the storm.

Understanding the socioeconomic and neighborhood conditions present in the area both pre- and post-Katrina allows for conclusions to be drawn about the effects of residential segregation, a stagnant economy reliant on low-wage jobs, high poverty, public housing redevelopment, racial and ethnic disparities, and population decline on the area that began long before Katrina made landfall (Liu and Plyer 2010). Despite HUD's efforts to redevelop New Orleans' public housing in the wake of Katrina, significantly altering local social and economic contexts across the region, little is understood about how labor market processes operate in these neighborhoods since their redevelopment and how inequality is currently manifested in these processes at the individual- and neighborhood-levels.

CHAPTER 4: DATA AND METHODOLOGY

Data

The present study focuses on all individuals between the ages of sixteen and sixty-four who are in the civilian labor force and who both live and work in the New Orleans-Metairie-Kenner MSA. Individual- and neighborhood-level characteristics are included in the study's models, with neighborhood variables measured at the census tract-level (all variables utilized in the study are summarized in Table 5)[2]. Census tracts typically contain 3,000 to 4,000 individuals and are often used to study relatively large racial and ethnic groups in urbanized areas that typically extend over multiple tracts (Logan and Zhang 2004). While less dense or smaller settlement areas may benefit from a reduced geographic scale of analysis, such as a block group or blocks, these data do not contain as many population characteristics as are available at the tract-level, producing a smaller-scale analysis with fewer explanatory variables. Given these considerations, tracts have been chosen to represent neighborhoods for the purposes of the present study.

This study utilizes data from three major sources: the United States Census Bureau (Census), the United States Department of Housing and Urban Development

[2] An alternate way to examine general labor market inequality in relation to public housing is to only incorporate neighborhood-level variables into an ordinary least squares (OLS) model, aggregating tract-level characteristics. While a similar research strategy examining the overall MSA labor market, the present study is concerned with individual labor market outcomes in relation to neighborhood characteristics, which due to spatial autocorrelation and other concerns with incorporating individual and geographic variables into a single model necessitates a more advanced statistical methodology, which is detailed further on pages 48-50.

(HUD), and the Louisiana State University GIS Information Clearinghouse. Confidential microdata were utilized from the Center for Economic Studies (CES), a division of the Census Bureau, for the 2000 decennial long-form Census (pre-Katrina) and the 2007-2011 American Community Survey (ACS) (post-Katrina).

The smallest geographic unit available in the Public Usable Microdata Sample (PUMS), which provides individual-level Census data to the public, is the Public Use Microdata Area (PUMA). PUMA's have a minimum population of 100,000, a scale too large to properly explore residence and employment for individuals at the neighborhood-level. While confidential Census data, similarly to PUMS data, provide individual-level characteristics, they also include the geographic locations of each respondent by where they live and work at the census tract-level. Therefore, individual characteristics are known for each respondent in the sample, and socioeconomic characteristics for the neighborhood where each respondent lives and works can be aggregated at the census tract-level. These data are governed by strict confidentiality and disclosure rules through the Census Bureau's Census Data Research Centers, and as a result some items, such as population counts and summary statistics, are not contained in the results chapters.

Along with confidential microdata, public housing data are utilized from HUD's A Picture of Subsidized Households, a dataset containing information on all households living in HUD-subsidized housing in the United States and available for both 2000 and 2011[3], coinciding with the pre- and post-Katrina microdata time periods. These public housing data are incorporated in the study's models in two ways. The first public housing

[3] One exception to the 2011 HUD A Picture of Subsidized Housing data are Housing Choice Vouchers (HCV) data, which were taken from 2012 due to technical issues with the availability of these 2011 data. Since HCVs are such an important component of New Orleans' subsidized housing today, the decision was made to utilize the more recent data (2012) in place of older (2010) data that were available.

variable measures the presence of traditional public housing developments as a dummy variable determining a census tract's physical proximity to these developments: a tract contains or is contiguous to a tract that contains a public housing development, or a tract does not contain or is not contiguous to a tract that contains a development. The second set of public housing variables measure percentages of five housing assistance programs as a proportion of a census tract's total housing units (Table 4).

Table 4: Subsidized housing program descriptions

Housing Program	**Description**
Public Housing Developments	Traditional project-based public housing developments, typically large multi-family complexes; can be either fully subsidized or mixed-income; also includes scattered site (typically single-family) housing that is not in a public housing or mixed-income development[4]
Section 8 Vouchers/Housing Choice Vouchers (HCVs)	Tenant-based housing program where vouchers are attached to residents and they can choose to live wherever the voucher is accepted, including privately owned single-family homes, townhouses, and apartments[5]
Section 8 Moderate Rehabilitation, New Construction, and Substantial Rehabilitation	Provides rental assistance in connection with the development of newly constructed , substantially rehabilitated, or moderately rehabilitated privately owned rental housing[6]
Low Income Housing Tax Credit (LIHTC) developments	Issues dollar-for-dollar tax credits to private developers (and 10% is reserved for nonprofit organizations) for the acquisition and rehabilitation or construction of rental housing targeted to lower-income households[7]
All other multifamily assisted properties receiving Federal Housing Administration (FHA) or HUD subsidy	Includes Section 8 Loan Management, Rental Assistance Program (RAP), Rent Supplement (SUP), Property Disposition, Section 202/811 capital advance, Section 236, and Preservation[8]

These variables act to determine the significance of public housing developments, and other housing assistance programs, as a proportion of a tract's total housing stock and how these proportions are associated with labor market outcomes. Additionally,

[4] http://portal.hud.gov/hudportal/HUD?src=/topics/rental_assistance/phprog
[5]http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing/programs/hcv/about/fact_sheet
[6] http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/mfh/rfp/s8bkinfo
[7] http://www.hud.gov/offices/cpd/affordablehousing/training/web/lihtc/basics/
[8] http://www.huduser.org/picture2008/dictionary.pdf

incorporating a range of housing assistance programs into the models allows for some comparisons between the variable of interest, traditional public housing developments, and the other subsidized housing programs to be made, particularly with regard to each program's impact on labor market inequality between African Americans and whites.

In addition, although this study is not focused on its effects, Hurricane Katrina is an important component to a study of New Orleans, especially because public housing developments in this area have been so tremendously impacted by the storm. Therefore, a spatially enabled raster dataset measuring the extent and depth of flood water in New Orleans as of September 2, 2005 (Watkins and Hagelman III 2011; Computer Aided Design and Geographic Information Systems Research Lab 2005) is utilized to construct a control variable acknowledging the impact of Hurricane Katrina on the New Orleans region, particularly for urban neighborhoods containing the majority of the MSA's public housing developments. The dataset, originally published online by the Louisiana State University GIS Information Clearinghouse[9], is the result of a joint effort between the United States Army Corps of Engineers and the United States Geological Survey. This dataset was specifically developed using Light-Imaging-Detection and Ranging (LiDAR) imagery to create a flood depth raster at a ten-meter resolution, allowing for the depth and extent of flood waters in New Orleans to be visualized and assigned to census tracts (Watkins and Hagelman III 2011, 118). To partially control for the physical damage born onto the MSA as a result of Katrina, these data were used to construct a variable included in the post-Katrina models. This variable measures the mean flood inundation level in

[9]The author thanks Case Watkins and Ronald Hagelman III for sharing this raster dataset, as it was not accessible online through LSU's GIS Information Clearinghouse.

each census tract, allowing for the degree of flood inundation to be controlled for at the census tract-level post-Katrina.

Table 5: All variables

Variable name	**Coding Strategy**	**Expected Direction of Relationship**	**Source**
Dependent variables			
Odds of employment (log)	Binary; population includes all individuals 16-64 in the civilian labor force	n/a	Census
Odds of working in segregated occupation (log)	Binary; population includes all individuals 16-64 in the employed, full-time, civilian labor force	n/a	Census
Total personal earned income (natural log)	Continuous; population includes all individuals 16-64 in the employed, full-time, civilian labor force	n/a	Census
Individual-level variables			
Gender	Female=1, Male=0	R_1 & R_3 (-) R_2 (+)	Census
Age	Continuous	R_1 & R_3 (+) R_2 (-)	Census
Married	Married=1, Single=0	R_1 & R_3 (+) R_2 (-)	Census
Non-Hispanic African American	Non-Hispanic African American=1, other=0	R_1 & R_3 (-) R_2 (+)	Census
Non-Hispanic white	Non-Hispanic white=1, other=0	R_1 & R_3 (+) R_2 (-)	Census
Travel time	Continuous; travel time from home to work	R_1 & R_3 (-) R_2 (+)	Census
Public transportation usage	Utilizes public transportation to get to work=1, does not use public transportation to get to work=0	R_1 & R_3 (-) R_2 (+)	Census
High school	High School degree or more=1, Less than high school=0	R_1 & R_3 (+) R_2 (-)	Census

Table 5: All variables (continued)

Census tract-level variables

Black population	Continuous; Share of non-Hispanic African Americans in census tract of residence	R_1 & R_3 (-) R_2 (+)	Census
Hispanic population	Continuous; Share of Latinos in census tract of residence	R_1 & R_3 (+) R_2 (-)	Census
High school degree	Continuous; Share of high school degree or more in census tract of residence	R_1 & R_3 (+) R_2 (-)	Census
Construction employment	Continuous; Share of construction employment in census tract of residence	R_1 & R_3 (-) R_2 (+)	Census
Public transportation	Continuous; Share of individuals in census tract who utilize public transportation to travel to work	R_1 & R_3 (-) R_2 (+)	Census
PH presence	Binary; Tract contains or is contiguous to a tract that contains public housing development=1; tract does not contain and is not contiguous to a tract that contains public housing development=0	R_1 & R_3 (-) R_2 (+)	HUD
PH Percent	Continuous; Percentage of traditional public housing units to all tract housing units	R_1 & R_3 (-) R_2 (+)	HUD
Voucher Percent	Continuous; Percentage of Section 8 vouchers/Housing Choice Vouchers to all tract housing units	R_1 & R_3 (-) R_2 (+)	HUD
Section 8 Percent	Continuous; Percentage of Section 8 development units to all tract housing units	R_1 & R_3 (-) R_2 (+)	HUD
LIHTC Percent	Continuous; Percentage of LIHTC units to all tract housing units	R_1 & R_3 (-) R_2 (+)	HUD
OtherPH Percent	Continuous; Percentage of all other public housing units to all tract housing units	R_1 & R_3 (-) R_2 (+)	HUD
Katrina flood-level	Continuous; Measures the mean flood inundation of census tracts in the post-Katrina models	R_1 & R_3 (-) R_2 (+)	LSU

Methodology

The present study utilizes a series of equations to address what, if any, role public housing developments play in labor market outcomes in the New Orleans-Metairie-Kenner MSA, particularly for African Americans in comparison to whites. For this research objective, three sets of research questions are addressed utilizing similar models and control variables. Each model was run twice to address each question: once to

measure the association between public housing and employment outcomes before Hurricane Katrina, and again to measure this association after the storm. The research questions attempt to measure particular labor market outcomes, employment status, job earnings, and occupational segregation, and determine if their levels are associated with the presence of or proximity to public housing in an individual's neighborhood. This relationship is examined for both non-Hispanic whites and non-Hispanic African Americans in order to determine whether public housing locations impact labor market outcomes differently between racial groups. In order to better understand associations between local conditions and individual labor market outcomes, both individual- and neighborhood-level variables must be included in each model, which presents a methodological problem in traditional multivariate models and is addressed by this study's statistical model and methodological approach.

In traditional studies, neighborhood-level variables are merged with individual-level variables to assess the effects of local conditions on an individual's outcomes (Raudenbush and Bryk 2002; Littell et al. 2006). In these analyses, individuals are nested within geographies which produces within-group homogeneity, violating the assumption of independence between observations. Additionally, due to measurement of neighborhood effects, this approach can overestimate the significance of these neighborhood effects (Raudenbush and Bryk 2002). To correct for these and other problems associated with combining individual and geographic variables, a hierarchical linear model (HLM) or hierarchical generalized linear model (HGLM) is appropriate to test individual- and tract-level data using a two-level approach, correcting for correlation errors among individuals within geographic areas (Raudenbush and Bryk 2002; Littell et

al. 2006). Either approach predicts the slope of individual-level independent variables, and includes random errors to control for correlation among individuals in the same geography, allowing for simultaneous estimation of a full multi-level model with controlled individual-level variables that predict an association between individual- and contextual-level variables (Cohen 1998; Wang 2010).

Research Questions

R_1 Is individual employment status associated with the presence of public housing after controlling for individual- and neighborhood-level characteristics? How does the relationship differ between whites and African Americans?

The individual-level equation takes the form:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X1 + \beta_{2j}X_{ij} \quad (1)$$

where:

Y_{ij}	=	is the odds (in log form) of an individual *i* being employed in census tract *j*
β_{0j}	=	the slope of individual-level coefficients representing the adjusted average (log) odds of being employed for all white individuals
$\beta_{1j}\,X1$	=	the slope of individual-level coefficients representing the difference between adjusted average (log) odds of being employed for all African American individuals and all white individuals
and β_{2j}	=	the slopes for individual-level control variables X

At the neighborhood-level, coefficients for the reference group (β_{0j}) and African Americans (β_{1j}) take the form:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j} \quad (2)$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_j + \mu_{0j} \quad (3)$$

where:

γ_{00}	=	for the reference group, whites, the intercept for the average log odds of being employed for all census tracts
γ_{01}	=	for whites, cross-level interaction between individual- and neighborhood-level coefficients
γ_{10}	=	the difference between intercepts for the average log odds of being employed for all census tracts for African Americans and whites

γ_{11} = cross-level interaction difference between African Americans and whites for individual- and neighborhood-level coefficients

W_j = vector representing slopes of neighborhood-level characteristics

and μ_{0j} = error term for neighborhood-level random effects

The first research question examines the relationship between the location of public housing and opportunities for employment (i.e. employed or not), in addition to individual- and neighborhood-level control variables. This research question also attempts to determine whether racial differences exist between whites (β_{0j}) and African Americans (β_{1j}) in this relationship in the combined model examining both racial groups. To properly examine differences between these groups, a binary race variable (African American=1, white=0) is incorporated in the combined neighborhood-level model which allows us to measure this racial inequality. As the dependent variable is binary, a multilevel logistic regression, or hierarchical generalized linear model[10], is utilized.

In order to address the first research question, African Americans and whites are first examined in separate models to determine the individual and neighborhood characteristics, including subsidized housing, that influence each group's employment likelihood separately. By examining each group individually, the factors that influence employment status can be identified before examining the factors that influence the employment likelihood for both groups in direct comparison with one another in the combined models. In the separate African American and white models, there is only one

[10] In hierarchical generalized linear models, a level-1 link function is sometimes used to transform the predicted value of the dependent variable, η_{ij}, so that predictions are constrained to lie within a given interval. In normal cases, however, this transformation is not necessary, so an identity link function is assumed and denoted as $\eta_{ij}=Y_{ij}$ (Raudenbush and Bryk 2002).

slope (β_{0j}) at the individual-level, which represents the slope of individual-level coefficients representing the adjusted average (log) odds of being employed for either African Americans or whites. Similarly, at the neighborhood-level there is one group being examined, so only equation (2) is applicable: $\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j}$. In this equation, γ_{00} and γ_{01} represent the interaction effects between independent- and neighborhood-level characteristics for either African Americans or whites. W_j represents tract-level variables controlling for various neighborhood-level characteristics, including subsidized housing (Table 5).

To measure the differences between whites and African Americans, a combined model including both African Americans and whites is run, with whites as the reference group and β_1 representing the difference between the two groups (equation 3). Then γ_{00} and γ_{01} in the neighborhood-level equation represent the interaction effects between independent- and neighborhood-level characteristics for the reference group, whites. γ_{10} and γ_{11} represent the difference between these effects for whites and for African Americans, effectively measuring inequality in employment status between the two groups. W_j represents tract-level variables representing the presence of public housing developments, percentages of housing assistance programs, the flood inundation variable (post-Katrina model only), and other socioeconomic characteristics (see Table 5). It is hypothesized that labor market inequality is demonstrated as a difference between the odds of employment for whites and African Americans and also as a difference between the strength of this relationship in relation to the presence of public housing.

R_2 Are individuals segregated in particular occupations in relation to the presence of public housing after controlling for individual- and neighborhood-level characteristics? How does the relationship differ between whites and African Americans?

The individual-level equation takes the form:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X1 + \beta_{2j}X_{ij} \quad (1)$$

where:

	Y_{ij}	=	is the odds (in log form) of an individual *i* being concentrated in a specific occupation in census tract *j*
	β_{0j}	=	the slope of individual-level coefficients representing the adjusted average (log) odds of being concentrated in a specific occupation for all white individuals
	$\beta_{1j}X1$	=	the slope of individual-level coefficients representing the difference between adjusted average (log) odds of being concentrated in a specific occupation for all African American individuals and all white individuals
and	β_{2j}	=	the slopes for individual-level control variables X

At the neighborhood-level, coefficients for the reference group (β_{0j}) and African

Americans (β_{1j}) takes the form:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j} \quad (2)$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_j + \mu_{0j} \quad (3)$$

where:

	γ_{00}	=	for the reference group, whites, the intercept for the average log odds of being concentrated in a specific occupation for all census tracts
	γ_{01}	=	for whites, cross-level interaction between individual- and neighborhood-level coefficients
	γ_{10}	=	the difference between intercepts for the average log odds of being concentrated in a specific occupation for all census tracts for African Americans and whites
	γ_{11}	=	cross-level interaction difference between African Americans and whites for individual- and neighborhood-level coefficients
	W_j	=	vector representing slopes of neighborhood-level characteristics
and	μ_{0j}	=	error term for neighborhood-level random effects

Occupational segregation is an important facet of labor market inequality

operating at the metropolitan level and provides a more detailed perspective on

differences in labor market outcomes between African Americans and whites than can be derived by examining industry of employment[11]. The second research question tests whether we are more likely to observe occupational concentration in lower levels of the labor market hierarchy for employed individuals living in or near neighborhoods containing public housing. This question also examines whether this relationship demonstrates signs of inequality for African Americans (β_{1j}) in relation to whites (β_{0j}) in the combined models, controlling for the same individual-level variables as R_1 plus employment-specific variables such as utilization of public transportation and commute time to work. To properly examine differences between these groups, a binary race variable (African American=1, white=0) is incorporated in the combined neighborhood-level model which allows us to measure this racial inequality. To measure occupational concentration, Y_{ij} , an odds ratio (Logan et al. 1994) was calculated to determine if African Americans are more concentrated in particular occupations compared to whites[12]. As the dependent variable is binary, a logistic multi-level regression or hierarchical generalized linear model was utilized[13].

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[11] Industrial concentration calculations and models were also examined in the course of this dissertation, but due to release guidelines from the Census Bureau, only one set of concentration measures and models could be released. Based on the more detailed perspective occupational concentration provides for the labor market experiences of individuals, it was chosen to be released over the more general and broad industrial concentration results.

[12]An odds ratio (OR) is the ratio of workers in a particular occupation divided by the workers in all other occupations and determines whether workers are overrepresented in a particular occupation compared to the total labor market. To examine African American occupational concentration, the numerator of the OR is the ratio of African American workers *A* in an occupation *o* to African American workers working in all other sectors *t-o* (A_i/A_{t-o}). The denominator represents the same ratio for all other (non-African American) workers *O* (O_{i}/O_{t-o}). The value of the OR can range from 0 (no African Americans present in occupation) to infinity (all workers in occupation are African American). An OR<1 indicates African Americans are less concentrated in occupation *o* when compared to the total population; an OR=1 indicates African Americans are equally concentrated compared to the population; and an OR>1 indicates African Americans are more concentrated in occupation *o* compared to the total population and higher OR values indicate higher degrees of concentration (Wang and Pandit 2007; Ellis and Wright 1999; Logan et al. 1994).

[13] Similarly to the equations in R1, an identity link function is assumed in level-1 of this set of models.

In order to address this second set of research questions, African Americans and whites are first examined in separate models to determine the individual and neighborhood characteristics that influence each group's likelihood for occupational concentration separately. Examining each group individually allows us to determine which factors influence the likelihood for occupational concentration of each group and to determine whether occupations individuals are concentrated within vary based on race, before directly comparing the groups in the combined model. In the separate African American and white models, there is only one slope (β_{0j}) at the individual-level, which represents the slope of individual-level coefficients representing the adjusted average (log) odds of being concentrated within an occupation for either African Americans or whites. Similarly, at the neighborhood-level there is one group being examined, so only one equation is applicable: $\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j}$. In this equation, γ_{00} and γ_{01} represent the interaction effects between independent- and neighborhood-level characteristics for either African Americans or whites. W_j represents tract-level variables controlling for various neighborhood-level characteristics, including subsidized housing (Table 5).

In the combined African American and white models, γ_{00} and γ_{01} in the neighborhood-level equation represent the interaction effects between independent- and neighborhood-level characteristics for the reference group, whites; γ_{10} and γ_{11} represent the difference between these effects for whites and for African Americans, effectively measuring inequality in employment in a racially concentrated occupation between the two groups. Again, W_j represents tract-level variables that could influence an individual's likelihood of working in a concentrated occupation (Table 5). It is hypothesized that labor

market inequality is evident in differential levels of occupational concentration for African Americans in comparison to whites, and will also cause a stronger relationship to be observed between African American occupational concentration and the presence of public housing developments.

To ensure appropriate representation of each racial group in occupations, the following threshold is employed for all occupations in which the odds ratio for either racial group is greater than 2. Occupations considered to be concentrated by either racial group using the above criteria must contain over 50% of the average representation from that racial group in the occupation. For example, if the average representation of African Americans across all occupations is 100 African Americans per occupation, an occupation must contain at least 51 African Americans for its odds ratio to be included in the appropriate model as one of the concentrated occupations. This technique ensures some significant representation in all occupations deemed concentrated in these analyses, and also helps alleviate confidentiality concerns from using the confidential census microdata. (Wang and Pandit 2007).

R_3 Are individual job earnings associated with the presence of public housing after controlling for individual- and neighborhood-level characteristics? How does the relationship defer between whites and African Americans?

The individual-level equation takes the form:

$$Y_{ij} = \beta_{0j} + \beta_{1j}X1 + \beta_{2j}X_{ij} \quad (1)$$

where:

Y_{ij}	=	is the natural log form of total personal earned income for individual *i* in census tract *j*
β_{0j}	=	the slope of individual-level coefficients representing the natural log form of total personal earned income for all white individuals

β_{1j} = the difference between slopes of individual-level coefficients representing the natural log form of total personal earned income for all African American individuals and all white individuals

and β_{2j} = the slopes for individual-level control variables X

At the neighborhood-level, coefficients for the reference group (β_{0j}) and African Americans (β_{1j}) takes the form:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j} \quad (2)$$
$$\beta_{1j} = \gamma_{10} + \gamma_{11}W_j + \mu_{0j} \quad (3)$$

where:

γ_{00} = for the reference group, whites, the intercept for the average natural log job earnings for all census tracts

γ_{01} = for whites, cross-level interaction between individual- and neighborhood-level coefficients

γ_{10} = the difference between intercepts for the average natural log job earnings for all census tracts for African Americans and whites

γ_{11} = cross-level interaction difference between African Americans and whites for individual- and neighborhood-level coefficients

W_j = vector representing slopes of neighborhood-level characteristics

and μ_{0j} = error term for neighborhood-level random effects

The third research question tests, for the employed labor force, whether living in or near neighborhoods containing public housing negatively impacts job earnings, Y_{ij} . This question examines whether this relationship differs for African Americans in relation to whites, controlling for the same individual-level variables as R_2, and measures another facet of labor market inequality. To properly examine differences between these groups, a binary race variable (African American=1, white=0) is incorporated in the combined neighborhood-level model which allows us to measure this racial inequality. Job earnings can be influenced by individual-level characteristics, such as human capital or social capital, as well as context-based characteristics, such as racial segregation and employment decentralization.

To address this third research question, African Americans and whites are examined in separate models to determine the individual and neighborhood characteristics, including subsidized housing, that influence each group's job earnings separately. By examining the groups individually, factors that impact earnings can be identified before examining factors that influence job earnings for both groups in direct comparison with one another in the combined models. It is hypothesized that different characteristics, both individual and neighborhood, will impact job earnings of the racial groups differently. In the separate African American and white models, there is only one slope (β_{0j}) at the individual-level, which represents the slope of individual-level coefficients representing the adjusted average (log) job earnings for either African Americans or whites. Similarly, at the neighborhood-level there is one group being examined, so only one equation is applicable: $\beta_{0j} = \gamma_{00} + \gamma_{01}W_j + \mu_{0j}$. In this equation, γ_{00} and γ_{01} represent the interaction effects between independent- and neighborhood-level characteristics for either African Americans or whites. W_j represents tract-level variables controlling for various neighborhood-level characteristics, including subsidized housing (Table 5).

In the combined African American and white models, γ_{00} and γ_{01} in the neighborhood-level equation represent the interaction effects between independent- and neighborhood-level characteristics for the reference group, whites; γ_{10} and γ_{11} represent the difference between these effects for whites and for African Americans, effectively measuring inequality in job earnings between the two groups. Again, W_j represents tract-level variables that could influence an individual's job earnings (Table 5). Inequity in job earnings will further support the examination of labor market inequality in the New

Orleans region; differential job earnings in relation to the presence of public housing will also inform the overall research objective and assist in drawing conclusions about the role of public housing in labor market inequality.

CHAPTER 5: DESCRIPTIVE STATISTICS FOR THE STUDY AREA

To have a better-informed understanding of the state of New Orleans in relation to the populations and characteristics contained in each set of models, summaries of these numbers both before and after Katrina are presented below. The individual-level variables are based on publically available microdata aggregated to the MSA-level (Ruggles et al. 2014). Tract-level variable means are derived from publically available decennial census and ACS data. Subsidized housing variables are derived from HUD's A Picture of Subsidized Households, and the flood depth mean variable was calculated from a LiDAR dataset from LSU.

Racial Disparities in Labor Market Outcomes – Employment Status and Job Earnings

Table 6: Employment status and job earnings figures

	2000 African American	**2000 white**	**2007-2011 African American (% change)**	**2007-2011 white (% change)**
Employed	144,194	204,567	149,841 (4%)	255,788 (25%)
Unemployed	15,169	6,262	24,775 (63%)	15,560 (149%)
Job earnings (mean)	$25,928	$42,591	$34,592 (33%)	$52,763 (24%)

Source: Ruggles et al. 2014

Examining first employment status, we find an overall increase in the number of both African Americans and whites in the civilian labor force age 16-64 from the 2000 to 2007-2011 datasets. We also find an increase in the employed segment of both African Americans (4%) and whites (25%) as well as an increased in the unemployed for both groups (63% African Americans and 149% whites). These figures indicate the white labor force has grown more quickly between the time steps than has the African American

labor force, although the white unemployed population has increased nearly 150% from pre- to post-Katrina, while the African American unemployed population has increased roughly 60%. As far as job earnings, both African Americans and whites experienced an increase in mean job earnings for the employed, full time, civilian labor force age 16-64 from pre- to post-Katrina. African American average job earnings increased over 30%, while white job earnings increased nearly 25%. These numbers indicate an African American labor force who may be experiencing slightly more favorable labor market outcomes in terms of earnings since Hurricane Katrina, although this finding may also be attributable to the slow return rates of low-income African Americans to the New Orleans region following the storm (see Chapter 9 for further discussion of return rates after Katrina).

Racial Disparities in Labor Market Outcomes – Occupational Concentration

To better understand the results from the occupational concentration HGLM models in Chapter 7, it is first important to have an overview of the types of occupations African Americans and whites are concentrated within, both before and after Hurricane Katrina. For African Americans, concentrated occupations pre-Katrina are almost exclusively low-skill, non-professional in nature, with the exceptions being in the lower ranking levels of professional occupations.

Table 7: Top 25 concentrated African American occupations 2000

2000 Occupation	African-American Odds Ratios
Driver/sales workers and truck drivers	2.61
Cashiers	3.08
Nursing, psychiatric, and home health aides	9.62
Janitors and building cleaners	4.43
Cooks	4.04
Maids and housekeeping cleaners	7.47
Laborers and freight, stock, and material movers, hand	3.09
Security guards and gaming surveillance officers	4.78
Construction laborers	2.12
Stock clerks and order filers	2.29
Social workers	2.43
First-line supervisors/managers of food preparation and serving workers	2.29
Grounds maintenance workers	2.06
Child care workers	2.07
Bus drivers	4.21
Industrial truck and tractor operators	3.16
Postal service mail carriers	2.31
Counselors	2.01
Teacher assistants	2.35
First-line supervisors/managers of housekeeping and janitorial workers	5.29
Cleaners of vehicles and equipment	4.35
Food preparation workers	3.28
Postal service mail sorters, processors, and processing machine operators	8.50
Postal service clerks	4.62
Laundry and dry-cleaning workers	5.69

Source: U.S. Census Bureau 2000
*Odds ratios ordered from largest to smallest group representation by occupation

Delivery drivers is the concentrated occupation with the highest representation of African Americans, followed by cashiers, health aides, janitors, cooks, food preparation, and housekeepers, the latter two occupations being concentrated at both the general and

supervisory levels. Warehousing and construction laborers, security, grounds maintenance, bus and tractor trailer drivers, child care, and various occupations within the postal service are other non-professional, service industry occupations concentrated by African Americans. Social workers, counselors, and teacher assistants are the occupations concentrated by African Americans that could be considered professional, although traditionally paying low wages and relegated to lower levels of the high-skill labor market hierarchy.

For whites in 2000, the majority of concentrated occupations fall within the high-skill or professional occupational category. Sales representatives, lawyers, managers, and chief executives dominate the most concentrated occupations with high proportions of white employment. Non-professional industries represented in these concentrated occupations include construction supervisors, ship captains and operators, and fire fighters. Each of these non-professional occupations does have some barrier to entry or specialized training required, which differentiates them from the non-professional occupations African Americans are concentrated within.

Table 8: Top 25 concentrated white occupations 2000

2000 Occupation	White Odds Ratio
Sales representatives, wholesale and manufacturing	4.64
Lawyers	6.61
Managers, all other	2.04
First-line supervisors/managers of construction trades and extraction workers	2.47
Chief executives	5.76
General and operations managers	2.62
Financial managers	2.28
Marketing and sales managers	2.56
Construction managers	2.68
Sales representatives, services, all other	3.29
Insurance sales agents	2.47
Secondary school teachers	2.06
Designers	2.41
Engineering technicians, except drafters	2.35
Real estate brokers and sales agents	2.68
Computer programmers	2.37
Ship and boat captains and operators	4.94
Fire fighters	2.42
Paralegals and legal assistants	2.41
Civil engineers	2.44
Environmental scientists and geoscientists	5.80
Management analysts	2.07
Drafters	3.85
Miscellaneous engineers, including agricultural and biomedical	2.93
Purchasing agents, except wholesale, retail, and farm products	2.50

Source: U.S. Census Bureau 2000
*Odds ratios ordered from largest to smallest group representation by occupation

While the differences between African American and white probability for occupational concentration are not as pronounced in the 2007-2011 data as they are in

2000, there are observed differences and the occupations in which each group are concentrated also differ.

Table 9: Top 25 concentrated African American occupations 2007-2011

2007-2011 Occupation	African-American odds ratio
Drivers/sales workers and truck drivers	3.75
Cooks	3.45
Nursing, psychiatric, and home health aides	9.52
Cashiers	2.53
Laborers and freight, stock, and material movers, hand	2.86
Janitors and building cleaners	3.49
Security guards and gaming surveillance officers	6.21
Maids and housekeeping cleaners	2.70
Stock clerks and order fillers	2.30
Personal care aides	9.93
Social workers	2.39
First-line supervisors of food production and serving workers	2.27
Licensed practical and licensed vocational nurses	2.75
Bus drivers	7.81
Counselors	2.45
Industrial truck and tractor operators	3.91
Preschool and kindergarten teachers	2.49
Tellers	2.47
Health practitioner support technologists and technicians	2.84
Medical assistants	3.24
Cleaners of vehicles and equipment	5.97
Bailiffs, correctional officers, and jailers	2.64
Combined food preparation and serving workers, including fast food	3.77
Baggage porters, bellhops, and concierges	4.42
Miscellaneous food preparation and serving related workers including dining room and cafeteria attendants and bartender helpers	3.02

Source: U.S. Census Bureau 2011

*Odds ratios ordered from largest to smallest group representation by occupation

African Americans remain concentrated in predominantly low-skill, non-professional occupations. In fact, the top eight concentrated occupations with the highest co-racial representation are the same, ordered slightly differently, in 2007-2011 compared to 2000: delivery drivers, cooks, health aides, cashiers, warehousing laborers, janitors, security, and housekeeping. Some new additions to the concentrated occupation list for African Americans include several service occupations in the high-skill, professional sector, albeit in the lower levels of the labor market hierarchy: licensed practical and vocational nurses, preschool and kindergarten teachers, tellers, health support technicians, and medical assistants. The increased presence of African Americans in these occupations with a decline in the overall population of New Orleans indicates some diversification in occupations to the higher-skill, more professional realm, which is a departure from patterns observed in 2000.

For whites, the majority of concentrated occupations with the largest proportions of white employment are professional or high-skill in nature post-Katrina. Managers in a variety of industries, lawyers, chief executives, and sales representatives have both high numbers of whites and high concentration levels. The low-skill or non-professional occupations observed in 2000 to be concentrated are also present in 2007-2011, with the addition of bartenders and industrial mechanics. Of the new additions to the concentrated occupations in 2007-2011 with an above average representation of whites, administrative assistants is to be noted as it is the concentrated occupation with the highest number of whites and was not considered to be a significantly concentrated occupation in 2000. Two other occupations that increased their concentration, white representation, or both from

2000 to 2007-2011 are physicians and accountants, adding to the high-skill, professional sector concentration of whites in New Orleans.

Table 10: Top 25 concentrated white occupations 2007-2011

2007-2011 Occupation	White odds ratio
Secretaries and administrative assistants	2.24
Miscellaneous managers, including funeral service managers and postmasters and mail superintendents	2.27
Sales representatives, wholesale and manufacturing	6.64
Lawyers, and judges, magistrates, and other judicial workers	5.00
Physicians and surgeons	2.38
First-line supervisors of construction trades and extraction workers	2.02
Bookkeeping, accounting, and auditing clerks	2.28
Chief executives and legislators	5.76
Construction managers	2.77
General and operations managers	3.23
Financial managers	2.40
Marketing and sales managers	3.95
Designers	3.37
Sales representatives, services, all other	2.71
Management analysts	5.95
Ship and boat captains and operators	3.31
Firefighters	2.27
Bartenders	2.06
Real estate brokers and sales agents	2.49
Civil engineers	2.65
Engineering technicians, except drafters	3.16
Miscellaneous engineers including nuclear engineers	2.51
Claims adjusters, appraisers, examiners, and investigators	2.25
Personal financial advisors	6.91
Industrial and refractory machinery mechanics	2.57

Source: U.S. Census Bureau 2011

*Odds ratios ordered from largest to smallest group representation by occupation

Individual-Level Independent Variables

Table 11: Individual-level characteristics

	2000 African American	**2000 white**	**2007-2011 African American (% change)**	**2007-2011 white (% change)**
Total	159,363	210,829	174,616 (10%)	271,348 (29%)
Males	68,839	114,231	80,894 (18%)	146,288 (28%)
Females	90,524	96,598	93,722 (4%)	125,060 (30%)
Age (mean)	37.13	39.76	38.35 (3%)	40.97 (3%)
Single	99,638	96,836	116,045 (17%)	130,032 (34%)
Married	59,725	113,993	58,571 (-2%)	141,316 (24%)
Less than high school degree	21,733	14,857	23,287 (7%)	20,425 (38%)
High school degree or more	137,630	195,972	151,329 (10%)	250,923 (28%)
Utilize private or other transportation (walking, biking, cab)	114,281	197,626	136,581 (20%)	247,760 (25%)
Utilize public transportation	25,218	4,060	8,791 (-65%)	2,136 (-47%)
Commute time (mean in minutes)	25.42	21.01	21.33 (-16%)	21.52 (2%)

Source: Ruggles et al. 2014

Examining individual-level independent variables, the first statistic of interest is the total African American and white population: both increased from pre- to post-Katrina, with whites increasing more (29%) than African Americans (10%). This could have something to do with return rates following the storm (see Chapter 9), which are disproportionately higher for households with more human capital such as whites. The African American male population increased more (18%) than the female population (4%) from the 2000 to 2007-2011 datasets, and the opposite is true for whites, although the margin is much closer (30% females versus 28% males). The average age of an individual in the civilian labor force in New Orleans increased by roughly 3% for both African Americans and whites from pre- to post-Katrina, indicating a slightly older work force is in place following the storm. The number of married African Americans in the labor force decreased from pre- to post-Katrina (down 2%) while married whites

increased 24%; single individuals of both groups increased, 17% for African Americans and 34% for whites. Of the civilian work force, the population with less than a high school degree increased more for whites (38%) than African Americans (7%), which indicates a larger low-skill white labor force post-Katrina, although the population with a high school degree or more did increase for both African Americans (10%) and whites (28%) over the same time period. Accessibility for individuals also changed from pre- to post-Katrina.

Utilization of public transportation decreased dramatically for both African Americans (-65%) and whites (-47%) while private transportation usage, including walking and biking, increased for both groups (20% and 25% respectively). These numbers indicate public transportation has a much diminished presence in New Orleans following Katrina, and increases in private or other transportation means indicates a shift to individual-based transportation modes in the region. Finally, changes in the average commute time varied for African Americans and whites pre- to post-Katrina. For whites, the average commute time increased only 2%, which is a negligible change. For African Americans, however, mean commute time decreased by 16%, down from roughly 25 minutes to 21. This change is significant when considering residential segregation and employment decentralization in the New Orleans region, and may suggest a lessened negative impact of commute time on the labor market outcomes of African Americans after Hurricane Katrina.

Neighborhood-Level Independent Variables

Table 12: Neighborhood-level characteristics (tract averages)

	2000	**2007-2011 (% change)**
Non-Hispanic African American population	41%	38.7% (-6%)
Hispanic population	4.2%	6.9% (64%)
High school degree or more	75.4%	63.4% (-16%)
Construction employment	7%	4.9% (-30%)
Public transportation utilization	8.9%	4.4% (-51%)

Source: U.S. Census Bureau 2000, 2011

At the neighborhood- or tract-level, changes have occurred in the mean tract figures pre- to post-Katrina. The mean African American population has declined at the tract-level approximately 6% from 2000 to 2007-2011, undoubtedly a result of return rates following Hurricane Katrina (see Chapter 9 for further discussion). The mean tract Hispanic population, conversely, has grown 64% since the storm, and reasons for this influx of Latinos is covered further in Chapter 9. The average tract population with a high school degree or higher has decreased 16% from the pre- to post-Katrina time periods, indicating, as was also observed in viewing the individual-level figures above, the population present in New Orleans has lower educational attainment, and labor market outcomes could be impacted as a result of a diminished human capital base in the region.

Average construction industry employment at the tract-level decreased roughly 30% from pre- to post-Katrina, which is interesting given the surge in development occurring in the region following Hurricane Katrina but could point to work being completed by temporary or short-term contract employees. Average public transportation utilization decreased over 50% after Hurricane Katrina at the tract-level, which as discussed in the individual-level descriptions above could be indicative of the population

moving towards alternative employment centers outside of the central city area and decreasing their usage and reliance on public transportation.

Public Housing Before and After Hurricane Katrina

Table 13: Subsidized housing program totals

	Before Hurricane Katrina (2000)	**After Hurricane Katrina (2011, 2012) (% change)**
Total MSA housing units	548,302	524,758 (-4%)
Section 8/Housing Choice Vouchers	7,750	26,360 (240%)
Low-income Housing Tax Credit units (LIHTC)	4,204	4,545 (8%)
Section 8 development units	3,803	3,377 (-11%)
Other subsidized housing units	2,785	1,577 (-43%)
Public housing units	14,444	4,707 (-67%)
Tracts containing or adjacent to tract containing public housing (out of total MSA tracts)	196/387	123/389

Source: HUD Picture of Subsidized Households, 2000, 2011, 2012

Striking in the summary of subsidized housing units before and after Katrina included in the models is the dramatic loss of public housing units before and after the storm: down 67.4%. This loss can be attributed both to damage incurred as a result of Katrina and also to the redevelopment tactics employed following the storm, namely mixed-income developments that severely decreased the overall number of fully subsidized units within these developments. Other subsidized units are also down dramatically (43.4%), while vouchers increased over 240% from 2000 to 2012. This finding indicates individual-based subsidized housing has become the predominant source of subsidy, unseating project-based housing as the region's program of choice. The increase in vouchers after Katrina can also be attributed to the massive displacement of residents following the storm, many of which qualified for voucher assistance in the wake of the storm who did not previously qualify for subsidized housing.

These subsidized housing figures impact the study's models in several ways. In terms of labor market outcomes, the extreme loss of public housing units following Katrina is expected to result in weaker relationships between public housing and labor market outcomes, primarily because of its diminished presence in the region. Before Katrina, it is expected that public and other subsidized housing have negative impacts on the likelihood for employment and job earnings, particularly for African Americans in contrast to whites, and have positive impacts on the likelihood for occupational concentration of African Americans and negative impacts on concentration for whites.

After the storm, it is expected these relationships are weaker for all programs but HCVs, since their presence has increased sharply in the region from before the storm. The direction of the relationship between HCVs and labor market outcomes after the storm could differ from relationships before the storm, primarily due to the increased number of vouchers and the program's design to allow residential mobility and freedom of choices for residents, who ideally would choose neighborhoods with more favorable socioeconomic and labor market characteristics. Therefore, the increase in the number of vouchers in the region could also lead to more positive relationships with labor market outcomes, particularly for African Americans who are economically more likely to utilize subsidized housing programs.

Given New Orleans' history of racial disparities between African Americans and whites, the residential locations of these groups, and particularly African Americans, are expected to have an important impact on individual labor market outcomes. Residential locations near subsidized housing, and specifically public housing developments, are expected to fare slightly worse for labor market outcomes than locations more removed

from these neighborhoods. The importance of the local context in this instance is based on lower educational attainment and economic status of individuals in these neighborhoods whose labor market outcomes are further negatively impacted by decades-long residential segregation of low-income, predominantly African American, households.

The negative relationships between place and labor market outcomes are expected to be more pronounced in the models measuring relationships before Hurricane Katrina due to the extensive demographic, socioeconomic, and physical transformation of New Orleans following the storm. Following Katrina, neighborhood dynamics and social networks are expected to have been disrupted due to the exodus and differential resettlement patterns of the region's low-income African American population (discussed further in Chapter 9); these dynamics are further being altered in neighborhoods once containing public housing and now centers for low-density, mixed-income developments. These developments deconcentrate low-income households and limit their numbers in revitalized areas, a facet of these programs that has the potential to be manifested as lessened or neutral neighborhood impacts on labor market outcomes following their transformation in the aftermath of Katrina.

Before Hurricane Katrina, based on the multiscalar characteristics discussed previously, the likelihood of employment for African Americans and whites is expected to be negatively associated with various individual and neighborhood variables, most specifically the presence of public housing units in their tract of residence. This relationship is expected to be stronger and negative for African Americans in comparison with whites based on the groups' respective representation in residentially segregated

areas with lower socioeconomic standing, which is expected to lead to negative outcomes. After Hurricane Katrina, based on the overall increase in income levels and educational attainment of African American in comparison to whites in addition to the overhaul of public housing to mixed-income developments, the negative relationship between employment likelihood and the model's variables is expected to decrease in significance. Similarly to employment likelihood, job earnings levels are expected to be negatively associated with the presence of public housing developments pre-Katrina, particularly for African Americans in comparison with whites. After the storm and dismantling of public housing, it is reasonable to expect the relationship between earnings and public housing to be reduced significantly if not neutralized completely.

For occupational concentration, based on the limited social capital and job information networks present in low-income neighborhoods and public housing, it is expected before Hurricane Katrina that concentration in low-skill, low-wage occupations is significantly related to individual and neighborhood characteristics including public housing for African Americans. Whites are expected to be concentrated in higher status occupations, and this concentration would be less likely in neighborhoods with more public housing, and simultaneously a larger African American population. After Katrina, it is expected occupational concentration would decrease for African Americans in the MSA with rising educational attainment and income levels, and we may even see a diversification of occupations African Americans are concentrated within due to economic restructuring and an emerging immigrant labor force (see Chapter 9). For whites, whose income and educational attainment levels did not match gains made by African Americans, occupational concentration may decrease after Hurricane Katrina in

comparison to levels prior to the storm, and some higher status occupations once heavily concentrated by African Americans may become more diversified as whites appear to be making up some ground in the lower levels of the labor market hierarchy.

CHAPTER 6: RESULTS FOR THE LIKELIHOOD OF EMPLOYMENT

Results before Hurricane Katrina (2000)

(1) African American

Examining the individual-level hierarchical generalized linear model (HGLM) results for African Americans in the New Orleans MSA in 2000, there are several significant variables related to the probability for employment (Table 14). For example, African American women are more likely to be employed than African American men, a slightly different relationship than might be expected based on traditional socioeconomic characteristics of the work force. Older individuals are more likely to be employed than younger individuals, and those who are married are also more likely to be employed. African Americans with a high school education or more are also more likely to be employed than those with lower levels of education, and education level is the strongest individual-level predictor for employment. These findings, not surprisingly, indicate traditional socioeconomic characteristics lead to higher probabilities for African American employment in 2000; the exception here is that African American females are more likely than males to be employed during this time period.

Table 14: Regression results for individual-level characteristics 2000

	African American only	**White only**	**Combined African American and white**
Female	.121**	-.057	.050
Age	.038***	.024***	.032***
Married	.571***	.678***	.609***
High school degree or higher	.962***	.985***	.962***
N	24,201	48,063	72,264

The dependent variable is the (log) odds of being employed. The neighborhood-level characteristics are presented in Table 15.
*legend: *p<.05; ** p<.01; *** p<.001*

At the census-tract-level (Table 15), our focus is the relationship between public housing developments and the probability of employment in relation to individual and other neighborhood-level characteristics. The key variable of interest, public housing developments, is measured as a binary variable indicating whether a tract contains or is adjacent to a tract containing traditional public housing developments. The presence of public housing is not a significant predictor for employment likelihood of African Americans in 2000. After controlling for other census tract-level characteristics, the proportion of Section 8 vouchers to a tract's total housing units has a coefficient of -.022, indicating the likelihood for employment for African Americans will decrease (1-exp(-0.022)) 2% with a 1% increase in the number of voucher users. Similarly, the coefficient for the percentage of a tract's housing units that are traditional public housing units is -.004, so as the number of public housing units increases 1%, the likelihood for employment decreases slightly, (1-exp(-0.004)) <1%.These findings indicate that with higher percentages of Section 8 vouchers and public housing development units, African Americans who live in those tracts are less likely to be employed.

Table 15: Regression results for tract-level characteristics 2000

	African American only	**White only**
Hispanic population tract	.001	.000
Construction employment tract	.001***	-.000
Section 8/Housing choice vouchers tract %	-.022*	-.062***
Traditional public housing development units tract %	-.004*	-.015
Tract contains or adjacent to tract containing public housing development	-.122	-.009
constant	2.251***	3.526***
chi2	1403.029	954.607
N	24,201	48,063

The dependent variable is the (log) odds of being employed. The individual-level results are presented in Table 14.
*legend: *p<.05; ** p<.01; *** p<.001*

(2) White

Turning to the individual-level HGLM results for whites in the New Orleans MSA in 2000 (Table 14), there are fewer significant variables than were found for African Americans. Similarly to African Americans, age, marital status (married), and more than a high school education all have positive effects on the probability for employment for whites, with educational attainment again being the strongest predictor of employment. Again, these findings coincide with traditional studies that have found these socioeconomic characteristics to be positive influences on labor market outcomes.

At the census tract-level (Table 15), the only significant census tract variable is the percentage of Section 8 vouchers of a tract's total housing units, which has a coefficient of -.062. That is, with an increase of 1% of Section 8 vouchers being used in a neighborhood, the likelihood of employment for whites decreases by 6% (1-exp(-0.062)).

Similarly to the effect on African Americans, this negative relationship indicates that, for both groups, neighborhoods containing large proportions of these vouchers tend to be less conducive to employment. These vouchers are not typically spatially concentrated to the same degree traditional public housing developments are. Vouchers are not tied to a specific geographic location but instead are tied to individuals who can utilize them in any area in which a landlord agrees to accept them, therefore they are dispersed across neighborhoods. The percentage of voucher units are negatively associated with the likelihood for employment of both African Americans and whites. This indicates that while these vouchers are not as concentrated as public housing, they are still associated with negative labor market outcomes typically expected from residentially segregated, low-income concentrated neighborhoods containing public housing.

(3) Differences between African Americans and Whites

Combining both African Americans and whites into a single HGLM allows measuring the difference between African Americans and whites. A number of variables are significant in measuring the probability for employment. At the individual-level, similarly to the separate models for each race, age, marital status (married) and a high school education or more lead to higher probabilities of employment for both African Americans and whites, with educational attainment again having the strongest influence on both groups (Table 14).

Table 16: Regression results for the combined model 2000

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	3.009*** (sd=.241)	-1.154*** (sd=.163)
Hispanic population tract	.000	.000
Construction employment tract	-.000	.002***
Section 8/Housing choice vouchers tract %	-.060***	.036
Traditional public housing development units tract %	-.017*	.012
Tract contains or adjacent to tract containing public housing development	-.007	-.116
chi2	3240.075	
N	72,264	

The dependent variable is the (log) odds of being employed. The individual-level results are presented in Table 14.
*legend: *p<.05; ** p<.01; *** p<.001*

As indicated by the intercepts (β_0 and β_1), with all other variables held constant, African Americans are less likely than whites to be employed. At the census tract-level, both the percentage of Section 8 voucher users and the percentage of traditional public housing development units in a tract are negatively associated with the likelihood of employment for both whites and African Americans. Contrary from what was expected, there is no significant difference between whites and African Americans as far as these subsidized housing variables are concerned.

Examining the relationships between tract-level variables for African Americans in comparison to whites as the reference group, one variable stands out as significant. Construction employment in the census tract of residence is significant, and a positive relationship exists for this variable for African Americans (1-exp(-0.002)) in comparison

to whites (1-exp(-0.000)). This finding indicates higher levels of construction employment at the tract-level have a small but positive impact on African Americans' likelihood for employment in comparison with whites. This could be the result of a higher likelihood for African American employment in the construction sector, which is typically a low-wage, low-skill occupation. Based on the occupational concentration odds ratios presented in Chapter 5, African Americans are indeed concentrated in the construction occupation (OR=2.12) and this occupation has one of the largest African American employee representations (ninth out of 25 concentrated occupations). This finding indicates the presence of construction employment could provide more employment opportunities for African Americans; however, such employment opportunities could be highly segregated in the lower levels of the labor market hierarchy.

Results after Hurricane Katrina (2007-2011)

(1) African American

Similar to the 2000 model, at the individual-level, females, older individuals, married individuals, and those with at least a high school education are more likely to be employed (Table 17). For instance, having a high school or higher degree will increase the likelihood of employment by 1.2 (=exp(0.77)-1) times for African Americans, and 12.5% (=exp(0.118)-1) for whites when compared to those without such degrees. This indicates a higher educational attainment could significantly increase opportunities for employment when other conditions are held the same.

Table 17: Regression results for individual-level characteristics 2007-2011

	African American only	**White only**	**Combined African American and white**
Female	.179*	.118	.154**
Age	.033***	.012***	.023***
Married	.592***	.894***	.759***
High school degree or higher	.770***	1.165***	.937***
N	6,773	16,961	23,734

The dependent variable is the (log) odds of being employed. The neighborhood-level characteristics are presented in Table 18.
*legend: *p<.05; ** p<.01; *** p<.001*

At the census tract-level, none of the coefficients for the variables representing the subsidized housing program variables are significant in the African American only model, and the mean tract flood level variable is also not significant (Table 18). Most of the other variables at the census tract-level are not significant either, except for the percentage of the population with at least a high school degree. The results indicate that for African Americans post-Katrina, individual-level characteristics have greater influences on the likelihood for employment than the neighborhood-level variables.

(2) White

Similar to the African American model results, age, marital status, and a high school education or more are all positively related to the likelihood of employment for whites (Table 17). Again, there are no significant neighborhood-level predictors for white employment in the 2007-2011 data (Table 18).

Table 18: Regression results for tract-level characteristics 2007-2011

	African American only	**White only**
African American population tract	.000	-.000
High school degree or higher tract	.000**	.000
Hispanic population tract	.000	-.000
Tract contains or adjacent to tract containing public housing development	-.113	.004
Housing choice vouchers tract %	-.007	-.010
Other subsidized housing program units tract %	-.019	-.012
Mean tract flood level	.013	.012
Constant	2.009***	3.148***
chi2	376.180	453.992
N	6,773	16,961

The dependent variable is the (log) odds of being employed. The individual-level results are presented in Table 17.
*legend: *p<.05; ** p<.01; *** p<.001*

(3) Differences between African Americans and Whites

At the individual-level, age, marital status (married), and high school educational attainment are all positively associated with the probability of employment for both African Americans and whites (Table 17). These findings are consistent with the individual-level results for each separate model and confirm the importance of socioeconomic characteristics, particularly education, in employment outcomes in the New Orleans MSA.

Table 19: Regression results for the combined model 2007-2011

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	2.729*** (sd=.220)	-.989*** (sd=.299)
African American population tract	-.000	.000
High school degree or higher tract	.000	.000
Hispanic population tract	-.000	.000
Tract contains or adjacent to tract containing public housing development	.001	-.100
Housing choice vouchers tract %	-.011	.004
Other subsidized housing program units tract %	-.016	-.003
Mean tract flood level	.018	-.008
chi2	1117.468	
N	23,734	

The dependent variable is the (log) odds of being employed. The individual-level results are presented in Table 17.
*legend: *p<.05; ** p<.01; *** p<.001*

As indicated by the intercepts (β_0 and β_1), with all other variables held the same, African Americans are less likely than whites to be employed, a similar relationship found before Hurricane Katrina in the 2000 model results. At the tract-level, there are no significant variables in the combined model, which is expected given the lack of significance in the separate African American and white models described previously (Table 17). There are no significant neighborhood-level variables in the combined model post-Katrina. The lack of significant neighborhood-level relationships could be due to the sampling methodology employed in the ACS versus the decennial census, with unweighted regressions not able to produce comparable results in scope or scale using ACS data as those found using decennial data. However, it is also possible that

neighborhood-level impacts after Hurricane Katrina are not as prevalent as they were prior to storm, which could be a result of physical and demographic restructuring and rebuilding of these neighborhoods. Chapter 9 will provide a detailed discussion of these changes since the storm.

Discussion and Conclusions

Examining the likelihood of employment in relation to individual and neighborhood characteristics, including subsidized housing programs, there are several important takeaways. Pre-Katrina, there is little evidence of racial inequality in the relationships between public and subsidized housing and employment likelihood. The percentage of a neighborhood's total housing units that are public housing units is found to have a negative relationship with the likelihood for employment for African Americans and whites, although there is no significant difference between the two groups, which corresponds with prior research on public housing's impact on labor market outcomes (Krivo et al. 1998; Massey et al. 1987; Reingold et al. 2001). Similarly, the percentage of Section 8 vouchers in a neighborhood is negatively associated with the likelihood of being employed and has a larger coefficient than the public housing variable.

Post-Katrina, there are no significant variables impacting the likelihood for employment related to any subsidized housing program, again indicating little inequality between African Americans and whites in relation to these variables. This finding, coupled with the relationship that was present before Katrina, may be an indication of an altered neighborhood dynamic as a result of the conversion of public housing to mixed-income developments. An altered dynamic would lend support to meeting the goals of mixed-income redevelopment programs: to reduce residential segregation, deconcentrate

poverty, and improve residents' human and social capital levels (Salama 1999; Brophy and Smith 1997; Epp 1996; Joseph 2006; Clampet-Lundquist 2004; Ludwig, et al. 2000; Ellen and Turner 1997; Joseph 2006; Goetz 2011a, 2011b).

This finding may also indicate post-Katrina, recipients of HCVs are living in neighborhoods with more favorable socioeconomic conditions, or at least are not being concentrated in low-income, less favorable neighborhoods to the same degree as they were before the storm are now more dispersed in a variety of local contexts. The lack of a negative relationship between employment status and public housing and vouchers may support Anil, Sjoquist, and Wallace's (2010) findings that individuals who move into a HOPE VI development or who use a voucher have a greater likelihood of being employed than those who move to another traditional public housing development. While we do not observe a greater likelihood of employment, the relationship is no longer negative, which could indicate a changing labor market context in relation to subsidized housing.

Turning to other neighborhood characteristics, the share of employment in the construction industry at the census tract-level is associated with a higher likelihood of employment for African Americans pre-Katrina. This finding indicates that in neighborhoods with greater employment in industries at the lower levels of the labor market hierarchy, such as construction, African Americans actually fare better in terms of likelihood for employment than do whites, although it does indicate some inequality between racial groups in regards to the types of employment, professional or non-professional, that have the greatest impact on labor market outcomes. The positive

relationship between construction employment and African American employment likelihood, however, is not found to be significant post-Katrina.

Finally, individual-level socioeconomic characteristics do have an impact on the employment likelihood of individuals both before and after Katrina: older age, being married, and having at least a high school degree are all positively associated with higher likelihood of employment for African Americans and whites. For African Americans in particular, females are more likely to be employed than males. These patterns sustain over time.

CHAPTER 7: RESULTS FOR OCCUPATIONAL CONCENTRATION

Results before Hurricane Katrina (2000)

(1) African American

Several individual-level characteristics are significantly associated with the probability of occupational concentration or segregation for African Americans (Table 20). For example, compared to males, the odds of working in an African American-concentrated occupation will decrease (1-exp(-0.177)) by 18% for females. Those who are older, married, have at least a high school degree, and those who commute longer are less likely to be concentrated in African American occupational niches. In addition, those who depend on public transportation are more likely to work in African American niches. As discussed in Chapter 5, African Americans are primarily concentrated in low-skill, low-wage sectors. Therefore, males, older ages, being married, and higher educational attainment seem to provide more opportunities for African Americans to work in non-segregated occupational sectors.

Table 20: Regression results for individual-level characteristics 2000

	African American only	**White only**	**Combined African American and white**
Female	-.177***	-.729***	-.511***
Age	-.007***	.008***	.002*
Married	-.255***	.306***	-.004
Commute time to work	-.003***	.002**	-.001
Utilize public transportation	.638***	-.346**	.426***
High school degree or higher	-.991***	.913***	-.304***
N	15,088	35,287	50,375

The dependent variable is the (log) odds of being employed in a concentrated occupation. The neighborhood-level characteristics are presented in Table 21.
*legend: *p<.05; ** p<.01; *** p<.001*

At the neighborhood-level (Table 21), the odds of working in an African American occupational niche decrease as African Americans' share in a tract's population increases. More importantly, the percentage of a tract's total housing units that are Section 8 vouchers, or Housing Choice Vouchers, is positively associated with a greater likelihood of occupational concentration. Specifically, the odds of being employed in an occupational niche will increase by nearly 4% (=exp(.037)-1) with a 1% increase in vouchers units. Likewise, the presence of public housing units in or adjacent to a tract of residence will increase the odds of African American occupational concentration by 15% (=exp(.137)-1), holding other conditions the same.

Table 21: Regression results for tract-level characteristics 2000

	African American only	**White only**
African American population tract	-.000*	-.000***
Hispanic population tract	-.000	-.000
Public transportation utilization tract	-.000	.002***
Section 8/Housing choice vouchers tract %	.037***	-.043*
Traditional public housing development units tract %	.001	.000
Low income housing tax credit units tract %	.003	-.005
Other subsidized housing units tract %	-.004	-.025*
Section 8 development units tract %	-.007	.007
Tract contains or adjacent to tract containing public housing development	.137**	-.120*
constant	-.358***	-.985***
chi2	830.641	1360.215
N	15,088	35,287

The dependent variable is the (log) odds of being employed in a concentrated occupation. The individual-level results are presented in Table 20.
*legend: *p<.05; ** p<.01; *** p<.001*

(2) White

At the individual-level (Table 20), the odds of occupational concentration will decrease for females in comparison with males. Those who utilize public transportation are less likely to be concentrated in a particular occupation than those who utilize other modes of transportation. Older whites, those who are married, and those with at least a high school education are more likely to be concentrated in a particular occupation, with educational attainment again having the largest influence on concentration likelihood. Longer commute times for whites also lead to a greater likelihood of occupational

concentration. These patterns are completely opposite to what we observed from the African American model.

At the neighborhood-level (Table 21), the percentage of a tract's housing units that are Section 8 vouchers is associated with a lower likelihood for white occupational concentration. Specifically, the odds will decrease by 4% (=1-exp(-.043)) with a 1% increase in vouchers. The percentage of other subsidized housing units as a percentage of a tract's total housing units is also negatively associated with the likelihood of white occupational concentration. That is, the odds will decrease by nearly 3% (=1-exp(-.025)) with a 1% increase in other subsidized housing units. Similarly, whites living in a tract that contains or is adjacent to a tract containing traditional public housing development units have a lower likelihood of occupational concentration. The likelihood will decrease by nearly 12% (=1-exp(-.120)) when the census tract contains or is adjacent to public housing projects. The only tract-level variable that increases the likelihood of white occupational concentration is the share of a tract's population that utilizes public transportation to travel to work.

To understand the above regression results correctly, it is important to consider the occupations each racial group is concentrated within. As discussed in Chapter 5, African Americans are highly concentrated in low-skill, low-wage occupations. For example, truck drivers, cashiers, janitors, cooks, housekeepers, freight movers, security guards, and construction laborers are some of the highly concentrated occupations African Americans are concentrated within that also have a significant share of the African American workforce. Given these occupations, it is not surprising then that it is the younger, less educated individuals who are more likely to be concentrated, and the presence of public

housing and vouchers increases this likelihood. This concentration could be compounded by the residentially segregated neighborhoods in which many African Americans are concentrated within in New Orleans, particularly low-income neighborhoods where subsidized housing units are prevalent.

Differing from African Americans, whites are highly concentrated in higher-wage, higher-skill occupations such as sales representatives, lawyers, managers in a variety of fields, construction supervisors, and chief executives. Therefore, for whites, we observe quite the opposite relationship, with older, more educated individuals being more likely to be concentrated, and public housing, vouchers, and other subsidized housing programs lead to less concentration for whites. Less concentration for whites may actually be a negative outcome for this group based on the generally high-skill, high-wage occupations they are more likely to be concentrated within. Also interesting is the utilization of public transportation, which leads to a greater likelihood of occupational concentration for African Americans and a lower likelihood of concentration for whites, indicating public transportation has a negative impact on labor market outcomes for both racial groups in terms of occupational concentration.

Neighborhood characteristics, particularly subsidized housing, also impact white occupational concentration. The presence of public housing, voucher, and other subsidized units all lead to a lower likelihood for white concentration, which again is a negative outcome. Similarly, a larger African American population leads to a lower likelihood for concentration of whites, so a larger minority population has negative implications for white labor market outcomes.

(3) Differences between African Americans and Whites

Holding all other conditions the same, at the individual-level (Table 20), being female and having a high school degree are negatively associated with the probability of working in each group's occupational niches; however, older age and public transportation usage are positively associated with niche employment.

Table 22: Regression results for the combined model 2000

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	-.336*** (sd=.194)	.331*** (sd=.198)
African American population tract	-.000**	-.000
Hispanic population tract	-.000*	.000
Public transportation utilization tract	.001*	-.001*
Section 8/Housing choice vouchers tract %	-.014	.047**
Traditional public housing development units tract %	.004	-.003
Low income housing tax credit units tract %	-.002	.006
Other subsidized housing units tract %	-.003	-.003
Section 8 development units tract %	-.001	-.007
Tract contains or adjacent to tract containing public housing development	-.075*	.159**
chi2	1363.645	
N	50,375	

The dependent variable is the (log) odds of being employed in a concentrated occupation. The individual-level results are presented in Table 20.
*legend: *p<.05; ** p<.01; *** p<.001*

As indicated by the intercepts (β_0 and β_1), with all other variables held constant, African Americans are more likely than whites to be concentrated in African American concentrated occupational niches (Table 22). The share of a census tract's population that is African American has a significant, negative relationship with the likelihood for

occupational concentration of whites. Similarly, tracts with larger Hispanic populations are associated with less occupational concentration of whites in comparison with African Americans than tracts with smaller Latino representation. Tracts with higher shares of individuals utilizing public transportation lead to a greater likelihood (exp(.000)-1) of occupational concentration for whites in comparison with African Americans. Finally, the presence of public housing developments, either in or adjacent to the census tract, leads to a lower likelihood of occupational concentration for whites in comparison with African Americans. Whites are nearly 8%, or (1-exp(-.075)), less likely to be concentrated in an occupation if they live near public housing, which is a negative labor market outcome based on the high-skill, high-wage occupations whites tend to be concentrated within. In this case, whites' outcomes seem to be detrimentally associated with the presence of traditional public housing.

Compared to whites, the percentage of Section 8 voucher units as a proportion of a tract's total housing units is associated with a greater likelihood of African American occupational concentration than for whites, with a nearly 5% greater likelihood (=exp(.047)-1) with a 1% increase in voucher units. The presence of public housing developments in or adjacent to a tract of residence leads to a greater likelihood of occupational concentration for African Americans in comparison with whites, (exp(.159)-1).

These results indicate vouchers and public housing proximity are associated with greater levels of occupational concentration for African Americans in comparison with whites. This finding corresponds with the idea that African Americans have a greater likelihood to live in residentially segregated, low-income neighborhoods and to be

concentrated in occupations and industries in the lower levels of the labor market hierarchy. Before Hurricane Katrina, we see a negative relationship between public housing and vouchers and the probability of African Americans being concentrated in low-skill, low-wage occupations. For whites in comparison with African Americans, we do not see the same significant relationships between subsidized housing and occupational concentration, which could be indicative of whites living in higher income, less residentially segregated areas that are less likely to contain subsidized housing. The overall patterns indicate residential proximity to public housing and to voucher units could possibly reinforce African American occupational segregation before Katrina.

Results after Hurricane Katrina (2007-2011)

(1) African American

At the individual-level (Table 23), married African Americans have a lower probability to work in occupational niches than those who are not married, and those with at least a high school education also have a lower likelihood for concentration. African Americans with longer commute times are also less likely to be concentrated. At the tract-level there are no significant variables, indicating that for the 2007-2011 data there are no significant neighborhood effects to explain the likelihood of African American occupational concentration (Table 24).

Table 23: Regression results for individual-level characteristics 2007-2011

	African American only	**White only**	**Combined African American and white**
Female	.027	-.260***	-.110**
Age	-.002	.008***	.003
Married	-.471***	.252***	-.047
Commute time to work	-.004*	.005***	.001
High school degree or higher	-.846***	.945***	-.096
Utilize public transportation	.257	-.201	.089
N	4,019	11,558	15,577

The dependent variable is the (log) odds of being employed in a concentrated occupation. The neighborhood-level characteristics are presented in Table 24.
*legend: *p<.05; ** p<.01; *** p<.001*

(2) White

At the individual-level (Table 23), white males have a greater likelihood for occupational concentration than females. Older whites are slightly more likely to be concentrated, as are married whites. Those with longer commute times are also slightly more likely to be concentrated in a particular occupation, and those with at least a high school education have a greater likelihood to be concentrated than are those with lower educational attainment levels.

Table 24: Regression results for tract-level characteristics 2007-2011

	African American only	**White only**
African American population tract	.000	-.000
High school degree or higher tract	-.000	-.000
Public transportation utilization tract	-.001	.003***
African American employees tract	-.000	.000
Tract contains or adjacent to tract containing public housing development	.090	.001
Section 8 development units tract %	-.004	.015
Housing choice vouchers tract %	.007	-.049***
Other subsidized housing units tract %	.033	-.061*
Mean tract flood level	-.016	.034
constant	-.541***	-.816***
chi2	137.760	249.249
N	4,019	11,558

The dependent variable is the (log) odds of being employed in a concentrated occupation. The individual-level results are presented in Table 23.
*legend: *p<.05; ** p<.01; *** p<.001*

At the neighborhood-level (Table 24), the percentage of Housing Choice Vouchers as a proportion of a tract's total housing units corresponds with a lower likelihood for occupational concentration of whites. Specifically, with a 1% increase in voucher units, the likelihood for concentrated decreases nearly 5% (=1-exp(-.049)). Likewise, with more vouchers as a percentage of a tract's total housing units in a white individual's neighborhood of residence, the likelihood of their occupational concentration decreases by 5%. Other subsidized housing units as a percentage of the tract's total housing units also exhibits a negative relationship with the probability for white occupational concentration. Specifically, a 1% increase in other subsidized housing units leads to a 6% decrease, (1-exp(-.061)), in the likelihood for white occupational concentration.

(3) Differences between African Americans and Whites

At the individual-level (Table 23), females have a lower likelihood (1-exp(-.110)) than males to be concentrated in a particular occupation. When African Americans and whites are combined into a single model, no other individual-level variables are significant.

Table 25: Regression results for the combined model 2007-2011

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	-.349*** (sd=.211)	.158 (sd=.210)
African American population tract	-.000	.000
High school degree or higher tract	-.000	.000
Public transportation utilization tract	.001	-.001
African American employees tract	-.000	-.000
Tract contains or adjacent to tract containing public housing development	-.004	.080
Section 8 development units tract %	.002	-.013
Housing choice vouchers tract %	-.024**	.031**
Other subsidized housing units tract %	-.018	.068*
Mean tract flood level	.014	-.023
chi2	108.586	
N	15,577	

The dependent variable is the (log) odds of being employed in a concentrated occupation. The individual-level results are presented in Table 23.
*legend: *p<.05; ** p<.01; *** p<.001*

There is no significant difference between African Americans and whites in their probability of working in each group's occupational niches (Table 25). At the census tract-level, there is one important variable that explains the occupational concentration of whites and African Americans. The percentage of a tract's housing units that are Housing Choice Vouchers has a negative relationship with the likelihood of occupational

concentration of whites in comparison to African Americans. Specifically, with a 1% increase in voucher units in a tract of residence, the likelihood for white occupational concentration decreases 2% (1-exp(-.024)).

Compared to whites, when the percentages of Housing Choice Vouchers and other subsidized housing units as proportions of a tract's total housing units increase, their residents' probability of working in African American occupational niches will significantly increase. Specifically, with a 1% increase in vouchers, African American occupational concentration likelihood increases 3% (exp(.031)-1). With a 1% increase in other subsidized housing units, the likelihood increases nearly 7% (exp(.068)-1). This finding indicates that African Americans are more strongly impacted by the presence of these programs than are whites, and the impacts are negative which actually reinforces African American occupational segregation.

Discussion and Conclusions

In sum, many characteristics impact the likelihood for occupational concentration at varying scales. As discussed previously, occupational concentration means very different things for African Americans and for whites, a manifestation of racial inequality in and of itself, and the significant variables must be interpreted with this opposing directionality in mind. Pre-Katrina, African Americans are more likely to be concentrated in low-skill, non-professional occupations such as truck drivers, cashiers, medical support, janitors, cooks, maids, warehousing, security and construction to name a few of the top 25 concentrated occupations. In direct contrast, whites are most likely to be concentrated in high-skill, professional occupations such as sales, lawyers, managers

(construction, general/operation, financial, marketing/sales, construction), and insurance to name a few of the top 25 white concentrated occupations.

Post-Katrina, African Americans remain heavily concentrated in low-skill, low-wage occupations (truck drivers, cooks, medical support, cashiers, warehousing, janitors, security, maids, store clerks), with some new additions in lower levels of the professional sector (licensed practical nurses, preschool/kindergarten teachers, tellers, medical assistants and technicians). The increased presence of African Americans in these occupations with a decline in the overall population of New Orleans indicates some diversification in occupations to the higher-skill, more professional realm, which is a departure from patterns observed in 2000. Whites remain concentrated in high-skill, professional occupations such as managers in a variety of industries, lawyers, chief executives, and sales representatives. As noted previously, a new addition to the post-Katrina concentrated occupations for whites is administrative assistants, which has the largest representation of whites compared to all other occupations, and is a lower-skill occupation whites are heavily concentrated within that was not present in the pre-Katrina white occupation list. The additions of higher-skill occupations African Americans are concentrated within and the lower-skill additions for whites could be an indication of lower levels of socioeconomic inequality between the groups post-Katrina, and at the very least points to a slightly restructuring local labor market.

Examining the relationship between occupational concentration and public housing and other subsidized housing programs, there are several important relationships to note pre-Katrina. Combined, those living in a neighborhood that contains or is adjacent to a neighborhood containing public housing are less likely to be concentrated in an

occupation; in comparison, however, African Americans are more likely to be concentrated when they live near public housing than are whites, an indication of inequality between groups. Examining the groups separately, we find African Americans are more likely to be concentrated while whites are less likely to be concentrated, which are negative effects from public housing's presence for each group. Before Katrina, when most public housing in New Orleans was located in fully subsidized developments, living near these developments had a negative impact on labor market outcomes for both African Americans and whites, in this case in the types of occupations in which they are employed. Particularly for African Americans, this increased likelihood to be concentrated in a low-skill, low-wage occupation could be the result of persistent inequality and the lack of human capital, social capital, and job information networks in traditional public housing developments (Curley 2005, 2009; Saegert and Wilkel 1998; Tach 2009).

Also significant pre-Katrina is that the presence of Section 8 vouchers more strongly impacts the likelihood for African American occupational concentration. In the combined model this is not a significant predictor for occupational concentration, however separately, the presence of Section 8 vouchers in a neighborhood leads to a higher likelihood for concentration for African Americans and a lower likelihood for whites, a very similar relationship to that found for proximity to public housing. Again, this indicates both African Americans and whites are negatively impacted by the presence of this subsidized housing program, and inequality persists in that the impact of this particular program is stronger for African Americans.

Post-Katrina, the separate models did not show significant relationships between public housing developments and occupational niching processes. Still, compared to whites, living near higher percentages of voucher and other subsidized housing units reinforces African American disadvantage and is related to a greater likelihood to be concentrated in low-skill, low-wage occupations. In this case, subsidized housing programs are in some way related to long-standing racial inequality in labor market processes. The redevelopment of public housing developments after Katrina may be the reason the public housing variables are not significantly involved in these processes, although the results are consistent with past, inconclusive work attempting to determine if mixed-income developments are a viable tactic to promote favorable labor market outcomes in areas long characterized by discrimination, inequality, and economic distress (Van Ryzin et al. 2003; Clampet-Lundquist 2004; Tach 2009; Turney et al. 2006; Curley 2005; Galster and Zobel 1998; Varaday et al. 2005).

Given the very different occupational concentration patterns for African Americans and whites, it is not surprising the socioeconomic characteristics relating to occupational concentration have different directions. Pre-Katrina, older, married individuals with higher levels of educational attainment are less likely to be concentrated in an occupation if they are African American and more likely to be concentrated if they are white. For both groups, females are less likely than males to be concentrated in an occupation; this finding may indicate African American females hold an advantage over males in labor market outcomes, or at least in the type of occupation they hold.

Post-Katrina, the findings are nearly identical with two exceptions related to African Americans: age and gender are no longer significant predictors of occupational

concentration. While these variables remain important in explaining white concentration, their absence for African Americans may indicate an equalization is occurring between males and females, which is partially supported by the finding that post-Katrina African American females are slightly more likely than males to be employed.

The opposite directionality for African Americans and whites continues when examining the accessibility-related variables. Pre-Katrina, African Americans with longer commute times are less likely to be concentrated, indicating longer commutes lead to better labor market outcomes; for whites, those who commute longer are more likely to be concentrated, which also leads to more favorable outcomes. As far as public transportation ridership, African Americans who use public transportation are more likely to be concentrated and whites are less likely to be concentrated, indicating for both groups public transportation utilization has detrimental effects and may indicate physical and social separation from favorable labor market outcomes (Mouw 2000). Particularly for African Americans, this physical and social separation contributes to greater joblessness, lower wages, and may encourage employment in low-wage, racially concentrated occupations that remain accessible (Van Ryzin et al. 2003; Reingold 1997; Thomas and Ong 2006; Tilly et al. 2001). Post-Katrina, commute time remains an indicator for positive labor market outcomes, with longer commutes helping both African Americans and whites. Public transportation utilization, however, is no longer significant for either group. The fact public transportation usage impacts earnings levels post-Katrina indicates it is still a significant factor in labor market outcomes for these groups, but in terms of occupational concentration it is no longer significant in predicting likelihoods for concentration.

CHAPTER 8: RESULTS FOR JOB EARNINGS

Results before Hurricane Katrina (2000)

(1) African American

There are several significant variables that have relationships with job earnings for African Americans (Table 26). Both older and married African Americans are more likely to have higher job earnings than younger or single African Americans. Higher education levels also are related to higher job earnings levels for African Americans, and females are associated with lower job earnings than are males.

Table 26: Regression results for individual-level characteristics 2000

	African American only	**White only**	**Combined African American and white**
Female	-.092***	-0.048	-.064**
Age	.012***	0.001	.004***
Married	.196***	.169***	.180***
Commute time to work	0.001	.005***	.004***
High school degree or higher	.535***	.811***	.684***
N	15,088	35,287	50,375

The dependent variable is (log) job earnings. The neighborhood-level characteristics are presented in Table 27.
*legend: *p<.05; ** p<.01; *** p<.001*

At the census tract-level (Table 27), the only significant subsidized housing-related variable in the African American job earnings model is the share of low-income housing tax credit (LIHTC) units as a percentage of a tract's total housing units. As the percentage of LIHTC units increases, job earnings of African Americans decrease by less

than 1% (-.008). This negative relationship indicates the presence of this type of subsidized housing limits the likelihood for higher job earnings for African Americans. This is interesting given the foundation of the LIHTC program in locating subsidized housing in neighborhoods with more favorable socioeconomic characteristics.

Table 27: Regression results for tract-level characteristics 2000

	African American only	**White only**
African American population tract	.000***	.000*
Hispanic population tract	.000*	.001**
Construction employment tract	-.001**	-.001***
Public transportation utilization tract	-.001***	-.001***
Traditional public housing development units tract %	-.001	-.000
Low income housing tax credit units tract %	-.008*	0.008
Constant	9.659***	9.792***
chi2	479.364	478.073
N	15,088	35,287

The dependent variable is (log) job earnings. The individual-level results are presented in Table 26.
*legend: *p<.05; ** p<.01; *** p<.001*

The presence of a co-racial population, in the form of number of African Americans in the census tract of residence, is associated with higher job earnings for African Americans. Also significantly associated with higher job earnings is the presence of a Hispanic population in the census tract of residence, indicating that tracts with larger minority populations could be conducive to higher earnings for African Americans. Higher construction employment at the tract-level is negatively associated with job earnings for African Americans, indicating this industry's presence is associated with limited economic prosperity for African Americans who live near this type of

employment. A higher share of public transportation utilization to travel to work in the census tract of residence is associated with lower job earnings for African Americans. This finding may indicate neighborhoods with higher public transportation utilization rates also are more likely to contain lower income individuals, and in this case it appears public transportation utilization is in some way associated with the job earnings of African Americans negatively.

(2) White

There are a few significant variables for job earnings of whites at the individual-level (Table 26). Married whites are associated with higher incomes than are single whites. Another characteristic that leads to higher earnings levels is educational attainment; in the case of whites in New Orleans, a high school degree or higher is associated with higher job earnings. Whites with longer commute times are slightly more likely to have higher incomes than those with shorter commutes. This finding could be the result of suburbanization of households and job opportunities: whites with higher earnings may be travelling from suburbanized household locations to inner-city employment opportunities, or conversely they may be travelling from inner-city household locations to suburbanized employment. Either way, whites who travel further to work tend to make more than those with shorter commutes, indicating they are not living and working in the same local context.

The neighborhood-level variables that impact levels of job earnings for whites are similar to those found to impact African American earnings (Table 27). The share of a tract's population that are African American or Hispanic are associated with higher job earnings for whites. This finding is very interesting given the somewhat segregated nature

of minorities in the New Orleans MSA, and may indicate some positive impacts from whites living in neighborhoods with more diverse racial and ethnic group representation. Employment in the construction industry in the tract of residence has a negative relationship with higher white job earnings. This finding is not surprising given the low-wage, low-skill nature of the construction industry, so that whites living near pockets of construction employees may themselves be living in less socioeconomically advantaged neighborhoods with lower job earnings than in other neighborhoods inhabited by whites. Similarly to the relationship observed for African Americans, the share of a tract's population utilizing public transportation to travel to work is negatively associated with job earnings for whites, so those who rely on public transportation to travel to work generally tend to have lower incomes than those who utilize alternate means. The presence of public housing programs is not found to have a significant impact on white job earnings in the pre-Katrina model.

(3) Differences between African Americans and Whites

Combining both African Americans and whites into a single hierarchical linear model, there are several individual-level variables that are significant predictors of job earnings for both groups (Table 26). Females earn less than males, and older, married individuals are more likely to have higher earnings than younger, single individuals for both races. Educational attainment has a significant, positive relationship with job earnings for both races. Longer commute times also significantly impact job earnings for both races, with longer commutes leading to higher incomes for both groups.

Table 28: Regression results for the combined model 2000

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	9.741*** (sd=.234)	-0.069 (sd=2.176)
African American population tract	.000*	0.000
Hispanic population tract	.001**	-.000
Construction employment tract	-.001***	0.000
Public transportation utilization tract	-.001**	0.000
Traditional public housing development units tract %	0.000	-0.001
Low income housing tax credit units tract %	0.008	-.015
chi2	791.855	
N	50,375	

The dependent variable is (log) job earnings. The individual-level results are presented in Table 26.
*legend: *p<.05; ** p<.01; *** p<.001*

As indicated by the intercepts (β_0 and β_1), with all other variables held constant, job earnings for African Americans are not significantly different from those for whites (Table 28). Overall, the shares of a census tract's total population that are African American or Hispanic are significant, positive predictors for higher job earnings for whites in comparison to African Americans. Construction employment in a tract has a negative influence on earnings levels for whites compared to African Americans, which is not a surprising finding given this industry's position in the lower levels of the labor market hierarchy. The share of a tract's population who utilize public transportation to travel to work is negatively associated with job earnings for whites, so that where a larger proportion of a tract's total population utilizes public transportation to travel to work, the income levels for whites in comparison to African Americans are likely to be lower than in areas with lower utilization of public transportation. Comparing the relationships for

African Americans to those for whites as a reference group, there are no significant variables. This finding indicates neighborhood-level characteristics do not influence African Americans more than whites when predicting levels of job earnings.

Results after Hurricane Katrina (2007-2011)

(1) African American

The 2007-2011 job earnings model for African Americans has several significant predictors for job earnings at the individual-level (Table 29). Older African Americans have slightly higher job earnings than younger African Americans. Educational attainment has a significant, positive relationship with job earnings. Usage of public transportation by African Americans is negatively associated with job earnings.

Table 29: Regression results for individual-level characteristics 2007-2011

	African American only	**White only**	**Combined African American and white**
Age	.011***	.004*	.006***
Married	.045	.248***	.194***
Commute time to work	.002	.004***	.004***
High school degree or higher	.408***	.843***	.660***
Utilize public transportation	-.372**	-.213	-.330**
N	4,019	11,558	15,577

The dependent variable is (log) job earnings. The neighborhood-level characteristics are presented in Table 30.
*legend: *p<.05; ** p<.01; *** p<.001*

At the neighborhood-level, there are two significant predictors for African American job earnings (Table 30). The share of a census tract's population who are African American has a negative relationship with job earnings. Also, a higher share of individuals with at least a high school degree is associated with slightly higher job earnings for African Americans, which could be a proxy for higher socioeconomic status

in these neighborhoods. None of the subsidized housing variables are significant predictors for African American job earnings post-Katrina.

(2) White

The 2007-2011 job earnings model for whites demonstrates many similar significant relationships as the African American model at the individual-level (Table 29). Older whites are slightly more likely to have higher incomes than are younger whites, and those who are married are associated with higher incomes than are those who are not. Higher educational attainment also leads to higher job earnings for whites. Additionally in the white model, those with longer commute times are slightly more likely to earn higher incomes, which is similar to the pre-Katrina results.

Table 30: Regression results for tract-level characteristics 2007-2011

	African American only	**White only**
High school degree or higher tract	.000**	.000*
Construction employment tract	-.000	-.001**
African American population tract	-.000***	-.000***
Traditional public housing development units tract %	-.003	-.006
Tract contains or adjacent to tract containing public housing development	-.121	.112
Housing choice vouchers tract %	.002	-.016*
Mean tract flood level	.007	.004
constant	9.960***	10.244***
chi2	107.738	245.552
N	4,019	11,558

The dependent variable is (log) job earnings. The individual-level results are presented in Table 29.

*legend: *p<.05; ** p<.01; *** p<.001*

At the tract-level, there are several significant variables that are associated with job earnings for whites (Table 30). The share of individuals in the tract of residence with at least a high school degree or more is positively related to higher job earnings for whites. Conversely, a tract's construction employment is negatively associated with white job earnings in that tract. The share of a tract's population that is African American has a negative relationship with the job earnings for whites, so more African Americans in their residential neighborhood are associated with lower earnings for whites. The share of Housing Choice Vouchers (HCV), formally known as Section 8 vouchers, of a tract's total housing units has a negative association with job earnings for whites, or a 2% lower likelihood for earnings. This suggests that with more HCVs in the tract of residence, whites' job earnings are more likely to be lower than in those tracts without a strong presence of this type of subsidized housing.

(3) Differences between African Americans and Whites

At the individual-level (Table 29), older, married African Americans and whites are more likely to have higher earnings than younger, single individuals in both racial groups. African Americans and whites with at least a high school education earn approximately 66% more than those with less education in both groups. Similarly, African Americans and whites with longer commute times to work are slightly more likely to have higher job earnings than those with shorter commutes. Individuals of both races who utilize public transportation to travel to work earn 33% less than those who utilize other transportation means.

As indicated by the intercepts (β_0 and β_1), with all other variables held constant, African Americans are more likely to have lower job earnings than whites. At the tract-

level (Table 31). Higher shares of individuals in a tract of residence with at least a high school degree or more are associated with higher income levels for whites in comparison to African Americans. The share of individuals employed in the construction industry in the tract of residence is associated with slightly lower income levels, <1% lower, for whites in comparison with African Americans. Similarly, the share of African Americans living in the tract of residence is associated with a slightly lower likelihood of income levels for whites in comparison to African Americans. This finding indicates that residents in the neighborhoods with a larger share of African American population tend to be poorer.

Table 31: Regression results for the combined model 2007-2011

	Intercept for β_0 (whites)	**Intercept for β_1 (difference between African Americans and whites)**
Intercept	10.111***	-.303**
High school degree or higher tract	.000*	.000
Construction employment tract	-.001**	.000
African American population tract	-.000***	.000
Traditional public housing development units tract %	-.006	.003
Tract contains or adjacent to tract containing public housing development	.107	-.219*
Housing choice vouchers tract %	-.016*	.018*
Mean tract flood level	.004	.004
chi2	376.776	
N	15,577	

The dependent variable is (log) job earnings. The individual-level results are presented in Table 29.
*legend: *p<.05; ** p<.01; *** p<.001*

Comparing whites to African Americans, a 1% increase in HCVs is associated with 2% lower incomes for whites in comparison to African Americans. Comparing

African Americans to whites, the percentage of HCVs in a tract of residence is associated with higher earnings for African Americans (nearly 2% higher). This finding could indicate HCVs are in fact directing African Americans to neighborhoods with better socioeconomic characteristics, or at least earning potential, post-Katrina. Conversely, living in a tract containing or adjacent to a tract containing traditional public housing developments is associated with lower job earnings, nearly 22%, for African Americans in comparison with whites. This result indicates that for African Americans, the presence of public housing, in this case most likely a mixed-income development, is associated with lower job earnings despite the program's aim at increasing the socioeconomic status of residents. This result also indicates that while whites have a positive association with proximity to mixed-income public housing, African Americans have the opposite relationship.

Discussion and Conclusions

Inequality in wages between African Americans and whites is commonly accepted, and the study's variables impact earnings of each group differently, presumably due in part to this long standing inequality. The relationship between job earnings levels and the presence of public housing is not pronounced pre-Katrina, with no significant programs. Post-Katrina, there are several interesting relationships between subsidized housing programs and earnings likelihoods. For African Americans, living in a census tract containing or adjacent to a tract containing a public housing development, most likely a mixed-income development, leads to lower job earnings than for those who do not live proximate to these developments. This finding indicates inequality in wages based on the location of public housing and does not support the goal of mixed-income

developments which is to improve the socioeconomic status of residents. This finding does coincide with prior research that has found little evidence these neighborhoods have positive impacts on African American residents (Curley 2005; Reingold et al. 2001; Clampet-Lundquist 2004). While the presence of public housing was not negatively associated with job earnings before the storm, its relationship with lower earnings after the storm indicates that while public housing is being redeveloped in New Orleans, positive impacts from that redevelopment are not being observed as far as the job earnings of African Americans living near these developments is concerned and inequality in wages persists. The lack of a positive relationship after large-scale mixed-income redevelopment could be the result of decades long segregation of low-income African American residents and social isolation from higher-income individuals (Joseph 2006; Curley 2005), which may require more time to reverse the impacts from and see improvements in job earnings than has passed in the time periods utilized in this analysis.

In addition, a negative relationship is observed between the percentage of HCVs used in a neighborhood and job earnings for whites, while the relationship is opposite for African Americans. HCVs are intended to offer recipients more housing choices than they would typically have access to in traditional subsidized housing developments, and the hope is recipients are able to find housing options in neighborhoods of better socioeconomic standing. We know this is not usually the case as landlords in these neighborhoods often refuse to accept HCVs, and the effect often clusters low-income residents in neighborhoods of lower socioeconomic standing, promoting racial inequality. The relationship between vouchers and African American earnings, however, indicates a positive association does exist, while public housing proximity is associated with lower

earnings. These findings could indicate some success in increased interactions with individuals of higher human capital levels by voucher users, which admittedly is a central premise of mixed-income redevelopment programs (Reingold et al. 2001; Anil et al. 2010; Levy et al. 2010; Ziersch and Arthurson 2005; Pinkster 2009) that appears to be failing based on these results.

Additionally, many residents of public housing who were displaced from their developments following Hurricane Katrina were offered HCVs to relocate with while the developments were being rebuilt. There are no official statistics on the number of individuals who chose to retain those vouchers instead of relocating back to the renovated mixed-income developments; given the less dense design of these developments with typically only one third of units reserved for fully subsidized housing, it can be assumed that a large percentage of HCV recipients continued using those vouchers after the storm. This displacement of very low-income individuals to neighborhoods removed from mixed-income developments could very well be the cause of the relationships observed relating to job earnings. This finding will be explored further in Chapter 9, as HCVs are now the most prominent subsidized housing program in New Orleans and their relationship with positive labor market outcomes, particularly for African Americans, is important in the post-Katrina local context.

At the neighborhood-level, pre-Katrina construction employment in a tract of residence leads to lower incomes for both African Americans and whites, and this relationship is maintained post-Katrina. Post-Katrina, another influence on labor market outcomes relating to the local labor market is the share of a neighborhood's population with at least a high school degree or higher, which leads to higher earnings for both

groups. It makes sense that a more educated labor force would lead to better outcomes for those participating in and living near that pool of workers. Post-Katrina we observe this relationship whose effects were weak or absent before the storm and could speak to a restructuring of the socioeconomic composition of New Orleans' neighborhoods.

Accessibility is another factor relating to neighborhoods that is found to play a role in determining labor market outcomes. The share of a tract's population who utilize public transportation to travel to work pre-Katrina has a negative impact on the job earnings of African Americans and whites living in that tract. So, increased public transportation ridership in this case at the neighborhood-level leads to less favorable labor market outcomes, whether or not an individual himself uses public transportation. Utilization of public transportation at the neighborhood-level is not found to impact employment or occupational concentration before or after Hurricane Katrina; combining this knowledge with the individual-level relationship with public transportation explored previously, it may be said that public transportation more strongly impacts the labor market outcomes of those who utilize it, and its greater usage rates do not impact outcomes as strongly as personal usage.

Another possible explanation for the decrease in significance of public transportation usage before and after Katrina may be attributable to a mature decentralized economy in which outlying areas are becoming more accessible to low-income, minority workers, who are sometimes able to move closer to pockets of jobs as development increases in suburban locations (Covington 2009). Despite these sometimes negative connotations with labor market outcomes, the option of increased accessibility is important in New Orleans after Hurricane Katrina, with a 2006 survey finding residents

consider transit access to be an important part of rebuilding the city, with a majority indicating at least some importance lies in having streetcar or bus access in future neighborhoods (Guthrie and Fan 2013).

Based on the results found in the current and previous analysis chapters, many questions are raised regarding the perceived change in neighborhood inequality structures and effects on labor market outcomes following Hurricane Katrina in comparison to pre-storm results. An examination of the current state of New Orleans is warranted given these results, as it is clear some changes have occurred at the neighborhood-level that are causing us to see different context-dependent relationships following the storm than those we observe in the pre-Katrina models. Specifically, return rates of residents following the storm, a shifting racial and ethnic population composition, differential neighborhood recovery, and public housing redevelopment are examined in the following chapter as potential causes for the changing neighborhood-level predictors of labor market inequality this study's analyses have uncovered before and after Hurricane Katrina.

CHAPTER 9: NEW ORLEANS AFTER THE STORM

The results of this study's analyses suggest a changing neighborhood and regional environment in New Orleans in which characteristics that influenced labor market outcomes prior to Hurricane Katrina do not remain significant influences after the storm. Return rates and population growth, neighborhood redevelopment, and the changing face of public housing in the region all play some part in the altered relationships found to exist between people, place, and public housing in present-day New Orleans.

Return Rates after the Storm

Hurricane Katrina created a massive displacement for most residents of New Orleans, although the length of this displacement varied greatly. Estimates of just how much of the city's population were displaced are not consistent, although figures approximately one year following the storm estimate the city was at around 60% of its pre-Katrina population total (Fussell, Sastry, and VanLandingham 2010). As was widely reported after the storm, low-income concentrated areas (primarily in low-lying areas of the city) predominantly comprised of African Americans experienced more flood-related damage than areas with higher socioeconomic status and larger white populations, and by most accounts residents of these low-income areas were slow to return following the storm. Fussell, Sastry, and VanLandingham (2010) found return rates were heavily dependent on race and socioeconomic status, with slower rates found for those with lower educational attainment and for African Americans, and race disparities in return rates were largely due to the level of housing damage experienced, predominantly in low-lying

neighborhoods characterized by concentrated poverty and residential segregation (22). Interestingly, the study found African Americans who did not live in these low-lying, residentially segregated neighborhoods were no more likely to return after the storm.

Similarly, Stringfield (2010) found specific socioeconomic characteristics predicted the likelihood of return for evacuated individuals, with income and race having the biggest impact on return rates. These return rates have significantly altered the areas of New Orleans most heavily impacted by the storm, and it intuitively makes sense that relationships at the neighborhood-level predicting labor market outcomes before the storm would not be as pronounced or existent at all following the storm. The population present in New Orleans' neighborhoods after Katrina is decidedly different than the population before the storm, and this altered population, coupled with redevelopment of both public and private housing options, has impacts on the city and region's social and economic characteristics, including the local and regional labor market.

Shifting Racial and Ethnic Population Composition

Another factor influencing the composition of New Orleans' neighborhoods and labor markets is an increasing Hispanic population and workforce, drawn in part by increased demand in the construction sector post-Katrina. Prior to Hurricane Katrina, New Orleans had a small Hispanic population, being classified as a small Latino place by Suro and Singer (2002), with a slow Hispanic growth rate and overall baseline population (Gleave and Wang 2013). In 2000, New Orleans was a bi-racial metropolitan area, comprised primarily of African Americans and whites, 38 percent and 57 percent respectively, and a very small Hispanic population (4 percent) (U.S. Census Bureau 2000; Gleave and Wang 2013). In the wake of Hurricane Katrina, when the New Orleans metro

lost nearly 15 percent of its total population 2000-2010, the Hispanic population increased: a 57 percent increase from 2000-2010 and an increased overall population share of 8 percent (Frey 2011; Gleave and Wang 2013).

This influx of Latinos to New Orleans is predominantly attributed to the surge in demand for low-skill construction and related industry workers after Hurricane Katrina (Martin 2014; Sisk and Brankston 2014; Fussell 2009). While African American residents were displaced across the country following the storm, a huge influx of Latino workers arrived, drawn by the rebuilding process (Martin 2014). Termed "hurricane chasers" by some, the vast majority of this workforce work to demolish and repair or replace damaged roofs, water- and flood-damaged buildings, and remove debris (Fussell 2009, 375). This work is urgent in nature, and reveals a subset of the Hispanic workforce who are generally foreign-born and are highly mobile to the demand for sudden-onset labor, such as that needed following Katrina (Fussell 2009). Long-term, it is not understood how much of this labor force will remain after the majority of the work is complete, but what is known is that the sudden influx of a segment of the population not historically a major part of a city and region's composition has far-reaching impacts on local neighborhoods and the labor market, particularly as these individuals typically occupy the “underclass” who live at or below the poverty line (Martin 2014).

According to Sisk and Brankston's (2014) study of New Orleans' construction industry before and after Katrina, the probability of native-born white and African American workers to be employed in the construction industry remained stable before and after the storm. After the storm, Latino immigrants were much more likely to be concentrated in lower-level positions in the construction industry, while the relative

position of US-born workers increased. These findings can be related to the findings regarding the construction industry in this study: pre-Katrina, the percentage of construction employment in a neighborhood actually decreased the likelihood for employment for African Americans and whites, although post-Katrina this relationship was no longer significant, indicating some shift at both the neighborhood- and local labor market-levels, which could be attributed to the increasing foreign-born Hispanic labor force.

In regards to earnings, an increased share of construction employment at the neighborhood-level led to lower levels of earnings both before and after Katrina. Examining this finding alongside Sisk and Brankston's finding that whites and African Americans' relative position within the construction industry occupational hierarchy improved after the storm, it is possible that while the skill-level required for these jobs increased, the pay did not increase at a similar rate. It is also possible the presence of Latinos in neighborhoods with higher shares of construction employment bring down the overall mean earnings in the area due to their concentration in the lowest paying occupations.

Differential Neighborhood Recovery

The increased presence of Latinos in the labor market following Katrina is largely attributed to the redevelopment efforts occurring in the New Orleans area as a result of the storm. These redevelopment efforts, coupled with low return rates of specific groups of neighborhood residents following the storm, are changing the face of New Orleans' neighborhoods and in turn the local labor market. Hurricane Katrina caused a flurry of reconstruction and redevelopment mimicking a major neighborhood change, and the

storm effectively destabilized many neighborhood ties and structures allowing for redevelopment to occur at a faster pace than is normally observed in a non-disaster response neighborhood redevelopment effort (Guthrie and Fan 2013).

As has been discussed previously, historical socio-demographic disparities in New Orleans, related to race and class most predominantly, led to the social and physical disaster of Hurricane Katrina, which impacted the most socially marginalized populations the hardest, sometimes independently of flood damage (Finch, Emrich, and Cutter 2010; Green, Bates and Smyth 2007; Chamlee-Wright and Storr 2009). As a result of being the hardest hit by the storm, these groups have experienced not only a lagged return to the city and region but also a delayed physical neighborhood recovery.

In a study of neighborhood socioeconomic characteristics and physical damage as a result of flooding, Finch, Emrich, and Cutter (2010) find those neighborhoods with higher socioeconomic status and less flooding, in addition to some low socioeconomic status neighborhoods with high levels of flooding, are recovering the fastest. Neighborhoods at the middle of the socioeconomic spectrum are those found to be recovering the slowest. Higher income neighborhoods have personal capital and sufficient insurance coverage to invest in redevelopment and low-income, socially vulnerable neighborhoods have received high levels of government and private funding to recover; these "in-between," often working-class, neighborhoods are left without public or personal assistance to aid redevelopment efforts (2010, 198-199). In this landscape, many residents are not returning to their pre-Katrina homes, and "the geography of recovery is based on who can afford it, not necessarily who was most affected by the disaster based on flooding levels or social vulnerability" (2010, 199-200).

Green, Bates, and Smyth (2007) agree with this assessment of redevelopment in a particular section of New Orleans, the Upper and Lower Ninth Ward, which have been historically populated by low- to moderate-income African American households.

Green, Bates, and Smyth, through a survey of recovery efforts in these neighborhoods following Katrina, find physical damage alone does not explain recovery timelines, and these efforts must also be examined through the lens of economic and social inequalities that pre-date the storm, including infrastructure investments, levee reconstruction, and household financial and social capital levels (2007, 330). Green and colleagues contend slow recovery is not an indicator of a resident's willingness to return or rebuild, so that when all residents do not have an equal capacity to rebuild the act itself does not measure preferences or plans (2007, 330). This selective recovery, and the capacity to recover that is rooted in historical socioeconomic conditions and inequality, undoubtedly has massive impacts on the neighborhood environment and the local labor market, and it is expected neighborhood relationships in existence prior to the storm would be altered or severed completely following this massive change agent.

Public Housing Redevelopment

Neighborhoods in central New Orleans containing traditional public housing developments at the time of Hurricane Katrina are some of the areas of the city that experienced high levels of flooding and are recovering at a rate faster than other low-income areas heavily impacted by flood-damage, which lack the government-funded recovery capital public housing neighborhoods have received since the storm. As stated in a previous chapter, the majority of New Orleans' public housing before Katrina was outdated and in disrepair, with financial mismanagement and corruption, poor

maintenance and neglect characterizing the Housing Authority of New Orleans (HANO) (HUD 2007, 1).

At the time of Katrina, HANO was in the process of redeveloping the largest public housing developments in the city to mixed-income, mixed-use developments. After Katrina, only one of these revitalized developments effectively survived the storm without needing large-scale repairs, and previously revitalized developments in addition to lower priority developments not yet redeveloped all needed considerable repairs, in many cases total demolition and rebuilding (Popkin et al. 2006). In the spirit of mixed-income redevelopment, in which the majority of previously fully-subsidized units are reallocated as assisted or market rate units, it is estimated post-Katrina New Orleans has less than 1,000 fully subsidized units available, down from the pre-Katrina number of over 12,000, making New Orleans one of the top cities in public housing removal 1990-2007 (Goetz 2011b).

The conversion of public housing to mixed-income developments is often targeted in areas identified as the most poised for higher income redevelopment, primarily near central cities, where gentrification almost always accompanies the redevelopment effort (Goetz 2011a). In New Orleans, the majority of public housing units are located in the central city and are thus attractive targets for mixed-income, mixed-use redevelopment efforts, an attempt at "French Quarterizing" the neighborhoods surrounding the Quarter that have historically been characterized by segregation and concentrated poverty. The immediate result of these redevelopment efforts is a less dense neighborhood structure with a variety of housing and business options and limited residential segregation. The evidence suggests, however, the residents of these new neighborhoods are not original,

and original residents of public housing are reconcentrating in other low-income neighborhoods (Goetz 2011b), frequently in suburban locations. In New Orleans, based on these patterns and return rates, it can be assumed that a new neighborhood socioeconomic structure would greatly alter labor market outcomes previously dependent on neighborhood-level characteristics, especially with the presence of public housing.

As is observed in the employment and occupational concentration models, public and subsidized housing-related measures are much less a predictor for these outcomes after Hurricane Katrina than they were prior to the storm, and this result can in part be explained by the massive overhaul of many neighborhoods following the storm that previously contained public housing. Earnings are impacted by public housing's presence more following Katrina than they were prior to the storm. For African Americans, living near a neighborhood containing a public housing development leads to lower levels of job earnings, a relationship that did not exist prior to the storm. Conversely, African Americans living in tracts with higher usage rates of Housing Choice Vouchers are likely to have higher earnings than those living in areas with less vouchers following Katrina, while whites' earnings suffer in the presence of vouchers. These findings indicate that in terms of job earnings, subsidized housing programs do impact labor market outcomes post-Katrina, while they do not maintain a significant relationship, positive or negative, with outcomes related to overall employment and occupational concentration.

The current state of New Orleans' changing face of public housing remains a work in progress. Prior to Katrina, there were 5,146 households living in public housing in New Orleans; in August 2013, that number had been cut more than by half to approximately 2,000, with a small percentage (11%) living in the largest four complexes

both before and after the storm (Reckdahl 2013). According to numbers released by HANO, in 2011 only half of the residents from the four largest developments had returned to New Orleans at all; 20 percent were unaccounted for completely (Reckdahl 2013). Reasons for this low return rate of former public housing residents are speculative and vary: better pay and schools elsewhere, HANO's refusal to accept voucher transfers into the city during its recovery following the storm, credit and criminal history checks in the new developments, and HANO's delayed moving assistance payments to former residents, to name a few potential causes (Reckdahl 2013).

The Iberville complex stands as the last remaining major public housing development slated for redevelopment, and its revival has been stalled, primarily due to city politics and a hotly contested workforce agreement to hire local residents to assist in the redevelopment (Martin 2014). Iberville is being redeveloped using a Choice Neighborhoods grant from HUD, which replaces HOPE VI as the go-to mixed-income funding scheme; the Choice Neighborhoods grant requires HANO to track all residents during the construction and to replace all fully subsidized units one for one, both of which are departures from HOPE VI that are often criticized as weaknesses in the program (Reckdahl 2013).

New Orleans is a city and region undergoing significant social, economic, political, and structural change which is sure to continue for years to come. The previous discussion highlights four potential influences on neighborhoods that could play into shifting labor market outcome patterns before and after Hurricane Katrina: return rates, immigration, neighborhood recovery, and public housing redevelopment. Each of these facets of the local context stand to greatly impact the labor market outcomes examined in

this dissertation and provide some explanation for the significant change observed between neighborhoods and individual economic outcomes pre- and post-Katrina. The long-term impacts of the massive social, economic, and physical redevelopment effort jumpstarted by Hurricane Katrina are impossible to predict; what is certain is that as New Orleans' residents, and particularly residents of public housing, encounter the changing face of the city and its neighborhoods, their own experiences, including their economic vitality, will continue to be significantly altered by these local context-driven effects.

CHAPTER 10: CONCLUSIONS

The overall research framework for this study examined the interplay between the location of public housing developments and labor market outcomes for individuals living in or near neighborhoods containing these developments, and whether different relationships are observed in the immediate timeframe following conversion to mixed-income developments. This overarching research question is examined in the New Orleans MSA, a region initially steeped in long-standing racial inequality, residential segregation, and developing employment decentralization; in the aftermath of Hurricane Katrina, we find a region with an altered demographic make-up and restructuring urban core, the results of which we begin to observe in this study's analyses. The general hypothesis was that the presence of public housing would be associated with labor market inequality, interacting with residential segregation and employment decentralization at the local- and regional-level, and we would expect this relationship to be altered in some way after mixed-income developments replaced most traditional public housing.

Effects of public housing on the local labor market in New Orleans are significant both before and after Hurricane Katrina. Not only are traditional public housing developments found to have an effect, but other subsidized housing programs are significant as well: Low Income Housing Tax Credit (LIHTC) units, smaller developments targeted at neighborhoods with more favorable socioeconomic characteristics; Section 8/Housing Choice Vouchers (HCV), the rent assistance program tied to residents and not housing units themselves providing individuals with freedom to

choose their neighborhood and housing unit as long as the landlord will accept the voucher; Section 8 developments, whole or partial developments accepting Section 8 vouchers; and other subsidized housing, including veteran's and elderly assistance units. While the focus of this study is on relationships with traditional public housing developments, and mixed-income developments following Katrina, the effects from these other types of programs allow us to develop a fuller understanding of how subsidized housing interacts with individuals and neighborhoods to influence labor market outcomes.

Specifically, in terms of public housing's influence on neighborhoods and labor market outcomes, there are several important takeaways. The public and subsidized housing results clearly indicate shifting relationships between these programs and labor market outcomes for African Americans and whites, and neighborhood change is also implied. We see that with regards to employment, subsidized housing that seemed to matter before the storm in predicting this likelihood does not appear to have a similar impact after the storm, namely public and Section 8 housing units. Similarly for occupational concentration, before Katrina living near public housing had negative impacts for both African Americans and whites; after the storm this effect has been at least neutralized, and it is possible longitudinally we may find this relationship becoming positive, particularly given the earnings results.

For job earnings, there is no significant relationship found to exist before the storm, and following Katrina living near public housing is found to have a negative impact on job earnings for African Americans in comparison to whites. In contrast, African American job earnings levels are improved with a greater presence of Housing

Choice Vouchers at the neighborhood-level, while job earnings of whites are negatively associated with the presence of vouchers. For African Americans, job earnings are improved with a greater presence of HCVs and decreased with proximity to public housing, now most likely a mixed-income development.

In terms of employment and occupational concentration, while public housing does not become a positive predictor for favorable outcomes after the storm, it is no longer associated with negative outcomes, which was the case before Katrina and the conversion to mixed-income developments began. Coupled with changing neighborhood dynamics related to residential segregation and employment decentralization, namely local industrial structure, racial and ethnic composition, and accessibility, these public housing results clearly indicate a significant shift in New Orleans' neighborhoods in the wake of Hurricane Katrina.

The preceding analyses indicate New Orleans is a region undergoing significant change, and based on these results a major part of that change is located within the local neighborhood context, particularly in relation to labor market outcomes. Neighborhood of residence, in this case defined as a census tract, does have a role in determining the likelihood of labor market outcomes in the New Orleans MSA, at least pre-Katrina. Changes at the neighborhood-level after the storm have altered some of the relationships found to exist before the storm. While we do not see the impact of neighborhood on labor market outcomes as strongly after the storm, its presence before Katrina indicates a structure was in place within the local New Orleans labor market in which neighborhoods interacted with individual characteristics to influence outcomes for both African Americans and whites.

In terms of local industrial structure, the amount of construction employment in a tract leads to lower employment rates for African Americans and lower earnings for both African Americans and whites, and the latter relationship is significant before and after Katrina. Earnings of whites are also impacted negatively by the size of the African American workforce in their tract of residence pre-Katrina, although this relationship is not significant post-Katrina. Higher educational attainment of a tract's population leads to higher earnings for African Americans and whites post-Katrina. Racial and ethnic composition of neighborhoods also matters. Pre-Katrina, higher shares of both the African American and Hispanic populations leads to higher earnings for African Americans and whites, although these relationships are not present after the storm. The African American tract population also has a positive effect on African American occupational concentration (discouraging concentration), which is typically in the lower levels of the labor market hierarchy, both before and after Katrina. Similarly, the Hispanic population leads to less concentration of African Americans pre-Katrina.

The African American and Hispanic population shares also have negative relationships with white occupational concentration pre-Katrina, which in this case is a negative outcome because whites tend to be concentrated in higher levels of the labor market hierarchy; the negative relationship remains true for the African American population after Katrina and the Hispanic population is no longer significant. In terms of accessibility, pre-Katrina the share of a tract's population utilizing public transportation leads to lower job earnings for both African Americans and whites; there is no observed relationship between public transportation usage and the likelihood for employment or occupational concentration before or after the storm. Since public transportation is a

significant predictor at the individual-level in these models, it can be concluded that public transportation ridership has negative effects on those who utilize it, but a greater usage presence at the tract-level does not similarly impact labor market outcomes.

Individual-level socioeconomic characteristics such as sex, age, marital status, and educational attainment all lead to very specific and consistent outcomes before and after Hurricane Katrina: males typically fare better, as do those who are older, married, and have higher levels of education (greater employment and earnings likelihood, less likely to be concentrated for African Americans, more likely to be concentrated for whites). Accessibility-specific characteristics also matter, as those who utilize public transportation typically experience less favorable outcomes, while those who commute longer typically do better than those with shorter commutes.

New Orleans has experienced many changes following the storm, demographically, socially, and economically. Return rates to the region in the wake of Hurricane Katrina indicate not all of the displaced are coming back, and it is widely acknowledged the most economically disadvantaged have not returned at the same rates as other groups. At the same time, the foreign-born Latino population is increasing dramatically in New Orleans, predominantly attributable to the demand for low-skill, low-wage construction and demolition labor following the storm. The physical recovery these Latinos are facilitating is not consistent across the New Orleans area, with more economically privileged areas having been recovered very quickly while many low-income neighborhoods remain almost uninhabitable.

While many low-income neighborhoods across the city and region are slow to recover, neighborhoods containing public housing developments are demonstrating

substantial recovery rates. This recovery is based on the redevelopment of outdated and damaged public housing into mixed-income neighborhoods. These mixed-income developments are definitively changing the face of formally low-income neighborhoods characterized by residential segregation and disinvestment, although many original residents of these neighborhoods are not returning after the mixed-income conversion. This leaves many wondering what the long term impacts of these new developments will be on surrounding areas and on other areas where low-income households may now be concentrating.

Intellectual Merit

This study represents a unique contribution to studies of both labor markets and public housing, with a focus on racial inequality. Few if any labor market studies have included a consideration for public housing developments in their analyses, which informs our understanding of the interplay between people and place, in this case the neighborhood in which they live. Further, this study measures levels of labor market inequality between white and African American residents in these neighborhoods, increasing our understanding of the importance of context in perpetuating racial inequality in urban labor market processes. This study attempts to disentangle the role of public housing in metropolitan labor market processes by incorporating both individual- and neighborhood-level characteristics into its analysis, a tactic not widely adopted primarily due to data constraints. This multi-scaled perspective and research design provides a richer and better-informed lens into these relationships and how they sustain socioeconomic inequality between racial groups.

As HUD has continued converting traditional public housing into mixed-income developments, there are few studies that have attempted to measure labor market outcomes for nearby neighborhoods before and after the conversion. While this research does not explicitly test conditions before and after a development's conversion to mixed-income housing, effects from this redevelopment appear to be present in the models before and after Hurricane Katrina. Understanding how mixed-income developments impact those who live in and near them is important for the long-term evaluation and continuation of these programs, particularly with regards to the local labor market and residents' socioeconomic conditions and outcomes. Also important is HUD's new shift from the project-based HOPE VI program to the more community-encompassing Choice Neighborhoods initiative, which expands funding and efforts beyond developments and into surrounding neighborhoods. Prior experience has suggested housing redevelopment programs, in addition to addressing residential segregation, need to focus on the impact of neighborhood effects on promoting self-sufficiency and upward mobility of public housing residents (Curley 2005). This need has undoubtedly influenced the Choice Neighborhoods' vision, and studies taking these larger neighborhood-based effects into account will provide a valuable tool for policymakers as they continue to refine and develop their project-based public housing strategies.

The New Orleans region, an underrepresented area in labor market and public housing research, provides a useful case study. Many spatial analyses of urban labor markets focused on ethnic and immigrant groups are conducted in immigration gateways, such as Chinese in San Francisco (Wang 2010; Massey and Fong 1990) and African Americans, Hispanics, and/or various immigrant groups in Los Angeles (Stoll 1999; Ellis

and Wright 1999; Ellis et al. 2004, 2007). Focusing specifically on African Americans in a Southern city such as New Orleans has provided a different perspective on the widely studied phenomenon of labor market inequality. Additionally, New Orleans' public housing has not been the focus of much research to date, with studies favoring analyses in Atlanta (Keating 2000; Boston 2005; Salama 1999; Anil et al. 2010), Chicago (Rosenbaum et al.1998; Oakley and Burchfield 2009), and Baltimore (Varady et al. 2005; Turney et al. 2006; Ludwig et al. 2000) to name a few. With the city's unique racial composition and experience with the exogenous shock of Hurricane Katrina, New Orleans provides a valuable context within which to understand the interaction between public housing and labor market inequality across racial groups in a traditionally underrepresented region.

Broader Impacts

Mixed-income public housing programs have been one of the most hotly debated social welfare programs, particularly for their socioeconomic impacts on their low-income residents. This study attempted to identify some real, quantifiable economic impacts of these developments on individuals living in or near them, providing one facet of the argument for or against the effectiveness of these programs. In terms of employment status and occupational concentration, this study finds negative relationships exist with traditional public housing before its conversion to a mixed-income model. This finding could highlight increasingly positive labor market characteristics in neighborhoods which have recently undergone a mixed-income redevelopment, at least in terms of overall employment and the types of jobs individuals are concentrated within. When examining job earnings, the results indicate a negative relationship exists between

mixed-income developments and the earnings of African Americans. So while the conversion of public housing to mixed-income developments may be improving some labor market outcomes, in terms of job earnings living in or near these neighborhoods does not positively influence outcomes. HOPE VI and mixed-income redevelopment may only be addressing some of the factors that encourage labor market inequality and limit socioeconomic upward mobility, which could be the foundation for continued change in these types of programs.

HUD has recently shifted its mixed-income redevelopment focus from the project-based HOPE VI to the community-encompassing Choice Neighborhoods Initiative. Choice Neighborhoods is the next wave of public housing programs, an approach that truly champions holistic, community-based revitalization. This approach, while not novel in the realm of community planning, is quite groundbreaking in the public housing field. These programs, if conducted effectively, have the potential to halt the cycle of poverty in many urban, and increasingly suburban, neighborhoods across the nation. One facet of this effort undoubtedly must focus on the labor markets operating in such neighborhoods and how these markets are impacted by the presence of public housing developments, mixed-income or otherwise.

Understanding the economic impacts of mixed-income developments on residents living in or near these neighborhoods will assist scholars and practitioners alike in shaping these programs going forward. This understanding also allows us to begin to make policy and program recommendations to benefit public housing residents, and helps to determine what supportive services are most likely to effect change in these neighborhoods. The case study selection of New Orleans also provides an important

contribution to local public housing redevelopment efforts, as the city is readying to redevelop the Iberville complex using Choice Neighborhoods funding. In this respect, the current study is timely and offers insights into the region's current relationships between public housing and labor market inequality, and it may offer insights into useful programs to be included as part of this revitalization effort.

Limitations to the Present Study

The biggest limitation of the present study is the confounding event of Hurricane Katrina and its related treatment in the models. There is no widely accepted method with which to control for the storm in studies, especially with a consideration of spatial effects. This fact has limited the number of studies examining differences in New Orleans' conditions before and after the storm. The present study's inclusion of flood inundation variables in the models was not intended to be a definitive control for the storm; however it was intended to add a consideration to the models for the confounding effects borne onto the study area by Katrina. That the flood inundation variable was not significant in any of the models indicates, in terms of labor market outcomes, the physical damage incurred on neighborhoods as a result of Katrina does not play an explicit role in the relationships between people, neighborhoods, and the local labor market. In evaluating the current conditions in New Orleans, we learn physical damage from Katrina has had direct impacts on return rates and neighborhood redevelopment efforts, but little has been said about its effect on labor markets except for the influx of Latinos performing repair and construction work it has fostered.

Because of the only passing treatment of Hurricane Katrina in this study's models, results of this study must be carefully interpreted not as depicting direct effects of

Hurricane Katrina on labor market processes in relation to the location of public housing in the MSA; instead, the results must be presented as a window into conditions before and after a natural disaster, with only the physical destruction borne onto census tracts controlled for in the models. The socioeconomic effects of Katrina are far too complex to be incorporated into the present study, and warrant much future research with better localized "on the ground" data that is beyond the scope, budget, or intentions of the present study.

Another limitation of the present study is the lack of significant variables in the post-Katrina models in comparison to pre-Katrina. While we know New Orleans' neighborhoods are changing as a result of the continued physical reconstruction and population shifts occurring throughout the region, the models employed in this study may not be designed to adequately capture this change in a way we can use to draw appropriate conclusions. There is also the question of who we are measuring both before and after the storm; we know it is not the same populations in both datasets, and we also know after Katrina there was a massive exodus of New Orleans residents, particularly low-income and minority households, and the return rate to the region is not close to matching the total number who left in the wake of the storm. These facts beg the question then of are we comparing an appropriate population after the storm to that in place before? We have no way of answering this question beyond acknowledging the limitations of the data and interpreting results with this potential discrepancy in mind. While there are many plausible reasons why we would fail to see significant variables, particularly at the neighborhood-level, following Katrina we cannot know for sure if it is

these impacts or model limitations that have caused the lack of significant results in the post-Katrina models.

Finally, a potential limitation in the models employed in these analyses is the sample size differences between the decennial census and American Community Survey, particularly because the HLMs used are unweighted in nature. There is a possibility the much smaller sample size in the post-Katrina model using the ACS had an impact on the results we see from that model, especially in comparison to the pre-Katrina sample size and significant variables. Unfortunately we do not have any way to know for sure if the sample differences impacted the study's results, but the possibility is worth acknowledging.

Future Work

There are several potential projects based on the current study's main hypotheses that could be further explored. Utilizing confidential microdata, a study focused on examining poverty and income levels by census tract or block both before and after Hurricane Katrina would be an interesting supplement to the present study. Mapping the "new" New Orleans following the massive redevelopment caused by Katrina and comparing pockets of disadvantage before and after the storm would provide insight into how the redevelopment of low-income neighborhoods, particularly public housing developments, has shifted the geography of inequality in the region. This study would allow us to begin to evaluate the effectiveness of redevelopment efforts and know whether we are truly addressing issues such as residential segregation and disadvantage, or merely causing a migration of these households to other parts of the city and region.

While there is no publically available source of data tracking public housing residents' moving patterns and preferences before and after the storm, developing or utilizing a representative sample of these individuals and households would allow us to delve more deeply into the effects of Hurricane Katrina on a variety of socioeconomic conditions, including labor market outcomes. There are studies that use representative samples of displaced residents as a result of Katrina, but they are focused primarily on these residents' desire to return to the city and attachment to place; they are not focused on evaluating labor market outcomes before and after the move or return to the city, which would provide many interesting insights into the personal economic impacts of the storm, and supplement this study's findings.

Along these same lines, incorporating qualitative research into this study's main research questions would provide a much better understanding of just how neighborhoods have changed since the storm and where labor market outcomes fit into this change. I would have liked to have spoken with community and government organizations at least to review this study's findings and gain better insight into some of the results, but time and resources prevented this line of questioning. In the future, I would very much like to make qualitative interviews a central component of studies examining labor market outcomes and neighborhood change, as there are only so many conclusions I can draw about my results without having the benefit of on the ground knowledge in interpreting results.

Concluding Remarks

To many, the recovery of New Orleans is considered to be a reimagining of the city, with large-scale changes creating a veritable “do-over” for a city rich with history

and culture and a long-standing reputation for poverty, inequality, and crime (O'Hagan 2014). Overall, this research effort has been successful in gaining some insight into the relationships behind this cityscape, particularly between individuals, neighborhoods, and public housing in pre- and post-Katrina New Orleans. While the main research questions have begun to be answered, questions remain about the long-term impacts the massive redevelopment of New Orleans will have on neighborhoods and the local labor market. As new data are released and more studies consciously attempt to determine pre- and post-Katrina effects, our understanding of the various impacts of Hurricane Katrina on New Orleans will be improved and better solutions to improve recovery and redevelopment efforts for similar disasters will be developed.

Further research is necessary to more fully develop an understanding of the impacts of public housing on labor market outcomes, particularly examining these relationships in neighborhoods that have experienced a conversion of traditional public housing to a mixed-income development. What we know without question as a result of this study is that public and subsidized housing programs do have varying impacts on labor market outcomes for individuals living in or near these types of housing, with generally negative relationships found, particularly for the African American population. We also can say with almost certainty neighborhoods in New Orleans are different following Hurricane Katrina than they were before the storm, and these changes are only beginning to take shape and have influences on residents and the local labor market.

This research effort has attempted to measure relationships between labor market outcomes and public housing that have not been explicitly tested before. The results, while not overwhelmingly significant, do suggest a relationship exists and broadens our

understanding of the importance of place and neighborhood on the overall social and economic well-being of individuals and greater labor market processes.

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