Gentrification and crime in New York City 1980-2009

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GENTRIFICATION AND CRIME IN NEW YORK CITY 1980-2009

by

Michael S. Barton

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Submitted to the University at Albany, State University of New York
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ABSTRACT:

It is a well supported fact that crime rates in cities across the United States increased between the 1960s and 1980s before dramatically declining during the 1990s. While scholars agree that this decline occurred, they continue to debate the cause of the decline (Greenberg, 2013; Zimring, 2011). References to changes in neighborhood crime rates as a result of gentrification have been common in previous research on gentrification, but only a few studies have empirically assessed the association between gentrification and crime. Kreager, Lyons, and Hays (2011), Papachristos, Smith, Scherer, and Fugiero (2011), and Smith (2012), who utilized innovative measures of gentrification, helped to advance the understanding of how gentrification was associated with crime in Seattle and Chicago respectively, but it remains unclear whether and to what extent gentrification has impacted crime rates in New York City, which has been the focus of much of the research on gentrification in American cities. The current study addresses this issue by utilizing an innovative operationalization of gentrification that draws upon data collected from The New York Times and the United States Census Bureau and conducts a series of fixed effects regressions to determine the extent to which gentrification was associated with crime at the New York City sub-borough level during the 1980s, 1990s, and 2000s. Overall, the results show that sub-boroughs that experienced greater rates of gentrification experienced declines in all four violent index crimes that were significantly different from sub-boroughs that experienced lower rates of gentrification. Additionally, limited support is found for a positive association of gentrification with rates of larceny and motor-vehicle theft.
CHAPTER 1: INTRODUCTION

Research on crime trends has long recognized that crime rates in most major U.S. cities increased between the 1960s and 1980s, but then decreased dramatically during the 1990s. This decline during the 1990s coincides with the gentrification movement, which began to occur in earnest in most U.S. cites during the 1980s and continued during the 1990s and 2000s. Scholars have often referenced the impact of gentrification on neighborhood crime rates, but only a few studies have empirically assessed this relationship. This work has been more recently advanced by Kreager, Lyons, and Hays (2011), Papachristos, Smith, Scherer, and Fugiero (2011), and Smith (2012) who utilized innovative measures of gentrification, leading to a better understanding of how gentrification was associated with crime rates in Seattle and Chicago respectively. It is currently unclear, however, whether and to what extent gentrification has impacted crime rates in New York City, which has experienced extensive gentrification since the 1970s. The current study addresses this issue by utilizing an innovative operationalization of gentrification that draws upon data collected from The New York Times and the United States Census Bureau and conducts a series of fixed effects regressions to determine the extent to which gentrification was associated with crime at the New York City sub-borough level during the 1980s, 1990s, and 2000s, thereby utilizing a longer time frame than existing research.

Social researchers have studied the process of gentrification in major cities across the United States since the 1970s, but the topic became of special interest to urban scholars during the 1980s and 1990s. Believed to be in part a desire among middle-class individuals for inexpensive housing and access to the amenities of city life and in part a
strategy promoted by city governments seeking to revitalize deteriorated areas, 
gentrification is often understood to be “the process by which higher income households 
displace lower income [households] of a neighborhood, changing the essential character 
and flavor of that neighborhood” (Kennedy and Leonard, 2001: 5). This process has 
frequently been discussed as a reversal of urban decay that developed in the wake of the 
middle-class flight to suburban areas, which resulted in elevated concentrations of 
disadvantaged populations and increased crime rates in many inner-city areas.

Recent years have seen resurgence in popular interest in gentrification, primarily 
due to a period of economic gain in many cities during the 1990s. Indeed, for the first 
time since the 1970s, poverty became less concentrated in inner-city areas (Jargowsky, 
2003: 13). In many major metropolitan areas in the United States, the 1990s were a 
period of significant growth in immigration, which helped to reverse the trend of 
population loss in many America’s cities and resulted in an increased proportion of 
minorities. The significant expansion of credit in the home mortgage market also sparked 
increases in home ownership between 1990 and 2000 (Joint Center for Housing Studies, 
2012). Taken together, these trends set the stage for the gentrification of many urban 
neighborhoods.

In addition to resurgence in popular interest, recent years have seen renewed 
scholarly interest in gentrification. Much of the early scholarship on gentrification 
sought to explain the emergence of gentrification, which resulted in the development of 
the production and consumption explanations of gentrification. To briefly summarize 
these arguments, proponents of the production explanation have argued that gentrification 
ocurred because of the perception that neighborhoods were undervalued and that
restoration or development efforts would increase property values to their maximum potential (Smith, 1979, 1987). In contrast, proponents of the consumption explanation have argued that gentrification was the result of the increased availability of service-oriented jobs that made cities more alluring to young, primarily white, middle-class professionals as well as the corresponding amenities that city living provided (Ley, 1996). This debate is discussed in more detail in Chapter 2.

Contemporary scholarship has built upon the existing literature and focused specifically on expanding the conceptualization and operationalization of gentrification as well as exploring a wider array of outcomes related to gentrification, such as residential displacement and crime. Examples of efforts to broaden the conceptualization of gentrification have primarily involved exploring the role of non-white residents, corporations and local government as the initiators of gentrification. In operationalizing gentrification, contemporary scholars have drawn upon qualitative, quantitative and mixed methodological approaches. The greater interest in outcomes has been reflected in an increasing number of empirical studies that assess the impact of gentrification on residential displacement (Freeman 2005; 2009; Newman and Wyly, 2006) and crime (Kreager et al., 2011; Lee, 2010; Papachristos et al., 2011; Smith, 2012), which is the focus of this dissertation. Since its conceptualization, scholars have noted the potential impact of gentrification on each of these phenomena, but recent years have seen an increasing number of empirical studies focused specifically on whether and to what extent gentrification influences these types of outcomes.

The conceptualization of gentrification has been debated since its inception by Glass (1964) and current debates have been fueled by large-scale changes that have
occurred in the United States and globally over the past forty years (Hackworth, 2007; Smith, 1996). Early scholarship focused on sweat equity efforts by middle-class whites to restore homes with perceived historical character due to their architectural design, while modern studies have expanded the conceptualization to efforts by non-whites and redevelopment efforts conducted by corporations and city governments. To date, there is still no consensus on how to define gentrification (Hackworth, 2007; Lees, Slater, and Wyly, 2008).

The lack of consensus concerning the conceptualization of gentrification has allowed researchers to operationalize the process in a variety of ways. Qualitative studies of gentrification have typically identified and discussed how a single neighborhood or a small group of neighborhoods have been impacted by gentrification. In New York City, the focus of this dissertation, this strategy has been used to study gentrification in Clinton Hill (Freeman, 2006), Harlem (Freeman, 2006, Maurrasse, 2006; Taylor, 2002), the Lower East Side (Zukin et al., 2009), and Williamsburg (Curran, 2007). Outside of New York City, this strategy has identified gentrified neighborhoods in Chicago (Boyd, 2005; 2008; Nyden, Edlynn, and Davis, 2006), Philadelphia (Anderson, 1990) and London (Bridge, 2006; Hamnett and Whitelegg, 2006).

Quantitative studies have taken a much more varied approach to identifying gentrified neighborhoods. Many studies have used a threshold strategy where neighborhoods were identified as gentrifiable if they featured a particular characteristic or characteristics at the beginning of a decade and gentrified if they experienced a change in the identified characteristic or characteristics. A simple version of this strategy was used by Atkinson (2000) who considered neighborhoods that experienced gains in the
proportion of workers employed in professional occupations between two time points as gentrified. Other quantitative studies have relied on a semi-mixed methods approach by using qualitative methods to identify gentrified neighborhoods and quantitative methods to explore how the identified neighborhoods changed over time (McDonald, 1986; Sullivan, 2007).

Drawing upon only qualitative or quantitative techniques to operationalize gentrification has potentially lead to the misspecification of neighborhoods as relying purely on qualitative methods ensured that some gentrified neighborhoods were overlooked while relying purely on quantitative methods identified neighborhoods that underwent naturally occurring improvements (incumbent upgrading) as well as those that improved due to gentrification. The current study speaks to this debate by using qualitative data to inform a quantitative operationalization of gentrification. First, gentrified neighborhoods are identified through the application of census-based strategies developed by Bostic and Martin (2003) and Freeman (2005). The results of the replications of the Bostic and Martin (2003) and Freeman (2005) operationalizations are then compared to results of a simple content analysis of The New York Times for the span 1980-2009 to determine which census-based strategy better predicted gentrification. These operationalization strategies are discussed in more detail in Chapter 4.

A further limitation of the gentrification literature was that while scholars often discussed the impact of changes in neighboring areas, no study could be located that explicitly tested this assertion. Neighborhoods are not completely isolated from processes and events that occur in nearby neighborhoods and therefore, changes in one neighborhood often have implications for other neighborhoods. In exploring the spatial
impact of gentrification, this study contributes to the gentrification literature by empirically assessing whether changes in nearby areas are important predictors of gentrification.

In addition to debates concerning the operationalization of gentrification, contemporary scholars have also debated the impact of gentrification on crime rates. In many cities, crime rates enjoyed a period of decline during the 1990s and 2000s (Greenberg, 2013; Zimring, 2011). At the same time that crime rates were declining, many cities saw experienced changes associated with decreased concentrated disadvantage such as an increased number of affluent and educated residents (Jargowsky and Sawhill, 2006), expansion of owner-occupied housing (Herbert and Kaul, 2005), increased housing values, and the deconcentration of poverty (Jargowsky, 2003; Jargowsky and Yang, 2006), all of which were commonly associated with gentrification. Further, a handful of studies have anecdotally referenced changes in crime rates due to gentrification in that they stated that crime rates changed in neighborhoods as they gentrified, but did not provide evidence pertaining to how much crime rates changed (Freeman, 2006; Maurrasse, 2006; Nyden et al., 2006). Whether and how these trends were associated with neighborhood crime rates remains to be definitively decided.

A small and growing number of studies directly linking gentrification to levels of neighborhood crime exists (Table 1). Research by McDonald (1986), O’Sullivan (2005), Papachristos et al. (2011), and Smith (2012) found that gentrification was associated with decreased crime. In contrast, Covington and Taylor (1989), Lee (2010), and Van Wilsem, Wittebrood, and De Graaf (2006) found that gentrification was associated with increased crime. To further complicate this debate, Kreager, et al. (2011) found a
curvilinear relationship between gentrification and crime in that crime rates increased as neighborhoods began to experience gentrification, but then decreased after the neighborhood reached a tipping point of gentrification. Several limitations in the existing research were likely to have generated these contradictory findings.

[Table 1 is located on page 281]

The primary reason for the disagreements about the overall impact of gentrification on crime rates was that previous research analyzed the impact of gentrification on a wide array of outcomes. McDonald (1986) and Kreager et al. (2011) studied variation in aggregate levels of total crime, violent crime, and property crime. The findings of these studies were important, but were unable to account for differences in the amount of specific types of crime that contributed to aggregate crime rates, which was potentially important as previous research that has analyzed the association of gentrification and specific crimes has not produced consistent results for each of the specific crime types. For example, analysis of the association of gentrification with specific forms of violent index crimes has consistently found that gentrification was negatively associated with homicide (Papachristos et al., 2011; Smith, 2012), while assessments of the association of gentrification with robbery has found support for a positive (Covington and Taylor, 1989; Lee, 2010) or negative (O’ Sullivan, 2005; Papachristos et al., 2011) association. Therefore, in order to accurately describe the association of gentrification and crime, the association of gentrification and specific types of crime needs to be assessed. Research by Lee (2010) has been the only study to date that has done this, but this study suffered from a number of limitations discussed in Chapter 3.

A second inconsistency among previous studies pertains to the study period. For
example, Van Wilsem et al. (2006) explored neighborhood changes over the five-year period 1994 to 1999 and found that gentrification was associated with increased crime, whereas Kreager et al. (2011) explored changes over the eighteen-year period 1982 to 2000 and found a curvilinear effect of gentrification and crime. This is important to note because neighborhood change is often a gradual process and its impact on crime may not be fully uncovered in a shorter time frame. Using the short time period of Van Wilsem et al. (2006) reduced the likelihood that neighborhood changes produced by gentrification would be uncovered, while the longer period used by Kreager et al. (2011) allowed for a fuller exploration of how gentrified neighborhoods changed as neighborhood processes such as gentrification often unfold over time. In exploring intercensal changes between 1980 and 2009, the current study follows the example set by Kreager et al. (2011) while also incorporating an additional decade of data.

Differences in the findings of previous research on gentrification and crime were also partly due to differences in how gentrification was operationalized. The strategy used to operationalize gentrification has important implications because it impacted which areas were (or were not) included in analyses. For example, less restrictive operationalizations of gentrification such as that of Covington and Taylor (1989), who identified gentrified neighborhoods based upon property values, were likely to include a substantially larger number of neighborhoods than a more restrictive operationalization such as that used by Papachristos et al. (2011) and Smith (2012), who operationalized gentrification through an increase in high-end coffee shops. Further, an important limitation of each of the strategies used in previous research was that because gentrification is a more subjectively defined urban phenomenon, compared to others like

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1 A five-year average of 2005-2009 ACS data is used because these data were in 2000 Census boundaries.
concentrated poverty or residential segregation, it is heavily influenced by residents’ perceptions. The current study addresses this issue by developing an operationalization of gentrification that draws upon a fuller array of predictors of gentrification identified by the dominant explanations of gentrification in the urban sociological literature and *The New York Times*, which is attuned to how residents of New York City perceived various neighborhoods.

Differences in the findings of previous research on the gentrification and crime association may also be due to differences in the method of analysis. All of the empirical assessments of gentrification and crime have been quantitative in nature, but these studies have drawn upon a wide array of statistical techniques including descriptive analysis (McDonald, 1986), ordinary least squares regression (Covington and Taylor, 1989; Van Wilsem et al., 2006), economic competition models (O’Sullivan, 2005), negative binomial regression with lagged independent variables (Smith, 2012), instrumental variable regression (Lee, 2010), and fixed effects regression with spatial lag variables (Kreager et al., 2011; Papachristos et al., 2011). The differences among these analysis strategies allowed different claims to be made in regards to how gentrification and crime were associated. For example, results of descriptive analyses provided moderate evidence that an association existed, while more advanced techniques such as ordinary least squares regression allowed for stronger claims in regards to association. The use of descriptive statistics and ordinary least squares regression, however, did not adequately control for unmeasured variables, nor did these techniques control for the influence of time.

Sophisticated statistical techniques such as instrumental variable regression and
fixed effects regression do a better job of controlling for the influence of unmeasured variables and time, thereby reducing the potential for endogeneity and allowing for claims of causation. For example, Lee (2010) used an instrumental variable approach that incorporated the influence of changes that resulted from the 1994 earthquake in Northridge, California, which allowed him to show that gentrification resulted in short term increases in assault, robbery, automobile theft and thefts from automobiles. More recently, Kreager et al. (2011) used a fixed effects analysis strategy that incorporated measures of time and found that gentrification was associated with increased rates of crime until a neighborhood reached a particular threshold, after which crime rates began to decline. For reasons described in the methodology chapter (Chapter 4), this study follows the lead of Kreager et al. (2011) and Papachristos et al. (2011) and controls for potential endogeneity by conducting fixed effects regression analyses. In contrast to Kreager et al. (2011) and Papachristos et al. (2011), who conducted conventional fixed effects analyses that require all measures be time variant, the current study utilizes a hybrid fixed effects approach that allows for the inclusion of time invariant measures that may be equally or more important predictors of crime than the time variant measures (Allison, 2005).

An additional limitation of previous research pertains to the theoretical lens used to study the impact of gentrification on crime. Much of the previous research has been grounded in the social disorganization tradition, with the exception of O’Sullivan (2005) who did not draw upon criminological literature. The basic argument of social disorganization theory is that neighborhoods characterized by concentrated disadvantage, racial and ethnic heterogeneity, and high rates of residential mobility have higher crime
rates because these characteristics decrease the potential for community development. Residents of neighborhoods where community bonds are weaker are less likely to use or respond to informal means of social control and therefore are more likely to utilize formal controls such as the police.

Gentrification presents a problem for the social disorganization tradition because it breaks up concentrations of poverty by bringing middle-class residents into disadvantaged areas, which should lead to reductions in neighborhood crime rates. Gentrification, however, is also associated with increased racial heterogeneity and residential mobility, which are factors associated with increased crime. As the process of gentrification is associated with changes that simultaneously support and conflict with social disorganization theory, grounding studies of gentrification and crime solely in the social disorganization tradition is problematic. Instead, it makes more sense to ground studies of this relationship in urban sociological theories more generally or theories of gentrification more specifically in addition to criminological theories. This is accomplished in the current study through the selection of an operationalization of gentrification that is more heavily grounded in the urban sociological literature on gentrification.

RESEARCH QUESTIONS

The current project is a case study of gentrification and its association with neighborhood crime rates in New York City during the span of years from 1980 to 2009. It seeks to address four questions. First, what is the most accurate way to operationalize the process of gentrification? Second, what are the key determinants of gentrification? Third, how is
gentrification influenced by changes in neighboring areas? Fourth, do neighborhoods that experience greater rates of gentrification experience changes in crime rates that are significantly different from neighborhoods that experience lower rates of gentrification. Finally, how does the association of gentrification and crime vary over time?

The decision to focus specifically on New York City was made primarily because much of the research on gentrification during the past 40 years has been based on qualitative studies of neighborhoods from New York City as the shift in urban policy from demolition to urban renewal that occurred during the 1970s and resulting conversion of former manufacturing spaces to loft apartments was most prominent in New York City. Much of the research on gentrification in New York City has been qualitative and has focused on a single or a small sample of neighborhoods, most of which are located in Brooklyn or Manhattan. The findings of such qualitative studies have highlighted several important aspects of the gentrification process. Very little empirical research, however, has been done on gentrification in New York City, making it unclear whether the findings of the qualitative studies were generalizable to the rest of New York City. By conducting a quantitative study that draws upon the full population of New York City neighborhoods, the current study can identify the full complement of neighborhoods that have undergone gentrification, the factors associated with such changes, and determine the impact of such changes on crime, all of which has been overlooked by previous studies.

New York City’s designation as a “global city” is another reason that makes it an ideal case study for the study of gentrification. Sassen (2012: 7) described global cities as being central hubs in the world economy, key locations and market places for the
leading industries, and major sites of production, including the production of innovation. Historically, New York City was a central hub in the world economy due to large waves of migrants and immigrants during the nineteenth and early twentieth centuries which led to dramatic swells in the population, fueled the development of manufacturing industries and led to the creation of a racially and ethnically diverse culture. More recently, the defining feature of New York City as a global city is its centrality in the global economy due to the importance of the New York Stock Exchange, which encouraged many financial institutions to set up offices in lower Manhattan. These historical and contemporary features have important implications for the gentrification that occurred during the late twentieth century. For example, the large population lead to increased competition for space, the transition from a manufacturing-oriented economy to a service-oriented economy lead to the closure and conversion of many factories into residential apartments, and the prevalence of service-oriented occupations in New York City was attractive to young professionals, who have often served as gentrifiers.

An additional reason for studying gentrification in New York City is that much of the population relies upon public transportation. Statistics reported in the 2008-2010 American Community Survey 3-Year data show that a greater percent of New Yorkers (about 55 percent) use public transportation than residents of the Chicago (26 percent) and Los Angeles (11 percent), the second and third largest American cities respectively (U.S. Census Bureau, 2012). Foreshadowing the discussion of gentrification and access to public transportation in Chapter 2, previous research has produced divergent findings as to whether gentrification is more likely to occur near public transportation nodes.
In regards to studying the association of gentrification and crime, New York City provides an interesting case study because the declines in crime that occurred in United States during the 1990s and 2000s were more pronounced in New York City than in other American cities. Statistics presented by Zimring (2011: 16) show rates of index crimes declined in the 10 largest non-New York City cities between 1990 and 2009. Included in this grouping of cities were Los Angeles, Chicago, Houston, Philadelphia, Dallas, Phoenix, San Diego, San Jose, Detroit and San Antonio (p. 16). With the exception of assault rates, however, the declines in these cities were smaller than the declines experienced in New York City.

An additional reason for assessing the relationship of gentrification and crime in New York City is that while a great deal of gentrification scholarship has sampled neighborhoods in New York City, only one study has assessed the relationship of gentrification and crime with a sample of New York City neighborhoods. McDonald (1986) conducted a descriptive analysis of gentrification and crime with a sample of neighborhoods from five American cities, including New York City. The importance of these results for New York City was limited as the author only included four New York City neighborhoods: East Village, West Village, Upper West Side, and Park Slope. This is problematic because three of the four sampled neighborhoods are located in Manhattan and because the study did not address the issue of endogeneity that has been raised by contemporary scholars in regards to the gentrification and crime association.

A final benefit of conducting a case study of New York City has to do with methodological concerns, specifically issues with data. The current study necessitated the collection of a large amount of data as this study bridges gaps between qualitative and
quantitative studies of gentrification and between general urban and criminological research. In order to address these gaps, a unique dataset was created that draws upon an array of information sources and was only possible because of the plethora of information available on New York City.

CONTRIBUTION TO THE FIELD
The findings of the current study contribute to both the gentrification and criminological literatures. By addressing the question of the most accurate way to operationalize, the current study contributes to the gentrification literature by identifying a strategy for developing a more grounded conceptualization and operationalization of gentrification than has been used in previous research. Recent research conducted by Papachristos et al. (2011) and Smith (2012) represented a major shift in the gentrification literature by operationalizing gentrification through a combination of changes in high-end coffeeshops, a cultural symbol often associated with gentrification, in addition to census measures of neighborhood change. Reliable information on neighborhood-level changes in business is difficult and potentially very expensive to obtain, however, so the current study seeks to accomplish a similar goal by developing an operationalization of gentrification that assesses the effectiveness of two census-based measures of gentrification by comparing the neighborhoods identified by each census-based operationalization to neighborhoods identified by The New York Times. Drawing upon The New York Times to confirm which census-based operationalization allows for a more culturally grounded operationalization of gentrification, while still ensuring that
neighborhoods that experienced similar changes, but which were not recognized as
gentrified by *The New York Times*, are included.

A second contribution to the gentrification literature pertains to the spatial
analysis of gentrification. Currently, much of the spatial data analysis presented in
studies of gentrification involves displaying maps that highlight the location of the
sampled neighborhoods or the distribution of key census characteristics. Such maps are
useful, but as is commonly recognized, neighborhood changes are often the result of
changes in nearby areas. The current study takes this into account by incorporating
spatially lagged versions of the independent variables in order to demonstrate whether
neighborhood gentrification is impacted by the characteristics of surrounding areas.

By addressing the question of how gentrification is associated with changes in
neighborhood crime rates, the current study simultaneously contributes to the
gentrification and criminological literatures. Urban scholars and criminologists have
each discussed this relationship, and while each group recognizes the research done by
the other, no study to date has comprehensively linked these two literatures together. The
current study contributes to the growing literature on gentrification and crime by
correcting for this limitation and drawing upon the rich body of urban research on
gentrification and the copious literature on neighborhoods and crime developed by
criminologists.

A final contribution pertains to the analysis of the association of gentrification and
felony arrests for the seven index crimes. Previous studies have typically either explored
variation in aggregate crime rates or explored variation in a few selected crime types and
have highlighted differential impacts of gentrification. In exploring the impact of
gentrification on each crime type individually, the results of the current study help to bridge the gap between these studies.

OUTLINE OF THE DISSERTATION

Chapter 2 discusses what gentrification is, the key determinants of gentrification and how the process has unfolded in New York City. Chapter 3 discusses arguments pertaining to how and why gentrification affects neighborhood crime rates. Chapter 4 discusses the methods that used to assess the nature and extent of gentrification in New York City, the determinants of gentrification, and how gentrification affected crime rates. Chapter 5 presents the results of univariate and multivariate analyses designed to determine predictors of gentrification. Chapter 6 presents results of the analysis of the association of gentrification and crime. Chapter 7 summarizes the findings of this dissertation and discusses the implications of the findings for past and present research of gentrification and its relation to crime.
CHAPTER 2: GENTRIFICATION DEBATES

This chapter describes important debates in the gentrification literature to provide a theoretical and empirical foundation that will guide the gentrification-specific analyses conducted in this study. The first section of this chapter reviews how gentrification has been conceptualized and operationalized over the past 50 years. The key point to this discussion is that gentrification scholars have yet to come to a consensus concerning how to conceptualize or operationalize this process. The discussion of the conceptualization and operationalization of gentrification is followed by a discussion of macro-level trends in cities, which were important as these trends set the stage for gentrification during the second half of the twentieth century. After discussing trends in cities overall, factors unique to New York City are discussed to demonstrate how gentrification in New York City was potentially similar to and different from gentrification in other major cities. The final section discusses the dominant explanations of gentrification, the consumption explanation (which emphasizes changes in the composition of neighborhood populations) and production explanation (which emphasizes the value of areas), and draws upon the discussion of macro level trends in cities and factors unique to New York City to demonstrate why gentrification has been and continues to be an important source of change for New York City.

Defining Gentrification

Gentrification has been studied for close to 50 years, but scholars have yet to come to a consensus concerning how the process should be defined (Hackworth, 2007, Lees et al., 2008). Most scholars acknowledge that the British geographer Ruth Glass first identified
the process in London during the 1960s. Glass (1964: xviii) used the term to describe the “invasion” of members of the middle and upper classes into traditionally working-class neighborhoods, resulting in the displacement of incumbent residents and a change to the social character of the neighborhood. Breaking down Glass’s definition reveals two interrelated components, each of which is important for understanding the conceptualization and operationalization of gentrification that followed. The first component of Glass’s definition is that gentrification changes the social composition of a neighborhood population as traditional, working or lower-class residents are replaced by members of the middle and upper classes. The second component is that the “social character” of the neighborhood was changed. An important limitation of Glass’s definition was that she did not formally state what was meant by changes to the social character. Glass did, however, discuss changes associated with increased competition for space such as increased commercial activity, the emergence of new occupations, and improvements to or the expansion of social, educational, and ancillary services which all have potential implications for how residents and outsiders perceived the “character” of the neighborhood (p. xix). Glass’s definition was important not only because it was the first, but also because it highlighted the multifaceted nature of the gentrification process by describing changes to the people, culture and appearance of neighborhoods.

The title of an often-cited piece by Beauregard (1986), “The Chaos and Complexity of Gentrification,” succinctly summarizes the current state of affairs in defining gentrification. The primary cause of the “chaos” has to do with differences in standpoint, as researchers from an array of disciplines including anthropology, economics, geography, urban planning, and sociology have studied gentrification. The
“chaos” also has to do with methodological differences, as quantitative, qualitative, and mixed method approaches have been used to study gentrification.

Much of the debates concerning the definition of gentrification stems from differences in qualitative and quantitative approaches. Qualitative studies typically utilized complex, multidimensional definitions that frequently included a discussion of changes to the local culture, which was an important aspect of Glass’s (1964) definition. In contrast, the definitions used by quantitative researchers typically did not discuss cultural changes because of difficulties in quantifying such changes. One of the best examples of a definition used in a qualitative study that includes a discussion of culture was that of Hamnett (1984: 284), who defined gentrification as

Simultaneously a physical, economic, social and cultural phenomenon gentrification commonly involves the invasion by middle-class or higher-income groups of previously working-class neighbourhoods or multi-occupied' twilight areas' and the replacement or displacement of many of the original occupants. It involves the physical renovation or rehabilitation of what was frequently a highly deteriorated housing stock and its upgrading to meet the requirements of its new owners.

While this was one of the most comprehensive definitions of gentrification discussed in the literature, it was also one of the more complex definitions. In order to operationalize this definition, information on the physical, economic, social, and cultural aspects of a neighborhood has to be measured. While such measures can often be found independently, it is much more difficult to find a data source that allows for the “simultaneously” measurement of all of these aspects.

Discussions of cultural changes associated with gentrification often emphasized transformation of the racial/ethnic identity of the neighborhood or of the types of
businesses located in the area. Much of the research on gentrification conducted in the United States since the 1970s has focused on cultural changes associated with the transition from traditional racial or ethnic neighborhood cultures to a uniform, middle-class, white culture (McDonald, 1986; Redfern, 1997). Guided by ideas similar to those presented by Park, Burgess, and McKenzie (1967), these studies saw gentrifiers as an invading group who moved into neighborhoods characterized by concentrated disadvantage (higher rates of poverty and larger proportions of racial/ethnic minorities) and displaced the traditional residents. It has become less common for gentrification scholars to draw upon this idea because of an increased number of racial and ethnic minority gentrifiers (Bostic and Martin, 2003; Boyd, 2008), but qualitative scholars still commonly quote longtime neighborhood residents of areas undergoing gentrification who fear that their neighborhood is becoming “whitened” (Anderson, 1990; Maurrasse, 2006).

Other discussions of cultural shifts have focused on how gentrification changed the identity of neighborhoods by altering the types of businesses in the neighborhood. Curran (2007: 1431) described this kind of change in the Brooklyn neighborhood of Williamsburg, which shifted from highly industrialized to largely residential due to gentrification in the form of the conversion of warehouses to loft apartments or the replacement of industrial buildings with high-rise condominiums. Similarly, Maurrasse (2006) and Zukin (2010) described examples of gentrification replacing traditional “mom and pop” stores and restaurants with chain stores and restaurants such as Starbucks, Old Navy, and Gap. Unfortunately, due to data limitations, it is difficult to identify trends in the transition of neighborhood businesses beyond anecdotal evidence.

In addition to a greater focus on cultural variation, qualitative studies of
gentrification were more likely to discuss residential displacement when defining how the process affects neighborhoods. Qualitative and quantitative scholars have studied the potential for gentrification-related displacement, but this issue has been of much more importance to qualitative studies, as displacement has been an elusive concept to quantify. Research by Newman and Wyly (2006) has been the only quantitative study that found gentrification was associated with residential displacement, but the authors were quick to note that displacement was not widespread. The issue of residential displacement is discussed in more detail below.

In contrast to qualitative studies of gentrification, quantitative studies have typically relied on census data and therefore define gentrification in terms of neighborhood demographic changes. Simple versions of this definitional strategy have focused solely on changes to the socio-economic composition of neighborhood residents. Atkinson (2000: 149) provided an example of this by defining gentrification as the “process of class succession and displacement in areas broadly characterized by working-class and unskilled households.” Freeman and Braconi (2004: 39), who defined gentrification in terms of an increased proportion of “better-educated and more affluent residents,” provided another example. In a later study, Freeman (2009: 2079) used a slightly different definition, describing gentrification as a process that “introduces [higher income residents] into relatively low-income neighbourhoods” and which resulted in increased economic diversity in the area. Definitions such as these were limited, however, in that they ignored the fact that gentrification is a multidimensional concept.

More complex conceptualizations have recognized that the process is multidimensional. One such example was the definition of gentrification used by the
United States Department of Housing and Urban Development (HUD) (U.S. Department of Housing and Urban Development, 1979), which stated that gentrification was a “process by which a neighbourhood occupied by lower-income households undergoes revitalization or reinvestment through the arrival of upper-income households.” A comparable and more recent definition was provided by Clark (2005: 258) who defined gentrification as a

process involving change in the population of land owners such that the new users are of a higher socio-economic status than the previous users, together with an associated change in the built environment through a reinvestment in fixed capital.

Definitions such as those by HUD (1979) and Clark (2005) capture more of the spirit of gentrification as identified by Glass (1964) in that they recognized that gentrification changes the composition of neighborhood populations, but also changed the physical appearance of the neighborhood, which impacts how the neighborhood is perceived by residents as well as outsiders. Even multivariate definitions such as these, however, were limited in that while they included multiple measures of gentrification, they may not have incorporated important aspects of gentrification. This issue is addressed in the present study by exploring the effectiveness of two prominent multivariate definitions of gentrification.

To summarize this section, scholars have yet to come to a consensus concerning the definition of gentrification due to differences in how the process has been conceptualized and operationalized over the past 50 years. Differences in the conceptualization and operationalization were in part due to differences in standpoint as
gentrification has been studied by researchers from a wide array of disciplines, but mostly due to methodological reasons. Due to the focus on a single or small group of neighborhoods, qualitative studies of gentrification have been able to identify the full extent of changes that gentrification produces in a neighborhood and therefore better able to draw upon richer conceptualizations of gentrification. In contrast, quantitative studies have compared gentrification in a large number of neighborhoods, but often relied on official data sources such as census data, thereby limiting how gentrification can be conceptualized and in turn operationalized. The current study addresses this issue by grounding a census-based operationalization in qualitative data collected from The New York Times. Operationalizing gentrification qualitatively, but checking it against qualitative data allows for a richer measurement of gentrification than has been used previously.

The Role of Displacement in Defining Gentrification

Debate about whether gentrification is associated with displacement dates back to Glass (1964) who was critical of gentrification for its potential to displace working-class households. Proponents of the production explanation, which is discussed in more detail below, argue that gentrification was more likely to occur in undervalued neighborhoods and contend that gentrification-related displacement occurred because gentrification affected neighborhoods tend to be characterized by low-quality and hence inexpensive housing stock. Gentrifiers are attracted to these areas because of the low housing values at the outset and the perception of change that is occurring in the neighborhood. Once they buy housing in such areas, gentrifiers make improvements that seek to bring the
actual character of the neighborhood in line with the perceived character. These improvements increase property values, which encourage or force poorer incumbent residents to move to other neighborhoods where housing is less expensive.

Proponents of the consumption explanation argue that gentrification-related displacement occurred because of changes in the availability of jobs and the need for affordable housing (Hamnett, 2003; Ley and Dobson, 2008). The economic restructuring of the United States economy during the 1960’s and 1970s resulted in fewer low-skill manufacturing jobs in cities and a greater number of high-skill, service oriented jobs. The increase in high-skill, service oriented jobs made cities more attractive to middle-class individuals who wanted to live close to work. With a greater interest among middle-class residents in city living, competition for space increased and costs of living, such as the property values discussed in regards to the production explanation, increased to the point that incumbent residents could no longer afford to live in certain neighborhoods.

While many scholars discussed the potential for displacement, very few have directly studied the relationship between gentrification and residential displacement due to difficulties associated with tracking displacees (Atkinson, 2000 Newman and Wyly, 2006; Shaw, 2008). Qualitative research such as that conducted by Freeman (2006) and Newman and Wyly (2006) have documented a few examples of gentrification-related displacement, but they have done a much better job documenting fear of displacement. For example, in ethnographic accounts of gentrification in Harlem (Manhattan) and Clinton Hill (Brooklyn), Freeman (2006: 73) reported a “general concern about displacement” among residents, even if respondents did not believe they themselves
would be displaced. Further evidence of fear of displacement was documented in interviews conducted by Newman and Wyly (2006: 45), who noted that residents may not be afraid that they will lose their home to gentrification, so much as they are afraid they will be unable to afford to shop at the new types of shops that appear in the neighborhood as the area gentrifies.

Due to difficulties in operationalizing gentrification-related displacement, a much smaller number of quantitative studies have explored the issue of whether gentrification is associated with displacement. Using data from the New York City Housing and Vacancy Survey (HVS), Freeman and Braconi (2004) found that disadvantaged residents in gentrifying neighborhoods were less likely to move than comparable households in non-gentrifying neighborhoods. From this contradictory finding, the authors concluded that the “massive displacement” of disadvantaged households was not a necessary outcome of the gentrification process (p. 51).

Using the same data as Freeman and Braconi (2004), Newman and Wyly (2006) found that displacement rates ranged between 6.22 and 9.87, which shows that a small minority of moves in NYC during the 1990s were due to displacement-related reasons. Based upon these findings, Newman and Wyly (2006: 29) were forced to agree with Freeman and Braconi (2004) that most residents of gentrifying neighborhoods were not forcefully displaced, but stress that a displacement rate of 9.87 proved that displacement was an issue worthy of concern.

In summary, research on gentrification has yet to definitively determine whether gentrification resulted in the forced displacement of neighborhood residents or that was a widespread issue. Further, given the often cited difficulties of studying gentrification-
related displacement, this issue is not explored in the current study. Instead, the current study focuses on the factors associated with gentrification and the impact of gentrification on crime outcomes.

MACROLEVEL TRENDS IN METROPOLITAN DEVELOPMENT

Researchers have studied the process of gentrification for nearly 50 years and as such, gentrification scholarship has been heavily influenced by the large-scale changes that cities underwent during the twentieth century. The first part of this section describes the more influential trends in urbanization that have influenced thinking on gentrification. The discussion of trends in cities overall is followed by a discussion of factors unique to New York City in order to demonstrate how gentrification in New York City is similar to and different from gentrification in other cities. The section concludes with a discussion of the dominant explanations of gentrification, which have been influenced by trends in urbanization and factors unique to specific cities such as New York City.

Mid-Nineteenth Century to Early Twentieth Century

The rise of the American city has its roots in the American Industrial Revolution, which began during the 1830’s. During this time, the population of cities increased dramatically as migrants and immigrants alike flocked to cities for opportunities in the newly constructed factories. Between the start of the American Industrial Revolution in the 1830’s and its end in the 1930’s, the percent of Americans living in cities increased from about 10 percent to about 50 percent (Monkkonen, 1988: 72). This rapid increase in urban population fueled the growth of American cities and the economy, but it was also
associated with a large number of social problems such as concentrated poverty and crime.

Much of the work of the Chicago School sociologists sought to understand the causes and cures of the social problems that arose as American cities developed during the first half of the twentieth century. For the current study, the work on spatial ordering of urban populations conducted by Park, et al. (1967) was the most important as it laid the foundation for much of the research on neighborhood change. In developing the Concentric Zone theory, Park, et al. (1967) argued that the spatial patterning of cities could be understood as a series of ever-widening circles. The center circle, the central businesses district (CBD), was the most desirable for businesses because of its location near major waterways or other forms of transportation hubs. The CBD was surrounded by an area of low-income housing, referred to as the Zone of Transition and featured high proportions of immigrants and poverty-stricken residents. The Zone of Transition was surrounded by the Zone of Workingmen’s Homes, which was populated by working class residents. The Workingmen’s Homes were surrounded by the Residential Zone, which was characterized by middle-class residents. The final zone, the Commuter Zone, was a suburban area characterized primarily by middle to upper-income households.

Park, et al. (1967) found that as individuals were able to accumulate resources and improve their socioeconomic status, they tended to move away from the CBD and into housing in more affluent areas that matched their improved socioeconomic standing. Drawing upon the natural sciences, this process was explained through a series of invasions and successions (p. 5). Areas started off being inhabited by a group of residents who typically shared a common ethnic heritage. Over time, members of this
group accumulated enough resources to be able to move to areas with lower density housing that were considered to be more affluent, creating vacancies in the areas left behind. These vacancies allowed for members of different and often poorer residents to invade the area. As a greater proportion of the original residents accumulated enough resources to migrate to more affluent areas, greater numbers of minorities would move in until the original residents had succeeded the area entirely to the new group.

Gentrification scholars have discussed a similar series of invasions and successions, but the pattern of invasion and succession identified by gentrification scholars contradicts the patterns identified by Park, et al. (1967). Whereas the “invaders” identified in the traditional concentric zone theory were of a different racial/ethnic minority group and of even lower socioeconomic status, the invaders in gentrifying neighborhoods were typically white and came from higher socioeconomic backgrounds than incumbent residents. Additionally, the pattern identified by Park and colleagues showed that individuals typically moved from areas with poorer housing stock to areas with better quality housing stock. In contrast, gentrification scholars have often pointed to the poorer quality (and therefore inexpensive) housing stock in disadvantaged neighborhoods as being a draw for gentrifiers.

Mid-Twentieth Century Suburbanization

The first half of the twentieth century was a period of great development in American cities, which were viewed as places for economic opportunity and attracted large concentrations of internal migrants from rural areas and immigrants from around the world. The massive waves of migrants from rural areas and immigrants from other
countries to U.S. cities during this time resulted in large population swells in many cities. This period of intense urban population growth in cities would come to a screeching halt shortly after the conclusion of World War II.

After the end of World War II, city populations exploded due to the return of large numbers of soldiers from overseas and the resulting baby boom (Jackson, 1985: 232). The dramatic increase in population amplified competition for living space, which caused housing prices to rise to levels that were unattainable to many city dwellers. Partly in response to the overcrowding of cities and partly as a means of reviving the post-war U.S. economy, the government began to sponsor programs such as the Federal Housing Administration (FHA) and the Veteran’s Administration (VA). These programs helped many working and middle-class families finance home purchases, which fueled the development of housing in suburban areas (Boustan and Shertzer, 2013; Jackson, 1985; Rusk, 1999). Due to discriminatory housing and lending practices, the majority of people who took advantage of these programs were middle-class whites.

The migration of the predominantly white, middle-class residents to the suburbs was important for a few reasons. First, it substantially decreased the population of many cities, which in turn decreased the tax base that many city governments drew upon to fund city services. Second, the migration of whites to suburban areas increased the vacancy rates in many traditionally white-only neighborhoods, which allowed members of racial and ethnic minorities to move to areas of cities that had previously been inaccessible to them (Taeuber and Taeuber, 1967: 165). Third, this migration increased the amount of residential segregation in many metropolitan areas as cities came to be
populated primary by racial and ethnic minorities and suburban areas primary by white residents.

In addition to being characterized by a massive migration to suburban areas, the post World War II era saw a dramatic shift in the U.S. economy from the manufacturing-based economy that fueled city development to a more service-oriented economy. This shift changed the employment structure of cities from one dominated by low-skill positions to one based in more knowledge intensive activities such as finance, insurance, corporate management, law, communications, and information processing (Beauregard, 2003: 194). These knowledge intensive jobs required workers to have higher education credentials, most of who were beginning to settle in suburban areas. The decreased availability of low-skill jobs in inner-city areas exacerbated social problems such as unemployment and poverty because many of the racial and ethnic minorities who remained concentrated in cities did not have the have the education necessary for the new types of jobs available. Moreover, many of these jobs moved to the suburbs and minorities could not access the jobs, worsening their economic situation.

Neighborhood Revitalization and Neoliberalism of the Late Twentieth Century

Beginning in the 1970s, many cities began to experience revitalization after many years of deterioration and decline (Smith, 1979: 538). It was initially believed that this revitalization was the result of a “back to the city” movement by members of groups who fled to the suburbs during the post-World War II years. This explanation has been debunked, however, as scholars generally agree that much of the revitalization American cities was the result of a combination of middle and upper-class residents moving within
cities rather than to cities and increased appreciation of capital (Ley, 1996; Redfern, 1997; Smith, 1979). Further, research has shown that the stabilization of the population in cities such as New York City was at least in part due to increased immigration that occurred after immigration quotas were removed (Boustan and Shertzer, 2013; Rosenbaum and Friedman, 2007).

An alternative explanation for the revitalization of cities since the 1970s credits changes in federal urban policy that encouraged revitalization over demolition (Zukin, 1987: 132). While the terms revitalization and gentrification have been used interchangeably by urban scholars, the two concepts are quite different. As defined by Bahchieva, Livak, Lobo, and Salvo (2008: 6), revitalization refers to a “process that improves the physical, commercial, and social components of neighborhoods.” What distinguishes revitalization from gentrification is that gentrifiers have typically been seen as individuals or small groups, while revitalization efforts are orchestrated by local governments. An additional difference between revitalization and gentrification is in regard to scale as discussions of gentrification often focus on single buildings or particular parts of a neighborhood, while revitalization projects often involve the redevelopment of entire city blocks or neighborhoods.

The processes of revitalization and gentrification are related in that both resulted in large scale changes to American cities. Beginning in the 1970s and continuing into the 2000s, the federal government implemented and encouraged neoliberal neighborhood revitalization efforts that focused on projects sponsored by public-private development partnerships (Hackworth, 2007: 11). Whereas urban politics of the fifties and sixties were guided by Keynesian Welfare policies that promoted intense local government
backed development and redevelopment projects, neoliberal policies promoted individual action, market-driven changes, and a noninterventionist state (p. 10).

The implementation of neoliberal policies and programs became especially important for gentrification during the 1990s as the United States economy experienced a major recession during which time it became more difficult for individuals to finance sweat equity projects, which some scholars and popular media sources believed would produce an end to gentrification (Ley, 1996: 351). Seeking to continue the trend in redevelopment, many city governments began to sponsor or endorse projects backed by private corporations (Atkinson, 2003; Hackworth, 2007; Lees et al., 2008). These efforts were intended to reduce concentrated poverty and increase tax revenues by increasing the proportion of middle- and upper-class households in targeted areas, allowing for city officials to bolster or update city services and amenities as well as reduce the signs of urban decay in non-gentrifying neighborhoods (Atkinson 2003; Judd and Swanstrom, 2006). By encouraging redevelopment, these efforts made cities more attractive to members of the middle-class as these policies resulted in more jobs and recreational activities.

Analyses conducted by Jargowsky (2003) and Ellen and O’Regan (2008) suggest that neoliberal policies were associated with reductions in concentrated poverty. Utilizing data for all of the census tracts in the United States, Jargowsky (2003: 4) found that the total number of residents of high-poverty areas declined by 24 percent between 1990 and 2000. Jargowsky (2003) goes on to explain that while areas in the Midwest experienced the greatest declines in concentrated poverty, areas across the country experienced substantial declines in concentrated poverty. Jargowsky’s (2003) findings
are supported by Ellen and O’Regan (2008: 858) who drew upon a sample of all metropolitan statistical areas in the United States during the same ten-year period and found similar declines in concentrated poverty. Ellen and O’Regan (2008) also report that this decline was not explained by differences in region or MSA.

Changes in City Populations During the 2000s

Research on changes to city populations during the 2000s is just starting to become available due to the recent release of the Census 2010 data. These statistics highlight three trends that have important implications for gentrification. First, most of the nation’s largest cities experienced continued gains in population during the 2000s, but at a slower rate than during the 1990s (Frey, 2012; Mather, Pollard, and Jacobsen, 2011). Statistics reported by Mather et al. (2011: 15) show that the percent of the population living in central cities increased by about three percent between 2000 and 2010, which resulted in approximately one-third of the U.S. population living in central cities, the highest level since 1950. One reason the continued increase in population was potentially important for gentrification is that it increased the competition for living space, which in turn would make more disadvantaged neighborhoods more attractive to potential gentrifiers. Additionally, the continued increase in population likely bolstered the tax bases of cities, which allowed for the continuation of many of the neoliberal development policies initiated during the 1990s. Claims about the importance of population increase during the 2000s are still speculatory as research has yet to catch up with the recent release of the Census 2010 statistics.
Statistics from Census 2010 also identified important changes in the minority population during the 2000s that were potentially important for gentrification. As noted by Mather et al. (2011: 15), many immigrants continued to settle in gateway cities, which helped to bolster the population size of many cities. As discussed in more detail later, limited research on the association of immigration and gentrification shows that gentrification was less likely to occur in areas with large foreign-born populations. What is currently unclear, however, is whether immigrants continued to settle in the same neighborhoods in gateway cities or if immigrants began to settle in new neighborhoods.

City populations were also greatly impacted by the housing market crash during the second half of the decade. This event was more important for suburban areas as a greater proportion of residents of suburban areas are homeowners, but this event was also important for central cities. This event likely discouraged or prevented many city residents from migrating due to increased difficulty in selling homes (Frey, 2012: Mather, Pollard, and Jacobsen, 2011). Further, this event initiated an economic recession during the late 2000s, which encouraged many people to pursue employment opportunities in more urban areas (Mather et al., 2011: 15). As the economic restructuring of previous decades resulted in increased service-oriented jobs in cities, it is most likely that the people searching for job opportunities in cities would be characterized by attributes commonly associated with gentrifiers such as higher levels of educational attainment and income.
Summary of the Macrolevel Trends in Cities

Reviewing the overall trends discussed in this section shows that cities have experienced dramatic shifts during the twentieth and early twenty-first centuries. Cities saw tremendous population growth and experienced dramatic development during the first half of the twentieth century, but declined dramatically during the middle part of the twentieth century due to the massive migration to suburban areas by members of the middle class, especially the white middle class. Overall, it appears that this decline was relatively short lived as many cities experienced population growth, mainly through immigration, and redevelopment during the late 1970s and early 1980s as a result of a combination of neoliberal development policies that made city living more attractive to the middle class and encouraged gentrification. Information on changes to cities during the 2000s show that many of the trends set into motion during the three prior decades continued to influence the nature of populations in the beginning of the twenty-first century. The following section discusses some of the factors unique to New York City that coincided with the macro-level trends of the late twentieth century and how those factors encouraged gentrification in New York City over the past 40 years.

FACTORS THAT MAKE NEW YORK CITY UNIQUE

A number of factors make gentrification that occurred in New York City similar to, but also different from gentrification that occurred in other cities. Housing conditions in New York City are not drastically different from those in other large cities, but many of the housing policies implemented in New York City are unique (Furman Center, 2006; Schwartz, 1999). The guiding principle behind housing policies in New York City has
been the desire to ensure that affordable housing exists even though competition for space is so great. An example of an effort to ensure that housing remains affordable is the policy of rent stabilization, which while not unique to New York City is especially important as roughly 70 percent of the occupied housing units in New York City are renter-occupied (U.S. Census Bureau, 2012). New York City rent control laws allow owners of rent-stabilized units to increase rent by 7.5 percent year until they reach the maximum base rent (New York City Rent Guidelines Board, 2012). Owners are allowed to increase regulated rent by up to 20 percent once rent-stabilized unites become vacant (Newman and Wyly, 2006: 47).

Rent-control policies were primarily important for gentrification because they decreased the potential for population turnover, thereby limiting access to new residents such as gentrifiers. On the other hand, landlords had incentive to encourage apartment vacancies in gentrifying neighborhoods because they could charge higher rents. Drawing upon interview data of residents of the New York City neighborhoods of Harlem and Clinton Hill, Freeman (2006: 76) explained how property owners in New York City have sometimes used nefarious methods such as withholding services, harassing tenets, and hiring detectives to ensure that tenants were following rent regulation guidelines. Lees et al. (2008: 30) discussed similar evidence of landlord harassment in their account of a landlord cutting off heat and hot water for ten days to a block of renovating apartments in the Brooklyn neighborhood of Park Slope. This type of landlord harassment was more difficult to measure with currently available quantitative data, but analyses of the New York City Housing and Vacancy Survey for the span of years from 1991 to 2002
conducted by Newman and Wyly (2006: 29) showed that landlord harassment was rarely cited as the primary reason for moving from a gentrified neighborhood.

The implementation of the Ten-Year Plan, a shifting assemblage of 100 programs overseen by the Department of Housing Preservation and Development, provided another example of an effort by New York City officials to ensure that affordable housing existed within city limits. The plan encouraged revitalization in neighborhoods throughout the city by promoting the renovation of units located within in rem properties, the construction of new housing units, and upgrades to apartments in privately owned buildings (Furman Center, 2006: 4). Between 1985 and the mid-2000s, the Ten-Year Plan resulted in the construction of 34,000 affordable housing units, the rehabilitation of 49,000 housing units in formerly vacant buildings, and the provision of renovation subsidies to residents of 125,000 units in distressed occupied buildings (Furman Center, 2006: 5) and in turn, increased property values in neighborhoods across the city (Schwartz, Susin, and Voicu, 2003: 132). The changes associated with the Ten-Year Plan have important implications for gentrification because they encouraged redevelopment projects and increased the number of vacancies in disadvantaged neighborhoods that could be occupied by gentrifiers. While difficult to measure the full extent of the policies implemented by the Ten-Year Policy, the current study includes a measure of the proportion of renter-occupied housing units in each tract that affordability restrictions were imposed upon during each period in order to identify whether the changes associated with the Ten-Year Policy encouraged gentrification. A similar measure was used by DeFilipis and Wyly (2008) to show how federally subsidized housing was distributed throughout New York City during the mid-2000s.
In addition to its housing policies, New York City’s status as a global city has had important implications for gentrification. The transition from a manufacturing-based economy to a service-oriented economy increased the importance of global trading, magnifying the importance of the New York Stock Exchange. As a result, this global shift encouraged many financial, insurance, and real estate corporations to set up offices in lower Manhattan. This was important for gentrification in New York City because it encouraged development, but also because New York’s position as a global city made it more attractive to what Florida (2005: 34) identifies as the “Creative Class,” which consisted primarily of young professionals employed in knowledge intensive industries such as high technology, finance, legal, healthcare, and business management. Drawing upon the consumption explanation, which is described in greater detail below, gentrification began and continues to occur because of the greater representation of individuals in cities with the characteristics identified by Florida (2005).

New York City continues to be a global city not only because it is an important hub in the global economy but also because of its historical and contemporary importance as an immigration gateway (Benton-Short, Price, and Friedman, 2005). The massive waves of immigration to New York City during the late nineteenth and the entire twentieth century contributed greatly to the size and diversity of the population, but also spurred development as immigrants built much of the city. Immigration to New York City during the second half of the twentieth century actually helped to reduce the impact of population loss due to suburbanization (Rosenbaum and Friedman, 2007: 107). Further, research has shown that large numbers of immigrants have continued to settle in ethnic enclaves in major cities such as Chicago, Dallas, Los Angeles, Miami, and New
York (Rosenbaum and Friedman, 2007; Waters and Jimenez, 2005). These
neighborhoods served as the entry point for many new immigrants and featured social
networks and contacts who shared information about job and housing opportunities,
which in turn facilitated immigrants’ transition into American society (Sampson, 2008).

The role of immigration and immigrant enclaves has been largely understudied by
gentrification scholars as immigrant populations have either been ignored or not
distinguished from other non-white groups seen as at risk of being displaced (see Nyden
et al., 2006; Smith, 2002). The existence and prevalence of immigrant enclaves is
potentially important for understanding where gentrification occurs because the limited
amount of empirical research that has explored the association of immigration and
gentrification has found that gentrification initially affects areas of cities populated by
native-born residents rather than immigrants (Ley and Dobson, 2008: 2474). Shaw
(2005) argued that this might be due to lower turnover rates in areas with large
concentrations of immigrants because real estate vacancies were more likely to have been
spread by word of mouth to individuals in the same racial or ethnic group. In working to
maintain the local community, members of these ethnic enclaves put up barriers that
excluded gentrifiers from the area.

While the limited amount of gentrification research that has discussed the role of
immigrants has argued that large immigrant populations inhibit gentrification, results of a
case study of Brighton Beach, Brooklyn conducted by Brown and Wyly (2000) showed
that immigration can promote gentrification. According to Brown and Wyly (2000) the
“Russianification” of Brighton Beach was associated with increases in income,
occupational prestige, and education levels, but was also associated with increased
poverty and unemployment. The authors recognized that these contradictory findings could be due to education credentials earned prior to immigrating to the United States that were not recognized in the United States. As this was the only study that could be located that discussed immigrants as gentrifiers, it is possible that the case of Brighton Beach was an isolated instance. The influence of immigrants on gentrification in New York City is explored in the current study in a more systematic way by including the percent of foreign-born residents as a predictor of gentrification.

Another factor that makes New York City unique relative to other cities is the significantly wide access to public transportation throughout the five boroughs. While public transportation was available in many U.S. cities, statistics reported in the 2008-2010 American Community Survey 3-Year data show about 55 percent of New Yorkers use public transportation to get to work in comparison to 26 percent of Chicagoans and 11 percent of residents of Los Angeles (U.S. Census Bureau, 2012). With so many New Yorkers reliant on public transportation, it is clear that access to transportation was an important determinant of where people decide to live. Little research, however, has explored whether access to transportation was associated with gentrification and the research that has been done has come to somewhat contradictory conclusions (Brueckner and Rosenthal, 2009; Kahn, 2007).

Drawing upon tract level data for 331 metropolitan statistical areas (MSA) collected from Census 2000, Brueckner and Rosenthal (2009) found that neighborhoods with public transportation tended to attract lower-income households, likely because such households could not afford private transportation. While the findings of this study were informative in regards to the location of low-income housing in regards to public
transportation, they provided limited insight into whether gentrification was more likely to occur in neighborhoods with greater access to public transportation due to the focus on MSAs rather than cities. Such analyses incorporate tracts from suburban areas, which have typically been ignored in gentrification research, and have fewer transportation stops.

Research by Kahn (2007) provided a slightly different interpretation of whether access to public transportation was associated with gentrification. Drawing upon tract level census data for 14 U.S. cities, excluding New York City, for the span of years from 1970 to 2000, Kahn (2007: 181) found that efforts by local governments to increase access to public transportation encouraged gentrification in cities such as Boston and Washington, D.C. where “Walk and Ride” programs were implemented, but not others such as Los Angeles and Portland, Oregon, where “Park and Ride” programs were implemented. Kahn (p. 168) provided a possible reason for this finding, arguing that “Walk and Ride” programs were more likely to be located in New Urbanist neighborhoods that were attractive to college educated and upper-income individuals, both of whom were associated with gentrification. These results should be interpreted with caution, however, as gentrification was operationalized only with a measure of change in the proportion of college educated residents. The current study corrects for this by exploring the association of access to rail transit with a richer measure of gentrification.
THEORETICAL EXPLANATIONS OF GENTRIFICATION

The broader trends in urbanization help to explain why the overarching process of gentrification began and continues to occur. To explain why specific neighborhoods or areas of cities gentrify, scholars typically draw upon some combination of the production and consumption explanations. Proponents of the production explanation argue that neighborhoods gentrify because property owners, developers, or city governments believe that development or redevelopment will result in financial gain or what Logan and Molotch (1987: 2) referred to as an increase in exchange value. In contrast to the production explanation, proponents of the consumption explanation are more interested in the characteristics of gentrifiers as a group and their attraction to what Logan and Molotch (p. 18) identified as the use values, which refers to idiosyncratic reasons for living in a particular neighborhood such as personal tastes, of neighborhoods being gentrified. Drawing upon the consumption explanation, neighborhoods are more likely to gentrify if they feature access to amenities such as bars, restaurants, shops, and employment in high skill service-oriented occupations through either proximity to such amenities in the neighborhood or to transportation that can be used to access such amenities. Each of these arguments is discussed in more detail below.

The Production Explanation of Gentrification

The production explanation was developed in the early 1970s, but did not become widely accepted until the introduction of Neil Smith’s “rent gap” hypothesis (1979; 1987). Smith (1987: 462) defined the rent gap as “the gap between the actual capitalized rent of a plot of land given its present use and the potential ground rent that might be gleaned
under a ‘higher and better’ use.’’ From the rent gap perspective, the primary causal mechanism of gentrification is the perception that neighborhoods are currently undervalued and that restoration or development efforts will increase property values to their maximum potential. Drawing upon Logan and Molotch (1987), the perceived value of a neighborhood is a consequence of factors related to use value such as the prevalence of amenities and factors related to exchange value such as the age of buildings in the neighborhood and policies implemented by local governments that influence the availability and affordability of housing. Further, exchange values are at least in part determined by use values as properties with greater use values are more attractive to potential buyers and therefore will sell for higher prices.

Gentrification scholars have frequently discussed the importance of amenities such as access to restaurants, museums and parks in a neighborhood as an important predictor of whether a neighborhood experiences gentrification (Kennedy and Leonard, 2001; Laska, Seaman, McSeveney, 1982). An amenity that has not often been discussed among gentrification scholars is access to public transportation. Access to transit in a neighborhood should make a neighborhood more valuable as greater access to transit allows residents easier access to other parts of the city and to areas outside of the city, hence increasing the value of the neighborhood.

The perceived value of a neighborhood is also impacted by the age of the housing stock. Research on the importance of the age of housing stock has been largely guided by the filtering model, which argues that housing becomes increasingly devalued as it ages (Brueckner and Rosenthal, 2009; Clark, 1992). According to the filtering model, housing stock that was once occupied by higher-income households becomes occupied
by increasingly poorer households while newer housing stock, which is typically constructed on the periphery of cities, is inhabited by higher-income individuals. This is best exemplified by the suburbanization of the mid-twentieth century where many middle and upper-class residents moved away from inner-city neighborhoods and into newly constructed suburban neighborhoods.

Gentrification poses a problem to the filtering model in that it typically involves higher-status households moving into disadvantaged neighborhoods with older and poorer housing stock. Research by Rosenthal (2008: 830) sheds light on this issue in that the author found a U-shaped relationship between the status of a neighborhood and the age of the housing stock. These findings partially support the traditional filtering model in that they show that higher-income households were attracted to newer housing stock, but also partially contradict the filtering model in that they show that older housing stock was also attractive to higher-status households. The bottom of the U-shape contains middle-aged homes, which Rosenthal (2008: 819) identified as falling in the range between 10 and 39 years old. Rosenthal’s (2008) findings were important for the gentrification literature, as scholars have long argued that gentrifiers are attracted to neighborhoods with older housing stock without specifying the age of such housing. Given Rosenthal’s findings that housing stock forty years old and greater is more attractive to members of the middle-class, the analyses in this study include a measure of the percent of housing stock built forty years or more before the start of each intercensal period.

The perceived value of a neighborhood is also impacted by policies that influence the availability of housing. Applying basic supply and demand logic to housing markets,
housing in tight markets, that is markets where a limited number of desirable housing units are available, is inherently more expensive because the greater demand for housing than the supply allows for results in increased competition for space. While the availability of housing in a neighborhood is mostly market controlled, it can be greatly impacted by government polices both at the federal and local levels. An example of the impact of federal policy on housing demand is seen in the suburbanization movement, which resulted from the implementation of federal programs that encouraged the construction of a greater number of housing units in suburban areas and ensuring that such housing was more affordable than similar housing in inner-city areas, thereby decreasing the competition for housing (Jackson, 1985; Rusk, 1999).

Housing policies have also encouraged gentrification and other forms of redevelopment in inner-cities. One such policy is the use of tax incentive programs that either reduce or abate taxes to encourage gentrification. An example of this type of program is the J-51 tax program initiated by New York City officials in the 1970s as a means of increasing the number of housing unit by encouraging developers or owners of commercial and manufacturing buildings to convert buildings into residential units. By converting from a commercial building to a residential building, owners were able to better capitalize on the space by attracting individuals who could afford smaller rents. Zukin (1982: 13) cited this program as the catalyst for the dramatic increase in residential lofts in New York City during the 1970s, which resulted in neighborhoods like SoHo transitioning from being mostly industrial to mostly residential.

Another example of how housing policy can alter the availability of housing in a tight market is the previously discussed Ten-Year Plan that was implemented in New
York City. To briefly recap, this program increased the availability of affordable housing in New York City by encouraging renovation of in rem units and upgrades to privately owned apartments. Between 1985 and 2001, about 82,000 units in occupied in rem properties and 47,000 units in vacant in rem properties were renovated, resulting in an increase of 129,000 housing units (Furman Center, 2006: 4).

**The Consumption Explanation of Gentrification**

In contrast to the production explanation, which emphasizes factors related to the production of housing that affect where gentrification occurs, proponents of the consumption explanation are more interested in the characteristics of gentrifiers as a group and their attraction to the use values of housing being gentrified. The basic argument of the consumption explanation is that gentrification was a consequence of the shift in urban economies from manufacturing-based to service-based during the 1960’s and 1970s, which resulted in the replacement of low-skill manufacturing jobs with high skill service-oriented jobs (Hamnett, 1991; Ley, 1996). This increased availability of service-oriented jobs discouraged lower-class and working-class residents from living in cities, but encouraged population growth among middle class individuals due to the perception of increased use value of city living as city living allowed these individuals to live closer to their jobs. Gentrification scholars have noted that the increased proportion of middle-class residents in cities was also associated with factors associated with decreased concentrated disadvantage in cities such as the increased representation of non-family households, college-educated residents, individuals in the age range of 25 to 50, homeowners, and white residents. The importance of the greater proportion of
individuals with these characteristics in cities in encouraging gentrification and associated reductions in neighborhood disadvantage is discussed below.

Much of the increase in non-family households in cities has been the result of a greater proportion of young people delaying marriage and instead choosing to live alone or with unrelated individuals (Cherlin, 2010; Teachman, Tedrow, and Crowder, 2000). While this trend has been important for Americans in general, this trend has been especially important for cities. Boustan and Shertzer (2013: 134) analyzed trends in population for cities and suburbs between 1950 and 2000 and found that married individuals were 11.4 percent more likely to live in suburban areas. Analyzing census data for 45 downtown areas located within 44 large U.S. cities, two of which were situated in New York City, Birch (2005: 7) found that the percent of non-family households increased from 62 percent in 1970 to 71 percent in 2000. Drawing upon data from the 1990 and 2000 Censuses for New York City, Bahchieva et al. (2008) reported that the percent of non-family households increased by 10.2 percent and that the percent of non-family households increased in all five boroughs during this period. The increase in non-family households was an important predictor of gentrification research has consistently shown that gentrifiers tend to be single or married couples without children (Carpenter and Lees, 1995; Laska, et al., 1982; Lee, Spain and Umberson, 1985). Individuals in these types of living situations have more time and money to invest in home renovations.

In addition to an increase in the proportion of non-family households, the greater availability of service-oriented jobs attracted a greater proportion of college-educated individuals, which was frequently associated with gentrification, as many of the new jobs
located in cities required a college degree (Freeman, 2005; Ley, 1996; Zukin, 2010).

Research has shown that educational attainment was a predictor of gentrification for two reasons. One reason was that educational attainment is positively associated with income, which means that the greater educational attainment of gentrifiers should provide them with great amounts of disposable income to spend on home improvement. Another reason was that educated, specifically college-educated, people tend to be attracted to central city neighborhoods because they are located near cultural amenities, which they valued (Kennedy and Leonard, 2001; Laska et al., 1982).

Data on trends in the percent college educated in cities have shown support for claims that increased educational attainment was positively associated with gentrification. Analysis of census data of college educated adults age 25 and over in the 100 largest U.S. metropolitan statistical areas (MSA) conducted by researchers at the Metropolitan Policy Program at the Brookings Institution show that many MSAs that experienced gentrification also saw dramatic increases in the percent of residents with bachelors’ degrees or better between 1970 and 2010 (Berube, 2012). Statistics for the New York MSA show that the percent of college educated residents increased by 23.5 percent during this time, which was well above the average increase of 17.9 percent and coincides with gentrification that was occurring in neighborhoods across New York City. These statistics should be interpreted with caution, however, as the units of analysis were MSAs that included central cities, where gentrification was most likely to occur, as well as suburban areas.

Proponents of the consumption explanation have also argued that gentrification was the result of an influx of younger individuals into cities. Scholars have varied in the
specific age range argued to be most important. For example, Robson, Bradford, and Deas (1994) argued that an increased proportion of the population aged 25 to 34 was the most important. In contrast, Hammel and Wyly (1996; Wyly and Hammel, 1999) and Bostic and Martin (2003) focused on changes in the proportion of residents between the ages of 30 and 44, while Rosenthal (2008) expanded this range to 55. Differences in the specific age range aside, the increased proportion of individuals in the overarching age range of 25 to 55 was important for gentrification because members of this group typically had access to greater financial resources than the young or elderly, which makes them better able to maintain their homes and support local community development projects (2008: 825).

A report produced by the New York City Department of City Planning (NYCDCP) lends some support to the argument that gentrification in New York City was at least in part due to changes in the age distribution across the five boroughs. The overall trend between 1970 and 2000 shows that the median age for New York City increased slightly from 33 in 1970 to 34 in 2000 (Salvo, Lobo, and Willett, 2006: 10). Borough-specific trends in median age for Manhattan and Brooklyn, the two boroughs that have received the most attention by gentrification scholars, yield more interesting findings. The data for Manhattan show that the average age of residents was about 34 years old in 1980, down from an average age of 37 in 1960. This decline can be explained mostly by the early wave of gentrification that swept through lower and midtown Manhattan during the late 1960’s and early 1970s as the conversion of former industrial buildings into loft-style apartments in these areas attracted large numbers of young artists who sought inexpensive living and work space (Zukin, 1982). The period
between 1980 and 2000, however, was associated with an increase in the median age as the median age in 2000 of about 36 years old was roughly two years higher than the average age of 34 years old in 1980. One possible explanation for the increase in median age pertains to the aging of the early gentrifiers who settled in the area. Essentially, increases in the average age of this population over time helped to increase the average age overall.

An alternative explanation for the increase in median age was provided by Zukin (1982: 6), who argued that the increased popularity of loft-living among the middle-class during the 1980s increased property values to a point where fewer young artists could afford to live in these areas. Essentially, the greater representation of middle-class residents, who were older than the young artists, helped to increase the average age of the population. This transition from young artists to middle-class residents helps to explain the gentle increase in the median age between 1980 and 2000 as similar waves of gentrification and increases in middle-class residents continued to occur in the Lower East side (Smith, 1996; Zukin and Kosta, 2004) in addition to spreading to Clinton (Hackworth and Smith, 2001) and Harlem (Freeman, 2006; Hackworth, 2002; Taylor, 2002).

The trend in median age for Brooklyn shows a similar pattern to Manhattan with the exception that, on average, the population of Brooklyn has and continues to be younger than the population of Manhattan. Similar to Manhattan, however, the data show a sharp decrease in the median age between 1960 and 1970 (from 34 to 30), which similar to Manhattan was associated with the conversion of former industrial buildings to loft-style apartment (Zukin, 1982: 3). Also similar to Manhattan, the sharp decrease
during the 1960’s was followed by steady increases in the median age during the 1970s, 1980s, and 1990s as the average age of the population increased about one year per decade. This steady increase was likely caused by greater representation of middle-class residents moving to gentrified neighborhoods in Brooklyn. The process of gentrification has not been as widely studied in Brooklyn as it has been in Manhattan, but research has identified gentrification in the Gowanus/ Boerum Hill and Park Slope neighborhoods as early as the 1960’s (Carpenter and Lees, 1995; Kasinitz, 1988). Gentrification scholars have also identified the process as occurring in Clinton Hill during the 1980s and 1990s (Freeman, 2006), the DUMBO (Down Under the Manhattan Bridge Overpass) neighborhood during the 1990s (Hackworth, 2002; Hackworth and Smith, 2001), and in Williamsburg during the 1990s and 2000s (Curran, 2007; Zuckin, 2010). While it cannot be stated that the increase in median age in Brooklyn was solely due to the greater representation of middle-class residents moving to gentrified neighborhoods, it is not a far stretch to argue that the steady increase in median age for Brooklyn between 1970 and 2000 was at least in part due to gentrification.

The increased proportion of middle-class residents in cities was also associated with increased homeownership. While the majority of occupied housing in cities continued to be renter-occupied during the second half of the twentieth century, analysis by Birch (2005: 8) showed that that homeownership rates in downtown areas of 44 cities increased by 141 percent between 1970 and 2000. Independent analysis of census data collected from the Neighborhood Change Database (NCDB) conducted by this researcher shows that the percent of owner-occupied units in New York City increased by 3.32 percent between 1980 and 2000. Borough specific results show that while the percent of
owner-occupied residences increased in all five boroughs, the two boroughs where
gentrification was most prominent during this period experienced the greatest increases in
the percent owner-occupied during this period. Specifically, the percent owner-occupied
in Brooklyn increased by 3.45 percent, while the percent-owner occupied in Manhattan
more than doubled, increasing from about 7.62 percent in 1980 to 18.49 percent in 2000.
This trend was important for gentrification because homeowners have greater flexibility
to make changes to their homes and because they have a stronger interest in maintaining
their homes as homes are represent important financial investments. Further, as Ellen
and O’Regan (2008: 859) argued, neighborhoods with higher rates of homeownership
were likely to improve either because such neighborhoods were more attractive to
affluent residents or because the improvements and investments made by more affluent
homeowners helped to improve the quality of life for lower-income residents.

Many cities also experienced substantial changes to their racial composition
during the second half of the twentieth century. The suburbanization movement was
often discussed in reference to “white flight” from central cities to suburban areas,
resulting in a substantially increased proportion of racial and ethnic minorities in cities.
According to Beauregard (2003: 137), the white population in all of the central cities in
the United States decreased dramatically between 1960 and 1968 while minority
populations swelled (emphasis added). Beginning in the early 1970s, however, the racial
and ethnic composition of cities began to change as many cities experienced gains in the
proportion of white, Hispanic, and Asian residents. The increased representation of each
of these groups was important for gentrification, but in slightly different ways.
The connection between the increased representation of white residents and
gentrification has been well established in the research with most treatments of
gentrification discussing the process as one that results in an increased proportion of
white residents in non-white, particularly black, neighborhoods (Atkinson 2003; Lee et
al. 1985; Lees 2003; Wyly and Hammel 1999). The increased representation of whites
was important in and of itself, but also important because of the potential conflicts it
created, an important theme in the gentrification literature over the past 50 years.

Interviews of Harlem residents conducted by Maurrasse (2006) and Freeman
(2006) reported that incumbent black residents reported fears that the neighborhood was
being “whitened,” which generally referred to changes in the local culture from
traditional black culture to more mainstream, middle-class culture. In essence, the
interviewees were not opposed to the greater representation of whites in their
neighborhoods so much as they were opposed to changes to the character of the
neighborhood. Research by Anderson (1990) in the Germantown neighborhood in
Philadelphia and by Boyd (2005; 2008) in the Douglas/ Grand Boulevard area on
Chicago’s South Side discussed similar tensions between white and black residents due to
fear of changes to the traditional character of neighborhoods.

While the majority of gentrification research has focused on the impact of
changes in the proportion of white residents as an indicator of gentrification, the
increased proportions of non-white groups such as Hispanic and Asian residents in many
cities also had important implications for gentrification as these groups tend to be highly
correlated with immigration. Census statistics reported by Been et al. (2012: 31) showed
that the percent of Hispanics and Asians increased during the 1990s and 2000s in
Chicago, New York City, and Philadelphia. Gentrification was also being documented in all three cities during this time, begging the question of whether gentrification in these cities was being driven by members of these groups. Due to limited research on the association of immigration and gentrification, this question cannot be definitively answered. According to Ley and Dobson (2008: 2474), however, gentrification initially affected areas of cities populated by native-born residents rather than immigrants. Therefore, it is likely that the spread of gentrification and increased presence of immigrants in these cities were likely occurring in different parts of the respective cities.

Geographic Expansion of Gentrification

Drawing upon a combination of the production and consumption explanations, gentrification scholars also recognize spillover effects of gentrification. In other words, neighborhoods may gentrify because they are located near neighborhoods that previously gentrified or are simultaneously experiencing gentrification. Further, the investments made in gentrifying neighborhoods make the surrounding neighborhoods more attractive to gentrification as neighborhood investments often result in spillover investments in neighboring areas (Bailey, 1997; Ellen et al., 2001; Wyly and Hammel, 1999). Neighborhoods located near gentrified or gentrifying neighborhoods tend to be attractive to people who cannot afford to live in a gentrified or gentrifying neighborhood, but who want to have access to the amenities that such a neighborhood provides (Bridge, 2006; Ley and Dobson, 2008). While gentrification scholars often discussed the impact of changes in neighboring areas, no study could be located that explicitly tested this assertion. Given the findings of research on other urban phenomenon, the current study
incorporates spatially lags of the independent variables in order to account for the influence of changes in neighboring areas on whether a neighborhood experienced gentrification.

*Summary of the Explanations of Gentrification*

To summarize, proponents of the production explanation argue that gentrification occurs when housing values are low, but there is a perception that the values are likely to increase dramatically, while proponents of the consumption explanation argue that gentrification occurs in disadvantaged neighborhoods because housing prices are more affordable to young, middle-class professionals want to live close to work and the amenities of city living. Further, research on the geography of gentrification shows that areas located near gentrified or gentrifying neighborhoods are likely to experience spillover effects in the form of reinvestments or through increases in residents who would engage in gentrification if they had access to the appropriate resources. While much of the discussion of explanations of gentrification presented here juxtaposes the production and consumption explanations in order to highlight the predictors of gentrification promoted by each tradition, current scholarship recognizes that gentrification is the result of factors related to both explanations (Lees et al., 2008; London, Lee, and Lipton 1986). Gentrification cannot occur without gentrifiable property, but it also cannot occur without individuals to act as gentrifiers. The current study recognizes this by drawing upon the arguments and measures associated with the production and consumption explanations, without pitting one type of explanation against the other.

Drawing upon a combination of the production and consumption explanation of gentrification, the current study hypothesizes that:
• Hypothesis 1: Previous research has found that gentrification is more likely to occur in lower class and working class neighborhoods and feature higher rates of poverty and unemployment, lower levels of educational attainment, and higher percents of racial minorities, which are characteristics associated with concentrated disadvantage (Sampson et al., 1997; 2012). Therefore, gentrification will be more likely to occur in neighborhoods characterized by higher scores on the index of concentrated disadvantage.

• Hypothesis 2: Gentrification is more likely to occur in areas characterized by high residential mobility because greater availability of vacancies in such areas provides greater opportunities for gentrifiers to move into the neighborhood.

• Hypothesis 3: Gentrification is less likely to occur in neighborhoods that feature large foreign-born populations because the availability of vacancies in such areas tends to spread by word of mouth.

• Hypothesis 4: Gentrification is more likely to occur in neighborhoods where a greater percentage of the housing stock is forty years or older because of the perception that such homes have greater historical character due to architectural characteristics.

• Hypothesis 5: Gentrification is more likely to occur in neighborhoods where a greater proportion of rental housing units had affordability restrictions imposed.

• Hypothesis 6: Gentrification is more likely to occur in neighborhoods with access to subway for public transportation.

• Hypothesis 7: Gentrification is more likely to occur in neighborhoods that border neighborhoods that also experience gentrification.
• Hypothesis 8: Previous research has identified the economic recession of the 1990s as encouraging a shift from gentrification funded by private individuals engaged in sweat-equity projects to gentrification efforts funded by private corporations. Given the greater resources available to private corporations, it is expected that gentrification during the 1990s and 2000s will be significantly different from gentrification during the 1980s.

CONCLUSION
This chapter described the important debates in the gentrification literature concerning the operationalization and conceptualization of gentrification, how gentrification has been influenced by macro-level and New York City specific factors, and discussed the dominant explanations of gentrification. In doing so, this chapter provided a foundation for the study of gentrification in New York City, from which eight hypotheses were developed. The reader will notice that the important changes associated with gentrification including changes to age composition, proportion employed in service oriented occupations, and homeownership are not explicitly identified in the discussion of the hypotheses. Changes in these measures are incorporated into the operationalization of gentrification, which is discussed in full detail in Chapter 4.
CHAPTER 3: THE ASSOCIATION OF GENTRIFICATION AND CRIME

This chapter describes important debates in the literature specific to the study of the association of gentrification and crime to provide a theoretical and empirical foundation that will guide the gentrification and crime analyses conducted in this study. The first section discusses the inconsistencies and limitations of previous research and highlights how the current study contributes to the literature on gentrification and crime. The second section discusses the dominant explanations pertaining to how gentrification and crime are related and identifies the hypotheses explored in this study. The chapter concludes with a discussion of crime trends in New York City to provide a context for the analyses in this study.

INCONSISTENCIES AND LIMITATIONS OF PREVIOUS RESEARCH

The inconsistent findings in regards to the association of gentrification and crime are primarily the result of the wide array of analytical strategies used in previous research. These inconsistencies were briefly identified in Chapter 1, but to recap, previous research has explored changes in different outcomes, analyzed varying lengths of time, operationalized gentrification in different ways, and utilized a variety of analysis strategies. Each of these issues is discussed below.

Reviewing the body of literature on the association of gentrification and crime shows that gentrification scholars have not definitively identified how gentrification was associated with crime, if at all. This was true of studies that have explored the association of gentrification with aggregate crimes rates as well as for studies that explored the association of gentrification with rates of specific crimes. For example,
using aggregate crime rates, McDonald (1986) found that gentrification was associated with decreased rates of violent crime, but that property crimes were unaffected by gentrification. In contrast, Kreager et al. (2011) found that gentrification was associated with short term increases in aggregate property and total crime rates and not associated with changes in the aggregate violent crime rate.

Similar to research that analyzed aggregate crime rates, research on the association of gentrification and specific crimes has also produced mixed results. For example, research by Lee (2010) and Van Wilsem et al. (2006) found that gentrification was positively associated with rates of assault, while O’Sullivan (2005) found a negative association. In regards to homicide, Papachristos et al. (2011) and Smith (2012) found that gentrification was negatively associated with homicide rates, but Lee (2010) reports a non-significant association. The association of gentrification and rape rates has only been assessed by Lee (2010), who reported a non-significant association. Previous research on the association of gentrification and robbery rates has also produced mixed results as Covington and Taylor (1989) reported a positive association, while Papachristos et al. (2011) found a negative association.

The contradictory findings in regards to the association of gentrification and crime also extend to property crimes. For example, Van Wilsem et al. (2006) found a positive association of gentrification and burglary, while O’Sullivan (2005) found a negative association and Lee (2010) found no association. In regards to larceny, Covington and Taylor (1989) found a positive association of gentrification and larceny rates, but Lee (2010) found no association. It is also unclear how gentrification is
associated with rates of motor-vehicle theft as Lee (2010) and Van Wilsem et al. (2006) have reported a positive association, but O’Sullivan found a negative association.

Given the overall findings of previous research, it is clear that research on gentrification and crime should analyze the association of gentrification with specific forms of crime to the extent possible. Using samples of neighborhoods from different cities and from different time points, previous research has produced mixed results pertaining to the association of gentrification and specific forms of crime. Additionally, research by Lee (2010) has been the only study to date that has explored the association of gentrification with all seven index crimes for the same sample of neighborhoods, but this study was limited in that it explored gentrification in Los Angeles, which has not been identified in previous research as being greatly impacted by gentrification, and analyzed variation over a ten year period. By analyzing the impact of gentrification on each of the seven forms of index crime, the findings of the current study help to bridge the gap between the findings of previous research.

The contradictory findings of previous research in regards to the direction of the association of gentrification and crime are due in part to the limitations of previous research. One such limitation pertains to the analytic strategies used in previous research. All of the empirical assessments of gentrification and crime have been quantitative in nature, but these studies have drawn upon a wide array of statistical techniques. Early studies relied on analysis strategies that do not allow for outside influences to be controlled or correct for endogeneity. Examples of this include the descriptive time series analysis conducted by McDonald (1986), the ordinary least square regressions conducted by Covington and Taylor (1989), the use of hierarchical linear modeling by
Van Wilsem et al. (2006) and the simple model of economic competition analyzed by O’Sullivan (2005). The findings of each of these studies were important as they highlighted the differential association of gentrification with specific forms of crime, but they only allow for tentative claims in regards to the association of gentrification and crime as it is possible that the unmeasured variables were responsible for the findings. Additionally, these analytical strategies cannot determine whether gentrification produces changes in crime rates or vice versa.

Recent research on the association of gentrification and crime has drawn upon more sophisticated statistical techniques in order to address the potential for endogeneity and the influence of unmeasured variables. Research by Smith (2012) used a simple approach to this problem by implementing a lagged variable approach where the control variables and measures of gentrification were measured at an earlier time point than the dependent variable of gang related homicide. Lee (2010), however, used a more sophisticated method by implementing an instrumental variable strategy, which requires the identification of a variable that is theoretically and empirically associated with changes in independent variable(s), while simultaneously being weakly correlated with the dependent variable of interest (Bushway and Apel, 2010: 605). This strategy controls for endogeneity and unmeasured variable bias, but it is not a practical method as instrumental variables are often difficult to identify (p. 605).

A more practical approach to controlling for endogeneity and unmeasured variable bias is the use of a fixed effects analysis strategy. The fixed effects approach, which is discussed in greater detail in Chapter 4, corrects for unmeasured variable bias by allowing for a different intercept for each case, allowing for analysis of variation within
each case independently of the other cases. Papachristos et al. (2011) used this strategy to analyze the association of a temporally lagged measure of gentrification on crime in Chicago between 1991 and 2005. The results of this study were limited in that the authors did not account for the influence of spatial autocorrelation, which is important because neighborhoods are not isolated from the effects of processes and events such as gentrification or crime that occur in nearby neighborhoods.

Analysis of the association of gentrification and crime in Seattle by Kreager et al. (2011) also utilized a fixed effects analysis strategy, but included a measure of spatial error. Analyzing aggregate total, violent and property crime rates, the authors identified a curvilinear relationship between gentrification and crime. Essentially the increased investment associated with gentrification was positively associated with crime during the 1980s, while the same investment was negatively associated with crime during the 1990s. The authors proposed that this relationship was due to a “tipping point,” where the association of gentrification and crime reverses due to a more complete turnover of the neighborhood (p. 634). As discussed earlier, the findings of this study were limited in that the dependent variables were aggregate crime rates, which potentially mask differential impacts of gentrification on specific forms of crime.

The current study mirrors the analysis strategy identified by Papachristos et al. (2011) and Kreager et al. (2011) and utilizes a combination of fixed effects and spatial regression techniques to explore the association of gentrification. Unlike the standard fixed effects models utilized by Papachristos et al. (2011) and Kreager et al. (2011), which require that all measures be time variant, the current study utilizes a hybrid fixed effects approach that allows for the inclusion of time invariant measures (Allison, 2005).
The inclusion of time invariant measures helps to identify whether changes in the sampled neighborhoods are due to stationary characteristics of neighborhoods such as access to transportation or if the changes are due variation in the composition of the population or other characteristics.

Differences in the findings of the association were also the result of the different strategies used to identify gentrified neighborhoods, which was important because it influenced the determination of whether neighborhoods were classified as sample or control neighborhoods. Similar to the broader literature on gentrification, studies of gentrification and crime have operationalized gentrification in one of three ways. One strategy used to operationalize gentrification has been the use of purposive sampling where neighborhoods were selected because they were identified as gentrified in previous research. McDonald (1986) used this strategy to select a sample of 14 neighborhoods from five U.S. cities for which crime data could be located and that had been the focus of case studies of gentrification. In contrast, Kreager et al. (2011) drew upon a database developed by Hammel and Wyly (1996; Wyly and Hammel, 1998; 1999; 2004) that classified Seattle census tracts as non-gentrified, appreciated (previously high-income), and gentrified. This strategy increased the likelihood of consensus that the sampled neighborhoods experienced gentrification, but potentially excludes neighborhoods that experienced similar changes to those identified as gentrified, but which were accidentally overlooked.

Research on gentrification has also operationalized gentrification by identifying neighborhoods that experienced changes in particular characteristics that have been identified as important predictors of gentrification in the broader literature on
gentrification. Simpler versions of this strategy have used census characteristics. For example, Covington and Taylor (1989) operationalized gentrified neighborhoods as those that experienced increased home values, while Van Wilsem et al. (2006) operationalized gentrification through neighborhood-level (socioeconomic change, residential mobility, percent minority) and individual-level (homeownership, number of cars, demographic characteristics) changes. In contrast with the strategy of relying on the identification of neighborhoods identified as gentrified by others, this strategy is more likely to result in the identification of a group of gentrified neighborhoods that experienced similar changes. Studies that have used this strategy cited gentrification literature in order to justify the measures used, but offered little theoretical explanation for the importance of the specified measures. Additionally, this strategy was limited due to difficulties associated with the measurement of important cultural changes associated with gentrification, which in turn may result in the exclusion of neighborhoods that commonly recognized as gentrified by residents.

Recognizing the limitations of relying solely on census measures to operationalize gentrification, efforts by Papachristos et al. (2011) and Smith (2012) operationalized gentrification through an increase in the number of high-end coffee shops. This innovative strategy was argued to be a measure of private actor investment related to the production explanation of gentrification in that the number of high-end coffee shops in a neighborhood was a reflection of the attractiveness of the neighborhood to financial investment. Further, analyzing variation in the number of coffee shops was argued to be a measure of the consumption explanation as such establishments were more likely to be frequented by middle-class individuals who were typically associated with gentrification.
(Papachristos et al., 2011; Smith, 2012). One limitation to this strategy, as recognized by Papachristos et al. (2011: 235), was that the location of coffee shops was influenced by city planning efforts, individual tastes and residential preferences, all of which were difficult to measure with currently available data. Additionally, as reflected in a map of Chicago presented by Papachristos et al. (2011: 227), coffee shops were clustered in central business areas. As the majority of city residents lived in areas out of the central business district, relying on a measure of high-end coffee shops potentially excluded a large number of neighborhoods that underwent similar changes.

Reviewing the operationalizations of gentrification in previous studies suggests that quantitative operationalizations were the most likely to identify a large sample of neighborhoods that experienced similar changes such as decreased poverty or increased homeownership, but were the most likely to accurately identify gentrified neighborhoods if they included a measure of changes to neighborhood culture such as the number of coffeeshops. The current study recognizes this and develops a measure of gentrification that is quantitative in nature, but is compared to neighborhood information collected from The New York Times in order to incorporate a measure of local cultural interpretations of change. While The New York Times data are useful by themselves, they are used in the current study to ground census-based operationalizations of gentrification, which are unable to measure important cultural interpretations of neighborhood change.

Differences in the findings of previous research on the association and gentrification and crime were also the result of differences in the overall length of time studied as well as differences for within period change. In regards to the overall time period, Van Wilsem et al. (2006) analyzed the shortest period of five years, while
Kreager et al. (2011) analyzed the longest period of 20 years, while the remaining studies averaging study periods of about ten years. Within the overarching study periods of five, 10 and 20 years, previous research has analyzed annual variation (Lee, 2010; Van Wilsem et al., 2006), variation in three year averages (Papachristos et al., 2011; Smith, 2012), and variation between decennial censuses (Covington and Taylor, 1989; Kreager et al., 2011; McDonald, 1986). The exploration of smaller intervals within the overarching study period has provided insight into how gradual changes influence neighborhood crime rates, but as suggested by Kirk and Laub (2010: 487), may not be necessary because gradual neighborhood changes tend to have little influence on neighborhood crime. As gentrification tends to be a gradual process (Freeman and Braconi, 2004; Henig, 1982), focusing on longer intervals and a broader study period may highlight more of the impact of gentrification on crime rates. Additionally, results by Kreager et al. (2011) showed that analyzing a broader study period may identify a non-linear relationship between gentrification and crime. The current study takes the importance of time into account by expanding upon the 20 year period studied by Kreager et al. (2011) to a 30 year period and incorporating time specific measures into the models analyzed.

Summary of Inconsistencies and Limitations

Highlighting the key points of this section, differences in the overall interpretation of whether and how gentrification was associated with crime are the result of differences in the specific outcome(s) studied as previous research has analyzed aggregate and specific crime rates, the ability to control for outside influences and endogeneity, how gentrified
neighborhoods were operationalized, and the length of time for which variation in the association of gentrification and crime was analyzed. Recognizing these inconsistencies and limitations, the current study seeks to bridge the findings of previous research on gentrification and crime by extending research into New York City, exploring the differential impact of gentrification on each of the seven index crimes over three decades grounding a quantitative operationalization of gentrification in local cultural interpretations of gentrification, and analyzing the impact of non-census measures that influence neighborhood development such as housing policies and access to public transportation, controlling for unmeasured variable bias. Details in regards to these methodological contributions are discussed in Chapter 4.

THEORIES ON THE ASSOCIATION OF GENTRIFICATION AND CRIME

The previous section focused on the inconsistencies of previous research on gentrification and crime, but one area where previous research has been consistent pertains to the theories used to explain the relationship between gentrification and crime. As gentrification is a neighborhood-level process, previous research on the association of gentrification and crime has typically drawn upon neighborhood-level theories of crime such as the social disorganization/collective efficacy framework and the routine activities theory. This section reviews each of these theoretical perspectives and discusses how each characterizes the relationship between gentrification and neighborhood crime.

\[\text{2 Research by O'Sullivan (2005) is an exception as this study did not draw upon criminological theory.}\]
Social Disorganization/Collective Efficacy Theory

The social disorganization perspective was developed by Chicago School sociologists, but drew its greatest attention with the publication of Shaw and McKay’s *Juvenile Delinquency and Urban Areas* (Bursik and Webb, 1982). Shaw and McKay (1969 [1942]) argued that delinquency and disorder were most common in areas of cities characterized by low socio-economic status, racial/ethnic heterogeneity, and residential instability. These factors were believed to be predictors of crime because they decreased the potential for the development of strong networks among neighborhood residents, which in turn decreased the probability for informal social control (Sampson and Groves, 1989).

Early applications of social disorganization theory explored the direct effects of social structural variables on crime such as social-economic status, percent renter-occupied, and the percent non-white among others, but assumed that the influence of social structural variables on crime was mediated by community-level factors (Kubrin and Weitzer, 2003: 376). In perhaps the most famous critique of the social disorganization tradition to date, Kornhauser (1978: 83) criticized these efforts as being unable to differentiate the effects of structural causes from subcultural causes of delinquency that vary by community and were at least in part produced by social structural factors. A result of this critique is that the social disorganization tradition fell out of favor with mainstream criminologists as data that would allow for the differentiation of structural and subcultural causes of crime were not available.

Interest in the social disorganization tradition was renewed during the late 1980s and early 1990s due to the development of the concept of collective efficacy by Sampson
and colleagues (Sampson and Groves, 1989; Sampson, et al., 1997) and the systemic model of crime developed by Bursik (1988; Bursik and Grasmick, 1993). In work that would lead to the development of the concept of collective efficacy, Sampson and Groves (1989) drew upon the British Crime Survey and tested the first model of social disorganization that included mediating measures of community. The authors first explored the impact of social structure on victimization rates by including measures of ethnic heterogeneity, residential mobility, low economic status, family disruption, and urbanization and then included measures of local friendship network density, the frequency of unsupervised youth groups, and organizational participation in order to measure the mediating influence of community-level subcultural factors. Results showed that victimization rates were higher in communities that featured sparse friendship networks, a greater number of unsupervised peer groups, and low organizational participation (p. 789). Further, the results supported the argument that social structural influences on crime were mediated by neighborhood-level characteristics as results showed all three dimensions of community were significantly impacted by changes in socio-economic status, residential mobility, ethnic heterogeneity, and family disruption at the neighborhood level and that the community measures mediated the association between social structural factors and rates of victimization (p. 799).

More recently, efforts by researchers working on the Project on Human Development in Chicago Neighborhoods (PHDCN) helped to more fully develop the intervening concept between social structure and crime (Sampson and Raudenbush, 2004; Sampson et al., 1997). An important result of this research was the concept of collective efficacy, defined as the differential ability of neighborhoods to realize common values
among residents and maintain effective social controls (Sampson et al. 1997: 918).

Sampson (2006: 152) argued that cohesion and the ability to realize common values were important is because they allowed for “repeated interactions and thereby expectations about the future.”

The other approach to social disorganization theory that arose in response to Kornhauser’s (1978) critique was the systemic model of crime (Bursik, 1988; Bursik and Grasmick, 1993). The systemic model of crime built upon research by Kasarda and Janowitz (1974) who argued that local communities were the result of complex systems of friendship and kinship networks and Hunter (1985) who identified social control as belonging to processes related to private, parochial, and public social networks. Private networks refer to informal primary groups such as families, while parochial networks develop through interaction with broader institutions such as schools and churches and public networks provide access to goods and services outside of the local community such as street maintenance and policing (1985: 233). Drawing upon the ideas of Kasarda and Janowitz’s (1974) and Hunter (1985), the systemic model argued that community disorganization should be defined in terms of the capacity of a neighborhood to regulate itself through formal and informal processes of social control based upon the complex system of friendship and kinship networks, and associational ties in the neighborhood, which were reflected in the operation of private, parochial, and public forms of social control (Bursik 1988: 527).

Of the two modern variants of social disorganization theory, the collective efficacy model (Sampson and Raudenbush, 2004; Sampson et al., 1997) has received the most empirical attention and support, due at least in part to the fact that was easier to test
than the systemic model. The basic model only required researchers to identify measures of social structure, local community (or collective efficacy as reflected in more recent work), and a measure of crime or victimization. Further, in defining the concept of collective efficacy, Sampson et al. (1997) provided clear instructions for operationalizing the concept by stating that collective efficacy is a combination of community cohesion and shared expectations of appropriate behaviors.

Applications of the updated model of social disorganization developed by Sampson and colleagues have been generally supportive. As discussed earlier, Sampson and Groves (1989: 799) found that the measured dimensions of community mediated the association between social structural factors and rates of criminal victimization. More recently, using data collected by the PHDCN and hierarchical linear modeling techniques, Sampson et al. (1997: 923) found that concentrated disadvantage, immigration concentration, and residential stability explained seventy percent of the variation in collective efficacy and that the concept of collective efficacy “mediated at a substantial portion of the association of residential stability and disadvantage with multiple measures of violence.” Additional support for the collective efficacy model was discussed by Taylor (2001: 293) who found that neighborhood residents who trusted each other were more likely to collectively organize against neighborhood problems and more recently by Chung and Steinberg (2006: 328), who found that lower levels of neighborhood social organization were indirectly related to higher levels of adolescent crime through parenting practices and peer affiliations.

Not all empirical assessments of collective efficacy, however, have found that collective efficacy was negatively associated with crime. For example, Browning,
Feinberg, and Dietz (2004) found that social networks could increase collective efficacy among neighborhood residents, but those same networks could be used to protect criminals from punishments. Similar findings were reported by Carr (2003) and Warner (2007). While these studies did not find the expected negative relationship between collective efficacy and crime, they still supported the logic of collective efficacy theory by showing that social structural influences on crime were at least in part mediated by community characteristics.

In contrast to the collective efficacy model, a much smaller number of empirical studies have tested the systemic model. Empirical assessments of the full systemic model require researchers to draw upon a rich data source that include measures of community such as the number of primary and secondary networks, the extent to which the parochial, private, and public social control was used, and how much access local communities have to outside resources such as political groups (Bursik and Grasmick, 1993: 39). A small number of datasets exist that allow for the simultaneous testing of all these relationships, which has hampered assessments of the systemic model.

An additional limitation to the systemic model of crime is that empirical assessments have come to contradictory conclusions regarding the association of neighborhood networks on crime. In support of the systemic model, Bursik (1999) analyzed survey data from a sample of Oklahoma City residents and found that concern about the loss of respect due to involvement in crime was partly due to the degree to which respondents were embedded in the private and parochial structures of local communities. Further, Bursik (1999: 94) found that respondents gave equal weight to
concerns about the loss of respect in private and parochial institutions, showing that membership in multiple networks was important.

Research conducted by Browning et al. (2004), Warner (2007) and Bellair and Browning (2010) supported arguments for the importance of neighborhood networks, but showed mixed results concerning the effects of networks on the prevalence of neighborhood crime. Drawing upon the PHDCN data, Browning et al. (2004) found the presence of networks alone was not enough to reduce violence as neighborhood networks could be used to fight or protect criminals. Bellair and Browning (2011: 515) reported a similar finding and argued that criminals often embed themselves in local networks, making it difficult for network members to directly intervene to prevent crime from occurring. Similarly, Warner (2007: 122) found that social ties were important for direct social control, but not indirect social control and that social ties were not relevant to forms of social control that rely on external agencies such as the police, demonstrating that networks may not necessarily interrelate in the way predicted by the systemic model of crime.

In addition to assessing the importance of neighborhood networks, assessments of the social disorganization tradition have explored the influence of broader contextual influences such as space and time. In regards to the influence of space, there is general agreement among scholars interested in neighborhood context that neighborhoods do not exist in isolation from each other, but instead are heavily influenced by changes in surrounding areas. In support of this, Peterson and Krivo (2010) found that white neighborhoods tend to be surrounded by neighborhoods characterized by factors that discouraged crime such as external community investments, while disadvantage and
crime tended to be higher in neighborhoods surrounding predominantly black neighborhoods. Similarly, research by Mears and Bhati (2006: 533) found that homicide rates were significantly higher in neighborhoods that were located near neighborhoods characterized by resource deprivation, measured by the prevalence of female headed families with children, poverty, unemployment, and lower levels of median household and median family income. Previous research has not documented the importance of residential mobility in surrounding neighborhoods.

Proponents of the social disorganization framework have often discussed the importance of time, but most empirical assessments have used cross-sectional research designs (Hipp, 2010; Kirk and Laub, 2010). The importance of time was first discussed by Shaw and McKay (1969 [1942]) who found that increased neighborhood crime rates in Chicago, Boston, Cleveland, Cincinnati, Philadelphia, and Richmond during the early to mid-twentieth century were the result of increased concentrations of poor residents who came from a diverse array of racial and ethnic backgrounds and only lived in the neighborhood for a short period of time. This basic argument was expanded upon by Schuerman and Kobrin (1986). They explored changes in neighborhood crime rates in Los Angeles between 1950 and 1970 and found that neighborhood crime rates initially increased as a result of changed land use (specifically an increased amount of multiple-dwelling units) and population composition (specifically increased residential mobility, single parent households, and racial/ethnic minorities), but that once neighborhood crime rates reached a certain point, they began to precede further changes in land use and population composition. More recently, research by Hipp (2010) analyzed changes in census tract level data for 13 cities between 1990 and 2000 and found that neighborhoods
with more crime tended to be characterized by residential instability, poverty and population heterogeneity. Given the relatively few longitudinal assessments of social disorganization and that Hipp’s (2010) study only analyzed a single ten-year period. It is unclear if crime rates actually precede changes to the composition of neighborhood populations.

Social Disorganization and Gentrification

Given the findings of previous research of the social disorganization framework, it is clear that neighborhood crime rates are associated with social structural and community-level factors, many of which influence and are influenced by gentrification. By its very nature, the process of gentrification is associated with reductions in concentrated disadvantage as it typically occurs in neighborhoods characterized by poverty, unemployment, and racial minorities where housing values also tend to be lower and results in an increased presence of affluent residents and higher property values. The changes in the gentrified neighborhood may also result in spillover investments made in the surrounding neighborhoods. The increased presence of affluent residents associated with gentrification is important because members of these classes have greater access to disposable income for building maintenance and repairs. Further, research has consistently documented that affluent residents were better able to make demands on city officials to assure that the neighborhood was maintained (Freeman, 2006, Maurrasse, 2006; Skogan, 1990). Given that previous research has found that concentrated disadvantage was negatively associated with crime rates, the decline in concentrated disadvantage due to gentrification should result in declines in crime.
While it is generally accepted that gentrification helps to break up pockets of concentrated disadvantage, the association with residential instability is less clear as scholars have discussed the destabilizing and stabilizing effects of gentrification on neighborhoods. Setting aside debates over whether gentrification resulted in residential displacement, it is generally agreed that gentrification introduces new residents, primarily white and middle-class, into neighborhoods often occupied by the poor and/or racial and ethnic minorities. In developing the social disorganization perspective, Shaw and McKay (1969 [1942]) argued that areas characterized by this type of residential mobility tended to feature higher crime rates because they featured weak communities. Social networks require time to develop and as recent migrants to the area, gentrifiers may not have had the time to develop relationships with other residents of the neighborhood that are required for community formation. Further, the development of social networks in gentrifying areas is complicated by worries among incumbent residents of being displaced by gentrifiers (Boyd, 2005; Freeman, 2006; Newman and Wyly, 2006).

On the other hand, gentrification may help to stabilize neighborhoods, as the process is associated with increased homeownership (Kreager et al., 2011; Sullivan, 2007). Home purchases are significant investments, and as Hipp (2007: 688) suggested, homeowners were more likely to be involved in crime-fighting behaviors such as neighborhood watches and calling the police to intervene in dangerous or suspicious situations. Therefore, the increased homeownership associated with gentrification should lead to increased neighborhood stabilization and decreased crime.

Similar to the association of residential stability and gentrification, the effects of gentrification on heterogeneity are complicated to interpret. Almost all scholars agree
that gentrification results in increased racial, ethnic, or socioeconomic heterogeneity, especially during the initial stages of the process (Covington and Taylor 1989: 147). Drawing upon the social disorganization tradition, the increased mixing of races, ethnicities, and social classes should decrease the potential for social consensus and collective efficacy and in turn lead to increased crime (Morenoff, Sampson, and Raudenbush, 2001; Sampson et al. 1997;). Many researchers have discussed racial tensions between white gentrifiers and racial and ethnic minority incumbent residents (Anderson, 1990; Freeman, 2006; Maurrasse, 2006). Further, research has found that distrust can develop even in neighborhoods where gentrifiers are the same race as the incumbent residents (Anderson, 1990; Boyd, 2005; Taylor, 2002).

To summarize, the social disorganization tradition argues that neighborhoods characterized by concentrated disadvantage, residential instability, racial and ethnic heterogeneity are less likely to feature strong community life and more likely to feature higher crime rates. Additionally, reviewing the tenets of social disorganization suggests ways that gentrification may be associated with crime through changes in social structural factors. Overall, however, the tenets of social disorganization predict an indeterminate relationship between gentrification and crime as gentrification is associated with declines in concentrated disadvantage, short term disruptions to residential stability, and increased population heterogeneity. This means that, from the standpoint of the social disorganization framework, gentrification may result in increased or decreased rates of crime. The following hypotheses derive from the tenets of the model:

- Hypothesis 9: Applications of the social disorganization framework have found that crime rates are higher in areas characterized by concentrated disadvantage.
Therefore, it is expect that neighborhoods that declined in concentrated disadvantage will have also experienced declines in crime.

- **Hypothesis 10:** Research has found that neighborhoods located near neighborhoods characterized by concentrated disadvantage tend to have high rates of violent crime. Therefore, it is expected that the spatial lag of concentrated disadvantage will be positively associated with crime overall.

- **Hypothesis 11:** The social disorganization framework argues that neighborhoods with a high rate of residential mobility are more likely to feature high crime rates.

- **Hypothesis 12:** The social disorganization framework predicts that crime rates are higher in neighborhoods characterized by heterogeneous populations. Therefore, crime rates should be higher in neighborhoods that experienced larger increases in population heterogeneity due to changes in the racial, ethnic, and socio-economic composition of neighborhood populations.

- **Hypothesis 13:** Gentrification will be associated with crime rates net of the influence of the other independent variables. Given the tenets of the social disorganization framework, the direction of the association is indeterminate.

- **Hypothesis 14:** Given the finding by Kreager et al. (2011) that the association of gentrification and crime is curvilinear, it is expected that crime rates in sub-boroughs that experienced greater gentrification will initially be higher, but as gentrification becomes established, crime rates will decline.
Routine Activities Theory

In addition to drawing upon the social disorganization/collective efficacy framework, gentrification and crime researchers have also drawn upon the routine activities theory. Routine activities theory builds upon conventional rational choice theory by identifying specific factors that affect the decision to engage in crime. According to this perspective, crime is more likely to occur when a suitable target (high value) that is lacking in capable guardianship converges in space and time with a motivated offender (Cohen and Felson 1979; Felson, 1987). As the routine activities theory emphasizes decisions made by individuals, most of the research on routine activities has used individual level data. While less common, researchers have also used routine activities theory to explain variation in crime rates at aggregate levels such as nation-states (Bennett, 1991; Stein, 2010), metropolitan statistical areas (Messner and Blau, 1987) and census tracts (Hipp, 2007). At the neighborhood level, the routine activities approach argues that crime rates are higher in neighborhoods characterized by a prevalence of high value, inappropriately guarded targets and a prevalence of motivated offenders.

Empirical assessments of routine activities theory support the logic of the theory. Coupe and Blake (2006: 460) found that burglars rationally selected less guarded targets for daytime burglaries and more heavily guarded targets for nighttime burglaries. In an application of routine activities theory to college students, Fisher, Sloan, Cullen, and Lu (1998) found that students who engaged in dangerous activities such as nighttime partying and recreational drug use were more likely to experience violent victimizations because these activities made them more attractive to would be offenders. In further support, Kelling and Coles (1996: 151) reported that the removal of graffiti and trash in
the New York City subway helped to deter low-level crimes because the removal of these signs of disorder increased awareness of policing activities in the area.

Research at the aggregate level has also supported the routine activities perspective. Drawing upon data for a sample of Standard Metropolitan Statistical Areas (SMSA), Messner and Blau (1987: 1047) found that nonhousehold activities were positively associated with rates of homicide, rape, robbery, assault, burglary and larceny, showing that residents of SMSAs who spent more time outside of their home were at greater risk of being targeted for criminal victimization. In an application of the routine activities perspective to census tract data from 19 U.S. cities, Hipp (2007: 689) found that income inequality was positively associated with the violent crimes of aggravated assault, robbery, and homicide and the property crime of burglary. Hipp (2007) explained this relationship by arguing that neighborhoods characterized by income inequality bring together motivated offenders (economically disadvantaged residents) with suitable targets (economically advantaged residents).

**Routine Activities Theory and Gentrification**

Based upon the routine activities perspective, it is reasonable to expect that gentrification will initially result in increased neighborhood crime overall. As will be explained shortly, the routine activities theory would argue that gentrification would result in decreased crime in the long term. Gentrification introduces young, middle-class professionals into disadvantaged neighborhoods populated by impoverished residents who are often resentful of the fact that gentrification is occurring in the neighborhood. All of the elements that routine activities theory requires for a crime to occur are present.
Gentrifiers are more *suitable targets* than incumbent residents because they are more likely to have high value possessions and are not necessarily familiar with techniques for protecting themselves while walking on the street (Anderson 1990: 149). Additionally, because gentrifying neighborhoods are frequently located near disadvantaged areas, they may attract offenders from nearby neighborhoods (Taylor 2001: 326). Over time, gentrification should result in a decreased number of suitable targets due to changes in the prevalence of motivated offenders and guardianship in the neighborhood, which are discussed shortly.

Offender *motivation* may be guided by income and wealth disparities between gentrifiers and incumbent residents or may be guided by resentment that incumbent residents feel toward gentrifiers (Taylor and Covington, 1988: 560). A prime example of how resentment toward the presence of gentrifiers can potentially lead to increased criminal victimization is the ‘mug-a-yuppie’ campaign (Atkinson, 2004; Mele, 2000). Atkinson (2004: 116) briefly documented the existence of this movement in London and San Francisco. Mele (2000: 257) documented the existence of this movement in the Lower East Side and described how graffiti messages such as “Die Yuppie Scum” began to appear as the neighborhood gentrified. Neither Atkinson (2004) nor Mele (2000) discussed specific examples of actual violence committed against gentrifiers, which means that it is unclear if this movement was actually associated with increased crime in gentrifying neighborhoods or just the increased threat of violence. Further, it is expected that the number of motivated offenders will decrease over time as members of groups associated with the gentrification process tend are significantly less likely to engage in index crimes.
Similar to predictions in regards to the amount of suitable targets and motivated offenders, it is expected that guardianship will change over time in ways that will initially result in increased crime and will result in decreased crime in the longer term. Qualitative studies of gentrification have often highlighted the resentment that incumbent residents feel toward the incoming gentrifiers who are seen as threats to the traditional way of life in a neighborhood (Freeman, 2006; Maurrasse, 2006; Mele, 1996). This resentment is important as it may encourage incumbent residents to victimize gentrifiers, but it may also discourage the incumbent residents from acting as capable guardians. To be capable guardians, individuals need to be able and willing to intervene on the behalf of an individual or their property. It is plausible to suggest that incumbent residents, who are potentially resentful of or at least weakly connected to gentrifiers, are less likely to intervene on the behalf of gentrifiers (Hipp, Tita, and Greenbaum, 2009: 1780). The decreased potential of incumbent residents to act as capable guardians coupled with the greater willingness and ability of gentrifiers to make demands on city services such as the police (Freeman, 2006, Maurrasse, 2006; Skogan, 1990) could initially lead to higher reported crime rates in gentrified neighborhoods. Over time, the greater ability of gentrifiers to act collectively and to make demands on local city agencies increases the likelihood that neighborhood problems will be quickly solved, whether informally through collective action of residents or formally through calls to city agencies. This should result in lower crime rates in the long term.

To summarize, the routine activities perspective argues that crime, and particularly nonviolent crime, is more likely to occur in neighborhoods characterized by large numbers of suitable (high value) targets, lack of guardianship, and motivated
offenders. Gentrification shapes neighborhoods in ways that, according to the routine activities theory, may initially result in increased rates of crime, but could result in lower rates of crime in the long term. Accordingly, this study explores the following hypotheses:

• Hypothesis 15: The first tenet of routine activities is that that crime is more likely to occur when there is a suitable target. Extending this argument to the neighborhood level, the increased proportion of young, middle-class professionals in disadvantaged neighborhoods associated with gentrification could increase the number of suitable targets and therefore should result in increased crime.

• Hypothesis 16: The second tenet of routine activities is that crime is more likely to occur in the presence of a motivated offender. Extending this argument to the neighborhood level, gentrification could be associated with increased crime because gentrification typically occurs in or near disadvantaged neighborhoods, where residents have more to gain from criminal activity.

• Hypothesis 17: The third tenet of routine activities is that crime is more likely to occur in the absence of a capable guardian. The changes associated with gentrification may decrease the likelihood that neighborhood residents will act as capable guardians and may increase the likelihood that the police will be called, both of which could result in an increased crime rates

• Hypothesis 18: Crimes rates should initially be positively associated with gentrification as the process increases the number of suitable targets, while reducing the potential for informal guardianship and increasing the potential for formal guardianship. Over time, however, crime rates will likely decline as gentrification
results in a decreased number of motivated offenders and increased guardianship, both formal and informal.

- Hypothesis 19: Given that gentrified neighborhoods often continue to be located near neighborhoods characterized by disadvantaged and unstable populations, positive associations with the spatial lags for concentrated disadvantage and residential mobility are anticipated as previous research has identified these factors as being positively associated with neighborhood crimes.

NEW YORK CITY CRIME TRENDS

The rapid flight of middle-class residents to suburban areas and resulting concentration of social problems such as poverty and crime in urban areas during the 1950’s and 1960’s have been well documented. Further, research has documented that crime rates overall, but specifically rates of violent crime, increased in many American cities dramatically between the 1960’s and 1980s (Blumstein and Wallman, 2000; Travis and Waul, 2002). The 1990s, however, saw a reversal of this trend as crime rates in cities across the United States began to decline (Blumstein and Wallman, 2000; Zimring, 2011). Figure 1 shows that New York City fits this trend as crime increased during the 1980s, but then declined dramatically during the 1990s and continued to decline at a more moderate pace during the 2000s. Crime rates trends in other large American cities described by Zimring (2011) show that this pattern was not unique to New York City, but that the declines in New York City during this period were greater than the declines reported for other cities where crime rates declined.
New York City is unique in its size and geography in that the city encompasses five boroughs, each of which is a county and four of which (The Bronx, Brooklyn, Manhattan, and Queens) contain populations that would place them within the top ten largest U.S. cities during the 2000s (Zimring, 2011: 10). Therefore, in order to understand if New York City really did experience a similar trend to other large U.S. cities, it is important to analyze trends in overall crime by borough. Figure 2 illustrates how the trend in overall crime for each of the five boroughs compares to the city as a whole. These data show that the trends for Brooklyn, The Bronx, and Queens were similar to the trend for the entire city, showing that crime increased during the 1980s, but was followed by a dramatic decrease during the 1990s and moderate decline during the 2000s. In contrast, the trends for Manhattan and Staten Island show that crime rates were already beginning to decline during the 1980s before the dramatic decline of the 1990s.
Exploring the trends in overall crime for New York City and the five boroughs is informative, but previous research has argued that much of the increase in crime during the period leading up to the 1990s was the product of dramatic increases in violent index crimes (Blumstein and Wallman, 2000; Travis and Waul, 2002). Given that much of the increase in overall crime prior to the 1990s was due to increased violent crime, it would be expected that the dramatic decrease since 1990 was driven by decreases in violent crime. This claim, however, does not appear to be supported as analysis of crime-specific rates by Zimring (2011: 16) showed that not all of the large U.S. cities experienced declines in each of the violent index crimes between 1990 and 2009. In fact, Philadelphia saw a 25 percent increase in rape and assault rates, while assaults in Houston and San Antonio respectively increased by 20 percent and 36 percent. In regards to specific forms of property crime, with the exception of San Jose which experienced a five percent increase in auto theft, all of the cities sampled by Zimring (2011) experienced declines in burglary, auto theft, and larceny.
Figure 3 presents crime-specific trends in New York City for 1980 to 2009. Variation in the change in crime rates for assault, burglary, larceny, motor-vehicle theft, and robbery should be interpreted with the scale on the left side of the figure, while variation in homicide and rape should be interpreted using the scale on the right side of the figure due to the much lower frequency of these crimes. Overall, these data show that the dramatic decline in crime in New York City during the 1990s and 2000s was driven by declines in the property crimes of burglary, larceny, and motor-vehicle theft and in the violent crimes of homicide, rape and robbery. The data also show that the assault rate declined substantially during the 1990s, but at a slower pace than the other types of crime.

![Figure 3. Trends in Specific Crimes for New York City](image)

**Why Did Crime Rates in New York City Decline?**

Social scientists generally agree that crime in urban areas across the country declined during the 1990s and 2000s, but the reasons for the decline are still debated (Greenberg,
2013: 2). The most often cited reason for the decline in crime in New York City during this period, but specifically during the 1990s pertains to the implementation order maintenance policing strategies guided by the Broken Windows thesis (BWT). The Broken Windows thesis draws upon the social disorganization and routine activities traditions in that socially disorganized neighborhoods are more likely to feature signs of social (public arguments, public drunkenness) and physical disorder (graffiti, vandalism), which signal to potential offenders that guardianship is likely to be lower in the neighborhood. The BWT argues that reducing the signs of social and physical disorder will result in decreased rates of minor crimes and in turn lower rates of more serious crimes (Kelling and Coles, 1996; Taylor, 2001).

Assessments of BWT in New York City have been generally supportive. Kelling and Coles (1996: 152) found that order maintenance policing strategies based upon BWT implemented between 1990 and 1994 helped to reduce felonies and robberies committed in the New York City subway system by 75 and 64 percent, respectively. Further, analyzing New York City police precinct data between 1990 and 1999, Messner et al. (2007: 405) found that changes in misdemeanor arrest rates were negatively associated with the more serious crime of homicide, which the authors attribute to greater guardianship in the form of more intensive policing. Additional research by Rosenfeld, Fornango, and Rengifo (2007: 377) found that order maintenance policing had a modest negative impact on homicide and robbery, but the authors go on to state that changes in socio-economic disadvantage, racial composition and immigrant concentration featured stronger negative associations with both homicide and robbery and conclude that
substantial crime reductions would have occurred even without the implementation or order maintenance policing strategies.

Rosenfeld et al. (2007) have not been the only researchers to find a strong association between neighborhood disadvantage and violent crime in New York City. Fagan and Davies (2004: 141) found that New York City neighborhoods characterized by disadvantage featured higher risks of violent victimization. Similarly, research by Hannon (2005: 1431) found that risk of homicide victimization was higher in neighborhoods characterized by extreme disadvantage, defined as having poverty rates of 40 percent or greater. As discussed in Chapter 2, Jargowsky (2003) and Ellen and O’Regan (2008) found that poverty declined substantially in areas across the United States during 1990s, and statistics reported by Zimring (2011: 17) showed that crime rates in the largest U.S. cities also declined substantially during the 1990s. It is likely that the decline in crime rates in New York City since the 1990s is attributable to the decline in neighborhood disadvantage in addition to order maintenance policing strategies put into place during this period. The fact that many cities across the U.S. experienced declines in crime but did not implement such policing strategies could mean that the decrease in neighborhood disadvantage may have even played a somewhat larger role in the drop in crime, although this hypothesis not conducted as part of this study.

Summary of the Crime Trends in New York City

Social researchers agree that crime rates declined dramatically in cities across the United States during the 1990s and continued to decline during the 2000s. As described above, New York City fit this trend well as rates of all seven index crimes declined sharply
during the 1990s and at a slower rate during the 2000s. The reason for the decline in crime cities is still debated as some ascribed the decline to reductions in the prevalence of disadvantage, which is supported by research in the social disorganization and routine activities traditions, while others attribute the declines to changes in policing. Given the stronger generalizability of arguments that the decline was the result of changes in disadvantage, the current study argues the declines in crime in New York City were the result of changes in concentrated disadvantage that were associated with gentrification.

CONCLUSION

This chapter highlighted the important inconsistencies and limitations of previous research on the association of gentrification and crime, discussed the dominant explanations that have been used to explain the association of gentrification and neighborhood crime and concluded with a discussion of crime trends in New York City. In highlighting the inconsistencies and limitations of previous research, this chapter illuminated a number of potential causes for the divergent findings of previous research and how the current study seeks to address these issues. The discussion of the dominant explanations for this association, social disorganization and routine activities theory, provided a framework for understanding how the changes associated with gentrification influenced crime rates that guided the development of the hypotheses explored in this study. Based upon two of the three tenets of the social disorganization framework, it is expected that crime rates will decrease in gentrified neighborhoods at a rate that is significantly different from other neighborhoods. In contrast, the tenets of the routine activities theory predict that the changes associated with gentrification will result in
increased crime. Therefore, it is expected that gentrified neighborhoods will have either experienced increased rates of crime or significantly lower rates of decline than non-gentrified neighborhoods. Finally, research on the causes of crime in New York City since 1990 suggests that the decline in crime during recent decades is likely the product, at least in part, of a decline in neighborhood disadvantage.
CHAPTER 4: METHODOLOGY

Previous research documenting gentrification and the association of gentrification and crime produced inconsistent results because of debates within the gentrification literature pertaining to the conceptualization and operationalization of the process (described in Chapter 2) as well as inconsistent and limited analyses of the association of gentrification and crime (described in Chapter 3). Drawing upon and expanding on the discussion of gentrification in Chapter 2 and gentrification and crime in Chapter 3, this chapter describes the data and analysis strategies used in the current study. In doing so, this chapter explores five research questions as identified in Chapter 1.

1. What is the most accurate way to operationalize gentrification?
2. What are the key determinants of gentrification?
3. How is gentrification influenced by changes in neighboring areas?
4. Do neighborhoods that experience greater rates of gentrification experience changes in crime rates that are significantly different from neighborhoods that experience less rates of gentrification?
5. How does the association of gentrification and crime vary over time?

WHY NEW YORK CITY?

The present study explores gentrification in New York City, its determinants, and how gentrification influenced crime rates in New York neighborhoods. While a great deal of attention has been provided to gentrification in New York City, much of the previous research has been qualitative. The qualitative efforts have provided a number of insights into how the gentrification process shapes neighborhoods, but most of these studies used small samples of neighborhoods, limiting the generalizability of the findings. Given the
changes that occurred throughout New York City over the last four decades, it is likely that gentrification was experienced by many neighborhoods beyond the small number identified in previous research. By exploring gentrification in neighborhoods throughout the city, the current study contributes to the gentrification literature specific to New York City, but also to the broader gentrification literature by focusing on its determinants.

An additional reason for focusing on New York City is that the association of gentrification and crime has not been well studied in New York City even though much of the gentrification literature has sampled New York City neighborhoods. Qualitative efforts such as Freeman (2006) and Maurrasse (2006) have referenced changes in crime rates due to gentrification, but a limited number of quantitative gentrification studies in New York City have explicitly explored changes in crime. McDonald (1986) explored changes in crime rates for the New York City neighborhoods of the East Village, West Village, and the Upper West Side in Manhattan and Park Slope in Brooklyn, which were commonly accepted as having gentrified during the 1970s and early 1980s. As discussed in Chapter 3, McDonald’s (1986) research was limited in that it used a small, arbitrarily selected sample, did not directly assess the association of gentrification and crime, and was unable to control for unmeasured variable bias. The current study addresses these limitations by directly assessing the association of gentrification in all 55 sub-borough areas in New York City and utilizes a hybrid fixed effects analysis strategy to control for unmeasured variable bias.

Focusing exclusively on New York City neighborhoods is a benefit and limitation to the current study. In many respects, New York City is similar to other large American cities in that it experienced broad changes to its population during the past five decades.
For example, the rapid loss of population and increased concentration of poverty and racial and ethnic minorities in New York City that resulted from the middle-class flight to suburban areas during the 1960’s and 1970s have been well documented. Further, similar to other large American cities, a plethora of research has documented the role of immigration in shaping the population of New York City. According to Lobo, Flores and Salvo (2002: 705), 64 percent of the New York City was non-Hispanic white in 1970, but data from the 2010 Census show that this percentage has dropped to 44 percent (U.S. Census Bureau, 2012). Finally, like other major American cities, efforts have been made since the 1980s to revitalize New York City, the most important of which has been the Ten-Year Plan, discussed in Chapter 3.

While New York City is similar to other major U.S. cities, there are also a few features that set it apart. The size of the population of New York City is one such feature, as it has long been the largest city in the United States. Current population estimates put the population of New York City at slightly over eight million residents, which is more than double that of Los Angeles, the second largest city and Chicago, the third largest city, combined (U.S. Census Bureau, 2011). Further, because expansion of New York City took place in a vertical manner rather than horizontal manner, it also the most densely populated city in the U.S. with about 27,000 residents per square mile (U.S. Census Bureau, 2011). In addition to the size and density of the population, New York City is also unique in that the majority of the residents, about 70 percent, are renters. The large percent of renters is especially important given that rental housing prices in New York City are regulated by restrictions that prevent rents from increasing dramatically
each year unless the unit becomes vacant. Finally, New York City is potentially unique in that it has been and continues to be a major hub of immigration.

The similarities and differences between New York City and other large American cities have important implications for gentrification and for the analyses included in this study. The size and density of the population of New York City was important for gentrification because it increased the competition for space, which encouraged developers to engage in redevelopment projects such as the conversion of former manufacturing buildings into loft-style apartments (Curran, 2007; Zukin, 1982). Additionally, rent regulations, such as those imposed by the New York City Rent Regulation Board, prevented owners of rent-stabilized units from increasing rents by more than 7.5 percent each year until they reached the maximum base rent. This decreased the likelihood that rental units became vacant (New York City Rent Guidelines Board, 2012). Finally, the large immigrant population in New York City was important for gentrification because previous research has shown that neighborhoods characterized by large proportions of immigrants were less likely to gentrify (Ley and Dobson, 2008; Shaw, 2005). The influence of these factors may help to explain findings that diverge from the broader gentrification literature.

To summarize, New York City is an ideal case study for a quantitative analysis of gentrification. Similar to other large American cities, New York City experienced many of the same population changes as other cities prior to the 1980s, providing a relatively common starting point for gentrification. While a great deal of research on gentrification in New York City neighborhoods has been conducted since the late 1970s and early 1980s, much of this research has been qualitative in nature, leading to questions about the
generalizability of the findings of these studies to neighborhoods in other cities. As the current study analyzes gentrification in the large number and great variety of neighborhoods within the city limits of New York City over the course of 39 years, the results of this study provide a much stronger link between gentrification in New York City and the findings of gentrification research of neighborhoods in other cities. Further, given the features of New York City that make it different from other cities, it is possible that the results of the current study will identify factors that promote or inhibit gentrification that have either not been explored or have been underexplored in other cities.

UNITS OF ANALYSIS
Gentrification is a neighborhood-level process and therefore the primary units of analysis in this dissertation are neighborhoods. Previous research has operationalized neighborhoods in a variety of ways including census tracts, groupings of census tracts (Papachristos et al., 2011; Sampson et al., 1997), electoral wards (Atkinson, 2000) community districts (Reichl, 2007; Schwartz et al., 2003), sub-borough areas (Newman and Wyly, 2006; Rosenbaum and Friedman, 2007), and police precincts (Messner et al., 2007; Rosenfeld et al., 2007).

Neighborhoods are operationalized in two ways in the present study due to the availability of data. The gentrification-specific analyses use the neighborhood areas identified by the New York City Department of City Planning (New York City Department of City Planning, 2011) as units of analysis. These areas were identified using a shapefile downloaded from BYTES of the BIG APPLE, which is overseen by the
New York City DCP (2011). Map 1 displays how census tracts are divided among the 188 New York City neighborhoods.

[Map 1 is located on page 300]

Using New York City DCP neighborhoods is advantageous for two reasons. First, these areas have colloquial neighborhood names attached to them and are similar to the neighborhood clusters identified in Chicago by researchers working with the Project on Human Development in Chicago Neighborhoods (PHDCN) (Sampson et al. 1997; Sampson, 2012). Second, the boundaries of these areas were coterminous with census tracts, which mean that census characteristics for these areas could be determined by aggregating the values of the tracts that are contained within a particular neighborhood area. As much of the previous research on neighborhoods and crime have drawn upon either the PHDCN data or used census tracts as proxies for neighborhoods, drawing upon data at the neighborhood cluster and census tract levels ensures that the results of this study can be compared with much of the previous research on neighborhoods and crime.

Analysis of the association of gentrification and crime uses sub-borough areas as the units of analysis. Sub-borough areas are geographic areas that are unique to New York City and were created by a collaborative effort of the New York City Department of Housing Preservation and Development (New York City DHPS) and the U.S. Census Bureau for the purposes of conducting the New York City Housing and Vacancy Survey. Each of the 55 sub-boroughs contains about 40 census tracts and a population of at least 100,000 residents (refer to Map 1). Sub-borough areas have been used by a number of urban scholars interested in gentrification and other urban-related process in New York City (see Freeman and Braconi, 2004; Newman and Wyly, 2006; Rosenbaum and Friedman, 2007). Most studies of crime in New York City, however, have preferred to
use the 76 NYPD police precincts (see Messner et al., 2007; Rosenfeld et al., 2007). The decision to use sub-borough areas over precincts was made because the boundaries of sub-borough areas were coterminous with the New York City DCP neighborhood areas, census tracts, and NYPD police precincts. Further, NYPD precinct boundaries were not coterminous with census tracts or DCP neighborhood areas. Using sub-boroughs as opposed to police precincts, however, means that the results of this study cannot be directly compared to those of previous research of neighborhood crime rates in New York City that have used police precincts. Police precincts were matched to sub-borough areas using a crosswalk file provided by Len Rodberg of Infoshare Online (Infoshare, 2010). The vast majority of sub-borough areas, 69 percent, contain a single police precinct, 27 percent contain two precincts, and four percent contain three or more precincts.

DATA AND MEASURES
This section discusses the data sources used to measure changes in gentrification and crime rates in New York City between 1980 and 2009. The first part of this section discusses data sources related to the operationalization and measurement of gentrification. Specifically, gentrification is operationalized and measured by drawing upon a combination of tract-level census data from the 1980, 1990, and 2000 decennial censuses and the 2005-2009 American Community Survey with qualitative data collected from The New York Times that identified gentrified neighborhoods between 1980 and 2009. The second section describes the crime data used in this study, which were
collected from Infoshare Online (Infoshare, 2010) and the Citywide Performance Report released by the New York Mayor’s Office of Operations (CPR, 2011).

_Census Data_

Data from the 1980, 1990, and 2000 Censuses were compiled at the tract level using the Neighborhood Change Database (NCDB), which is maintained by The Urban Institute in conjunction with Geolytics, Inc. The NCDB was used rather than acquiring the data from the Census Summary Tape Files for two reasons. First, the NCDB software facilitated the collection of tract-level measures. Second, and more importantly, tract boundaries shifted over time, making it difficult to conduct longitudinal analyses using tract-level data. The NCDB overcame this limitation by providing an option that normalized census tracts for the 1980 and 1990 Censuses to Census 2000 boundaries (Friedman, 2008: 922). Tract-level census data for the 2005-2009 period were collected from the American Community Survey (ACS). Annual ACS data are unavailable for smaller units of analysis such as census tracts, so the five-year estimates were instead. The 2005-2009 data were in the 2000 boundaries so there was no need to normalize these data.

Census data are used in the current study as measures of neighborhood change that predict gentrification and crime, but also to operationalization gentrification in New York City between 1980 and 2009. Two strategies are used and compared to finalize the operationalization of gentrification used in the present study. The Bostic and Martin (2003) strategy was selected because it is purely census-based and seeks to build upon the widely cited, but difficult to replicate strategy developed by Hammel and Wyly (1996; Wyly and Hammel 1999; 2004) who utilized a combination of census data and field work
to identify gentrified neighborhoods in 23 large United States cities. The Freeman (2005) strategy was selected because it was also purely census based and because a recent study by Freeman (2009) compared the strategy identified by Freeman (2005) to the Hammel and Wyly (1996) strategy. Freeman’s (2009: 2088) goal was not to determine which strategy was a better predictor of gentrification, but an important finding in this study was that the number of neighborhoods identified as gentrified by each strategy differed substantially. Each of these strategies is discussed below.

The operationalization of gentrification identified by Bostic and Martin (2003) used the work of Hammel and Wyly (1996; Wyly and Hammel, 1999; 2004) as their starting point and explored tract level changes for the 50 largest metropolitan areas in the United States to develop a multivariate threshold operationalization of gentrification. Specifically, changes in the following characteristics are used: proportion with bachelor’s degrees, average family income, homeownership rates, proportion aged 30-44, proportion white non-family households, proportion managerial and administrative workers, proportion with some college, the proportion in poverty, and the proportion black. Bostic and Martin (2003) deviate from Wyly and Hammel’s (1999) in two important ways. First, the Bostic and Martin (2003) strategy incorporated Wyly and Hammel’s (1999: 731) suggestion and used median family income instead of average family income because median family income was a better representation of the average. Second, and more importantly, Bostic and Martin (2003) relied on two census-based threshold approaches rather than use fieldwork to identify gentrified neighborhoods.

In the first part of their analysis, Bostic and Martin (2003) identified gentrifiable tracts as those below the median income at the beginning of an intercensal period and
gentrified tracts as those that changed from below median income to above median income between decennial censuses. Figure 4 provides an example of this strategy using data from the 1980 and 1990 Censuses. This decision replicates Hammel and Wyly’s (1996) decision to identify gentrifiable tracts as those with a median income less than 50 percent of the median income for the MSA. Using this approach, Bostic and Martin (2003: 2430) identified 731 gentrifiable tracts in 1970 and 1907 gentrifiable tracts in 1980 in order to establish the baseline number of tracts used in later analyses.

Figure 4. Bostic and Martin Median Income Threshold

<table>
<thead>
<tr>
<th>Tract #</th>
<th>Below Median Income 1980</th>
<th>Above Median Income 1990</th>
<th>Gentrified</th>
</tr>
</thead>
<tbody>
<tr>
<td>36005009700</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>36005009900</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>36005010500</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>36005011501</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>36005011502</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

In the second part of their analysis, Bostic and Martin (2003) created a scoring system that drew upon the nine indicators of gentrification identified by Wyly and Hammel (1999). This process involved two steps. The authors first calculated a series of change score variables in order to determine how much tracts changed on each of the nine variables identified by Wyly and Hammel (1999) between 1970/1980 and 1980/1990. The tract change score variables were then assigned a rank value for each decade. Tracts were assigned lower rank scores (i.e., first (1), second (2), third (3), etc.) if they experienced increases in the proportion with college degrees, family income, homeownership rates, proportion aged 30-44, proportion white non-family households,
proportion managerial and administrative workers, and the proportion with some college or decreases in poverty and percent black. The average of the ranked variables was computed and tracts with lower average rank values were considered more likely to have gentrified. Figure 5 illustrates this process using data from the 1980 and 1990 Censuses.

In order to facilitate the comparison of the two operationalizations, the same number of tracts identified by the first approach was used in the second approach. For example, using the first strategy, which was based solely on whether a tract changed from below median income to above median income between decennial censuses, Bostic and Martin (2003: 2431) determined that 131 tracts gentrified between 1970 and 1980 and 329 tracts gentrified between 1980 and 1990. In order to keep the number of tracts consistent across strategies, the authors then identified the 131 tracts with the lowest average rank score for the period 1970-1980 and the 329 tracts with the lowest average rank score for the period 1980-1990. Replication of the Bostic and Martin (2003) strategy with New York City census tracts identified 152 tracts as having gentrified between 1980 and 1990, 154 tracts as having gentrified between 1990 and 2000, and 138 tracts as having gentrified between 2000 and 2005/2009.

Like Bostic and Martin (2003), Freeman (2005) developed a multivariate operationalization of gentrification. Using the geocoded version of the Panel Study of Income Dynamics, Freeman (2005) identified gentrifiable neighborhoods as those located in the central city, having a median income less than the median for that metropolitan area, and having a proportion of housing built within the past 20 years lower than the proportion found at the median for the respective metropolitan area at the beginning of a decennial census period.
Figure 5. Bostic and Martin Variable Ranking Approach

<table>
<thead>
<tr>
<th>Tract #</th>
<th>Change in % College Degree</th>
<th>Change in % Family Income</th>
<th>Change in % Ages 30-44</th>
<th>Change in % Non-white Family</th>
<th>Change in % Professional Employment</th>
<th>Change in % Some College</th>
<th>Change in % Poverty</th>
<th>Change in % Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>36005009700</td>
<td>1.99</td>
<td>9241.14</td>
<td>4.24</td>
<td>-15.24</td>
<td>-0.26</td>
<td>3.94</td>
<td>5</td>
<td>-3.43</td>
</tr>
<tr>
<td>36005009900</td>
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<td>10922</td>
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<td>-6.73</td>
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<td>-0.87</td>
<td>1.63</td>
<td>5.42</td>
<td>1.23</td>
<td>1</td>
<td>2.77</td>
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<tr>
<td>Rank of Change College Degree</td>
<td>Rank of Change Family Income</td>
<td>Rank of Change Age 30-44</td>
<td>Rank of Change Non-white Family</td>
<td>Rank of Change Professional Employment</td>
<td>Rank of Change Percent with Some College</td>
<td>Rank of Change Poverty</td>
<td>Rank of Change Percent Black</td>
<td>Ranking Average</td>
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<td>5</td>
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<tr>
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<td>4</td>
<td>2</td>
<td>3.75</td>
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Freeman (2005) identified gentrified neighborhoods as those featuring the characteristics of gentrifiable neighborhoods, but which also featured an increase in educational attainment greater than the median for the metropolitan area and an increase in real housing prices during intercensal period. Recognizing that some neighborhoods might not change, Freeman (2005) identified non-gentrified neighborhoods as those which featured the characteristics of gentrifiable areas at the start of the decennial census period, but which did not experience the changes required for gentrification. Replicating this strategy with New York City tracts identified 138 tracts as having gentrified between 1980 and 1990, 248 tracts as having gentrified between 1990 and 2000, and 283 tracts as having gentrified between 2000 and 2005/2009.

The tracts identified by replication of the Bostic and Martin (2003) and Freeman (2005) strategy were then mapped using a publically available shapefile downloaded from BYTES of the BIG APPLE (New York City Department of City Planning, 2011) to identify the distribution of gentrification within New York City. Additionally, this shapefile provides New York City DCP and sub-borough area identifiers for each census tract. These identifiers, specifically the DCP neighborhood area identifier, facilitated the comparison of the results of the Bostic and Martin (2003) and Freeman (2005) operationalizations to The New York Times content analysis results, which frequently discussed gentrification in regards to an overall neighborhood as opposed to a specific part of a neighborhood. Maps are discussed in Chapter 5 that identify the distribution of gentrification during each period according to the Bostic and Martin (2003) and Freeman (2005) strategies.
Recent analyses of gentrification have begun to move away from using strictly census-based operationalizations of gentrification. Examples of this include Papachristos et al. (2011) and Smith (2012) who used the number of coffeeshops in a neighborhood as a proxy for gentrification, Kreager et al. (2011) who explored changes in mortgage investment data reported by the Home Mortgage Disclosure Act, and Smith (2012) who measured gentrification through the demolition of public housing. The current study grounds census-based operationalizations of gentrification with data about neighborhood gentrification collected from *The New York Times*. *The New York Times* was selected because it is a nationally recognized news source with a strong emphasis on events in New York City. While these data are useful by themselves, they are used in the current study in addition to census-based operationalizations of gentrification, which are unable to measure important cultural interpretations of neighborhood change.

These data were collected from the LexisNexis database, which contained electronic versions of *The New York Times* dating back to January 1, 1980. In order to be considered, an article had to be published between January 1, 1980 and December 31, 2009 and contained the terms “gentrification” and “New York City.” This strategy produced 759 documents. Each document was coded according to the year and month of publication, the neighborhood identified, and a description of other potentially relevant information where identified such as the cause of gentrification and specific changes associated with gentrification such as changes to local business or in the composition of the population of the neighborhood. The final data set, comprised of dichotomous variables that identify whether neighborhoods gentrified during the 1980s, the 1990s, and
2000s, identified 102 neighborhood areas as experiencing gentrification between 1980 and 2009.

To determine which census-based operationalization was more strongly associated with the operationalization of gentrification developed by *The New York Times*, crosstabulations were computed for each period. Results of analyses described in Chapter 5 show that the Bostic and Martin (2003) strategy was more strongly associated with *The New York Times* during for each period than the Freeman (2005) operationalization. Therefore, the decision was made to use the Bostic and Martin (2003) strategy to operationalize gentrification in the remainder of the analyses.

**Crime Data**

Much of the previous research on the association of gentrification and crime has used official statistics and explored changes in crime rates, the exception being Van Wilsem et al. (2006) who explored changes in self-reported rates of victimization. For the purposes of assessing the association of gentrification and crime, it makes more sense to analyze variation in official crime data than victimization data because previous research has found a greater willingness and ability of gentrifiers to make demands on city services such as the police than incumbent residents (Freeman, 2006, Maurrasse, 2006; Skogan, 1990). Therefore, victimization data may overstate the effect of gentrification on crime. In analyzing crime rates, previous research has explored variation in aggregate and crime-specific rates. McDonald (1986) and Kreager et al. (2011) studied variation in aggregate levels of total crime, violent crime, and property crime. Covington and Taylor

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3 Efforts were made to revise the Freeman and Bostic and Martin operationalizations in order to increase the associations with the New York Times, but were not fruitful and actually resulted in decreased associations.
(1989) explored variation in robbery, larceny, and burglary. O’Sullivan (2005) studied changes in rates of motor-vehicle thefts, burglaries, assaults, and robberies. Lee (2010) analyzed variation in the seven index crimes and three public order crimes. Papachristos et al. (2011) focused on changes in homicide and robbery. More recently, Smith (2012) analyzed variation in gang-related homicides. In order to bridge the findings of previous research, the current study analyzes variation in counts of seven of the eight index crimes that were reported to the police: homicide, sexual assault, robbery, aggravated assault, burglary, larceny, and motor-vehicle theft. Arson and misdemeanor data were not included because reliable data could not be located for the study period. Further, analyzing variation in the seven index crimes was important because Lee (2010) found that gentrification differentially affected crime rates.

Counts of the seven index crimes reported to the police for the years 1989 through 1991 and 1999 through 2001 were downloaded from Infoshare Online (Infoshare, 2010). These data were collected at the precinct level, but were only downloadable at the Community District level. Precinct level crime data for the years 2005-2009 were collected from New York City’s Citywide Performance Tool (CPR, 2011). To facilitate the comparison of the two data sources, the precinct level data for 2005-2009 were matched to the Community District level using a crosswalk file provided by Len Rodberg at Infoshare Online (Infoshare, 2010).

Using Community Districts is problematic for the current study because their boundaries are not coterminous with census tract boundaries. To correct for this, Community Districts were matched to sub-boroughs using a well established practice of merging Bronx Community Districts 1 and 2 into a single sub-borough, Bronx
Community Districts 3 and 6 into a single sub-borough, Manhattan Community Districts 1 and 2 into a single sub-borough and Manhattan Community Districts 4 and 5 into a single sub-borough (Been et al., 2011). In addition to being coterminous with census tract boundaries, sub-borough boundaries were also coterminous with police precinct boundaries, making them the lowest level of analysis at which census and crime data could be accurately matched. While not ideal proxies for neighborhoods due to their size, each sub-borough contains about 100,000 residents, they have been used by a number of studies focused on New York City (Reichl, 2007; Rosenbaum and Friedman, 2007; Schwartz et al., 2003; Schwartz, 1999). The vertical nature of New York City makes it the most densely populated city in the United States, which is reflected in the sub-borough population density average of 43,000 residents per square mile.

Criminologists recognize that crime rates can vary substantially from year to year, which is problematic for the current study due to the cross-sectional nature of census data. Previous research has corrected for this issue by computing three-year averages for crime rates around decennial census years (see Browning et al., 2010; Cancino, Martinez and Stowell, 2009 and Kreager et al., 2011). The current study used this approach and computed crime-specific rates for 1990 and 2000 by averaging the counts of each crime type preceding the census year, for the census year, and for the year proceeding census. The average of the counts was then divided by the total population and multiplied by 1000 in order to produce the rate per 1000 sub-borough residents:

\[
\text{Homicide Rate } 90 = \frac{(\#\text{Homicides}1989 + \#\text{Homicides}1990 + \#\text{Homicides}1991)}{\text{Subborough population}} \times 1000
\]
Crime data for the final time point were created by averaging annual crime counts of each crime for the years 2005 through 2009 to match the years included in the five-year 2005-2009 ACS estimates.

*Predictors of Gentrification and Crime*

*Concentrated Disadvantage.* Gentrification scholars differ on the specifics of why and how gentrification occurred (see Chapter 2 for more discussion), but all generally agree that gentrification was more likely to have occurred in disadvantaged neighborhoods. Further, a great deal of criminological research has found that concentrated disadvantage was positively associated with neighborhood crime, particularly with violent crime (Kubrin and Weitzer, 2003; Sampson et al., 1997; Shaw and McKay, 1969 [1942]).

Similar to the concept of gentrification, the concept of disadvantage has been operationalized in many different ways. For example, Fagan and Davies (2004: 134) operationalized concentrated disadvantage through changes in poverty, labor market, segregation, supervision, anonymity, immigration, and housing structure. Similarly, research by Krivo and Peterson (1996: 624) operationalized disadvantaged areas as featuring high poverty rates, high proportions of female headed households and unemployed males aged 16 or older, and low proportions of residents employed in professional or managerial occupations. In the current study, concentrated disadvantage is operationalized using a slight variation on the index identified by Sampson et al. (1997) who developed an index of concentrated disadvantage that included the percent of residents receiving public assistance, poverty, unemployment rate, percent with less than a high-school education, percent female-headed households, and percent black. While
originally developed with tract level data specific to Chicago, Sampson (2012: 100) reported a high degree of generalizability of this operationalization to other large American cities.

In order to ensure that this operationalization of concentrated disadvantage was applicable to New York City, factor analyses were conducted with New York City tract data from the 1980, 1990, and 2000 censuses and the 2005-2009 ACS. Results revealed that the percent receiving public assistance, percent below poverty, percent unemployed, percent female-headed households, and percent black consistently loaded highly on the same component. Unlike the results of Sampson and colleagues, the percent with less than high school education did not consistently loaded highly on a single factor with the other variables and therefore was excluded. The results of these analyses were then aggregated to the neighborhood level in order to show the mean level of concentrated disadvantage for the neighborhood. It is expected that neighborhoods characterized by disadvantage are more likely to gentrify and feature higher crime rates. Additionally, it is expected that areas where disadvantaged populations became less concentrated will have experienced greater declines in crime.

*Residential Stability.* Residential stability is an important predictor of gentrification because gentrification is associated with the introduction of new, primarily middle-class, residents into disadvantaged neighborhoods, but also because neighborhoods with low rates of residential stability provide fewer opportunities for middle and upper-class residents to move into the area. As discussed in Chapter 2, members of the middle and upper class tend to move to disadvantaged neighborhoods and engage in gentrification
because such areas often feature inexpensive housing with historical architecture, access to amenities such as bars, restaurants, and shops through either proximity to such amenities in the neighborhood or to transportation that can be used to access such amenities and are located closer to their places of work.

Residential stability is also a strong predictor of crime, as research on neighborhood correlates of crime has shown that residential stability was negatively associated with crime rates (Kreager et al., 2011; Peterson and Krivo, 2010). Residents of neighborhoods characterized by residential mobility, the opposite of residential stability, are less likely to draw upon informal means of social control because neighborhoods characterized by residential mobility tend to feature weaker communities (Sampson et al., 1997: 919). The decreased ability to rely on means of informal social control means that residents must instead rely on formal means of social control such as calling the police, which inflates crime rates as a greater number of incidents get recorded in official statistics.

Similar to previous research on neighborhood change, the current study operationalizes residential stability through change in the population who lived in the same home for at least five years (Morenoff, Sampson, and Raudenbush, 2001; Papachristos et al., 2011; Warner and Rountree, 1997). Given the findings of previous research, it is expected neighborhoods with higher rates of residential mobility will be more likely to experience gentrification and feature higher crime rates. Further, it is expected that declines in residential mobility over time will result in decreased crime.
*Age of Housing.* Much of the scholarship on gentrification argued that neighborhoods with a large number of buildings with historical character, whether perceived or actual, were more likely to experience gentrification (Curran, 2007; Hamnett and Whitelegg, 2003; Zukin, 1982). While most studies were vague as to how old buildings must be before they were susceptible to gentrification, analyses conducted by Rosenthal (2008) revealed that neighborhoods characterized by housing stock that was forty years old or greater was more attractive to members of the middle-class and hence more likely to gentrify. The current study incorporates Rosenthal’s (2008) findings and includes a measure of the percent of housing in a neighborhood built 40 years or more before the start of a given census period. A few steps were required to create this variable. First, the number of occupied housing units built 40 years or more prior to each census was computed. For example, for the 1990 census the values of “occupied housing units built 1940-1949” and “occupied housing units built 1939 or earlier” were summed in order to determine the base number of housing units. The base value was then divided by the number of occupied housing units for the census year (1980 in this example) and multiplied by 100 in order to create a percentage. It is expected that neighborhoods where the percent of buildings built forty years or more prior increase will be more likely to experience gentrification.

While age of the housing stock has been found to be an important predictor of gentrification, criminological research has not explicitly explored the association of the age of housing with crime rates. Instead, research on the neighborhood correlates of crime has recognized that home values in marginal neighborhoods tend to be lower than home values in other neighborhoods, which was due in large part to the greater
prevalence of crime in marginal neighborhoods (O’Sullivan, 2005; Schwartz et al., 2003). Drawing upon gentrification research, housing in marginal neighborhoods should also be older than housing in other neighborhoods (Bourne, 1993; Ley and Dobson, 2008). Therefore, crime rates should be higher in neighborhoods characterized by higher percents of housing built 40 years or earlier.

Immigration. Neighborhood level research has frequently discussed the importance of immigration for neighborhood change, which is measured in the current study by change in the percent foreign born between decennial censuses. Little research, however, has analyzed the association of immigration and gentrification. While much of the previous gentrification literature has discussed immigrants as being at risk of displacement, research by Ley and Dobson (2008: 2474) questioned this assumption as they found that gentrification was less likely to occur in neighborhoods characterized by large immigrant populations. Therefore, neighborhoods with large foreign-born populations should be less likely to experience gentrification.

Immigration also has the potential to influence crime rates. While research conducted by Chicago School sociologists such as Thomas and Znaniecki (1974 [1918]) and Shaw and McKay (1969 [1942]) found that neighborhoods characterized by large foreign-born populations tended to feature higher crime rates, recent research shown a much different pattern. Using data from the National Neighborhood Crime Study, Peterson and Krivo (2009) found that the percent foreign born was negatively associated with violent crime. Analyses of neighborhood data from Columbus, Ohio conducted by Browning et al. (2010) show further support for the argument that immigration was
negatively associated with crime as the authors found that neighborhoods with large concentrations of immigration reported lower rates of assault and robbery. Given these findings, it is expected that crime rates will be lower in neighborhoods characterized by large foreign-born populations.

Subway Entrances. Previous research on the association of transportation access and gentrification has produced mixed results. Brueckner and Rosenthal (2009) found that neighborhoods with access to public transit were more attractive to lower-income households and were therefore less likely to gentrify. In contrast, research by Kahn (2007) showed that increased access to “Walk and Ride” forms of public transit encouraged gentrification. The current study addresses this issue by measuring access to public transit by identifying whether neighborhoods contained a subway entrance. Further, as subway entrances represent a form of “Walk and Ride” transportation, it is expected that neighborhoods with subway access will be more likely to gentrify.

According to Loukaitou-Sideris, Liggett, and Hiseki (2002: 135), transit-related crimes were common, but largely underreported. Drawing upon the routine activities perspective, previous research has argued that public transit nodes such as subway entrances attract criminal activity as they allow offenders to loiter for long periods waiting for potential victims, who often represented easy targets due to tiredness or preoccupation (Block and Davis, 1996; Myhre and Russo, 1996). Further, transit nodes were not isolated from the neighborhoods they were located in and have been found to have crime rates similar to those of the neighborhood in which they are located (Loukaitou-Sideris et al., 2002: 146).
Information on the location of subway entrances was downloaded from Spatiality\(^4\) (Romalewski, 2010) and then geocoded to census tracts. Analysis of the number of subway entrances showed very little variation, as 82 percent of census tracts did not contain a subway entrance, 14 percent contained one entrance, 2.5 percent contained two entrances and 0.3 percent contained more than two entrances. Due to the small amount of variation in the number of subway entrances per census tract, neighborhood area analyses include a dichotomous measure of whether a neighborhood area contained at least one subway entrance. This was not a problem at the sub-borough level because every sub-borough area contains at least one subway entrance. Instead, sub-borough area analyses incorporate a measure of the percent of tracts that contained subway entrances.

*Housing Affordability Restrictions.* Research on housing in New York City has frequently discussed the impacts of the Ten-Year Plan (see Chapter 2 for a discussion of the Ten-Year Plan). Much of the previous research on the impacts of the Ten-Year Plan has analyzed variation in the amount of money spent on capital expenditures and the number of housing units rehabilitated or constructed through efforts of programs associated with the Ten-Year Plan (Ellen et al., 2001; Schill et al., 2002; Schwartz and Vidal, 1999). These data, however, are difficult to obtain. Instead, the current study utilizes a measure of the percent of renter-occupied housing units in each tract upon which affordability restrictions were imposed during the 1980s, 1990s, and 2000s. Data on the start date of affordability restrictions were collected from the New York City Housing and Neighborhood Information System (NYCHANIS) (Furman Center, 2010).

\(^4\) Spatiality is a blog maintained by Steven Romalewski, who is the Director of Mapping Service at the Center for Urban Research at the CUNY Graduate Center.
A similar measure was used by DeFilipis and Wyly (2008) to show how federally subsidized housing was distributed throughout New York City during the mid-2000s.

The impact of increased affordable housing on crime is unclear because criminological research has yet to explore the association of affordable housing and crime rates. Evaluations of the Ten-Year Plan in New York City, the primary goal of which was to increase affordable housing, show that the majority of investments were made in the poorest neighborhoods in New York City (Furman Center, 2006; Schill et al., 2002). Given the findings of research that found concentrated disadvantage was positively associated with crime, it is logical to argue that neighborhoods that experienced an increase in the proportion of affordable housing should have experienced declines in crime. Schwartz (1999: 859) stated that crime and welfare dependency have both declined since the implementation of the Ten-Year Plan, but these associations have yet to be explicitly assessed.

**Time Period.** Research by Kreager et al. (2011) found that the association of gentrification and crime was curvilinear in that crime rates increased as the area developed, but declined after the neighborhood had reached a tipping point in development. This finding is incorporated into the current study by exploring multiple operationalizations of time. First, time is incorporated through dichotomous variables that help to distinguish the impact of changes during the 1980s from changes during the 1990s and 2000s. A second strategy explores the impact of the interaction time with the independent variables.
ANALYTICAL STRATEGY

Sample Sizes

Gentrification-specific analyses will draw upon two types of analytical units. The first type of analytical units is the 2217 census tracts in New York City identified by Census 2000. As is the standard in tract-level analyses, tracts that contained zero population or where the entire population lived in group quarters at the beginning of the decennial census period were removed. This removed tracts such as that occupied by Central Park, Riker’s Island, and tract 162200 in Queens, which is completely underwater, resulting in a final sample size of 2135 census tracts for each decade.

The second type of analytical units used for the gentrification-specific analyses are the neighborhood areas defined by the New York City Department of City Planning. These areas divide the 2217 census tracts into 195 neighborhood areas. Areas covered by airports, parks, cemeteries, and Riker’s Island were excluded before analyses were conducted, bringing the total sample size to 188 neighborhood areas with an average of 11 tracts per neighborhood.

Analyses of the association of gentrification and crime utilize the 55 sub-borough areas. Sub-borough areas are defined by the U.S. Census bureau, which means their boundaries are coterminous with tract and neighborhood area boundaries. On average, sub-borough areas contained approximately 100,000 residents, 11 neighborhood areas and 40 census tracts.
Analytical Plan Part 1A: Operationalizing Gentrification

The first series of analyses describes how the decision to operationalize gentrification in the current study was made. Gentrification has been operationalized by quantitative researchers in many ways, each associated with strengths and limitations. Rather than arbitrarily settling on an operationalization strategy, however, analysis was conducted that applied operationalizations of gentrification developed by Bostic and Martin (2003) and Freeman (2005) to New York City for the periods 1980-1990, 1990-2000 and 2000-2005/2009. These analyses produced a list of tracts that were matched to NYCDCP neighborhood areas in order to identify neighborhood areas that contained at least one census tract considered to be gentrified. Matching census tracts to NYCDCP neighborhood areas facilitated the comparison of the Bostic and Martin (2003) and Freeman (2005) operationalizations to the results of The New York Times content analysis as the sampled articles often discussed gentrification in regards to an overall neighborhood, rather than to a specific part of a neighborhood.

Dependent Variables. For the tract-level analyses, separate dichotomous variables were created that reflected whether a tract was considered gentrifiable and gentrified for each decennial census according to the Bostic and Martin (2003) and Freeman (2005) strategies. For the neighborhood level analyses, tract level data were aggregated to the DCP neighborhood level and neighborhoods were labeled gentrified if at least one tract within the neighborhood cluster was determined to have gentrified during the tract level classifications. Results in Table 2 show that the majority of neighborhoods that experienced gentrification during each decade contained two or fewer gentrified tracts.
The last step facilitated the comparison of the census analyses to *The New York Times* analyses, as *The New York Times* frequently discussed gentrification in regards to an overall neighborhood as opposed to a specific part of a neighborhood.

[Table 2 is located on page 283]

*Independent Variables.* The independent variables used in these analyses include the measures required to replicate the operationalizations of gentrification identified by Bostic and Martin (2003) and Freeman (2005). For the replication of Bostic and Martin (2003), these variables include the proportion with bachelor’s degrees, average family income, homeownership rate, proportion aged 30-44, proportion white non-family households, proportion managerial and administrative workers, proportion with some college, the proportion in poverty, and the proportion black for each of the three time periods analyzed. For the replication of Freeman (2005), these variables include median income, the proportion of housing stock built within the last 20 years, the percent with college degrees, and median gross rent.

**Analytical Plan Part 1B: Identification of Where Gentrification Occurred**

Preliminary results of Analytical Plan Part 1A show that the Bostic and Martin (2003) operationalization of gentrification matched more closely with *The New York Times* than the Freeman (2005) operationalization. Given that the Bostic and Martin (2003) operationalization better predicted gentrification in New York City during the study period, the remainder of the analyses utilize the Bostic and Martin operationalization in order to identify gentrified areas. The analyses in this section provide an overview of the characteristics of gentrified and non-gentrified areas during the 1980s, 1990s, and 2000s.
In addition to presenting descriptive statistics, maps will be presented that display the spatial distribution of gentrified and non-gentrified tracts for each decade.

**Analytical Plan Part 1C: Identification of the Predictors of Gentrification**

These analyses utilize a hybrid fixed effects technique developed by Allison (2005) in order to identify the important predictors of gentrification in New York City for the study period. The primary advantage to the general fixed effects method is that, similar to experimental designs, it focuses exclusively on within-unit variation. While restricting attention to within-unit variation greatly reduces the potential for the calculation of biased estimates, the fixed effects method cannot estimate coefficients for variables that have no (or little) within-unit variation. Random effects methods, on the other hand, allow estimates for time-invariant variables while adjusting for the within-unit correlation in repeated measures of the dependent variable that would inflate estimated standard errors and bias inference in conventional regression analysis. Allison’s (2005) hybrid fixed effects method retains the strong causal inference properties of fixed effects methods for time-varying variables with the ability of random effects methods to estimate the between-subject effects of time-invariant variables and their conditioning effect on the change component of the dependent variable.

The basic model is given by the familiar model for within- and between-person variance decomposition with the extension that neighborhood areas (indexed by $i$) nested within time (indexed by $t$):

$$y_{it} = \mu_{i} + \lambda_{it} + \beta x_{it} + \gamma_0 z_t + \alpha_i + \varepsilon_{it}$$

with $i = \text{Neighborhood Area } 1, \ldots, n$; and $t = 1980 - 1990, \ldots, T$
where $x_{it}$ and $z_i$, are time-varying neighborhood-level and time-invariant neighborhood-level correlates respectively; $\mu_t$ is an intercept that is allowed to vary with time; $\lambda_i$ allows time to be treated as neighborhood-specific random coefficients; $\beta$ is a (fixed) coefficient for time-varying neighborhood-level correlates; $\gamma_t$ is a time-varying coefficient for time-invariant neighborhood-level variables; $\epsilon_{ijt}$ is a random disturbance term; and $\alpha_i$ is a random effect that varies over neighborhood areas that is assumed to follow a normal distribution with a mean of 0 and constant variance, and is independent of $z_i$, $x_{it}$, and $\epsilon_{it}$.

There are a few features of the hybrid fixed effects model that distinguish it from conventional fixed effects. First, the elimination of between-unit variation in conventional fixed effects methods is accomplished either through the inclusion of $n-1$ dummy variables or through differencing $y$ and the $x$s around their person-specific means (over time). This is the reason that fixed effects models cannot include time-invariant variables. The hybrid model does not difference $y$, thus there is within-unit and between-unit variation. The hybrid method reproduces fixed effects estimates for time-varying neighborhood-level variables by differencing the $x$’s around their unit-specific means and regressing $y$ on time (treated as $T-1$ dummies), the unit-specific means ($\bar{x}_i = \frac{1}{n_t} \sum_t x_{it}$), and the unit-specific differenced $x$s ($x_{it}' = x_{it} - \bar{x}_i$). Second, the $t$ subscripts on $\gamma$ represent the flexibility to treat time-invariant variables from within the fixed effects framework via time-varying coefficients. These coefficients, which result from interactions between time-invariant variables with time, allow the effect of time to vary with level of the time-invariant covariate. Third, the hybrid model permits error

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5 The author is grateful to Glenn Deane for his assistance with this discussion.

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covariance structures that are less constrained than the conventional fixed effects method. In particular no constraints are imposed on the variance/covariance matrix (known as “unstructured”) of the within-unit random effects.

The independence assumption is important for distinguishing between random and fixed effects models. In fixed effects models, $\alpha_i$, which represents all stable characteristics of the units of analysis, are treated as a set of fixed parameters that are either differenced out of the equation or estimated directly. In other words, the fixed effects method imposes no restrictions on the relationship between $\alpha_i$ and $x_{it}$. If $\alpha_i$ is treated as a random variable, the random effects method must rely on the independence assumption. While the hybrid model does not separate model estimation from the independence assumption, it does allow direct tests of the random effect model against the alternative of a fixed effect mode, thereby allowing for an assessment of whether inference is biased.

At the neighborhood level, the dependent variable is the percent of tracts located within each DCP neighborhood that gentrified. Similarly, the dependent variable at the sub-borough level is the percent of tracts within a sub-borough that gentrified. As the dependent variable, percent of the area that gentrified, is the same for both levels of analysis, the same model is used:

$$\% \text{Gentrified}_i = \mu_t + \text{Disadvantage}_i \lambda_i t_i + \text{Disadvantage}_i t + \text{Moved}_i \lambda_i t_i + \text{Moved}_i t + \text{Foreign}_i \lambda_i t_i + \text{Foreign}_i t + \text{Built40}_i \lambda_i t_i + \text{Built40}_i t + \text{Housing Affordability}_i \lambda_i t_i + \text{Housing Affordability}_i t + \text{Subway Entrance}_i \lambda_i t_i + \text{Subway Entrance}_i t + \alpha_i + \epsilon_{it},$$

**Analytical Plan Part 1D: Determining the Spatial Dependence of Gentrification**

Neighborhoods are interdependent and therefore spatial dependence is expected. In order to determine if spatial dependency is an issue, Moran’s I will be computed for each intercensal period in order to determine if spatial autocorrelation is an issue at the sub-borough level. If spatial autocorrelation is an issue, then the GeoDa software package will be used to create spatially lagged versions of the independent variables using a first-order queen contiguity weights matrix. According to Anselin (2002: 259), the specification of a weights matrix is a somewhat arbitrary decision that should be guided by the data and the theoretical framework guiding the analyses. Recognizing these criteria, the current study utilizes a first-order queen matrix because the shape and distribution of the DCP neighborhood areas lends itself best to the queen weight matrix because many neighborhood areas share borders with four or more other neighborhood areas. These analyses start with the model described in Analytical Plan Part 1C and include spatially lagged variants of the independent variables based upon a first-order queen weight matrix created using the GeoDa software package.

**Analytical Plan Part 2A: Fixed Effects Analysis of Gentrification and Crime**

The final series of analyses will investigate the association of gentrification and crime. The dependent variables in these analyses are changes in the rates of homicide, robbery, sexual assault, aggravated assault, burglary, larceny, and motor-vehicle theft during each intercensal period. Drawing upon the predictors of gentrification and neighborhood crime discussed in Chapters 2 and 3 respectively, the independent variables in these analyses reflect changes in sub-borough areas for concentrated disadvantage, the percent
who moved in the past five years, the percent foreign born, the percent of housing built in
the last 40 years, proportion of renter-occupied housing units upon which affordability
restrictions were imposed, the proportion of tracts that contain subway entrances and the
percent gentrified between decennial censuses.

The first stage of these analyses is descriptive and shows how rates of each crime
varied during each of the three intercensal periods. These results will be displayed in a
tabular format, but also through a series of maps to highlight the distribution of crime rate
changes among sub-borough areas.

The second stage will present multivariate results of the association of
gentrification and crime. An important consideration for the multivariate analyses is
endogeneity as the direction of the relationship between gentrification and crime has yet
to be definitively established. Two approaches have been utilized by previous
researchers to correct for the issue of endogeneity. Lee (2010) used an instrumental
variable approach, which requires the identification of a variable that meets two
requirements. First, there should be a theoretical reason why changes in the instrumental
variable are associated with changes in independent variable(s). Second, the instrumental
variable should be strongly correlated with independent variable(s) while simultaneously
being weakly correlated with the dependent variable of interest. Finding such a variable
is often a difficult task (Bushway and Apel, 2010: 605). Lee (2010) argues that the
earthquake in Northridge California in 1994 qualifies as such a variable. The author
argues this event meets the first qualification of instrumental variables because it
produced a large gentrifiable housing stock and was not significantly associated with
changes in crime.
In contrast to Lee (2010), a fixed-effects approach has been utilized by Papachristos et al. (2011) and Kreager et al. (2011). Fixed effects analysis corrects for endogeneity by allowing for a different intercept for each case, which allows for analysis of variation within each case independently of the other cases. The drawback to this approach is that the unmeasured variables cannot be specifically identified. In pursuing this strategy, the authors first tested their model with a random (or mixed) effects approach in order to provide a comparison to the results of the fixed effects analysis. As discussed by Kennedy (2008: 286) and as recognized by Papachristos et al. (2011: 224), results of random effects models are more likely to be statistically significant, but random effects models do not control for unexplained variables.

While the instrumental variable and fixed effects approach are both valid means of addressing the potential issue of endogeneity, the current study utilizes a hybrid fixed effects approach (Allison, 2005). The instrumental variable approach was pursued, but a thorough search of potential variables failed to yield an appropriate instrumental variable. Fixed-effects analyses require a data structure where each observation is associated with a specific time point. The current analyses draw upon a similar data structure to that described by Kreager et al. (2011) in that each observation (sub-borough area) is associated with measures that reflect the change in the independent variables between decennial censuses. The data are structured this way because the primary variable of interest, the percent gentrified, was created by aggregating change scores calculated at the tract level using the operationalization of gentrification developed by Bostic and Martin (2003). The dependent variable, however, is measured at the end of each decade in order to determine if variation in crime rates are the result of changes during each decade. The

After restructuring the data, two fixed-effects regressions are analyzed for each crime type. The first model regresses each crime rate at the end of a decade on changes in the independent variables. Using the example of homicide:

\[
\text{Homicide Rate}_{it} = \mu_t + \text{Disadvantage}_{it} + \text{Moved}_{it} + \text{Moved}_{it} + \text{Foreign}_{it} + \text{Foreign}_{it} + \text{Built40}_{it} + \text{Built40}_{it} + \text{Housing Affordability}_{it} + \text{Housing Affordability}_{it} + \text{Subway Entrance}_{e} + \alpha_t + \epsilon_{it},
\]

\[
\]

The second model will regress each crime type on the predictors of gentrification and includes the percent of tracts within a sub-borough that gentrified. Again, using the example of homicide, this can be stated as:

\[
\text{Homicide Rate}_{it} = \mu_t + \text{Disadvantage}_{it} + \text{Moved}_{it} + \text{Moved}_{it} + \text{Foreign}_{it} + \text{Foreign}_{it} + \text{Built40}_{it} + \text{Built40}_{it} + \text{Housing Affordability}_{it} + \text{Housing Affordability}_{it} + \text{Gentrified}_{it} + \text{Subway Entrance}_{e} + \alpha_t + \epsilon_{it},
\]

\[
\]

**Analytical Plan Part 2B: Spatial Analysis of Gentrification and Crime**

The last set of analyses will explore the impact of the spatial distribution of gentrification and crime. Similar to the spatial analyses of gentrification described above, this set of analyses will compute Moran’s I for each intercensal period in order to determine if spatial autocorrelation is an issue at the sub-borough level. If spatial autocorrelation is an issue, then the GeoDa software package will be used to create spatially lagged versions of the independent variables using a first-order queen contiguity weights matrix. The spatially lagged versions of the independent variable will then be incorporated into the
hybrid fixed effects analyses. Given that previous gentrification research has discussed
the possibility that gentrification will result in spillover effects in neighboring areas, it is
expected that the prevalence of gentrification in neighboring sub-boroughs will be a
significant predictor of crime rates.
CHAPTER 5: GENTRIFICATION ANALYSES

This chapter represents the first of two analytical chapters and focuses on analyses where gentrification is the dependent variable. The first part of the chapter draws upon the discussion of operationalizations of gentrification discussed in Chapter 2 and assesses the relevance of operationalizations of gentrification developed by Bostic and Martin (2003) and Freeman (2005) for New York City by applying each operationalization to tract level data from New York City and comparing the identified neighborhoods to those identified by The New York Times between 1980 and 2009. It was necessary to assess multiple operationalizations because gentrification scholars have yet to come to a consensus concerning how the process should be operationalized. Further, comparing the results of the census-based strategies to the neighborhoods identified by The New York Times allows for the incorporation of cultural aspects of gentrification that are difficult to measure with census data.

Chapters 2 and 3 also discussed some of the more important changes that occurred in New York City between 1980 and 2009, such as increased availability of housing as a result of the Ten-Year Plan, an increased percent of residents with college education, a minor increase in the average age of residents, increased homeownership and dramatically decreased rates of index crimes among others. These changes at the city level were important of themselves, but they were also important because of their impact on why and where neighborhoods gentrified in New York City during the 1980s, 1990s, and 2000s. Recognizing the importance of these changes, the second part of this chapter presents and discusses univariate statistics pertaining to changes in concentrated disadvantage, residential stability, the percent foreign born, the percent of housing 40
years or older, the implementation of housing affordability restrictions and the
distribution of subway entrances, which have been found to be important predictors of
gentrification.

The final section of the chapter explores the effectiveness of the variables
discussed in the second section of the chapter as predictors of gentrification in New York
City. These analyses begin with an assessment of the bivariate correlations of changes in
concentrated disadvantage, residential stability, the percent foreign born, the percent of
housing 40 years or older, the percent of tracts that began to have housing affordability
restrictions applied and a stationary measure of the distribution of subway entrances with
the percent of tracts in a neighborhood that gentrified during the 1980s, 1990s, and
2000s. Exploration of the bivariate results is followed by discussion of results of a series
of hybrid fixed effects regressions.

OPERATIONALIZING GENTRIFICATION

Chapter 2 described strategies used in previous research to operationalize gentrification,
which have included the use of qualitative, quantitative and mixed methods approaches.
One of the overarching goals of the current study is to quantitatively assess the impact of
gentrification on crime rates. To improve upon existing research, supplemental analysis
of The New York Times was also conducted to compare the quantitative definition with
more qualitative definitions of gentrification. A careful review of the gentrification
literature identified operationalizations by Bostic and Martin (2003) and Freeman (2005)
as two of the most complex and most grounded operationalizations of gentrification.

Each of these strategies utilized nationally representative samples of census tracts, but
both strategies sampled census tracts from metropolitan statistical areas as opposed to cities. Therefore, the first step was to replicate each strategy with tract-level census data for New York City in order to determine how each strategy applied to New York City. The specifics of each strategy are described in detail in Chapter 3.

**Tract-level Replications of Census-Based Operations of Gentrification**

Bostic and Martin (2003) and Freeman (2005) both operationalized gentrification at the tract level, so the replications of each strategy began with the analysis of tract level data for New York City. Before replicating each strategy, descriptive analyses were conducted in order to highlight important changes in the component variables of each operationalization. Table 3 present means and standard deviations, in parentheses, for the change variables identified by the Bostic and Martin (2003) operationalization. The data on the percent of the population who held a college degree increased during the entire study period with an average increase of about five percent each decade. For example, the results show that the average tract experienced an increase in the percent of college educated residents of 5.33 percent between 1980 and 1990. This trend mirrors the national trend of increased educational attainment between 1970 and 2010 described by Berube (2012). The data for the average family income also increased during all three decades, but experienced the largest increase between 1980 and 1990.  

[Table 3 is located on page 283]

Similar to the national trend identified by Birch (2005), the rate of homeownership increased during each decade, but the increase was very small during the 1990s. While supportive of the overall national trend in homeownership, the small increase during the 1990s.  

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6 Data are not adjusted for inflation as this was not done by Bostic and Martin (2003).
increase during the 1990s was surprising given that the thrust of the Ten-Year Plan occurred during this decade and should have resulted in increased homeownership (Schill et al., 2002). The standard deviation of 6.97 percent during the 1990s, however, shows that tracts varied greatly in the rate of homeownership during this decade.

Statistics on percent of the population aged 30-44, the age group often associated with gentrification, show that this group increased during the 1980s and 1990s. Similar findings were reported by Salvo, Lobo, and Willet (2006: 10) who found that the average age of New York City residents increased between 1980 and 2000. The decline in the percent aged 30-44 during the 2000s is surprising given the upward trends during the 1980s and 1990s, but also because projections reported by Salvo et al. (2006: 10) predicted that the median age in New York City would increase to about 35 by the year 2010. It is unclear why the mean value for the percent aged 30 to 44 decreased during this decade. This decline could be the result of Baby-Boomers aging out of this group, but could also be due to the greater representation of individuals in other groups who returned to cities in search of employment or to retire (Mather et al., 2011: 15).

Much of the gentrification scholarship has found that gentrification is associated with increased representation of white and childless households. The data for changes in the percent of white non-family households in New York City show that, while gentrification was being documented in neighborhoods across the city, the percent of white non-family households was actually declining. Results show that that the average tract experienced half of a percent decrease in this population during the 1980s, almost an eight percent decrease during the 1990s and a decline of over 30 percent during the 2000s. This finding was surprising as research by Boustan and Shertzer (2013: 134)
found that married individuals were 11.4 percent more likely to live in suburban areas. Further, research by Birch (2005: 7) found that the percent of non-family households in a national sample of downtown areas increased between 1970 and 2000. The unexpected decrease reported here could be the result of the emphasis on white non-family households as opposed to non-family households in general or because the analyses used the entire population of census tracts in New York City as opposed to those located in downtown areas emphasized by Birch (2005). Exploratory spatial data analysis revealed that tracts across the city reported decreased percentages of white non-family households during all three decades.

Research on macro-level trends in cities and the consumption explanation of gentrification has discussed the transition of the U.S. economy from being dominated by manufacturing to being dominated by service-oriented jobs as an important source of the revitalization of cities in general and the gentrification of specific neighborhoods (Hamnett, 2003; Ley, 1996; Ley and Dobson, 2008). Given that gentrified neighborhoods tend to experience increases in the amount of residents employed in service oriented occupations, it was expected that the results in regards to the percent of the population employed in managerial or administrative occupations would have increased throughout the study period. Overall, the data for New York City show that the percent of residents employed in managerial or administrative occupations only increased by three percent during the study period. The data show that about two thirds of this increase occurred during the 1980s with the remaining third occurring during the 2000s. During the 1990s, however, the average tract experienced a minor decrease in this population of about a quarter of a percent. Overall, these results show that the landscape
of New York City between 1980 and 2009 was not impacted greatly by this transition. Further, exploratory spatial data analysis (not shown) of the change in the percent occupied in professional occupations for each decade shows that that the distribution of this population was relatively evenly during all three decades.

The overall results for the change in the percent poverty show that the average tract did not experience great changes in the percent of residents living below the poverty level. Results of exploratory spatial data analysis not shown here found that the majority of tracts that experienced decreased rates of poverty during the 1980s and 1990s were located in Manhattan, while the majority of tracts that experienced increased rates of poverty were located in Brooklyn and Queens. Results during the 2000s, however, show that many tracts in Brooklyn and Queens experienced decreased rates of poverty, while many tracts in Staten Island gained in poverty.

Finally, results for the change in the percent black show that the average tract experienced an increase in the black population of 3.49 percent during the 1980s and 1.03 percent during the 1990s. Much of the increase during the 1980s and 1990s, however, was offset by a decrease during the 2000s. Taken at face value, these results were somewhat unexpected given that gentrification was spreading throughout New York City during the 1980s and 1990s and that much of the gentrification literature has discussed blacks as potential victims of gentrification-related displacement. One possible reason for this contradictory finding is that gentrification did not have a substantial impact on the black population because it was not widespread during these decades. Alternatively, the coinciding increase in gentrification and percent black may be explained by the understudied phenomenon of black gentrification as research by Freeman (2006),
Maurrasse (2006) and Taylor (2002) have all documented gentrification efforts initiated by middle-class black residents in Harlem. Given that black gentrification has been largely understudied, it is possible that gentrification in other New York City neighborhoods may also have been conducted by racial and ethnic minorities. New York City attracts a lot of immigrants, so it is possible that gentrification impacted non-black minorities as well as blacks, making its impact smaller on changes in the black population.

Table 4 presents descriptive statistics for the components of the Freeman (2005) operationalization. In order to be considered gentrifiable, tracts must have featured an average household income and percent of housing stock that were below the respective median amounts during the start of each decade. Not surprisingly, the data show that threshold for the average household income and housing stock age increased by roughly 31,000 dollars over the study period. Results show that the average household income more than doubled during the 1980s and increased by a third during the 1990s. Similarly, results show that the average tract experienced an increase in the percent of housing that was 20 years or older of three percent during the 1980s and an increase of two percent during the 1990s. The increase in the percent of housing stock in this age range is not terribly surprising given that construction of new housing in New York City occurred infrequently.

In order to be classified as gentrified, tracts must have been classified as gentrifiable and feature an increase in educational attainment above the median change.
for the city during a particular decade⁷. Drawing upon data from the 1980 and 1990 censuses, gentrified tracts were those characterized by an average household income below $17,053.44 and at least 90.16 percent of the housing stock was older than 20 years of age in 1980 and an increase in educational attainment greater than 4.70 percent in addition to an increase in median gross rent of at least one cent. Median gross rent was used as a gauge of housing costs because of the high percentage of renters in New York City.

Table 5 shows how the Bostic and Martin (2003) and Freeman (2005) operationalizations compared in regards to the number of tracts identified as gentrifiable and gentrified by census year. Two points warrant special attention. As discussed in Chapter 3, Bostic and Martin (2003) identified the number of tracts that changed from below median income at Time 1 (1980 for example) to above median income at Time 2 (1990 for example) as the base number of tracts for their analyses. This means that the number of tracts considered gentrifiable at the start of a particular decade is equal to the number of tracts considered to be gentrified at the end of the decade. This amounted to 152 tracts as gentrifiable/gentrified during the 1980s, 154 tracts as gentrifiable/gentrified during the 1990s, and 138 tracts as gentrifiable/gentrified during the 2000s.

[Table 5 is located on page 284]

The other result in Table 5 that warrants discussion is the differences in the number of gentrifiable tracts identified by each strategy. The Freeman strategy identified a substantially larger number of tracts as gentrifiable for all three time points. For example, at 1980, the Bostic and Martin operationalization identified 152 gentrifiable

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⁷ The median change in educational attainment at the tract level during between 1980 and 1990 was 4.55 percent, between 1990 and 2000 was 4.05 percent, and between 2000 and 2005/2009 was 4.75 percent.
tracts, while the Freeman operationalization identified 400. Given that the Freeman operationalization identified a substantially larger number of gentrifiable tracts than the Bostic and Martin operationalization at 1980, it is surprising to see that the Freeman operationalization identified a slightly smaller number of tracts than the Bostic and Martin operationalization as gentrified at 1990. Specifically, the Freeman operationalization identified 132 gentrified tracts at 1990, while the Bostic and Martin operationalization identified 152 gentrified tracts at 1990. Results in regards to the number of gentrified tracts identified by each operationalization during the 1990s and 2000s were less surprising as the Freeman operationalization identified a substantially larger number of both gentrifiable and gentrified tracts than the Bostic and Martin during each of these decades.

Exploration into why the Freeman (2005) operationalization identified such a high number of gentrifiable tracts and low number of gentrified tracts revealed the this operationalization was less likely to identify gentrified tracts in the Bronx than in the other boroughs. Results presented in Table 6 show that the Bronx contained 26.8 percent of the gentrifiable tracts in 1980, but only 18.2 percent of the gentrified tracts in 1990. In contrast, Manhattan contained 16.5 percent of the gentrifiable tracts in 1980, but 25.8 percent of the gentrified tracts in 1990. Results for Brooklyn, Queens and Staten Island were roughly proportional. These results can be explained, however, by Map 2, which shows that the majority of tracts in the Bronx experienced either a decrease in the percent of residents with a college education or an increase that was below the median change for the city.

[Table 6 is located on page 284]
Additional descriptive spatial data analyses of the tract level replications of Bostic and Martin and Freeman operationalizations were conducted in order to identify the distribution of gentrified tracts throughout New York City. These results are not included in the section because the multivariate analyses of gentrification discussed shortly utilize New York City Department of City Planning Neighborhoods, which are collections of census tracts. The results of these analyses are presented in Appendix A.

Comparison of Census-based Operationalization and The New York Times

The replications of the Bostic and Martin (2003) and Freeman (2005) operationalizations utilized tract level data, but the analyses discussed in this section use the neighborhoods identified by the New York City Department of City Planning (DCP) as the units of analysis. As described in Chapter 4, the 188 neighborhood areas defined by the New York City DCP are coterminous with census tract boundaries and contain about 11 census tracts each and consistent for the period 1980 to 2009. The shift in unit of analysis from census tracts to DCP neighborhoods is necessary for the analyses that follow because The New York Times frequently discussed neighborhoods as experiencing gentrification as opposed to specific parts of a neighborhood or census tracts.

Results presented in Table 7 show the number of neighborhoods identified as gentrified according to the replication of the Bostic and Martin (2003) and Freeman (2005) operationalizations in addition to number of neighborhoods identified as gentrified by The New York Times. Neighborhoods were classified as gentrified according to the
Bostic and Martin (2003) and Freeman (2005) operationalizations during each decade if at least one tract in the neighborhood was identified as gentrified. As discussed in Chapter 4, this was necessary because the majority of references to gentrification in The New York Times discussed neighborhoods as gentrifying, rather than changes in a particular tract of a neighborhood.

[Table 7 is located on page 285]

A couple points stand out in the results presented in Table 7. First, the number of neighborhoods identified as gentrified varied substantially during each decade. Results show that the Bostic and Martin and Freeman operationalizations both identified 69 neighborhoods as having experienced gentrification during the 1980s. Map 3 shows that while the two strategies identified neighborhoods throughout the five boroughs, the Bostic and Martin operationalization identified six more neighborhoods as gentrified in Staten Island than the Freeman operationalization, while the Freeman operationalization identified 11 more neighborhoods in the Bronx and five more neighborhoods in Brooklyn than the Bostic and Martin operationalization.

[Map 3 is located on page 302]

Comparisons of The New York Times operationalization with the Bostic and Martin and Freeman operationalizations using data from the 1980s are displayed in Maps 4 and 5 respectively. The first thing to note in comparing these maps is that the Bostic and Martin and New York Times operationalizations agreed upon 26 neighborhoods (Map 4), most of which were located in Brooklyn or Manhattan, while the Freeman and New York Times operationalizations agreed upon 23 neighborhoods (Map 5), most of which were also located in Brooklyn or Manhattan. While the number of agreements of each
operationalization with *The New York Times* was close, calculation of the percents shows that the 37.68 percent of the neighborhoods identified by Bostic and Martin were also identified by *The New York Times* as opposed to 33.33 percent of the neighborhoods identified by the Freeman operationalization.

[Map 4 is located on page 303]

[Map 5 is located on page 304]

Comparison of the neighborhoods identified by the Bostic and Martin, Freeman, and *New York Times* operationalizations identified during the 1990s are displayed in Maps 6 and 7. Unlike the results for the 1980s, the Bostic and Martin operationalization (Map 6) identified fewer neighborhoods than the Freeman operationalization (Map 7). Calculation of the percent of matches, however, revealed that the Bostic and Martin operationalization was a much better match with *The New York Times* as 81.48 percent of neighborhoods identified by the Bostic and Martin operationalization matched with the neighborhoods identified by *The New York Times* compared to 22.11 percent of the neighborhoods identified by the Freeman operationalization. So, while the overall number of agreements with the Freeman operationalization was higher, the less restrictive requirements of the Freeman operationalization resulted in a substantially larger number of neighborhoods identified as gentrified during the 1990s and resulted in a lower percentage of agreements.

[Map 6 is located on page 305]

[Map 7 is located on page 306]

The results for the 2000s displayed in Maps 8 and 9 show a similar pattern to the 1990s in that the Freeman operationalization identified more neighborhoods than the Bostic and Martin and *New York Times* operationalizations. Unlike the results for the
1990s, however, the results for the 2000s show that the Bostic and Martin operationalization (Map 8) featured one more agreement with *The New York Times* than the Freeman operationalization (Map 9). While the overall number of agreements with *The New York Times* was only one larger for the Bostic and Martin operationalization, calculation of the percents shows that the 42.42 percent of the neighborhoods identified by the Bostic and Martin operationalization were also identified by *The New York Times* compared to 27.83 percent of those identified by the Freeman operationalization.

The descriptive results presented up to this point have shown that the Bostic and Martin operationalization more closely matched the neighborhoods identified by *The New York Times* than did the Freeman operationalization. In order to confirm these results, crosstabulations were computed that utilized a series of dichotomous variables identifying whether a neighborhood was identified as having experienced gentrification by the Bostic and Martin, Freeman and *New York Times* operationalizations during each decade in order to determine confirm whether the Bostic and Martin or Freeman operationalization was a better match with *The New York Times*. Results presented in Table 8 confirm the findings of the descriptive analyses. During the 1980s, the phi coefficient measuring the strength of the association between *The New York Times* and the Bostic and Martin operationalization was 0.257* compared to 0.179** with the Freeman operationalization, showing that Bostic and Martin operationalization better matched the neighborhoods identified by *The New York Times*. Similarly, results for the 1990s show that the phi coefficient with the Bostic and Martin operationalization (0.337**) was larger than the phi coefficient with the Freeman operationalization (0.246**). Results for the 2000s also show that the Bostic and Martin operationalization
was a better match with *The New York Times* operationalization than the Freeman operationalization as the phi coefficient for the Bostic and Martin operationalization was 0.497** compared to 0.297** for the Freeman operationalization. As the results show that the Bostic and Martin operationalization more closely matched the neighborhoods identified by *The New York Times*, the decision was made to use the Bostic and Martin operationalization of gentrification for the remainder of the analyses.

[Table 8 is located on page 285]

[Map 8 is located on page 307]

[Map 9 is located on page 308]

*Descriptive Statistics for the Control Variables*

The analyses and results discussed to this point have provided a description of how gentrification was operationalized in the current study and where gentrification occurred in New York City during the study period. Before moving into the multivariate analysis, however, similar descriptive results for the control variables at the neighborhood level must also be discussed. Results in Table 9 identify the mean and standard deviation for the changes in the index of concentrated disadvantage, residential stability (measured through the percent of residents who have lived in the same home for at least five years), the percent of the population that is foreign born, housing age (the percent of housing that is 40 years or older), housing affordability restrictions (percent of tracts containing units to which housing affordability restrictions were applied during each decade), and a stationary measure of the number of subway entrances per neighborhood. These measures were included because previous research, discussed in Chapter 2, found that
Gentrification was more likely to occur in neighborhoods characterized by disadvantaged populations, lower rates of residential stability, smaller foreign-born populations, older housing, larger amounts of housing with affordability restrictions, and that were within walking distance of public transportation.

[Table 9 is located on page 285]

The index of concentrated disadvantage was calculated by computing and summing z-scores for the percent receiving public assistance, percent below poverty, percent unemployed, percent female-headed households, and percent black for each census. Negative values of this variable reflect lower levels of concentrated disadvantage, while positive values reflect higher levels. Summary statistics presented in Table 9 show that concentrated disadvantage increased in the average neighborhood by 0.055 between 1980 and 1990, decreased by 0.057 between 1990 and 2000 and increased by 0.39 between 2000 and 2005/2009. Overall, these results appear to mirror national trends as concentrated disadvantage is generally accepted as increasing prior to the 1990s before declining between 1990 and 2000 (Ellen and O’Regan, 2008; Jargowsky, 2003). Further, the increase in concentrate disadvantage during the 2000s coincides with the economic recession during the second half of the decade.

The increase in concentrated disadvantage during the 1980s makes sense given that much of the efforts to gentrify or revitalize New York City did not begin until the mid-1980s, which means the impact of these changes would potentially not be seen until the early to mid-1990s. The spatial distribution of change in concentrated poverty during the 1980s displayed in Map 10 supports this argument, showing that the largest declines in concentrated disadvantage, those in the range of -4 to -2, occurred in the Manhattan...
neighborhoods of Clinton, Central Harlem, the East Village, SoHo/Tribeca, and the Upper West Side and in the north eastern Brooklyn neighborhoods of Clinton Hill, Park Slope/Gowanus, and Prospect Heights, which are generally accepted as having begun to experience gentrification during the 1980s.

[Map 10 is located on page 309]

The slight decrease in concentrated poverty during the 1990s echoes findings of nationally representative studies conducted by Jargowsky (2003) and Ellen and O’Regan (2008) who found concentrated poverty declined during the 1990s. As displayed in Map 11, neighborhoods in Manhattan, northeastern Brooklyn, and the southwestern section of the Bronx experienced the greatest declines. Similar to the 1980s, the declines in lower Manhattan and northeastern Brooklyn correlate with findings of research that has identified gentrification in these neighborhoods. For example, all of the neighborhoods in Manhattan and many of the neighborhoods in northeastern Brooklyn experienced declines in concentrated disadvantage in the range of -1.99 to 0.

[Map 11 is located on page 310]

The overall decline in concentrated disadvantage in neighborhoods in Manhattan and Brooklyn not typically recognized as gentrifying and the neighborhoods in the southwestern Bronx were likely the result of redevelopment projects implemented as part of the Ten-Year Program, much of which were concentrated in these areas (Furman Center, 2006: 4). These projects cannot be considered gentrification themselves because they were often associated with affordability restrictions, which limited the potential profit that could be gained from the renovation. The resulting improvements, however, likely addressed structural issues in the neighborhood, thereby making the neighborhood
more attractive to gentrifiers. As discussed in Chapter 2, the primary thrust of the Ten-Year Plan occurred between 1985 and 2000, which means that most of the effects of the Ten-Year Plan would have occurred between 1990 and 2000.

The increase in mean concentrated disadvantage during the 2000s was likely the result of the economic recession that occurred during the second half of the decade. Further, as displayed in Map 12, most (97 of 120) of the neighborhoods that experienced an increase in concentrated disadvantage were in the lowest bracket. The results for Manhattan, Brooklyn and the Bronx stand out. Many of the neighborhoods in central and lower Manhattan that experienced gentrification during the 1980s or 1990s increased in concentrated disadvantage during the 2000s, while the gentrified neighborhoods in northwestern Brooklyn continued to experienced declines in concentrated disadvantage. Of further interest is that while neighborhoods in central and lower Manhattan increased in disadvantage, neighborhoods in upper Manhattan and the southwestern portion of the Bronx experienced dramatic declines. The most likely explanation for these contradictory results is that increases in concentrated disadvantage in lower Manhattan were likely due to the generally lower concentrations of disadvantage in these neighborhoods, which means that any increase would be more apparent.

[Map 12 is located on page 311]

Shifting to descriptive statistics for the residential stability measure, which reflects the percent of residents who lived in the same home at least five years prior to each census, results show the majority of residents in the average neighborhood lived in the same home for at least five years prior to each census. Specifically, results in Table 9 show that the percent reporting to have lived in the same house for at least five years
increased by 2.75 percent between 1980 and 1990 in the average neighborhood. Map 13 shows that most of the neighborhoods in Manhattan and the Bronx experienced increases in the percent of residents who had lived in the same house for at least five years during this period. Previous literature has recognized gentrification as occurring in lower Manhattan and the Brooklyn neighborhoods of Park Slope/Gowanus and Prospect Heights during the 1980s, so it is surprising to see that the populations of these neighborhoods were generally less mobile than populations of other neighborhoods. Map 13 also shows that while the mean percent of residents who had lived in the same home for at least five years increased between 1980 and 1990, many neighborhoods were characterized by declines in this population. These neighborhoods tended to be located in the less densely populated boroughs of Brooklyn, Queens, and Staten Island.

Between 1990 and 2000, the average neighborhood experienced a slight decline in the residually stable population of 1.83 percent (Table 9). Map 14 shows that the majority of neighborhoods that experienced declines in the percent of residents living in the same house for at least five years decreased by less than ten percent. In contrast to the 1980s, results for the 1990s show that many neighborhoods recognized as gentrifying during this decade such as Harlem and the Upper West Side in Manhattan and Park Slope/Gowanus to Clinton Hill and the area Down Under the Brooklyn Bridge frequently referred to as DUMBO in Brooklyn also featured less stable populations. This relationship is explored more fully in the discussion of the multivariate results later in this chapter.
The descriptive statistics for the residential stability measure between 2000 and 2005/2009, however, show a dramatic increase in the residentially stable population as the percent of residents living in the same home for at least five years increased by 15.62 percent between 2000 and 2005/2009. The reason for the dramatic increase in the residentially stable population during the 2000s after the small changes experienced by the average neighborhood during the 1980s and 1990s is not entirely clear as previous research has yet to document this change. As noted by Frey (2012) and Mather, Pollard, and Jacobsen (2011), however, the economic recession during the second half of the 2000s made it much more difficult for homeowners to sell their homes, which means that fewer vacancies were likely available during this period and therefore fewer opportunities to move. Map 15 shows that most neighborhoods experienced an increase in this population between 11 and 20 percent. Further, the results show that a larger share of Manhattan neighborhoods, relative to neighborhoods in the other boroughs, had residents reporting residences in the same house for at least five years, which is likely the result of especially intense competition for space in this borough.

[Map 15 is located on page 314]

Statistics pertaining to the percent of foreign-born residents in Table 9 show that the average neighborhood increased in the percent foreign born during each of the three periods. Between 1980 and 1990, the average neighborhood experienced an increase of 4.54 percent in foreign-born residents. Results displayed in Map 16 show that the majority of neighborhoods that increased in the percent foreign born did so by one to ten percent. While the majority of neighborhoods in the Bronx, Brooklyn, Queens, and Staten Island experienced increases in the percent foreign born, 10 of the 26
neighborhoods in Manhattan experienced a decline in this population. This finding makes sense given that many of the neighborhoods traditionally associated with immigrants are located in Brooklyn and Queens.

[Map 16 is located on page 315]

During the 1990s, the mean percent foreign born increased from 26.31 percent in 1990 to 33.05 percent in 2000, reflecting an increase of 6.74 percent. Similar to the 1980s, Map 17 shows that the majority of neighborhoods during the 1990s experienced an increase in the percent foreign born between one and ten percent. While the majority of neighborhoods gained in the percent foreign born, the largest increases were concentrated in lower Brooklyn and in neighborhoods scattered throughout Queens. In support of research by Ley and Dobson (2008) and Shaw (2005), the concentration of increased foreign-born residents in Brooklyn occurred in neighborhoods other than those identified as having gentrified during this period. Similar statements cannot be made in regards to the other four boroughs however, as little research has identified gentrification in Queens and increases in the percent foreign born in the Bronx, Manhattan and Staten Island were spread relatively evenly.

[Map 17 is located on page 316]

Results for the change in the percent foreign born between 2000 and 2005/2009 show that the rate of growth in the foreign-born population was slower during this period as the average neighborhood only experienced an increase of one percent in the foreign-born population. Map 18 shows that 73 neighborhoods, just over a third, experienced declines in the percent foreign born during this period. Further, many of the neighborhoods that experienced declines in the percent foreign born have been identified
as experiencing gentrification such as East Village, Central Harlem, Clinton, and the Lower East Side in Manhattan and Clinton Hill, Park Slope/Gowanus, and Williamsburg in Brooklyn. Even though a substantial proportion of neighborhoods experienced declines in the percent foreign born, many neighborhoods, especially in Brooklyn and Queens continued to gain in the percent foreign born, which is not surprising given the long history of immigrant enclaves in neighborhoods in these two boroughs. Many neighborhoods in Staten Island also experienced increased immigration, which, given that Staten Island is considered to be the most suburban of the boroughs, appears to support recent research showing that immigrant population in suburban areas have increased in recent years (Logan, Alba, and Zhang, 2002; Waters and Jimenez, 2005).

[Map 18 is located on page 317]

Statistics in Table 9 pertaining to the mean change in the percent of housing that was 40 years or older (housing age), which previous research has found to be most attractive to gentrification, shows that the average neighborhood experienced substantial increases in the housing stock likely to be gentrified during each decade. During the 1980s, the average neighborhood experienced an increase of 6.5 in the percent of housing in this age range, while statistics for the 1990s show an increase of 11.62 percent and for the 2000s of 17.22 percent. Map 19 displays the distribution of this change across New York City neighborhoods during the 1980s and shows that this percent might have been larger if not for pockets of declines in such housing in the Bronx, Brooklyn, and Staten Island. The declines in the percent of housing units in this category in the Bronx and Brooklyn can at least be partially explained by the implementation of the Ten-Year Plan, which targeted housing units in poorer neighborhoods for development or redevelopment.
The declines in neighborhoods in Staten Island are less surprising as the lower density of housing and greater availability of space likely allowed for greater development of new housing.

[Map 19 is located on page 318]

Results for the 1990s show that the average neighborhoods experienced an increase of 11.62 percent in the percent of housing 40 years or older between 1990 and 2000, while results in Map 20 show that the majority of neighborhoods experienced gains in this type of housing stock. Further, the results show that the majority of neighborhoods that experienced an increase of less than 25 percent and that the neighborhoods in this category were distributed evenly throughout the city. Given the wide distribution of neighborhoods that gained in housing stock that is typically attractive to gentrification, it seems unlikely that this was an important predictor of gentrification during this period.

[Map 20 is located on page 319]

Statistics on the percent of housing aged 40 years or older during the 2000s shows that the average neighborhood experienced an increase from 66.14 percent in 2000 to 78.73 percent by 2005/2009. The change between 2000 and 2005/2009 was the largest of the three decades with an increase of 12.59 percent. Similar to the resulted displayed in Map 20, results in Map 21 show that the majority of neighborhoods experienced an increase in the percent of housing in this category with most neighborhoods experiencing an increase of less than 25 percent.

[Map 21 is located on page 320]
The descriptive results pertaining to the percent of tracts that contained rental housing units to which affordability restrictions were applied during each decade are presented in Table 9. This measure is included in the current study in order to measure the impact of New York City’s Ten-Year Plan, which was an effort by New York City officials to increase the availability of affordability housing in New York City through projects that renovated in rem properties and upgrades to privately owned apartments. While investments were made throughout the city, the majority of investments was made in New York City’s poorest neighborhoods, particularly in the Bronx, Brooklyn, and Manhattan and targeted areas characterized by a high proportion of renters (Furman Center, 2006; Schill et al., 2002).

During the 1980s, 13.91 percent of renter-occupied housing units in the average neighborhood began to feature housing affordability restrictions. The standard deviation of 18.11, however, shows that neighborhoods varied substantially in the percent of renter-occupied housing to which affordability restrictions were applied. Results in Map 22 confirm findings of previous research by the Furman Center (2006) and Schill et al. (2002) that much of the efforts of the Ten-Year Plan, as measured through affordability restrictions were concentrated in the Bronx, Brooklyn, and Manhattan. While it was expected that the improvements associated with the Ten-Year Plan would make neighborhoods more likely to gentrify, the neighborhoods that featured the most renter-occupied housing to which affordability restrictions were applied were not those commonly associated with gentrification in the Bronx and Brooklyn. In Manhattan, however, many of the neighborhoods associated with gentrification during the 1980s such as Clinton, East Village, Hudson Yards-Chelsea-Flat Iron-Union Square and the Lower
East Side were characterized by relatively larger shares of renter-occupied housing to which affordability restrictions were applied.

[Map 22 is located on page 321]

The mean and standard deviation for the percent of renter-occupied housing to which affordability restrictions were applied during the 1990s and 2000s were similar as 16.74 percent of renter-occupied housing in the average neighborhood began to have affordability restrictions applied during the 1990s and 17.22 percent began to have affordability restrictions applied during the 2000s. Similar to results for the 1980s, the results for 1990s and 2000s support the findings of previous research in that affordability restrictions were more likely to be applied in neighborhoods in the Bronx, Brooklyn, and Manhattan (see Map 23 for the 1990s and Map 24 for the 2000s). In contrast to the 1980s, however, many of the neighborhoods with higher percent of renter-occupied housing units with affordability restrictions were also those associated with gentrification. This can be seen for the 1990s in the Brooklyn neighborhoods of Bedford, Clinton Hill, and Stuyvesant Heights and in the Manhattan neighborhoods of Clinton, East Village, Harlem, and the Lower East Side (Map 23) and for the 2000s in the Brooklyn neighborhoods of Bushwick, Bedford, and Stuyvesant Heights and the Manhattan neighborhoods of Hudson Yards-Chelsea-Flat Iron-Union Square, Clinton, and Central Harlem (Map 24).

[Map 23 is located on page 322]

[Map 24 is located on page 323]

The final neighborhood level map, Map 25, displays the distribution of subway entrances among the neighborhood areas. The subway entrance measure is different than
the other control variables used in this study in that it did not vary during the study period. As identified in Table 9, the average neighborhood area contained 2.49 subway entrances, but as can be seen by the standard deviation of 2.96, neighborhoods varied greatly in the number of subway entrances located within their boundaries. Subway entrances tend to be located in densely populated areas and areas that are heavily concentrated with workplace, which explains why there is a high clustering of subway entrances in lower Manhattan, specifically in the neighborhoods of Midtown, Hudson Yards-Chelsea-Flatiron-Union Square, West Village, and SoHo-Tribeca, and zero subway entrances in the neighborhoods in the eastern section of Queens. Foreshadowing results discussed shortly, neighborhoods with subway entrances were also more likely to gentrify during the 1990s and 2000s than neighborhoods that did not contain a subway entrance.

[Map 25 is located on page 324]

Summary of the Neighborhood Level Descriptive Statistics

Reviewing the descriptive statistics at the neighborhood level revealed a few potentially important trends for where and when gentrification occurred in New York City between 1980 and 2009. The average neighborhood experienced declines in the intensity of concentrated disadvantage during the 1980s and 1990s, but a substantial proportion of neighborhoods experienced gains in concentrated disadvantage during the 2000s. The descriptive statistics in regards to residential stability show that the average neighborhood experienced an increase in the percent of residents who lived in the same home for at least five years prior to each census during the length of the study period, with the largest
increase occurring during the 2000s. Similarly, the percent foreign born increased substantially during the study period, showing that many New York City neighborhoods were impacted greatly by changes in the foreign-born population. Results pertaining to the percent of housing that was 40 years or older show that the average neighborhood experienced substantial increases in the type of housing that is most attractive to gentrifiers. Descriptive statistics pertaining to the percent of renter-occupied housing units to which affordability restrictions were applied, used to measure the impact of the Ten-Year Plan, confirm that neighborhoods in the Bronx, Brooklyn, and Manhattan were more likely to feature this type of housing and that the renovations associated with this initiative may have encouraged gentrification during the 1990s and 2000s. Finally, the descriptive statistics revealed that the average neighborhood contained 2.49 subway entrances. The next section presents and discusses results of bivariate and multivariate analyses to assess the effectiveness of these changes in predicting gentrification in New York City neighborhoods between 1980 and 2009.

IDENTIFICATION OF THE PREDICTORS OF GENTRIFICATION
Chapter 2 discussed the production and consumption explanations of gentrification and identified a number of predictors and consequences of gentrification according to each perspective. To briefly summarize these arguments, proponents of the production explanation have argued that gentrification occurred because of the perception that neighborhoods were undervalued and that restoration or development efforts would increase property values to their maximum potential (Smith, 1979; 1987). In contrast, proponents of the consumption explanation have argued that gentrification was the result
of the increased availability of service-oriented jobs that made cities more alluring to young, primarily white, middle-class professionals as well as the corresponding amenities that city living provided (Ley, 1996).

Hypotheses presented in Chapter 2 drew upon a combination of the production and consumption explanation in order to identify predictors of gentrification in New York City. These hypotheses predicted that gentrification would be more likely to occur in areas characterized by concentrated disadvantage (Hypothesis 1), lower rates of residential stability (Hypothesis 2), smaller foreign-born populations (Hypothesis 3), larger amounts of housing that was 40 years or older (Hypothesis 4), where a greater proportion of rental housing had affordability restrictions imposed (Hypothesis 5), greater availability of access to public transportation such as subway entrances (Hypothesis 6), and that the predictors of gentrification would impacted by changes in neighboring areas (Hypothesis 7) and changes over time (Hypothesis 8). Table 10 presents the bivariate correlations of each of these variables with the percent of tracts per neighborhood that were classified as gentrified by the Bostic and Martin operationalization for each decade. Variables X1 through X6 represent changes in the independent and dependent variables during the 1980s, variables X7 through X12 represent changes in the independent and dependent variables during the 1990s, and variables X13 through X19 represent changes in the independent and dependent variables during the 2000s.

[Table 10 is located on page 286]

As predicted by Hypothesis 1, concentrated disadvantage was positively correlated with gentrification, showing that gentrification was more likely to occur in neighborhoods characterized by disadvantaged populations. This association, however,
was only found at 1990 ($r = 0.313^{**}$) and 2000 ($r = 0.215^{**}$). The non-significant
correlation of disadvantage at 1980 was surprising given that one of the few areas where
gentrification scholars agree is that the process was more likely to occur in
neighborhoods that featured disadvantaged populations. This null finding, however,
could be due fact that disadvantage was so widespread throughout New York City during
at 1980, while gentrification occurred in a small number of areas.

Hypothesis 2 suggested that gentrification would be more likely in neighborhoods
categorized by residential mobility due to the greater prevalence of vacancies. The
bivariate correlations only show partial support for this hypothesis as the correlation of
residential stability at 1980 ($r = -0.102$) and 2000 ($r = -0.084$) were not significant. In
contrast, the correlation of residential stability at 1990 ($r = -0.185^{*}$) was negative, which
meant that gentrification was more likely to occur in neighborhoods where a larger
percent of the population had not lived in the same house for at least five years. A
possible reason for the lack of significance of the correlations in 1980 and 2000 is that the
residential stability measure at 1980 and 2000 is only picking up on changes in the
percent of population who moved within the last five years, which means that changes
during the first half of the decade are not included.

The bivariate correlations with the percent foreign born shows that gentrification
was less likely to occur in neighborhoods characterized by larger foreign-born
populations in 1990 ($r = -0.289^{**}$). The respective correlations of foreign born at 1990
and 2000 with the percent of tracts that gentrified during the proceeding decade were not
significant, although the signs of the coefficients were in the expected direction. Given
findings of research by Ley and Dobson (2008) and Shaw (2005) it was expected that
gentrification would be less likely to occur in neighborhoods characterized by large foreign-born populations as vacancies in such neighborhoods tend to spread through word of mouth, thereby limiting the potential for gentrifiers to enter into such a neighborhood.

Much of the previous literature on gentrification has described gentrifiers as being attracted to neighborhoods with older housing stock. The correlations presented in Table 10 show partial support for this argument as the positive correlation at 1980 (r = 0.257**) and 2000 (r = 0.201**) show that neighborhoods that featured larger percents of older housing were more likely to have experienced gentrification at 1990 and 2005/2009 respectively. The null finding at 1990 could be due to the transition in the funding source of gentrification as the transition to corporate sponsored gentrification efforts during the 1990s was more likely to be characterized by new build projects.

The bivariate correlations of the percent of tracts in a neighborhood that contained housing that had affordability restrictions imposed and the percent gentrified show that neighborhoods that experienced an increase in housing with affordability restrictions were also more likely to gentrify during the 1990s (r = 0.421***) and 2000s (r = 0.345***) . The lack of a significant correlation during the 1980s can be explained by the fact that the Ten-Year Plan, which was designed to encourage neighborhood revitalization and increase the amount of affordable housing, was not initiated until 1985 and would likely not have produced immediate results. The positive correlations for the 1990s and 2000s, however, show that neighborhoods that were more heavily impacted by the Ten-Year Plan, in the form of housing affordability restrictions associated with redevelopment efforts, were also more likely to experience gentrification.
Previous assessments of whether gentrification was more likely to occur in areas with access to public transportation produced mixed findings with research as Brueckner and Rosenthal (2009) found that neighborhoods with public transportation tended to attract lower-income households, while Kahn (2007) found that neighborhoods with greater access to public transportation were more likely to gentrify. The bivariate correlations presented here are more similar to the findings of Kahn (2007) in that neighborhoods with greater access to the subway system were more likely to gentrify during the 1990s ($r = 0.225^{**}$) and 2000s ($r = 0.227^{**}$). This association makes sense given that gentrification scholarship has argued that neighborhoods with amenities such as access to transportation are more attractive to members of groups associated with gentrification.

The lack of a significant correlation with subway entrances during the 1980s is surprising and difficult to explain given the limited amount of previous research linking gentrification to public transportation. Kelling and Coles (1996) provide a possible explanation for these findings in their discussion of efforts by New York City officials to clean up subway entrances during the late 1980s and early 1990s. According to Kelling and Coles (1996: 120), efforts by the New York City Police Department were effective in removing graffiti from subway entrances during the 1980s, but efforts during the 1990s also included the removal of homeless people from subway stations. These cleanup efforts may have made living near subway entrances more attractive and in turn encouraged gentrification in areas located near subway entrances.

Shifting from the bivariate to the multivariate results, results of the hybrid fixed effects regressions predicting gentrification are displayed in Table 11. The technical
details of and reasons for utilizing this type of statistical technique are discussed in Chapter 4. As a reminder, the hybrid fixed effects approach requires that between-unit and within-unit variation are assessed simultaneously, but only the coefficients for the within-unit variation are interpreted as the between-unit measures are included primarily to ensure that the within-unit variations are significant after controlling for variation between units (Allison, 2005: 36). Coefficients for the between-unit variation are not reported, but are available upon request.

[Table 11 is located on page 288]

Hypothesis 8 suggested that gentrification during the 1980s would be significantly different from gentrification in the 1990s and 2000s due to changes in the primary funding source. In order to assess this hypothesis, Model 1 regressed dichotomous variables of time in order to determine if gentrification during the 1990s and 2000s was significantly different from gentrification during the 1980s. Previous research has highlighted differences in gentrification over time, as efforts during the 1970s and 1980s were often associated with sweat equity projects (Carpenter and Lees, 1995; Lees et al., 2008). An economic recession during the 1990s, however, prevented many sweat equity projects from being funded and so gentrification efforts began to be overseen by sponsored by private corporations (Atkinson, 2003; Hackworth, 2007; Lees et al., 2008). The lack of significant associations with the time measures in Model 1 show that while the funding sources of gentrification may have changed over time, gentrification was just as likely during the 1990s and 2000s as it was during the 1980s.

Model 2 added measures of concentrated disadvantage, residential stability, the percent foreign born, the percent of housing stock older than 40 years at the start of each
decade and a measure of the percent of renter occupied housing that had affordability restrictions applied during each decade. Hypothesis 1 suggested that gentrification would be more likely to occur in neighborhoods that feature disadvantaged populations characterized by poverty, racial minorities, unemployment, and low educational attainment because property values tend to be lower in these neighborhoods, in turn making them more attractive to members of the middle-class. In support of this hypothesis, the coefficient for concentrated disadvantage (2.696***) shows that neighborhoods characterized by disadvantaged populations at the start of a decade were more likely to experience gentrification by the end of the decade, controlling for other factors. This association should be interpreted with caution though as it shows that disadvantaged neighborhoods were more likely to experience gentrification, but not that the residents of the neighborhood were forcefully displaced because of gentrification.

Hypothesis 2 suggested that gentrification would be more likely to occur in neighborhoods characterized by higher rates of residential mobility because of the greater availability of vacancies in such neighborhoods, which are required for members of the middle and upper class to move into a neighborhood. This hypothesis was not supported though as the coefficient for the within-unit variation of residential stability in Model 2 was not significant. The bivariate correlations discussed earlier showed that residential stability at 1990 was negatively correlated with gentrification at 2000, but the correlations for the other two decades were not significant. As the coefficient in Table 11 was also not significant, it is clear that residential stability was not an important predictor of gentrification in New York City.
Immigrants have traditionally been treated as being at risk of gentrification-related displacement, but a limited amount of recent research on the association of gentrification and immigration has found that gentrification is less likely to occur in neighborhoods with large foreign-born populations (Ley and Dobson, 2008; Shaw, 2005) or that neighborhoods may gentrify because of the presence of larger foreign-born populations (Brown and Wyly, 2000). Given the stronger support for claims that immigrant neighborhoods are less likely to gentrify, Hypothesis 3 predicted that neighborhoods with larger foreign-born populations would be less likely to gentrify. The bivariate correlations partially supported this hypothesis, but the multivariate results did not as the coefficient for the within-unit variation in the percent foreign born (0.218†) was positive and significant, controlling for other factors. This suggests that there are additional features associated with immigrant neighborhoods, such as higher levels of disadvantage and older housing stock, which may make neighborhoods populated by foreign-born residents more likely to gentrify.

Given the findings of previous research that gentrification is more likely to occur in neighborhoods characterized by older housing stock because gentrifiers tend to be attracted to such housing due to the perception of historical character and architectural design features, Hypothesis 4 suggested that neighborhoods that featured higher percents of housing stock that was 40 years or older at the start of a decade would be more likely to gentrify by the end of the decade. This hypothesis was partially supported by the bivariate correlations, which showed that neighborhoods were more likely to contain gentrified census tracts at 1990 and 2005/2009 if they featured a greater percentage of housing stock that was 40 years or older at 1980 and 2000 respectively. The multivariate
results, however, did not support this hypothesis as the coefficient for the within-unit variation in the percent of housing that was 40 years or older was negative and significant (-0.125*). A possible explanation for this contradictory finding is provided in the discussion of the results of Model 5.

The impact of the Ten-Year Plan in New York City on the availability of housing was discussed in Chapter 2. To briefly recap, the Ten-Year Plan was a shifting assemblage of 100 programs that was implemented in 1985 and was overseen by the New York City Department of Housing Preservation and Development that encouraged revitalization through the renovation or construction of new housing units across the five boroughs (Furman Center, 2006: 4). The specific housing units that were developed or redeveloped because of the Ten-Year Plan cannot be considered gentrification because these projects were associated with affordability restrictions that limited the potential profit that could be made on the units themselves, but is likely that the neighborhood improvements associated with these efforts would have made neighborhoods more attractive to gentrification. Therefore, Hypothesis 5 predicted that gentrification would be more likely to occur in neighborhoods where a greater percent of tracts contained housing units that had housing affordability restrictions applied during a particular decade. The bivariate correlations for the 1990s and 2000s supported this hypothesis, and it was further supported by the coefficient of 0.079** in model 2, which shows that neighborhoods that experienced gentrification were also those where a greater percent of housing units were developed or redeveloped with the assistance of subsidies.

A limited amount of research has explored the association of gentrification with access to public transportation and the findings of this research have produced mixed
conclusions with Brueckner and Rosenthal (2009) finding a negative association and Kahn (2007: 168) finding a positive association, but only for neighborhoods that have access to “Walk and Ride” forms of public transportation. Given that the measure of public transportation used in this study, presence of subway entrances in a neighborhood, is a form of “Walk and Ride” public transportation, Hypothesis 6 suggested that neighborhoods with at least one subway entrance would be more likely to gentrify. While the bivariate results showed a correlation between subway entrances and the percent of tracts that had gentrified during the 1990s and 2000s, the multivariate results show that the presence of subway entrances is not significant after controlling for other factors.

**Multivariate Analyses with Spatial Lags and Interactions with Time**

Given the findings of previous research that gentrification and other types of neighborhood reinvestment often have spillover effects, Hypothesis 7 conjectured that gentrification would be influenced by changes in neighboring areas. In order to assess this hypothesis, Model 3 incorporated spatial lags of the control variables and the percent gentrified that utilized a first-order queen contiguity weights matrix. The spatially lagged variables were created using a queen, first-order weight matrix, which means that only changes in neighborhoods that directly bordered each neighborhoods were taken into account. The results show that only the spatial lag of gentrification was positive and significant (0.554***), which means that neighborhoods were more likely to experience gentrification if they were located near neighborhoods that contained tracts that gentrified during the same decade.
Analysis of the bivariate correlations revealed inconsistencies in the significance of the independent variables across time. In order to determine if these inconsistencies were statistically significant, Model 4 incorporated time interaction variables in order to determine if the within-unit variation in the independent variables was significantly different during the study period. The results identified statistically significant differences in the effect of concentrated disadvantage and the percent of tracts containing subway entrances during at 1990 compared to 1980 and 2000. In regards to concentrated disadvantage, the results show that neighborhoods were more likely gentrify between 1980 and 1990 if they were characterized by concentrated disadvantage in 1980 (5.874***). This was expected given the findings of previous research that gentrification typically occurs in neighborhoods characterized by disadvantaged populations.

The results in regards to the association of concentrated disadvantage and gentrification during the 2000s tell a slightly different story. First, it is important to recognize that the statistically significant coefficient for the interaction of concentrated disadvantage and the 2000 dichotomy variable (-8.066***) shows that the association of concentrated disadvantage and gentrification during the 2000s was significantly different from the 1980s (5.874**). In order to compare the size of the associations between the 1980s and 2000s, the coefficient for the 2000s (-8.066***) is added to the coefficient for the within-unit variation in concentrated disadvantage (5.874**), which results in a coefficient of -2.192. The coefficient of -2.192 shows that neighborhoods characterized by concentrated disadvantage in 2000 were less likely to gentrify than neighborhoods characterized by concentrated disadvantage in 1980. The lesser probability of gentrification in neighborhoods characterized by concentrated disadvantage during the
2000s could be the result of changes associated with the economic recession during the second half of the 2000s, which would have made it more difficult for individuals or corporations to finance gentrification projects in more risk-averse neighborhoods.

The interaction of subway entrances with time shows that neighborhoods where subway entrances were more prevalent were more likely to gentrify during the 1990s (7.846*). This association was expected given the positive bivariate correlations for the 1990s (r = 0.225**) and 2000s (r = .227**). As stated prior, this association makes sense given findings by Kahn (2007) that showed that gentrification was more likely to occur in neighborhoods with public transportation that was within walking distance. Further, the significant association during the 1990s might be the result of cleanup efforts to the New York City subway system during the late 1980s and early 1990s. It is possible that the association during the 2000s was not significant because the changes had already occurred during the 1990s.

Results in Model 5 are for the full model, which includes the year dichotomies, the control variables, the spatial lags of the control variables, and the interactions with time. After controlling for all these variables, the results continue to show the importance of concentrated disadvantage, the presence of subway entrances, and gentrification in neighboring areas as predictors of gentrification, but with a few caveats. Similar to results in Model 4, results in Model 5 show that gentrification was more likely to occur in neighborhoods characterized by disadvantage during the 1980s, but less likely during the 2000s. Additionally, these results show the presence of subway entrances was an important predictor of gentrification during the 1990s, but not during the 1980s or 2000s. As discussed earlier, this is likely the result of improvements to the New York City
subway that occurred during the late 1980s and early 1990s that made subway entrances more appealing to live near. Finally, the results in Model 5 show that neighborhoods are more likely to gentrify if they are located near neighborhoods also experiencing gentrification, which suggests that improvements in one neighborhood may result in spillover improvements to neighboring areas as individuals who cannot afford to live in gentrifying neighborhoods, but want to have access to the amenities of such neighborhoods may choose to live in a neighboring area.

**SUMMARY OF THE GENTRIFICATION-SPECIFIC ANALYSES**

The analyses in this chapter sought to answer two questions. The first question addressed how gentrification should be operationalized. Previous research has operationalized gentrification using qualitative and quantitative methods, each of which is associated with a number of strengths and weaknesses. Seeking to bridge this gap, while still drawing upon the fullest sample of neighborhoods possible, multivariate census-based operationalizations of gentrification developed by Bostic and Martin (2003) and Freeman (2005) were replicated with data from New York City for the period 1980 to 2009 and the results were compared to neighborhoods identified as gentrified by *The New York Times* during the same period. Comparing the results of the census-based strategies to *The New York Times* allowed for a more culturally grounded operationalization of gentrification than has been used in previous quantitative research on gentrification, while still ensuring that neighborhoods that experienced similar changes to those identified by *The New York Times*, but which were not recognized as gentrified by *The New York Times*, were included in later analyses.
One interesting result of the comparison of the census-based and *New York Times* operationalizations of gentrification was that all three operationalizations identified a substantial number of neighborhoods as having experienced gentrification than have been identified by qualitative studies of gentrification in New York City. This is important because much of the research on gentrification in New York City has been qualitative in nature and focused on a small number of neighborhoods, specifically Harlem (Freeman, 2006, Maurrasse, 2006; Taylor, 2002) and the Lower East Side (Mele, 1996; 2000; Zukin et al., 2009) in Manhattan and the grouping of neighborhoods in northeastern Brooklyn that includes the area Down Under the Manhattan Bridge (DUMBO) (Hackworth, 2002; Hackworth and Smith, 2001), Park Slope (Carpenter and Lees, 1995; Kasinitz, 1988), and Williamsburg (Curran, 2007; Zukin, 2010). As displayed in the maps showing the spatial distribution of the neighborhoods identified by *The New York Times* and the census-based operationalizations, it is clear that gentrification was not limited to the small number of neighborhoods discussed by qualitative research.

The comparison of the operationalizations of gentrification also showed that even though the Bostic and Martin operationalization was the more restrictive of the two census-based operationalizations, it produced a list of neighborhoods that was much more similar to *The New York Times*, and therefore more likely to be representative of how native New Yorkers see their neighborhoods, than the Freeman operationalization. The higher rate of agreements with *The New York Times* was supported in descriptive analyses that identified the Bostic and Martin operationalization as featuring substantially higher rates of neighborhood agreements with *The New York Times* for all three decades, but also by the larger significant phi coefficients in the crosstabulation analyses.
Even though the Bostic and Martin operationalization more closely matched *The New York Times* operationalization, there was still a good deal of disagreement between the two operationalizations. This was not entirely surprising given that fifty years of gentrification scholarship has yet to result in a consensus about the definition of gentrification, let alone where it occurred. Given these disagreements, it is possible that *The New York Times* staff overlooked neighborhoods that experienced changes similar, but not exact, to those identified as having experienced gentrification. According to Sampson (2012: 189), it is not uncommon for journalists to report on events that are “newsworthy,” while overlooking similar events in less noteworthy areas. It is also possible that other terms were used to describe changes in improving neighborhoods such as urban renewal, urban revitalization, or urban regeneration, which are often treated as synonyms for gentrification (Kennedy and Leonard, 2001: 5).

The second question addressed in this chapter concerned the identification of significant predictors of gentrification. To address this question, the current study drew upon a combination of the consumption and production explanations of gentrification and tested predictions that gentrification was more likely to occur in neighborhoods characterized by concentrated disadvantage (Hypothesis 1), lower rates of residential stability (Hypothesis 2), smaller foreign-born populations (Hypothesis 3), larger amounts of housing that was 40 years or older (Hypothesis 4), where a greater proportion of rental housing had affordability restrictions imposed (Hypothesis 5) and more accessible to public transportation such as subway entrances (Hypothesis 6). Additionally, Hypothesis 7 predicted that the predictors of gentrification would be influenced by changes in neighboring areas, while Hypothesis 8 predicted that the importance of the predictors
would vary over time. Results of a series of hybrid fixed effects regressions showed mixed support for these hypotheses.

Hypothesis 1 predicted that gentrification would be more likely to occur in neighborhoods populated by disadvantaged residents because property values tend to be lower in these neighborhoods, which increase the potential for profit on home purchases, but also increase the likelihood that young, middle-class professionals who want to live close to work and the amenities of city can afford to live in the city. Indeed, the results appear to show strong support for this argument, as concentrated disadvantage was the most consistent predictor of gentrification during the study period. Overall, the results show that neighborhoods that contained higher values on the index of concentrated disadvantage and therefore contained greater proportions of disadvantaged residents were more likely to have gentrified.

The results pertaining to Hypothesis 2, which predicted that gentrification would be less likely to occur in neighborhoods characterized by higher rates of residential stability, were counter to what was expected. It was predicted that neighborhoods with higher rates of residential stability would be less likely to gentrify because such neighborhoods provide fewer opportunities for new residents, specifically gentrifiers, to move in. The multivariate results, however, showed that controlling for additional factors resulted in a non-significant association of residential stability and gentrification, which means that neighborhoods with lower rates of residential stability were not significantly more likely to experience gentrification than neighborhoods with higher rates of residential stability. This may be the result of rental control policies in New York City, which do not allow owners of rent-stabilized units to increase rent by more
than 7.5 percent year or to increase rent once they reach the maximum base rent (New York City Rent Guidelines Board). Given the competition for housing in New York City, this type of policy discourages residents from moving, as they may not be able to find less expensive housing.

Gentrification scholarship prior to the 2000s either overlooked the association of immigration and gentrification or did not distinguish foreign-born populations from native racial and ethnic minorities, who were seen as being at risk of gentrification-related displacement. Recent research by Ley and Dobson (2008) and Shaw (2005) has argued that gentrification was less likely to occur in areas characterized by immigrant populations because vacancies in such areas tend to spread through word of mouth. Additionally, Brown and Wyly (2000) discussed the potential for immigrants to act as gentrifiers, which the authors argued occurred in the Brighton Beach neighborhood in Brooklyn. As no other study to date has discussed immigrants as gentrifiers, Hypothesis 3 predicted that gentrification would be less likely to occur in areas that feature larger foreign-born populations.

The results did not support Hypothesis 3 and instead found that neighborhoods with larger foreign-born populations were more significantly more likely to gentrify, but only if changes in neighboring areas were not controlled for. This appears to support more traditional arguments about the role of immigrants in the gentrification process, but given the findings of Brown and Wyly (2000), could also mean that immigrants became increasingly likely to engage in gentrification during the study period. Unfortunately, neither of these possibilities could be assessed with the data used in this dissertation and therefore will have to be addressed by future research.
A great deal of prior research on gentrification has argued that neighborhoods were more likely to gentrify if they featured a greater amount of buildings with historical character, whether perceived or actual (Curran, 2007; Hamnett and Whitelegg, 2003; Zukin, 1982). Unfortunately most research has been vague about the specifics of what was meant by historical character, but research by Rosenthal (2008) revealed that neighborhoods characterized by housing stock that was forty years old or greater was more attractive to members of the middle-class and hence more susceptible to gentrification. Therefore, Hypothesis 4 predicted that neighborhoods that featured higher percentages of housing that were 40 years or older would be more likely to have experienced gentrification. The results did not support this hypothesis, instead showing that gentrification was less likely to occur in neighborhoods that contained higher percents of housing in this age range. This appears to suggest that, in New York City at least, gentrifiers tend to be more attracted to newer construction or to building that were older than 40 years old.

Hypothesis 5 predicted that gentrification would be more likely to occur in neighborhoods where a greater percent of rental housing began to have affordability restrictions applied during the decade as this was a feature associated with development efforts conducted as part of the Ten-Year Plan in New York City (Ellen et al., 2001; Schill et al., 2002; Schwartz and Vidal, 1999). Rental housing that had affordability restrictions applied cannot be considered gentrification because such restrictions limited the potential profit that could be gained from renovation, but the improvements to targeted units likely helped to address structural issues in the neighborhood, thereby making the neighborhood more attractive to gentrifiers. Indeed, the results supported this
hypothesis, but only when changes in surrounding neighborhoods were not controlled for. This suggests that this type of program encouraged gentrification in more isolated areas as opposed to neighborhoods that gentrified or experienced changes associated with gentrification because of spillover effects in gentrified neighborhoods.

Research by Kahn (2007) found a positive association of gentrification with public transportation, but only for neighborhoods that have access to “Walk and Ride” forms of public transportation. Given that the measure of public transportation used in this study, presence of subway entrances in a neighborhood, is a form of “Walk and Ride” public transportation, Hypothesis 6 suggested that neighborhoods with at least one subway entrance would be more likely to gentrify. The results show that neighborhoods that contained subway entrances were more likely to gentrify during the 1990s than other neighborhoods, but not for the 1980s or 2000s. Research by Kelling and Coles (1996) provided a possible explanation for this in their discussion of efforts by New York City officials to clean up subway stations during the late 1980s and early 1990s. These cleanup efforts may have made living near subway entrances more attractive and in turn encouraged gentrification in areas located near subway entrances. As these changes occurred during the late 1980s and early 1990s, it is possible that these neighborhoods were not significantly different from other neighborhoods during the 2000s.

Relatedly, Hypothesis 7 predicted that changes in neighboring areas would be a predictor of whether neighborhoods gentrified as previous research has discussed the possibility that neighborhoods located near gentrified or gentrifying neighborhoods tend to be attractive to people who cannot afford to live in a gentrified or gentrifying neighborhood, but who want to have access to the amenities that such a neighborhood
provides (Bridge, 2006; Ley and Dobson, 2008). While this makes logical sense, it has not been explored in previous quantitative research on gentrification. The results presented here, however, support this argument, showing that neighborhoods that bordered gentrified neighborhoods were more likely to experience gentrification. Given this significant finding, future research should explore this issue further in order to determine if this result is unique to New York City.

Finally, the results did not show strong support for Hypothesis 8, which predicted that the significant predictors of gentrification would vary over the course of the study period. In fact, the only measure to show significant changes over time was the index of concentrated disadvantage. Here, the results showed that neighborhoods were more likely to have gentrified during the 1980s and 1990s if they featured higher levels of concentrated disadvantage at 1980 and 1990 respectively, but that neighborhoods were more likely to have gentrified during the 2000s if they were characterized by lower levels of concentrated disadvantage at 2000. The contradictory result for the 2000s could be the result of changes associated with the economic recession during the second half of the 2000s, which would have made it more difficult for individuals or corporations to finance gentrification projects in more risk-averse neighborhoods.
CHAPTER 6: GENTRIFICATION AND CRIME

The primary goal of this dissertation is to assess the association of gentrification and crime rates in New York City between 1980 and 2009. The theoretical setup for this analysis was discussed in Chapter 2, which described the influence of gentrification on neighborhood change, and Chapter 3, which discussed the social disorganization perspective and routine activities theory and described how each could be used to explain the association of gentrification and crime. Chapter 3 also discussed trends in crime in New York City, which confirmed well-documented declines in crime during the 1990s and 2000s. Even though well-documented, the cause of this decline is still debated as research by Kelling and Coles (1996) and Messner et al. (2007) found support for the importance of changes in policing practices such as the implementation of Broken Windows Policing, while research by Rosenfeld, et al. (2007) and Zimring (2011) found that the decline in crime was the result of declines in concentrated disadvantage in cities.

Results presented in this chapter provide additional support for claims that the decline in index crime rates in New York City during the 1990s and 2000s were the result of decreased concentrated disadvantage, but the results also suggest that gentrification was associated with this decline as the process resulted in improvements to neighborhoods that reduced the prevalence of crime while at the same time helping to deconcentrate disadvantage. These results are presented in three parts. The first part of the chapter expands on the discussion of crime trends presented in Chapter 3 and discusses the temporal and spatial distribution of crime trends among the 55 New York City sub-boroughs. After discussing the univariate crime trends, bivariate correlations of the control variables and measure of gentrification with each of the index crimes are
presented. The final part of the chapter presents results of hybrid fixed effects regressions. While analyses were conducted with all seven index crimes, results of the rape analyses are presented separately in Appendix B because of reliability issues with the reporting rape incidents to the police.

CRIME TRENDS

Chapter 3 presented citywide and borough-specific statistics that showed crime rates generally increased between 1980 and 1990, but then declined sharply between 1990 and 2000 and continued to decline at a slower rate between 2000 and 2005/2009. In comparison, Table 15 presents statistics for the crime-specific trends at the sub-borough level, the level of analysis used to assess the association between gentrification and crime. Results pertaining to changes in each of the seven index crimes are discussed in the subsequent paragraphs. In order to produce standardized maps of the changes in each of the crime rates over time, maps were produced that centered the changes in each crime-specific rate for each decade around zero and determined whether changes were within one standard deviation from zero (small increase/decrease) or within two standard deviations of zero (large increase/decrease). These maps also identify the distribution of census tracts identified by the replication of the Bostic and Martin (2003) operationalization in order to show how gentrification was patterned against crime rates.

Analysis of the trend in assault rates in Table 12 shows that the rate of assaults per 1000 residents in the average sub-borough increased by 2.76 between 1980 and 1990. Map 26 shows that while the average sub-borough experienced an increase in assault during this period, four sub-boroughs experienced declines. Foreshadowing results
described later, sub-boroughs that experienced the largest increases in assault between
1980 and 1990 tended to be characterized by concentrated disadvantage, but the sub-
boroughs that experienced the largest declines were not those associated with
gentrification, but bordered sub-boroughs that experienced gentrification.

Table 12 is located on page 289
Map 26 is located on page 325

The results of the change in assault rates between 1990 and 2000 presented in
Table 12 show that assault rates in the average sub-borough declined by 1.48 incidents
per 1000 residents between 1990 and 2000. As displayed in Map 27, the average decline
was the result of declines in assault rates in 54 of the 55 sub-borough areas and that the
largest declines occurred in many of the sub-boroughs that experienced the largest
increases in assault during the previous decade. The only sub-borough that experienced
an increase in the assault rate was Borough Park, but the increase was very small (0.21
per 1000 residents). Further, these results suggest that gentrification was associated with
the decline in assault rates as sub-boroughs such as Central Harlem and
Chelsea/Clinton/Midtown in Manhattan and Bedford Stuyvesant, Brooklyn Heights, Park
Slope/Carroll Gardens, and Williamsburg, which contained neighborhoods often
discussed as having experienced gentrification also experienced some of the largest
declines in assault during the 1990s.

Map 27 is located on page 326

Results in Table 12 also show that the mean assault rate continued to decline
during the 2000s as the rate of assaults in the average sub-borough declined by 2.47
incidents per 1000 residents between 2000 and 2005/2009. Results in Map 28 show that
while the majority of sub-boroughs continued to experience declines in assault during the 2000s, assault rates increased in the Lower East Side in Manhattan and Mott Haven/Hunts Point in the Bronx. The results also show that many of the sub-boroughs associated with gentrification, specifically Central Harlem in Manhattan and Bedford Stuyvesant in Brooklyn, experienced some of the largest declines in assault. The Chelsea/Clinton/Midtown in Manhattan and Brooklyn Heights, Park Slope/Carroll Gardens and Williamsburg in Brooklyn, which have also been identified as experiencing gentrification during the 2000s experienced smaller declines in assault.

[Map 28 is located on page 327]

Transitioning to the descriptive statistics pertaining to burglary rates, Table 12 shows that burglary rates began to decline during the 1980s as the average burglary rate declined by 6.72 incidents per 1000 residents between 1980 and 1990. Map 29 shows that, while burglary rates declined in 48 of the 55 sub-boroughs during the 1980s, they increased in much of the Bronx, but also in the Manhattan areas of Harlem and the Upper East Side, and the Queens sub-boroughs of Ridgewood and Jamaica. In regards to the association of burglary rates and gentrification, the sub-boroughs in Manhattan that experienced the largest declines in burglary during the 1980s were also those most often identified as having gentrified during this period, specifically, the Lower East Side and Chelsea/Clinton/Midtown. The association of burglary rates and gentrification in sub-borough areas in the other four boroughs was less apparent as the sub-boroughs in these boroughs that experienced the largest declines in burglary rates during the 1980s did not contain neighborhoods frequently discussed as having gentrified during the 1980s.

[Map 29 is located on page 328]
Descriptive statistics in Table 12 show that burglary rates continued to decline during the 1990s as the number of burglaries per 1000 residents declined by 5.04 incidents per 1000 residents between 1990 and 2000. Map 30 shows that burglary rates declined during the 1990s in all 55 sub-borough areas, but most sub-boroughs experienced small declines, which is to say that these sub-boroughs experienced declines that were within one standard deviation of zero. Further, with the exception of East New York/Starret City in Brooklyn, the sub-boroughs that experienced the greatest declines tended to share at least one border with another sub-borough that experienced a large decrease in burglary. It is also interesting to note that, unlike the 1980s, many of the sub-boroughs that experienced the largest declines in burglary were also identified by previous research as having gentrified during the 1990s, specifically Harlem and the Upper East Side in Manhattan and Park Slope/Carroll Gardens, Bedford Stuyvesant and Brooklyn Heights in Brooklyn. It is unclear from these results how strongly gentrification was associated with declines in burglary rates, however, as the sub-boroughs of Highbridge/South Concourse and Morrisania/East Tremont in the Bronx and Elmhurst/Corona in Queens, which have not been identified as experiencing gentrification during this period, were also categorized as experiencing some of the largest declines in burglary during the 1990s.

[Map 30 is located on page 329]

Table 12 shows that the burglary rate in the average sub-borough declined by 7.81 incidents per 1000 residents between 2000 and 2005/2009. Results in Map 31 shows that even though the average burglary rate declined, rates of burglary increased in the Lower East Side in Manhattan and Mott Haven/Hunts Point. In regards to the association of
gentrification and burglary rates, the results in Map 53 do not appear to show a strong correlation as many of the sub-boroughs identified as having experienced large decreases in crime during the 2000s were not been identified as having gentrified during the 2000s, while sub-boroughs such as Harlem and Williamsburg, which have been identified as experienced gentrification, experienced smaller declines in burglary.

[Map 31 is located on page 330]

Shifting to a discussion of larceny rates, Table 12 shows that larceny rates began to decline during the 1980s, but did not decline substantially until the 1990s. Between 1980 and 1990, the average larceny rate decreased by 1.48 per 1000 residents. While the average sub-borough experienced a decline in larceny during the 1980s, results in Map 32 show that 12 sub-boroughs actually experienced an increase in larceny. The increase in larceny rates were most heavily concentrated in the lower Manhattan sub-boroughs of Greenwich Village/Financial District, the Lower East Side and Chelsea/Clinton/Midtown, which contained neighborhoods commonly referenced as experiencing gentrification during the 1980s. This suggests that gentrification was associated with increased larceny.

[Map 32 is located on page 331]

Between 1990 and 2000, the larceny rate in the average sub-borough declined by 2.01 incidents per 1000 residents, which was the result of declines in larceny rates in all 55 sub-boroughs (Map 33). One point of interest in this map is that, with the exception of Morrisania/East Tremont in the Bronx, all of the sub-boroughs that were identified as experiencing large increases in larceny rates during the 1980s were identified as experiencing large declines in larceny during the 1990s. The other interesting result is
that many of the sub-boroughs that contained neighborhoods often identified as having experienced gentrification during the 1990s were identified as experiencing large decreases in larceny. This can be seen in the Greenwich Village/Financial District and Chelsea/Clinton/Midtown sub-boroughs and Lower East Side in Manhattan and Brooklyn Heights/Fort Greene and Bedford Stuyvesant in Brooklyn.

[Map 33 is located on page 332]

Larceny rates experienced the largest decline during the 2000s as the average larceny rate declined by 4.37 incidents per 1000 residents between 2000 and 2005/2009 (Table 12). While the mean larceny rate decreased during this period, Map 34 shows that 36 sub-boroughs experienced an increase in larceny during the 2000s. The results also show that the sub-boroughs identified as experiencing the largest increases were distributed throughout the city, but that there was a concentration of increased larceny rates in sub-boroughs in upper Manhattan and the Bronx, which tend to be characterized by disadvantage. Given the distribution of changes in larceny rates during the 2000s in Map 34, gentrification does not appear to have been associated with changes in larceny rates. It is not clear why so many sub-boroughs experienced slight increases in larceny after the dramatic declines during the 1990s, but this increase could be the result of changes in factors that increased the risk of apprehension for other types of crime, thereby making larceny a less risky crime to commit (Hakim, Spiegel and Weinblatt, 1984).

[Map 34 is located on page 333]

In regards to changes in the homicide rate, results in Table 12 show that the homicide rate followed a similar trend to the overall crime rate for the city in that the
average homicide increased during the 1980s by 0.07 incidents per 1000 residents, but then decreased during the 1990s by 0.06 incidents per 1000 residents and more dramatically by 0.15 incidents per 1000 residents during the 2000s. Map 35 displays the distribution of changes in homicide rates during the 1980s. This map shows that, as expected, the homicide rate increased in 52 sub-boroughs, but it also decreased in Greenwich Village/Financial District, Chelsea/Clinton/Midtown, and East Harlem. The decline in these sub-boroughs is interesting of itself, but also because Greenwich Village/Financial District and Chelsea/Clinton/Midtown contained neighborhoods frequently discussed as having gentrified during the 1980s. This map also shows that the sub-boroughs that experienced the largest increases in homicide during the 1980s were more likely to be located in Brooklyn or Queens than in Manhattan, the Bronx, or Staten Island.

[Map 35 is located on page 334]

In contrast to the 1980s, the distribution of changes in homicide rates between 1990 and 2000 displayed in Map 36 shows that homicide rates decreased in all 55 sub-borough areas and that the largest decreases were in many of the same areas that experienced large increases during the previous decade. This map offers limited support for the association of gentrification and homicide as the sub-boroughs associated with gentrification during the 1990s were also identified as experiencing small decreases in homicide. Instead, the sub-boroughs that experienced the largest declines in homicide during the 1990s tended to be located in areas of Brooklyn and Queens that were characterized by large immigrant populations.

[Map 36 is located on page 335]
The average homicide rate per 1000 residents also declined during the 2000s as
the average homicide rate among sub-borough areas declined by 0.15 incidents per 1000
residents between 2000 and 2005/2009 (Table 12). Map 37 shows that this decline was
the result of declines in the rate of homicides in 54 of the 55 sub-boroughs. The Mott
Haven/ Hunts Point sub-borough was the only sub-borough to experience an increase, but
this increase amounted to 0.01 incidents per 1000 residents. Similar to the 1990s, this
map also shows that sub-boroughs associated with gentrification tended to be
characterized by smaller declines in homicide, while sub-boroughs characterized by large
foreign-born populations such as Canarsie/ Flatlands and East New York in Brooklyn and
Kew Gardens/ Woodhaven and Flushing in Queens featured some of the larger declines
in homicide. This finding appears to support claims that immigration is negatively
associated with violent crime (Browning et al., 2010; Peterson and Krivo, 2009). This
association is more fully explored in the multivariate analyses.

[Map 37 is located on page 336]

Changes in motor-vehicle theft rates, displayed in Table 12, also followed the
trend for the city as the average motor-vehicle theft rate increased by 7.84 incidents per
1000 residents between 1980 and 1990. This increase was followed by a substantial
decrease of 6.75 incidents per 1000 residents between 1990 and 2000 and even larger
decrease of 10.27 incidents per 1000 residents between 2000 and 2005/2009. Map 38
shows that the average motor-vehicle theft rate increased during the 1980s primarily
because of increases in the Bronx, northern Brooklyn, most of Queens and to a lesser
extent, Staten Island. These results also appear to show that gentrification was negatively
associated with motor-vehicle theft rates as the sub-boroughs in Manhattan often
associated with gentrification during the 1980s, specifically Chelsea/Clinton/Midtown and the Lower East Side, experienced some of the largest declines in motor-vehicle theft rates. Drawing upon the consumption explanation of gentrification, gentrifiers tend to be attracted to neighborhoods with access to amenities such as public transportation and therefore tend to be less reliant on and less likely to own motor-vehicles. It is possible that the gentrification in these neighborhoods reduced the number of targets available for motor-vehicle theft.

[Map 38 is located on page 337]

Shifting to the results pertaining to changes in motor-vehicle theft rates during the 1990s, results in Map 39 shows that declines were distributed throughout the city, but the largest declines were in the southern Bronx/upper Manhattan/southern Bronx and in northern Brooklyn. These results offer limited support for an association of gentrification and motor-vehicle theft rates, however as sub-boroughs that experienced larger declines in motor-vehicle theft in Manhattan and Brooklyn tended to be those associated with gentrification. Many sub-boroughs in the Bronx, which were not associated with gentrification, also experienced declines in motor-vehicle theft, however, which suggests this association may be unique to particular boroughs.

[Map 39 is located on page 338]

Transitioning to the results of changes in motor-vehicle theft rates between 2000 and 2005/2009, Map 40 shows that while the majority of sub-boroughs reported declines in motor-vehicle theft, 14 sub-boroughs experienced increased rates of motor-vehicle theft during the 2000s. Given the distribution of these changes, it is unclear whether gentrification was correlated with motor-vehicle theft rates as Greenwich Village/
Financial district and the Upper West Side in Manhattan were characterized by increased rates of motor-vehicle theft while Central Harlem and Brooklyn Heights/ Fort Greene and Bedford Stuyvesant in Brooklyn were characterized by larger declines.

[Map 40 is located on page 339]

The trends for robbery presented in Table 12 show that the robbery rate in the average sub-borough increased by 1.61 incidents per 1000 residents between 1980 and 1990 before declining by 3.52 incidents per 1000 residents between 1990 and 2000 and an additional 6.49 incidents per 1000 residents between 2000 and 2005/2009. The results in Map 41 show that the increase in the mean robbery rate across sub-boroughs was influenced most strongly by increased rates of robbery in sub-boroughs in the Bronx, Brooklyn, and Queens. The sub-boroughs areas that experienced the largest increases in robbery rates also tended to be those associated with concentrated disadvantage during the 1980s, so it is expected that changes in concentrated disadvantage will be strongly correlated with robbery rates in the multivariate models. The results in Map 41 also do not suggest a strong correlation between robbery rates and gentrification during this decade as only the sub-boroughs of Chelsea/ Clinton/ Midtown and the Lower East Side in Manhattan were identified as experiencing declines in robbery. Given the declines in robbery in Manhattan sub-boroughs associated with gentrification, it is surprising to see that robbery rates increased in many Brooklyn sub-boroughs even though gentrification has been documented in Brooklyn during this period. This may be the result of more concentrated gentrification efforts in Manhattan during the 1970s and 1980s.

[Map 41 is located on page 340]
As displayed in Map 42, all 55 sub-boroughs experienced decreased rates of robbery during the 1990s. Further, the distribution of the declines appears to be negatively associated with gentrification. The sub-boroughs of Chelsea/Clinton/Midtown, Central Harlem, East Harlem, and the Lower East Side in Manhattan and Park Slope/Carroll Gardens, Brooklyn Heights/Fort Green, Bedford Stuyvesant, and Williamsburg in Brooklyn have each been discussed as experiencing gentrification in previous research and were identified as experiencing large decreases in robbery rates during the 1990s.

[Map 42 is located on page 341]

Map 43 shows that this decline was not only smaller in most sub-boroughs during the 2000s than it was during the 1990s, but also that four sub-boroughs increased in the rate of robbery during the 2000s. The sub-boroughs that experienced increased rates of robbery during the 2000s were Stuyvesant Town/Turtle Bay and Washington Heights/Inwood in Manhattan, Mott Haven/Hunts Point in Brooklyn and Mid-Island in Staten Island. The results for the Washington Heights/Inwood and Stuyvesant Town/Turtle Bay are interesting as they were located near sub-boroughs that experienced gentrification. While only two cases, this may foreshadow the importance of the spatial lag of gentrification in the multivariate results. The direct association of gentrification and robbery rates during the 2000s is also difficult to predict based upon Map 46 as only the Greenwich Village/Financial District and Lower East Side in Manhattan were identified as having experienced large decreases in robbery rates. This association appears to be stronger in Brooklyn, however, as Brooklyn Heights/Fort Greene and
Bedford Stuyvesant, Bushwick, and Park Slope/Carroll Gardens were all categorized as experiencing large declines in robbery.

TRENDS IN THE CONTROL VARIABLES

The descriptive statistics at the sub-borough level in Table 13 largely mirror the results at the New York City Department of City Planning neighborhood level discussed in Chapter 5, but there were a few notable differences. It is important to note that while the neighborhood level analyses included the percent of tracts that contained rental housing to which affordability restrictions were applied, the sub-borough level analyses did not include this variable because its inclusion conflicted with the use of a fixed effects analysis strategy in the multivariate models. Additional differences in the descriptive statistics for the control variables are the result of differences in aggregation as the average neighborhood contained 11 tracts, while the average sub-borough contained 40 tracts.

Results in Table 13 show that, similar to national trends identified by Ellen and O’Regan (2008) and Jargowsky (2003), the average sub-borough experienced a decline in concentrated disadvantage between 1980 and 2000. Results for the 1980s show a decline in concentrated disadvantage of 0.032, where results for the 1990s show a decline of 0.089. The distributions of these declines are displayed in Map 44 (1980s) and Map 45 (1990s) and show that much of the average decline in concentrated disadvantage during this period was the result of decreased concentrated disadvantage in sub-boroughs located
in Manhattan or northeastern Brooklyn. In addition to the areas that consistently declined during this period, declines during the 1980s were also seen in the Staten Island sub-boroughs as well as the Queens sub-boroughs of East New York, Howard Beach/ South Ozone Park, and Jamaica as well as in the Bronx sub-boroughs of Highbridge/ South Concourse, Mott Haven/ Hunts Point and Morrisiana/ East Tremont during the 2000s.

[Map 44 is located on page 343]

[Map 45 is located on page 344]

In comparison to the average decline in concentrated disadvantage during the 1980s and 1990s, results for the 2000s show that the average sub-borough experienced an increase of 0.147 in concentrated disadvantage between 2000 and 2005/2009. The increase during this period was likely a result of the economic recession that occurred during the second half of the decade. Map 46 shows that many of the Manhattan sub-boroughs that increased in concentrated disadvantage in Manhattan during the 2000s were those that either decreased in concentrated disadvantage during previous decades and/or contained gentrified neighborhoods identified as having gentrified during the 1980s or 1990s. This is seen specifically in the Upper East Side and the Upper West Side. Map 46 also shows that sub-boroughs that continued to experience declines in concentrated disadvantage were located in upper Manhattan, the Bronx, or northern Brooklyn.

[Map 46 is located on page 345]

Transitioning to the results in regards to residential stability, results in Table 13 do not appear to support the findings of previous research that residential stability is negatively associated with crime. Between 1980 and 1990, the average neighborhood
experienced an increase in residential stability of about 3.24 percent. Map 47 shows the majority of sub-boroughs, 35 of 55, experienced an increase in the percent living in the same household for at least five years between 1980 and 1990 of one to ten percent and that the overall increase would have been higher if not for declines in residential stability in many of the sub-boroughs in Queens. As discussed earlier, however, crime trends at the sub-borough level show that rates of burglary, larceny, and rape began to decline during the 1980s in the average sub-borough. Further, comparing Map 47 with the maps displaying changes in the different crime types between 1980 and 1990 shows that many of the areas that experienced increased rates of residential mobility were those that also featured increased rates of assault, larceny, homicide, and robbery.

[Map 47 is located on page 346]

In contrast to the average increase in residential stability during the 1980s, residential stability rates decreased by 1.88 percent during the 1990s. Map 48 shows that this decline was relatively evenly distributed throughout the 55 sub-boroughs and that most, 30 of 55, sub-boroughs experienced a decline of less than five percent. At the same time, however, crime rates for all seven index crimes in New York City declined substantially. As discussed in the previous section, the declines in index crimes during the 1990s were distributed throughout the city with a few exceptions.

[Map 48 is located on page 347]

In comparison to the relatively small changes in the mean rate of residential stability during the 1980s and 1990s, residential stability rates during the 2000s increased dramatically as the percent of residents who reported living in the same house increased by 15.51 percent between 2000 and 2005/2009. Map 49 shows that the average increase
was the result of increased residential stability in all 55 sub-boroughs. While the rate of residential stability increased dramatically during this period, the crime trends show that rates of all seven index crimes continued to decline during the 2000s, but at a much slower rate than during the 1990s when residential stability was decreasing. Given the overall trend in residential stability during the study period, it is possible that the multivariate results will show either a negative association of residential stability with the crime rates, which contradicts previous research, or a null finding as residential stability rates increased the most during the 2000s when crime rates only declining slightly.

[Map 49 is located on page 348]

Reviewing the trend in the percent foreign born shows that this population increased throughout the study period, with a mean increase of 4.59 percent during the 1980s, a mean increase of 6.92 percent during the 1990s, and a relatively smaller average increase of 0.47 percent during the 2000s. Map 50 shows that while the majority of sub-boroughs gained in the percent foreign born during this period, sub-boroughs in Queens were the most likely to gain, especially Flushing/Whitestone, Elmhurst/Corona, Jackson Heights and Astoria. In contrast, Map 51 shows that sub-boroughs in Brooklyn and Queens experienced the largest gains in the percent foreign born. Groupings of sub-boroughs in southern Brooklyn, specifically Bensonhurst and Sheepshead Bay and Gravesend, and in southern Queens, specifically, Kew Gardens/ Woodhaven and Howard Beach/ South Ozone Park, saw the greatest gains in the percent foreign born. Results for the 2000s displayed in Map 52 show that, similar to the 1980s and 1990s, the sub-boroughs that experienced gains in the foreign-born population continued to be in Brooklyn and Queens, specifically Bensonhurst and Sheepshead Bay and Gravesend in
Comparing the trend in percent foreign born to the crime rates trends appears to suggest that changes in this population were negatively associated with specific crimes as the percent foreign born increased during the 1980s and 1990s at the same time that rates of burglary, larceny, and rape declined. Additionally, the lower rate of increase in the percent foreign born during the 2000s occurred at the same time that rates of burglary, larceny, and rape as well as the other index crimes began to decline at a slower rate. Given that changes in the percent foreign born were distributed relatively evenly throughout the city during each of the three periods, it is unclear if this association will be significant at the sub-borough level.

Similar to the trend in the percent foreign born, the trend in the average age of housing stock, measured by the percent of housing stock that was 40 years or older, increased throughout the study period. Descriptive statistics in Table 13 show that 51.42 percent of housing stock in the average sub-borough was 40 years or older in 1980 and that this percent increased by 5.53 percent to 56.95 percent in 1990. This was not unexpected given that buildings naturally aged into this age range over time. Results in Map 53 show that the average increase during the 1980s was the result of an increase in the average percent of housing that was 40 years or older in the 45 of the 55 sub-boroughs and that the average increase was distributed throughout the five boroughs.
Map 54 shows that 54 of the 55 sub-boroughs experienced an increase in the percent of housing in this age range and that the average increase was distributed throughout the city, but was most heavily concentrated in the Bronx, Brooklyn, and Queens. Similarly, results for the 2000s in Map 55 show that the continued average increase in housing in this age range was the result of increases in all 55 sub-boroughs. Given the overall trend in the percent housing as well as the relatively even distribution during all three decades, it is not expected that changes in the age of housing will be a significant predictor of crime rates in the multivariate models.

[Map 53 is located on page 352]

[Map 54 is located on page 353]

[Map 55 is located on page 354]

The mean and standard deviation of the number of tracts per sub-borough that contained at least one subway entrance show that sub-boroughs varied greatly on this attribute as the standard deviation of 7.23 was almost as large as the mean of 8.94. Map 59 shows that subway entrances were most heavily concentrated in the Manhattan sub-borough and sub-boroughs further from the center of the city tended to have fewer subway entrances. Given the greater concentration of subway entrances in particular sub-boroughs, it is unclear exactly how the measure of subway entrances will be associated with each of the index crimes.

[Map 56 is located on page 355]

Descriptive statistics pertaining to the percent of tracts within each sub-borough that gentrified show that, on average, about seven percent of tracts within each sub-borough gentrified during each decade. The standard deviations for the percent gentrified
for all three decades shows that there was a great deal of variability in this measure as the standard deviation was larger than the mean percent gentrified at each time. As expected given the descriptive results of neighborhood level analyses in Chapter 5, Maps 60 through 62 show that sub-boroughs throughout the five boroughs contained tracts identified as having experienced gentrification during at least one of the three decades, but also that sub-boroughs in Manhattan and the northeastern section of Brooklyn experienced the heaviest gentrification between 1980 and 2009. In comparison, the review of the crime maps showed that the sub-boroughs that experienced the more dramatic changes (large decrease or large increase) in each of the crimes tended to be more distributed throughout the city. Given these results, it is expected that gentrification will be moderately associated with crime rates for each of the decades.

[Map 57 is located on page 356]

[Map 58 is located on page 357]

[Map 59 is located on page 358]

Summary of the Sub-borough Level Descriptive Statistics

The descriptive statistics at the sub-borough level were similar to those at the neighborhood level with a few minor exceptions due to differences in aggregation as neighborhoods contained about 11 census tracts, while sub-boroughs contained about 40 census tracts. The difference in the number of tracts is important as the smaller overall number of units and much larger number of tracts within sub-boroughs may mask important variations in the control variables. The most substantial difference between the two levels pertained to the mean values for concentrated disadvantage as results at the
neighborhood level reported that the average neighborhood was not characterized by concentrated disadvantage at 1980, 1990 or 2000, while the positive values for the sub-borough level showed that the average sub-borough was more likely to feature concentrated disadvantage. The mean values for the percent who moved in the last five years, the percent foreign born and the percent of housing stock 40 years or older differed slightly between the two levels of analysis, but results for the changes between were similar. Results pertaining to the percent of renter-occupied housing units to which affordability restrictions were applied confirm that neighborhoods in the Bronx, Brooklyn, and Manhattan were more likely to feature this type of housing during the 1990s and 2000s and that the developments associated with this initiative during these decades may have encouraged gentrification. Results for the subway entrance variable identified a small number of subway entrances per neighborhood than sub-borough, which was expected, but also a much larger variation as the standard deviation for the number of subway entrances at the neighborhood level was larger than the mean value. Finally, descriptive statistics for the percent of tracts within each sub-borough that gentrified show that about seven percent of tracts in the average sub-borough gentrified during each decade.

BIVARIATE CORRELATIONS

This section presents the bivariate correlations of the independent variables with each of the seven index crimes for each time point and discusses how the results relate to the hypotheses pertaining to the association of the control variables and gentrification with crime described in Chapter 3. To briefly recap, drawing upon the social disorganization
perspective, it was expected that each of the crime rates would be positive correlated with changes in concentrated disadvantage and the percent foreign born and negatively correlated with residential stability. From the standpoint of the social disorganization perspective, predictions in regards to the association of gentrification and crime are difficult to concretely state as gentrification breaks up pockets of concentrated disadvantage, which should result in reduced crime, but is also associated with decreased residential stability and increased population heterogeneity, which have been found to be positively associated with crime. In comparison, drawing upon the routine activities perspective, gentrification should be initially positively correlated with crime as the process increases the number of high value targets in neighborhoods more likely to be characterized by motivated offenders where crimes are more likely to be reported to the police.

Resulted presented in Table 14 show how rates of the violent crime types were correlated with the independent variables at each time point. Beginning with the bivariate correlations changes in concentrated disadvantage, the results show that, contrary to what was expected, changes in concentrated disadvantage between decennial censuses were negatively associated with assault and robbery rates for all three time points. Results for assault show the change in concentrated disadvantage between 1980 and 1990 featured a correlation with assault rates of 1990 of -.260, the change in concentrated disadvantage between 1990 and 2000 featured a correlation of -.547 with assault at 2000 and change in concentrated disadvantage between 2000 and 2005/2009 featured a correlation of -.310 with assault rates at 2005/2009. Similarly, the correlations with robbery identified coefficients of -.368 at 1990, -.606 at 2000, and -.306 at
2005/2009. In contrast to assault and robbery, the results for homicide show that the change in concentrated disadvantage was only negatively correlated with homicide at 2000 (r = -.524) and 2005/2009 (r = -.259). While all of the significant correlations of change in concentrated disadvantage and the violent crimes were negative, it is clear that the association of changes in concentrated disadvantage and crime rates varied over time.

[Table 14 is located on page 290]

In regards to residential stability, both the social disorganization framework and routine activities perspective predicted that residential stability would be negatively correlated with crime. Similar to the correlations of concentrated disadvantage and the violent crime types, the bivariate correlations with residential stability also varied over time. Robbery rates were the only crime to be consistently correlated with changes in residential stability, showing correlations of -.256 at 1990, -.290 at 2000, and -.357 at 2005/2009. Specifically, in regards to assault, changes in residential stability during the 1990s featured a correlation of -.251 with assault rates at 2000, while changes in residential stability during the 2000s featured a correlation of -.257 with assault rates at 2000. Homicide rates, however, were not significantly correlated with residential stability for any of the time points. Overall, these results suggest that residential mobility will be differentially associated with crime rates in the multivariate analyses and that the impact of residential mobility may have varied over time.

The bivariate correlations of changes in the percent foreign born and the different crime rates did not identify any concurrent significant correlations. This is contradictory to recent research that has found a negative association between the percent foreign born and crime overall, but especially violent crime (Browning, et al., 2010 Peterson and
It is possible that this relationship may not hold up in New York City because of its long tradition as an immigration gateway, which has resulted in very few homogenous neighborhoods.

The bivariate correlations of the measure of change in housing age, which reflects changes in the percent of housing that was 40 years or older, was not strongly correlated with the violent crime rates overall. These results show that the housing age variable was negatively and significantly correlated with assault (-.583), homicide (-.577), and robbery (-.538) at 1990, but not significantly correlated for the other time points. Given these results, it is expected that the housing age measure will be significantly associated with the crime rates in the multivariate analyses, but not for the entire study period.

The bivariate correlations of the percent of tracts within a sub-borough that contained at least one subway entrance with the violent crime types shows that this relationship varied across crime and time. For example, the correlation coefficients with assault at 1990 (r = .233) and 2000 (r = .244) were positive and significant, showing that assault rates were significantly higher in sub-boroughs with greater access to the subway system during the 1990s and 2000. The correlation coefficients for robbery showed similar results as robbery rates at 1990 (r = .397) and 2000 (r = .304) were significantly correlated with the presence of subway entrances. Specifically, the results showed significant positive correlates of subway entrances with assault and robbery, but only at 1990 and 2000.

The bivariate correlations of the percent of tracts within a sub-borough that gentrified during a given decade and the violent crime rates at the end of each decade show that gentrification highlight important time differences. With the exception of
homicide, which featured a coefficient of -.253, crime rates at 1990 did not vary significantly based upon the extent to which gentrification occurred within the sub-borough. Results for the later time points yielded much more significant findings as the correlations of the percent gentrified with all four violent crimes were positive and significant at 2000 and 2005/2009. These results are contradictory to findings of research by Papachristos et al. (2011) and Smith (2012), who found that gentrification was negatively associated with assault and homicide rates, but it is possible that the direction of these associations will be different in the fixed effects analyses, which control for the influence of additional factors that could be impacting this relationship.

Transitioning to the correlations with the property crimes, Table 15 identifies the bivariate correlations of the independent variables with the rates of burglary, larceny, and motor-vehicle theft for each time point. Whereas the bivariate correlations of the violent crime types with the change in concentrated disadvantage identified a number of significant correlations, the results for the property crime types only yielded a significant correlation with burglary rates and even then only for burglary rates at 1990 ($r = -.318$).

[Table 15 is located on page 291]

Drawing upon the social disorganization framework and routine activities perspective, it was expected that residential stability would be negatively correlated with each of the crime types because the residents of stable areas are more likely to be familiar with each other and therefore more likely to take steps to prevent crime in the neighborhood. Similar to the results of the bivariate analyses of residential stability with the violent crime types, the bivariate correlations with the property crime types also yielded mixed results as residential stability was correlated rates of burglary and motor-
vehicle theft, but not larceny. The results for burglary are interesting in that sub-
boroughs that were characterized by higher rates of residential stability during the 1980s
tended to feature significantly higher rates of burglary at the end of the decade ($r = .311$),
whereas the reverse was true for the 1990s ($r = -.699$) and 2000s ($r = -.612$). In contrast,
the bivariate correlations with motor-vehicle theft reveal a non-significant correlation at
1990 and significant negative correlations at 2000 ($r = -.683$) and 2005/2009 ($r = -.719$).

Analysis of the bivariate correlations of the change in the percent foreign born
and the violent crime types did not identify any significant concurrent correlations, which
is surprising given findings of recent research that crime, particularly violent crime, tends
to be lower in neighborhoods characterized by large immigrant populations. As
discussed prior, however, the bivariate correlations with the violent crime types did not
reveal any significant correlations, which was also true for the property crimes of
burglary and motor-vehicle theft. The bivariate correlations with larceny, however, were
significant and negative for all three time points, showing that sub-boroughs that
experienced greater increases in the percent foreign born during each decade tended to
feature significantly lower rates of larceny at the end of the decade. Specifically, the
results reveal correlation coefficients of -.226 at 1990, -.238 at 2000, and -.257 at

The bivariate correlations of the change in housing age, which reflects changes in
the percent of housing that is 40 years or older between censuses, only identified
significant correlations with the violent crime types at 1990, but the results in regards to
the property crime types were more varied. In regards to burglary, the results show a
significant correlation with the housing age measure for the 1990s ($r = -.282$), but not for
the other time points. In contrast, the correlations with larceny rates were significant at 2000 \( (r = -0.255) \) and 2005/2009 \( (r = -0.251) \). Further, the correlation with motor-vehicle theft were significant at 1990 \( (r = 0.575) \) and 2005/2009 \( (r = 0.288) \).

Parallel to the bivariate correlations of the violent crime types with the percent of tracts within a sub-borough that contained at least one subway entrance, the correlations with the property crime types varied across crime. Burglary rates were not significantly correlated with the presence of subway entrances, but larceny and motor-vehicle theft rates did feature significant correlations. The correlations with larceny rates were positive and significant for all three time points, which makes sense given previous research that found subway stations tend to have higher rates of personal crime, such as larceny, because their design allows offenders to loiter for long periods waiting for potential victims, who often represent easy targets due to tiredness or preoccupation (Block and Davis, 1996; Myhre, 1996). In contrast to larceny, the correlations of subway entrances with motor-vehicle theft were negative, which also makes sense as residents of neighborhoods with greater access to public transportation such as the subway are likely to be less reliant on automobiles, which means that there were likely to be fewer automobiles in these sub-boroughs and therefore fewer targets for motor-vehicle theft.

The bivariate correlations of the percent of tracts within a sub-borough that gentrified with the property crime types show that gentrification was not correlated with burglary or motor-vehicle theft rates, but was correlated with larceny rates. The positive correlations with larceny show that sub-boroughs that experienced greater rates of gentrification during the 1980s and 2000s featured significantly higher rates of larceny at 1990 \( (r = 0.373) \) and 2005/2009 \( (r = 0.330) \) respectively. The non-significant correlations
of gentrification with burglary and motor-vehicle theft and significant correlations with larceny rates appear to suggest that gentrification was more likely to be associated with personal crime rates.

MULTIVARIATE ANALYSES

Assault

Table 16 presents results of the hybrid fixed effects analysis where assault rates were the dependent variable. As discussed in Chapter 4, hybrid fixed effects regressions require that between-unit and within-unit variation is assessed for each of the time variant independent variables, but only the coefficients for the measures of within-unit variation are interpreted and therefore presented in the results tables. As described in Chapter 3 and confirmed in the descriptive results presented earlier in this chapter, crime rates in New York City declined greatly during the 1990s and 2000s. In order to determine if this decline was statistically significant in regards to assault rates, Model 6 regressed assault rates on dichotomous measures of time in order to determine if assault rates at 2000 and 2005/2009 were significantly different from assault rates at 1990. The significant and negatively coefficients for the 1990s and 2000s decade variables confirmed that assault rates were significantly lower at 2000 and 2005/2009 than they were at 1990.

[Table 16 is located on page 292]

Model 7 controlled for the influence of time and regressed assault rates on the percent of tracts in a sub-borough that gentrified. Similar to findings reported by O’Sullivan (2005), the results show that sub-boroughs that experienced greater rates of gentrification during a given decade tended to feature significantly lower rates of assault.

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8 The between-unit coefficients are available upon request.
at the end of the decade. This model is limited, however, in that it assumes a linear relationship between gentrification and assault rates, which is potentially problematic as the bivariate correlations identified differences over time. The importance of time is explored more fully in later models.

Model 8 regressed assault rates on the dichotomous measures of time and measures of the within and between-unit variation of changes in concentrated disadvantage, residential stability, the percent foreign born, and the percent of housing 40 years or older as well as a time invariant measure of the percent of tracts in each sub-borough that contained at least one subway entrance. Similar to previous research on neighborhood correlates of crime and in support of Hypothesis 9, these results show that change in concentrated disadvantage was positively associated with assault rates. This shows that sub-boroughs tended to feature significantly higher rates of assault at the end of each decade if they experienced an increase in the level of concentrated disadvantage.

The non-significant coefficient for residential stability was unexpected given that previous research has found that neighborhoods with higher rates of residential stability typically feature lower crime rates because of the greater potential for strong social networks and greater presence of homeowners. This may be the result of differences across decade as the bivariate correlations in Table 14 did not reveal a consistent pattern of correlation between changes in residential mobility during each decade and crime rates at the end of the decade. This relationship is explored further in Models 11 and 12.

Results in Model 8 also revealed a non-significant association of change in the foreign-born population with assault rates. This is contrary to recent research by Peterson and Krivo (2009) and Browning et al. (2010), who found a negative association between
the percent foreign born and rates of violent crime. This contradictory finding may the result of New York City’s long history as immigration gateway city and the fact that so many neighborhoods contain large foreign-born populations. This could also be differences in the unit of analysis as research by Peterson and Krivo (2009) and Browning et al. (2010) were able to assess this relationship at the census tract level, which are much smaller units of analysis.

The coefficient for the housing age variable in Model 8 shows that sub-boroughs that experienced an increase in the percent of housing aged 40 years or older during were more likely to feature lower rates of assault. It was expected that crime rates would be higher in areas characterized by older housing as such housing is typically located in marginal neighborhoods, which are characterized by higher crime (O’Sullivan, 2005; Schwartz et al., 2003). Similar to the contradictory finding in regards to the association of changes in the percent foreign born and assault rates, this finding may also be the result of New York City’s uniqueness in that so many of the buildings in New York City fall into the age range of 40 years older.

The association of the percent of tracts that contained subway entrances with assault rates was also not significant. One possible reason for this is that subway entrances are not evenly distributed throughout the city. It is also possible that subway stations may be more strongly associated with other types of crime such as robbery or larceny, which are explored in later models.

In order to determine if the percent gentrified measure continued to be significant after controlling for changes in concentrated disadvantage, residential stability, the percent foreign born, housing age, and the presence of subway entrances, Model 9 added
The percent gentrified. The coefficient for the gentrification measure (-0.088) shows that even after controlling for the additional variables, assault rates in sub-boroughs that experienced greater rates of gentrification were significantly lower than assault rates in sub-boroughs that experienced less gentrification. The results also show that concentrated disadvantage continued to be positively associated with assault, while the percent of older housing continued to be negatively associated with assault.

Model 10 introduced spatially lagged variants of the neighborhood correlates of crime and gentrification measure. The results show negative associations for the spatial lags of housing age and gentrification. The negative coefficient for the spatial lag of housing age (-0.073) shows that sub-boroughs were more likely to feature lower assault rates at each time point if they were bordered by sub-boroughs where the percent of housing that was 40 years or older increased. Similarly, the negative coefficient for the spatial lag of gentrification (-0.061) shows that sub-boroughs were more likely to feature lower assault rates if they bordered sub-boroughs characterized by higher rates of gentrification. Further, these results show that after controlling for changes in neighboring areas, the gentrification and change in housing age measures continued to be negatively associated with assault, while concentrated disadvantage continued to feature a positive association with assault rates.

The significant coefficients for the time measures in the analyses to this point provide limited insight into the importance of time for the current study given that declines in crime in New York City and other large American cities during the 1990s have been well documented and that the cause of this decline is still debated. An additional reason to further explore the importance of time is that research by Kreager et
al. (2011) found a curvilinear relationship between gentrification and crime. In order to contribute to each of these debates, Model 11 incorporated time interaction variables, which highlight a number of important period effects.

In regards to gentrification, the coefficient for the percent gentrified (-0.086**) shows that sub-boroughs that experienced greater rates of gentrification during the 1980s tended to feature lower assault rates at 1990 than those that experienced less gentrification. Further, the results reveal non-significant associations of the interaction of gentrification with the 1990s and 2000s, which means that the relationship of gentrification and assault rates was similar for all three periods. This finding is counter to that of Kreager et al. (2011) and shows that Hypotheses 14 and 18, which predicted that crime rates would initially increase due to gentrification and then decline due to changes associated with the gentrification process, were not supported in regards to assault.

The results for the interactions of time with changes in concentrated disadvantage show that change in concentrated disadvantage during the 1980s was negatively associated with assault rates at 1990 (-1.626**). This is counter to what much of the literature has suggested in regards to the association of concentrate disadvantage and crime, but appears to support Hypotheses 15 and 16, which drew upon the routine activities perspective and predicted that crime rates would be higher when motivated offenders shared space with suitable targets.

The contradictory finding in regards to the association of changes in concentrated disadvantage during the 1980s does not tell the whole story though as the results in Model 6 also show that the associations of changes in concentrated disadvantage during the 1990s and 2000s with assault rates were significantly different from the association
reported for the 1980s. The coefficients for the time interactions variables give the
difference in the rate of change in concentrated disadvantage during the 1990s compared
to the 1980s and similarly for the 2000s in comparison to the 1980s. Therefore, in order
to interpret the strength of these coefficients, the coefficient for each decade interaction is
added to the coefficient of the 1980s. For the 1990s, this means that the coefficient for
the association of change in concentrated disadvantage and assault is 0.425 (-1.201 +
1.626) and 0.438 (-1.201 + 1.639) for the 2000s, showing that, as expected given the
findings of previous research, sub-boroughs that increased in concentrated disadvantage
during the 1990s and 2000s were more likely feature higher assault rates at 2000 and
2005/2009 respectively. Further, the overall results for changes in concentrated
disadvantage appear to show a curvilinear relationship as the association was initially
negative and later become positive.

Similar to the interactions of time with change in concentrated disadvantage, the
interactions of time with change in residential stability in Model 11 also identify changes
in the direction of the association over time. The coefficient for change in residential
stability at 1980 (0.112*) shows that sub-boroughs that experienced an increase in the
percent of the population who had lived in the same home for at least five years tended to
feature higher rates of assault. The coefficient for the interaction of the 1990s was not
significant, which means that the relationship between residential stability and assault
rates was not significantly different from the 1980s. The significant coefficient for the
2000s (-0.148*), however, shows that this association was significantly different from the
association reported for the 1980s. Calculation of the coefficient for the 2000s revealed a
value of -0.036, which means that sub-boroughs characterized by gains in residential stability during the 2000s were more likely to feature lower rates of assault at 2005/2009.

The results for the housing age variable also highlighted the importance of time as the coefficients at all three time points were significant. The coefficient for the 1980s (-0.167) shows that sub-boroughs that increased in the percent of housing that was 40 years or older tended to feature lower rates of assault at 1990. Further, the significant interactions terms for the 1990s and 2000s show that this association was significantly different from the 1980s during each of these decades. Calculation of the coefficient for the 1990s produced a value of -0.015, while calculation of the coefficient for the 2000s produced a value of -0.019. Overall, these results show that sub-boroughs where the percent of housing stock aged 40 years or older increased were more likely to feature lower rates of assault at all three time points.

Model 12 presents results of the full model. A few points stand out here. Even after controlling for the additional variables, the results continue to show the importance of time as the time dichotomies as well as the interaction terms for changes in concentrated disadvantage, residential stability, and housing age that were discussed in regards to the previous model. Additionally, the results continue to show that gentrification was significantly associated with assault, but only during the 1980s. Further, the results show that assault rates were influenced by changes in the age of housing and the percent of tracts that gentrified in neighboring sub-boroughs after controlling for the interactions of time.
Burglary

Table 17 displays results of hybrid fixed effects regressions with burglary rates as the dependent variable. Results in Model 13 show that burglary rates at 2000 and 2005/2009 were significantly different from burglary rates at 1990. These findings confirm that the decline in burglary rates during the 1990s displayed in Figure 3 in Chapter 3 was not only substantial, but also statistically significant. The importance of time for the other independent variables is explored further in Models 18 and 19.

[Table 17 is located on page 293]

Model 14 introduced the measure of gentrification. The results show that after controlling for significant differences in burglary over time, sub-boroughs that experienced greater rates of gentrification were characterized by significantly lower rates of burglary. Similar to the results pertaining to assault, the negative association of burglary rates and the percent of tracts within a sub-borough that gentrified support findings by O’Sullivan (2005) who found a negative association of gentrification and burglary.

Model 15 regressed burglary rates on the decade dichotomies, changes in concentrated disadvantage, residential stability, the percent foreign-born, the percent of housing 40 years or older, and the percent of tracts that contained subway entrances. The results continue to highlight the importance of the dramatic decline in burglary rates that occurred during the 1990s, but do not provide much insight into how burglary rates varied by sub-borough as only the coefficient for the change in percent foreign-born was significant. The coefficient of 0.136 for the percent foreign born shows that burglary rates were significantly higher in sub-boroughs that experienced larger increases in the
percent foreign born. This was unexpected given that previous research has found that violent crime rates tend to be lower in areas with larger foreign-born populations. Given this finding, it appears that increased immigration may have different impacts on property crime than it does on violent crime.

Results in Model 16 show that the gentrification measure was not significant when the additional covariates were controlled. This is counter to the negative association of gentrification and burglary rates reported by O’Sullivan (2005). The association of burglary rates with the change in percent foreign born continued to be significant after controlling for gentrification. This also contradicted the expectation given previous research on the association of immigration and crime as changes in the percent foreign-born continued to have an unexpected positive association with burglary rates.

Model 17 incorporated spatial lags of changes in concentrate disadvantage, residential stability, the percent foreign-born the percent of housing 40 years or older and the percent of tracts within each sub-borough that experienced gentrification during each decade. Similar to the previous results pertaining to burglary, results in Model 17 show that burglary rates were significantly lower at 2000 and 2005/2009 than they were at 1990. Additionally, the results show that sub-boroughs featured higher burglary rates if they were bordered by sub-boroughs that experienced gains in residential stability. While difficult to definitively state due data limitations, this finding appears to suggest that neighborhoods characterized by residential stability were more attractive to burglars.

The results in Models 18 show that the changes in burglary rates over time were significant, but also highlight differences in the importance of the independent variables
over time. In contrast to results in previous models, results in Model 18 show that the influence of gentrification on burglary rates was significantly different during the 1990s and 2000s than it was during the 1980s. Adding the coefficient for gentrification during the 1980s (-0.028) with the coefficient for gentrification during the 1990s (-0.147) results in a coefficient of -0.175, showing that burglary rates tended to be lower in sub-boroughs that experienced greater rates of gentrification. Similarly, results for the 2000s result in a coefficient of -0.171, also showing that gentrification was negatively associated burglary rates. While this does not support the curvilinear relationship found by Kreager et al. (2011), it does show that gentrification was an important predict of the declines in burglary during the 1990s and 2000s.

The results in Model 18 also show that the importance of changes in residential stability varied over the study period. Specifically, the coefficients for the change in residential stability during the 1980s was an important predict of burglary rates at 1990, while the significant interaction terms show that the association of changes in residential stability during the 1990s and 2000s were significantly different at 2000 and 2005/2009 respectively. Further exploration shows that the association of residential stability during the 1990s was smaller, but still positive and then became negative for the 2000s (-0.046). This is most likely the result of a general pattern of increased residential stability during this decade.

Model 19 presents results for the full model, which controls for the influence of time and space. These results show that changes over time were more important than changes across sub-boroughs, specifically for the change in residential stability and gentrification measures. The results for residential stability in Model 19 show that sub-
boroughs that experienced greater residential stability during the 1980s were more likely to feature higher rates of burglary at 1990. The interaction terms for the 1990s and 2000s, however, show that this relationship was significantly different from the 1980s. Computing the coefficients for each decade results in a coefficient of -0.002 for the 1990s and -0.036 for the 2000s, which shows that sub-boroughs characterized by increased residential stability tended to be characterized by lower rates of burglary at 2000 and 2005/2009.

Results in Model 19 also show that the association of gentrification and burglary rates was significantly different during the 1990s and 2000s. Computing the coefficient for the 1990s results in a value of 0.159, showing that sub-boroughs that experienced greater rates of gentrification during the 1990s tended to feature higher rates of burglary at 2000. Results for the 2000s were similar, as the computed coefficient of 0.162 shows that neighborhoods that gentrified during the 2000s tended to be feature higher burglary rates at the 2005/2009 time point.

*Larceny*

Table 18 presents results of the hybrid fixed effects regressions with larceny rates as the dependent variable. Similar to the results of the analyses of assault and burglary rates, the results in Model 13 show that larceny rates at 2000 and 2005/2009 were significantly lower than larceny rates at 1990. This confirms that the decline in larceny rates during the 1990s displayed in Figure 3 (Chapter 3) were statistically significant.

[Table 18 is located on page 294]

Results in Model 21 show that gentrification was not significantly associated with larceny rates over the entire study period. This is contrary to Covington and Taylor
(1989) who reported that gentrification was positively associated with larceny rates. Results in later models, however, show that the importance of gentrification as a predictor of larceny rates was only important for specific periods.

Model 22 regressed larceny rates on the dichotomous measures of time and change in concentrated disadvantage, residential stability, foreign born, housing age, and the percent of tracts within a sub-borough that contained subway entrances. The results show the importance of time, but also show that larceny rates tended to be higher in sub-boroughs that featured a greater percent of tracts with subway entrances. The importance of subway entrances as a predictor of larceny rates makes sense given that subway stations provide spaces for potential offenders to loiter in wait for potential victims and provide easy escape routes. Overall, this finding supports the predictions of Hypotheses 15 and 16, which together argued that crime rates would be higher in areas where motivated offenders were more likely to encounter suitable targets. The results pertaining to the other independent variables are surprising as they show that the within-unit changes in these particular measures were not important predictors of larceny rates over the entire time period. Results in later models, described shortly, highlight important the importance of a few of these measures for particular decades though for particular decades.

Model 23 reintroduces the gentrification measure. The results show that gentrification as well as changes in concentrated disadvantage, residential stability, foreign born and housing age were not significant predictors of larceny rates. In contrast, the measure of subway entrances was significant, lending further support for Hypotheses 15 and 16.
Model 24 incorporated spatial lags of the independent variables. Of the spatial lag variables, only the coefficient for the spatial lag of gentrification (0.267) was significant. The positive coefficient for the spatial lag of gentrification suggests that sub-boroughs were more likely to feature higher larceny rates if they bordered sub-boroughs that experienced greater rates of gentrification and suggests that gentrification may have displaced crime to nearby neighborhoods. In contrast, the results for the remaining independent variables mirrored the results already reported, showing that larceny rates were significantly lower during the 1990s and 2000s than they were during the 1980s and that sub-boroughs with greater access to the subway system tended to feature higher rates of larceny.

In order to unpack the significance of time as a predictor of larceny rates, Model 25 regressed larceny rates on interactions of the independent variables with the measures of time. In regards to gentrification, the results show that the association of gentrification with larceny rates was significant at all three time points. The coefficient for the 1980s (0.289) shows that sub-boroughs that experienced higher rates of gentrification also tended to feature higher rates of larceny, which mirrors the findings of Covington and Taylor (1989). In contrast, calculation of the coefficients for the 1990s (-0.182) and 2000s (-0.215) shows that sub-boroughs that experienced greater rates of gentrification during these decades featured significantly lower rates of assault, mirroring the findings of O’Sullivan (2005). Overall, this suggests a similar curvilinear relationship of gentrification and crime to that found by Kreager et al. (2011).

The interactions of time with the subway measure in Model 25 show the importance of subway entrances as a predictor of larceny rates, but also show that
direction of this association varied over time. While results for the subway entrance in previous models showed a positive coefficient, the coefficients for the interaction of subway entrances with the 1990s (-.158) and 2000s (-.220) were negative, showing that sub-boroughs that contained a larger percent of tracts with at least one subway entrance featured significantly lower rates of larceny. This finding makes sense given that previous research has identified efforts by New York City officials to reduce the prevalence of incivilities and lower level crimes in the subway system during the late 1980s and early 1990s.

Model 26 regressed larceny rates on the independent variables interacted with time and the spatial lags of the independent variables. Similar to the results in Model 25, results in Model 26 show that gentrification was positively associated with larceny rates during the 1980s, but negatively associated with larceny rates during the 1990s and 2000s. Further, the results show that sub-boroughs were significantly more likely to feature higher larceny rates if they bordered sub-boroughs that experienced greater rates of gentrification. Results pertaining to the other independent variables show that concentrated disadvantage was positively associated with larceny rates during the 1980s, but negatively associated with larceny during the 2000s and that sub-boroughs that contained a greater percent of tracts with subway entrances were characterized by lower rates of larceny during the 1990s and 2000s.

Homicide

Results of the fixed effects regressions with homicide rates as the dependent variable are presented in Table 19. Model 27 regressed dichotomous measures of decade on homicide
rates in order to determine whether the decline in homicide rates during the 1990s was statistically significant. The results show that homicide rates were significantly lower at 2000 and 2005/2009 than they were at 1990.

[Table 19 is located on page 295]

Model 28 regressed the percent of tracts within a sub-borough that gentrified during each decade on homicide rates controlling for differences in larceny rates over time. The results show that sub-boroughs that experienced greater rates of gentrification featured significantly lower rates of homicide for each of the three periods. This finding is similar to that of Papachristos et al. (2011) who found that gentrification was negatively associated with homicide rates and Smith (2012) who found that gentrification was negatively associated with gang-related homicides. Given that homicide is the most consistently reported crime, these results suggest that gentrification in New York City was a significant contributor to the decline in homicide between 1990 and 2000.

Model 29 regressed homicide rates on the change in concentrated disadvantage, residential stability, foreign born, housing age and a stable measure of the percent of tracts within a sub-borough that contained subway entrances. These results show that sub-boroughs that gained in concentrated disadvantage and the percent foreign born featured significantly higher rates of homicide. The results also show that sub-boroughs that experienced gains in the percent of housing aged 40 years or older were characterized by significantly lower rates of homicide.

The results in Model 30 show that gentrification was negatively associated with homicide rates after controlling for changes in gentrification and the other independent variables. Further, these results show that sub-boroughs that increased in concentrated
disadvantage and the percent foreign born were significantly more likely to feature higher homicide rates, which supports Hypotheses 9 and 12 respectively. Additionally, sub-boroughs that experienced gains in the percent of housing aged 40 years or older experienced declines in homicide.

Results in Model 31 highlight the importance of the spatial lag off housing age and gentrification after controlling for time, the percent gentrified and changes in the neighborhood control variables. The negative coefficient for the spatial lag of housing age suggests that sub-boroughs were likely to feature lower homicide rates if they bordered sub-boroughs that experienced larger gains in the percent of housing aged 40 years or older. Similarly, the results for the spatial lag of gentrification suggest that not only was gentrification negatively associated with homicide rates in sub-boroughs that experienced gentrification, but also that there were spillover effects as sub-boroughs were likely to feature lower homicide rates if they bordered sub-boroughs that experienced larger increases in the percent gentrified. The finding of a direct association of gentrification and an indirect effect on homicide rates through the spatial lag suggests that gentrification significantly contributed to the decline in homicide rates during the study period.

Model 32 explored the importance of time as a predictor of homicide rates by assessing the association of time interacted with the independent variables. The results pertaining to gentrification show that the association of gentrification and homicide rates was significantly different during the 1980s than it was during the 1990s. Similar to the overall results, the coefficient for the 1980s (-0.007) suggests that sub-boroughs that experienced greater rates of gentrification during the 1980s featured significantly lower
rates of homicide at 1990. Adding the coefficient for the 1990s (.005) to the coefficient for the 1980s (-.007) results in a coefficient of -.002, which shows that gentrification during the 1990s was negatively associated with homicide rates, but the strength of the association was smaller than during the 1980s.

Similar to the results pertaining to gentrification, the interaction terms with changes in concentrated disadvantage highlight differences over time as the interaction terms for the 1990s and 2000s were significant. Adding the coefficient for the 1990s (0.093) to the coefficient for the 1980s (-0.026) results in a coefficient of 0.067, showing that sub-boroughs that increased in concentrated disadvantage featured significantly higher rates of homicide during the 1990s. Similar, adding the coefficient for the 1980s (-0.026) to the coefficient for the 2000s (0.057) results in a coefficient of 0.031, which also shows that sub-boroughs that gained in concentrated disadvantage during the 2000s featured significantly higher rates of homicide.

Results in Model 32 also show that changes in the percent of housing aged 40 years or older was significantly associated with homicide rates during the 1980s and 2000s. During the 1980s, the coefficient of -0.014 shows that sub-boroughs that experienced gains in the percent of housing aged 40 years older featured significantly lower rates of homicide. Calculation of the coefficients for the 1990s (-0.002) identified a similar negative association, but calculation of the coefficient for the 2000s (0.002) show that sub-boroughs that experienced gains in the percent of housing stock in this age range featured significantly higher rates of homicide at 2005/2009.

Model 33 regressed homicide rates on the full range of time interactions and spatial lags. The results show that gentrification was negatively associated with homicide
rates and that this relationship was consistent across time. Further, the negative coefficient for the spatial lag of gentrification shows that homicide rates were significantly lower in sub-boroughs that bordered sub-boroughs that experienced higher rates of gentrification. These results also show that sub-boroughs that experienced gains in concentrated disadvantage during the 1990s and 2000s featured significantly higher rates of homicide. Further, the results show that sub-boroughs that gained in the percent of housing stock aged 40 years or older featured significantly lower rates of homicide during the 1980s and 1990s, but significantly higher rates during the 2000s. Finally, the results show that sub-boroughs tended to be characterized by lower homicide rates if they bordered sub-boroughs that experienced gains in the percent of housing stock older than 40 years old or that experienced gentrification.

**Motor-Vehicle Theft**

The fixed effects regression results with motor-vehicle theft rates as the dependent variable are displayed in Table 20. Similar to the results in regards to the other crimes discussed so far, the results show that motor-vehicle theft rates were significantly lower at 2000 and 2005/2009 than they were at 1990. The importance of time on changes in motor-vehicle theft rates is explored further in Models 39 and 40, which interact time with the primary independent variables.

[Table 20 is located on page 296]

Model 35 regressed motor-vehicle theft rates on the percent of tracts within a sub-borough that gentrified during each decade. Contrary to expectations, the results show that after controlling for differences across time sub-boroughs that experienced greater
rate of gentrification featured higher rates of motor-vehicle theft. This is contrary to the findings of O’Sullivan (2005) who found that gentrification was negatively associated with motor-vehicle theft rates, but is somewhat similar to the findings of Lee (2010) who found that gentrification initially resulted in increased rates of motor-vehicle theft, but that the association became negative over time. The importance of time in regards to the association of gentrification and motor-vehicle theft rates is discussed shortly in the results of Model 39.

Results in Model 36 highlight the importance of changes in concentrated disadvantage, the percent foreign born and housing age as predictors of motor-vehicle theft rates. Contrary to Hypothesis 9, which predicted that crime rates would be positively associated with changes in concentrated disadvantage, the results in Model 36 show that sub-boroughs that experienced greater declines in concentrated disadvantage were more likely to experience motor-vehicle theft. This could be due to the fact that decreased neighborhood disadvantage increases the availability of suitable targets for motor-vehicle theft as more affluent residents are more likely to own expensive cars.

Similar to the results of concentrated disadvantage, the coefficient for the change in the percent foreign born was negative, which means that sub-boroughs that experienced greater increases in the percent foreign born tended to feature lower rates of motor-vehicle theft. As stated prior, recent research has found that increased immigration was negatively associated with violent crimes, not property crime such as motor-vehicle theft. This relationship might be explained by a decreased need for motor-vehicles in areas characterized by increased immigration as these areas are more likely to feature
immigrant enclaves, which provide their members with resources such as access to carpools.

The results in Model 36 also highlight the importance of changes in housing age. Specifically, the results show that sub-boroughs that increased in the percent of housing aged 40 years or older featured higher rates of motor-vehicle theft. The age of housing stock has been identified by previous research as important predictor of gentrification, but has been unexplored in regards to the on crime rates. Given that this type of housing is more attractive to affluent residents, it is possible that sub-boroughs that increased in the percent of housing in this age range increased in attractiveness to affluent residents who tend to have higher value possessions such as automobiles. Given the predictions made by Hypotheses 15 and 16, the mixing of affluent and disadvantage residents results increases the probability that suitable targets will come into contact with motivated offenders.

Results in Model 37 are similar to those in Model 36 in that they show that motor-vehicle theft rates tended be higher in sub-boroughs characterized by decreased concentrated disadvantage and the percent foreign born and an increase in the percent of housing aged 40 years or older. The results also show that the measure of gentrification was not significant after controlling for time and changes in the other independent variables. This suggests that gentrification was not an important predictor of changes in motor-vehicle theft.

Model 38 incorporated spatial lags of the control variables. The results show that spatial lag of residential stability was significantly associated with motor-vehicle theft controlling for changes across decades in motor-vehicle theft rates as well as changes in
the independent variables. This suggests that motor-vehicle theft rates were significantly lower in areas that were bordered by sub-boroughs where residential stability increased during a given decade.

Model 39 regressed motor-vehicle theft rates on the interaction of the independent variables with time and highlighted the importance of time for gentrification as well as for changes in concentrated disadvantage, residential stability, foreign born, and housing age. The results show that the percent of tracts within a sub-borough that gentrified during each decade had important implications for the motor-vehicle theft rates. The coefficient for the gentrification measure during 1980s (0.205) shows that sub-boroughs that experienced greater rates of gentrification during the 1980s were more likely to feature higher rates of motor-vehicle theft at 1990. Computing the coefficients for the 1990s and 2000s, however, results in values of -0.009 and 0.041 respectively, which shows that the direction of the association varied by decade.

Similar to the interaction of gentrification with time, the results for the interaction of changes in concentrated disadvantage with time show similar variation over time. The coefficient for the 1980s was not significant, but the coefficient for the 1990s (-2.606) and 2000s (-2.509) were significant, which shows that the impact of concentrated disadvantage on motor-vehicle thefts was significantly different during these decades. Calculation of the coefficients for the 1990s and 2000s results in values of -0.882 and -0.785 respectively, which suggests that sub-boroughs that declined in concentrated disadvantage during the 1990s and 2000s were more likely to feature higher rates of motor-vehicle theft.
Results for the interaction of time with changes in the percent foreign born tell a similar story to the results for concentrated disadvantage. The coefficient for the 1980s was not significant, but the coefficient for the 1990s (-0.471) and 2000s (-0.483) were significant, which shows that the impact of changes in the percent foreign born on motor-vehicle thefts was significantly different during these decades. Further, calculation of the coefficients for the 1990s and 2000s resulted in values of -0.275 and 0.287 respectively. This suggests that sub-boroughs that experienced where the percent foreign born increased during the 1990s and 2000s tended to feature significantly lower rates of motor-vehicle theft at 2000 and 2005/2009 respectively.

The results for the housing age variable in Model 39 show that sub-boroughs where the percent of housing aged 40 years or older increased were more likely to feature higher rates of motor-vehicle theft for all three periods, but the strength of this association declined over time. Reviewing these coefficients shows that the coefficient for the 1980s was 0.345, but was only 0.025 for the 1990s and 0.026 for the 2000s. A possible cause of the smaller associations during the 1990s and 2000s was that gentrification, which has been found to be more likely in neighborhoods characterized by housing in this age range, decreased the reliance on automobiles in these neighborhoods, which in turn decreased the number of targets for motor-vehicle theft.

The results in Model 40 regressed motor-vehicle theft rates on the interactions of time with the dependent variables as well as the spatial lags of the independent variables. The results show that changes within sub-boroughs were more important than changes across sub-boroughs as the same relationships described in Model 39 were identified in Model 40, while none of the coefficients for the spatial lags were significant. These
results suggest that spatial processes at this level of analyses were not strong predictors of motor-vehicle theft.

Robbery

Table 21 presents results of the hybrid fixed effects regressions with robbery rates as the dependent variable. Results in Model 41 show that robbery rates were significantly lower at 2000 and 2005/2009 than they were at 1990. The importance of time in regards to robbery rates are explored more fully in Models 46 and 47.

Contrary to the findings of Papachristos et al. (2011), results in Model 42 show that gentrification was negatively associated with robbery rates. Specifically, the results show that sub-boroughs that experienced greater rates of gentrification featured significantly lower rates of robbery during the study period. This suggests that gentrification results in changes to neighborhoods that make robbery less likely to occur.

Results in Model 43 support Hypothesis 9 and 12, which drew upon the social disorganization framework and predicted that crime rates would be higher in areas that increased in concentrated disadvantage and the percent foreign born respectively. The results also show that sub-boroughs that gained in the percent of housing stock aged 40 years or older tended to feature lower rates of robbery. The results for residential stability, however, show that robbery rates were not significantly associated with changes in the percent of residents who lived in the same home for at least five years.

Model 44 regressed robbery rates on the gentrification measure and the control variables. The results show that gentrification was negatively associated with robbery
rates after controlling for the additional variables. These results also show that even after controlling for gentrification, sub-boroughs that experienced greater gains in the percent of housing that was 40 years or older tended to feature significantly lower rates of robbery.

Model 45 incorporated spatial lags of the independent variables. Only the coefficient for the spatial lag of residential stability was significant, however, showing that sub-boroughs featured significantly lower rates of robbery if they bordered sub-boroughs where the percent of residents living in the same house for at least five years increased. These results also show that sub-boroughs that experienced increased gentrification and an increased percent of housing aged 40 years or older were characterized by significantly lower rates of robbery.

Model 46 explored the importance of time by regressing robbery rates on interactions of time with the independent variables. The results show that the association of changes in concentrated disadvantage were significantly associated with robbery rates for all three periods, but also that the relationship during the 1990s and 2000s was significantly different from the 1980s. The coefficient of -2.674 for the 1980s shows that sub-boroughs that increased in concentrated disadvantaged featured lower rates of robbery during the 1980s. In contrast, calculation of the coefficient for the 1990s results in a value of 0.614, showing that sub-boroughs that increased in concentrated disadvantage featured significantly higher rates of robbery during this period. Further, calculation of the coefficient for the 2000s results in a value of 0.321, showing that sub-boroughs that increased in concentrated disadvantage during the 2000s also featured significantly higher rates of robbery.
Reviewing the coefficients for the change in residential stability shows that robbery rates were significantly associated with changes in the percent of residents who lived in the same house for at least five years for all three periods. The coefficient for the 1980s (0.358) shows that sub-boroughs that experienced increased residential stability tended to feature higher rates of robbery at 1990. In contrast, adding the coefficients for the interaction terms of residential stability for the 1990s and 2000s to that of the 1980s results in values of -0.08 and -0.026 respectively, showing that increased residential stability during each of these decades was associated with lower rates of robbery at 2000 and 2005/2009 respectively. Overall, these results partially support Hypothesis 11, which predicted that crime rates would be negatively associated with changes in residential stability. The change in direction of this association over time may mean that neighborhoods need to reach a critical mass of residential stability before crime rates are impacted.

Results in Model 46 also show that the importance of changes in the housing age measure varied over time as the coefficients for all three periods were significant. The coefficient of -0.273 shows that sub-boroughs that gained in the percent of housing stock aged 40 years or older during the 1980s featured significantly lower rates of robbery at 1990. In contrast, calculation of the coefficient for the 1990s and 2000s result in values of -0.027 and 0.029 respectively. This means that, similar to the 1980s, sub-boroughs that gained in the percent of housing aged 40 years or older between 1990 and 2000 featured lower rates robbery at 2000. In contrast, the positive coefficient for the housing measure for the 2000s shows that the nature of this relationship changed, showing instead that sub-boroughs that experienced an increase in the percent of housing in this age range
tended to feature higher rates of robbery at 2005/2009. A possible explanation for this is that the improvements associated with the Ten-Year Plan encouraged greater mixing of social classes over the study period, which in turn would have resulted in more frequent interactions of suitable targets and motivated offenders.

Model 47 regressed robbery rates on the combination of time interactions with the independent variables and the spatial lags of the independent variables. The results show the importance of changes in concentrated disadvantage, residential stability and housing age as predictors of robbery rates and that the impact of changes in each of these variables varied over time. Similar to results previously discussed, results in Model 47 show that sub-boroughs that experienced increased concentrated disadvantage during the 1980s tended to feature higher rates of robbery at 1990, while sub-boroughs were more likely to feature lower rates of robbery at 2000 and 2005/2009 if they experienced decreased concentrated disadvantage during the 1990s and 2000s respectively. These results also show that even after controlling for the importance of changes in neighboring areas, sub-boroughs where residential stability increased during the 1980s tended to feature higher rates of robbery at 1990, while sub-boroughs that experienced increased residential stability during the 1990s and 2000s tended to feature increased residential stability during the 1990s and 2000s. Further, results in Model 47 show that sub-boroughs where the percent of housing aged 40 years or older increased during the 1980s and 1990s tended to feature lower rates of robbery at 1990 and 2000, but this relationship reversed during the 2000s, showing that sub-boroughs that increased in this category of housing tended to feature higher rates of robbery at 2005/2009. Finally, the results pertaining to the spatial lag variables show that only the spatial lag of residential stability
was significant. This shows that sub-boroughs tended to feature lower rates of robbery if they neighbored sub-boroughs that experienced increased rates of residential stability.

SUMMARY OF THE CRIME-SPECIFIC ANALYSES

Even though previous assessments of the association of gentrification and crime have generally drawn upon the same theoretical frameworks of social disorganization and routine activities, they have come to varied conclusions about the association of gentrification and crime because of inconsistencies in the analysis strategy pertaining to the time period, length of time, and specific forms of crime analyzed. The analyses in this chapter were designed to cut across all of these limitations by assessing the association of gentrification and each of the seven index crimes for the most commonly studied decades and for a longer time frame in New York City, which has been the epicenter of gentrification scholarship in the United States. In addition to contributing to the overarching debate in regards to the association of gentrification and crime, the analyses in this chapter also address sub-questions pertaining to how the association of gentrification and crime was influenced by changes in neighboring areas as well as how this association is influenced by changes over time. The answers to each of these questions are summarized in the following paragraphs.

Overall, the results presented in this chapter show that neighborhoods that experienced gentrification featured significantly larger declines in the violent index crimes. The negative association with assault supports findings reported by O’Sullivan (2005), but contradicts findings reported by Lee (2010) and Van Wilsem et al. (2006). The contradictory findings of Van Wilsem et al. (2006) might be explained by differences
in the type of data used as the authors used victimization data, which includes crimes that were reported to the police as well as those that were not. For the purposes of assessing the association of gentrification and crime, it makes more sense to analyze variation in crimes reported to the police rather than using victimization data because previous research has found that gentrifiers had a greater willingness and ability to make demands on city services such as the police than incumbent residents (Freeman, 2006, Maurrasse, 2006; Skogan, 1990). Analyzing variation in victimizations potentially overstates the association of gentrification and crime as victimizations may already be high in the neighborhood, but not reflected in official statistics due to a lower willingness to report incidents to the police. The contradictory findings with Lee (2010) are more difficult to explain, but could be due to differences in the modeling strategy as Lee (2010) analyzed changes in crime before and after the highly disruptive event of the 1994 earthquake in Northridge California, which disrupted a large number of communities at the exact same time.

The negative association of gentrification and homicide reported in these analyses was more in line with the findings of previous research as Papachristos et al. (2011) reported that gentrification was negatively associated with homicide and Smith (2012) reported that gentrification was negatively associated with gang-related homicides. As discussed by Papachristos et al. (2011: 222), homicides have the highest potential for being reported to or being discovered by the police. Given the accuracy with which homicides are recorded and the consistency of the findings reported here with previous research, there is strong evidence that gentrified neighborhoods were more likely to experience greater declines in homicide than non-gentrified neighborhoods.
The results for robbery do not show a firm association of robbery rates with gentrification as the association of robbery and gentrification was significant overall, but failed to reach significance after including interactions of time with the other independent variables. The overall finding of a negative association is similar to that reported by O’Sullivan (2005), but contradictory to that reported by Covington and Taylor (1989) and Lee (2010). The fact that the association failed to reach significance after incorporating interactions with time suggests period effects, which may help to explain the contradictory finding with Covington and Taylor (1989) who explored this association during the 1970s, which was not included in the current analyses. Additionally, as described earlier, the contradictory finding with Lee (2010) is likely due to differences in the analysis strategy as it is not clear whether Lee’s study assesses the impact of the gentrification process on crime rates or the aftermath of the 1994 Northridge earthquake.

The results of the analyses of the property index crimes only identified concurrent correlations with larceny rates, but multivariate analyses identified limited relationships of gentrification with rates of burglary, larceny and motor-vehicle theft. Of the three property crimes, motor-vehicle theft was the only property crime found to be significantly associated with the main effect of gentrification. Results of analyses that included that the interaction of time with the independent variables revealed that that rates of burglary, larceny, and motor-vehicle theft were significantly associated with gentrification during particular decades. An overall comparison of the results of the violent crime and property crime analyses suggests that gentrification is more likely to be associated with variation in crimes against persons.
Of the tenets of social disorganization theory, the results have the most relevance for future research regarding the association of concentrated disadvantage with crime rates. With a few exceptions, the results show that crime rates were associated with changes in concentrated disadvantage and the percent of older housing, which previous research has found tends to be located in marginal areas. In contrast, the results also show that for the most part, violent crimes were not significantly associated with changes in residential stability or the percent foreign born. Given these findings and the results showing gentrification was negatively associated with all four violent crimes, it appears that gentrification influenced neighborhood crime rates because the process was more likely to occur in marginal areas and helps to reduce the prevalence of concentrated disadvantage.

The results in this chapter also highlight the importance of time for gentrification and the measures of social disorganization. Recent research by Kreager et al. (2011) identified a curvilinear association of gentrification with aggregate crime rates, showing that neighborhood crime rates initially increased as neighborhoods began to gentrify, but then declined after neighborhoods had achieved a tipping point of gentrification. Results of the analyses in this chapter identified significant differences in the association of gentrification and rates of larceny and homicide over time, but only suggest a similar curvilinear relationship to that identified by Kreager et al. (2011) for larceny rates, which were positively associated with gentrification during the 1980s, but then negatively associated with gentrification during the 1990s and 2000s. In contrast, the results showed that the association of gentrification and homicide was significantly different during the 1990s and 2000s, but the coefficients for all three periods were negative.
The results of the crime analyses that included measures of time also have implications for the social disorganization framework. Even though Shaw and McKay (1969 [1942]) emphasized the importance of changes in neighborhood over time in their original statement of the social disorganization perspective, most of the assessments of the social disorganization perspective have been cross-sectional (Hipp, 2010; Kirk and Laub, 2010). The results in this chapter highlight the importance of changes in neighborhoods over time as a predictor of crime, particularly for changes in concentrated disadvantage as testing for the interaction of time with changes in concentrated disadvantage showed that the association of changes in concentrated disadvantage with specific forms of crime was significantly different during the 1980s than the associations for the 1990s and 2000s. For example, results for the 1980s showed that assault rates at 1990 were negatively associated with changes in concentrated disadvantage during the 1980s, while assault rates at 2000 and 2005/2009 were positively associate with changes in concentrated disadvantage during the 1990s and 2000s respectively.

Overall, the results presented here offered little support for the tenets of the routine activities theory. A limited amount of previous research by Atkinson (2004) and Mele (2000) has argued that incumbent residents of gentrified neighborhoods may be motivated to engage in crime against gentrifiers out of resentment of the gentrification process or because of fear of residential displacement. The results in regards to violent crimes do not support this argument, however, as sub-boroughs that experienced greater rates of gentrification were significantly more likely to experience greater declines in violent crime. While conflicts between incumbent residents and gentrifiers undoubtedly
occurred, they were clearly not occurring on a grand enough scale to influence rates of violent crime overall.

Results pertaining to larceny show that gentrification was positively associated with larceny rates during the 1980s only after controlling for the interaction of time, but negatively associated with larceny rates during the 1990s and 2000s. The fact that this association was not significant until the influence of time was controlled for as well as the fact that the direction of the association changed over time suggests that other processes occurred that influenced this association. The most likely explanation for both of these issues is that the clean-up of the New York City subway system during the late 1980s and early 1990s had a strong influence on larceny rates. This is supported by the significance of the measure of subway entrances, which was only significantly associated with larceny rates.

A final point of summary pertains to the sub-question of the influence of changes in neighboring areas. While the more general research on neighborhood correlates of crime has assessed the influence of changes in neighboring areas on crime rates in target neighborhood, research by Kreager et al. (2011) has been the only study to assess the influence of space on the association of gentrification and crime. The results of the analyses in this chapter highlighted the importance of changes in neighboring areas, but the importance of changes in the independent variables in neighboring areas was not consistent across each crime. It is likely, however, that analyses using smaller units of analyses than sub-borough areas would produce different findings as sub-boroughs are much larger than the neighborhoods used in most research, which results in a smaller number of neighbors for each target neighborhood.
Overall, results presented in this chapter suggest that gentrification in neighborhoods across New York City was an important predictor of whether and how much crime rates declined between 1980 and 2005/2009. The results suggest that gentrification was more strongly associated with changes in crimes against persons rather than property and that the most substantial impact of neighborhood gentrification was on rates of violent crime. Chapter 7 discusses the implications of these findings for the broader criminological and gentrification literatures and directions for future research.
CHAPTER 7: DISCUSSION AND CONCLUSION

Social researchers have documented substantial and significant declines in crime in cities across the United States during the 1990s and 2000s, but have yet to come to a consensus in regards to the cause of this decline (Greenberg, 2013; Zimring, 2011). Results of the analyses in this study contribute to this discussion by showing that the declines in violent crime rates in particular in New York City during the 1990s and 2000s were associated with gentrification. In order to come to this conclusion, two sets of analyses were conducted. Analyses in Chapter 5 determined how gentrification would be operationalized in later analyses and then explored the significance of predictors of gentrification identified in previous research. Analyses in Chapter 6 assessed the significance of gentrification and a set of commonly used predictors of neighborhood change in order to identify whether gentrification was associated with the decline in crime in New York City between 1980 and 2009. This chapter briefly summarizes the findings of these analyses and highlights the contributions made to the gentrification and criminological literatures.

RESEARCH PROBLEM

The primary research question addressed by this project was whether gentrification was associated with changes in crime rates in New York City between 1980 and 2005/2009. Gentrification research conducted during this period frequently referenced the impact of the gentrification process on neighborhood crime rates, but only a handful of studies directly assessed this relationship. The answer to this question has important implications for research on gentrification and the correlates of neighborhood crime as
many local governments have encouraged or sponsored gentrification efforts as a means of improving disadvantaged neighborhoods, which were typically characterized by higher crime rates. Therefore, the current study drew upon each of these literatures in order to answer five sub-questions. First, what was the most accurate way to operationalize the process of gentrification? Second, what were the key determinants of gentrification? Third, how is gentrification influenced by changes in neighboring areas? Fourth, was gentrification influenced by changes in neighboring areas? Fifth, did neighborhoods that experienced greater rates of gentrification experience changes in crime rates that were significantly different from neighborhoods that experienced lower rates of gentrification? Finally, how did the association of gentrification and crime vary over time?

In order to address these questions, the current study sampled neighborhoods from New York City because much of the research on gentrification during the past 40 years has been qualitative studies of New York City neighborhoods, most of which were located in Manhattan or Brooklyn. These qualitative studies identified important aspects of the gentrification process, but their focus on a limited number of neighborhoods made it unclear whether the findings of these studies were generalizable to the entire population of New York City neighborhoods. Recognizing this, the current study drew upon the full population of New York City neighborhoods so that the full complement of neighborhoods that underwent gentrification could be identified.

In addition to being the focus of much of the gentrification research during the past 40 years, New York City makes for an interesting case study of gentrification and crime because of factors that distinguish it from other large American cities, which also experienced gentrification. These factors were described in detail in Chapter 2, but are
briefly recapped here. The primary distinguishing factor of New York City was its status as a “global city” due to its centrality to the world economy as it has a long history as an immigration gateway and more recently due to the importance of the New York Stock Exchange, which encouraged many international financial institutions to establish offices in lower Manhattan. New York City was also unique in that a greater percent of the population used public transportation than the percent of residents who used public transportation in Chicago and Los Angeles combined. While these factors help to distinguish New York City from other cities, research discussed in Chapter 2 highlighted the importance of these factors as predictors of gentrification.

New York City also provides an interesting case study of the association of gentrification and crime. Given the amount of qualitative gentrification research that sampled New York City neighborhoods, gentrification was clearly an influential process in New York City during the 1980s, 1990s, and 2000s. This same period, however, was also characterized by dramatic changes in crime rates. As discussed in Chapter 3, statistics on crime trends during the 1990s and 2000s show that crime rates were declining in most American cities and that the largest declines occurred in New York City. Interestingly, the only effort to directly assess the association of gentrification and crime in New York City was a descriptive study conducted by McDonald (1986) that explored changes between 1970 and 1984, which was well before the significant decline in crime took place. Further, the importance of McDonald’s (1986) research for New York City was limited as the author only sampled four New York City neighborhoods, three of which (East Village, West Village and Upper West Side) were located in Manhattan with a fourth (Park Slope) located in Brooklyn. As a point of comparison, the
New York City Department of City Planning identified 188 neighborhood areas divided among the five boroughs (New York City Department of City Planning, 2011).

FINDINGS OF THE ANALYSIS OF GENTRIFICATION

The analyses of gentrification in Chapter 5 addressed questions related to the operationalization and prediction of gentrification. In regards to the operationalization of gentrification, the results show that the more restrictive operationalization of gentrification identified by Bostic and Martin (2003) was a much better match with the operationalization used by *The New York Times* staff than was the operationalization identified by Freeman (2005). While the Bostic and Martin (2003) operationalization was a better match, there was still a clear divide between the operationalizations as *The New York Times* operationalization identified a substantially smaller number of gentrified neighborhoods for all three decades. The primary reason for this discrepancy appears to be related to the fact that *The New York Times* operationalization emphasized changes that occurred in neighborhoods in Brooklyn and Manhattan during the study period, while the census-based operationalization developed by Bostic and Martin (2003) identified neighborhoods throughout the five boroughs. As recognized by Sampson (2012: 189), a limitation of using news sources to identify temporal changes in neighborhoods is that newspapers tend to report on events that are “newsworthy,” while overlooking similar events in less noteworthy areas. Given the results in this study, it is clear that many neighborhoods not recognized as gentrified by *The New York Times* staff experienced similar changes to those that were identified as gentrified. Even with this potential limitation, however, *The New York Times* was the best measure of culture that
could be located. Further, the gap between these operationalizations might be closed by a review of *The New York Times* for articles that included synonyms for gentrification such as revitalization and renewal.

Chapter 2 described how gentrification scholars have drawn upon the production and consumption explanations, which respectively argue that gentrification occurred because of the perception of profit and an increased desire among middle- and upper-class individuals to live close to work and the amenities of city living, in order to identify a large number of predictors of gentrification, but the only predictor that has been uniformly agreed upon was that gentrification was more likely to occur in neighborhoods characterized by disadvantage. The results of analyses in Chapter 5 confirm the importance of neighborhood disadvantage as a predictor of gentrification as the index of concentrated disadvantage was the only consistent predictor of gentrification across models.

The measure of concentrated disadvantaged used in this study drew more heavily upon the consumption explanation as it focused on changes in the prevalence of members of disadvantaged populations. While concentrated disadvantage was the most consistent predictor of gentrification, the significance of this relationship varied somewhat over time. As expected, results for the 1980s and 1990s showed that gentrification was more likely to occur in neighborhoods characterized by higher concentrations of disadvantaged populations in 1980 and 1990 respectively. Results for the 2000s, however, showed that gentrification was more likely to have occurred in neighborhoods characterized by lower concentrations of disadvantaged populations. This could be linked to the economic recession that occurred during the second half of the decade as descriptive statistics in
Chapter 5 showed that the mean concentration of disadvantage increased during this period between 2000 and 2005/2009. This might also suggest what Lees (2003) referred to as “super-gentrification” or the gentrification of middle-class neighborhoods by members of the upper-class occurred during this period. Given the limitations of the data, however, it is unclear exactly why this occurred.

The results also highlighted the importance of another measure of gentrification associated with the consumption explanation, the percent foreign born, which garnered recent attention among gentrification scholars as an inhibitor of gentrification (Ley and Dobson, 2008; Shaw, 2005). Contrary to much of the recent research, however, the findings showed that gentrification was more likely to occur in neighborhoods characterized by larger foreign-born populations. This association failed to achieve significance after controlling for changes in neighboring areas, however, which suggests that previous assessments that have found gentrification was less likely in immigrant neighborhoods may have been flawed because they failed to account for changes in neighboring areas. It is unclear from these results, however, whether immigrant populations were being replaced by gentrifiers, which was the traditional view of the association of immigration and gentrification, or if immigrant populations were responsible for gentrification as was identified in Brown and Wyly’s (2000) case study of the Brighton Beach neighborhood in Brooklyn.

Perhaps not too surprising given the contradictory findings among previous research, the results did not reveal consistent significant associations of gentrification with the measures of residential stability, housing age or presence of subway entrances. Residential stability was important for the production and consumption explanations of
gentrification as property values tend to be higher in areas characterized by higher residential stability due to lack of available housing and because areas characterized by lower rates of residential stability provide more opportunities gentrifiers to move into a neighborhood. Most of the references to residential stability in the gentrification literature, however, have been made in regards to the debate of whether gentrification is associated with residential displacement. While many studies have argued that gentrification was associated with residential displacement and hence with rapid population turnover, research by Freeman and Braconi (2004) and Newman and Wyly (2006) found that turnover rates in gentrified neighborhoods were not substantially different from neighborhoods that did not experience gentrification, which was supported in the current study.

In regards to housing age, which was a measure associated with the production explanation due to its influence on property values, gentrification scholars have long argued that neighborhoods with older housing were more likely to experience gentrification, but most studies have not clearly identified how old homes have to be in order to be attractive to gentrifiers. For example, Freeman (2005) assessed changes in the percent of housing that was 20 years or older, while research by Rosenthal (2008) found that housing became more attractive to higher status households after reaching the age of 40. As the Rosenthal (2008) study was a more rigorous examination of the impact of housing age on neighborhood change, the current study assessed changes in the percent of neighborhood housing stock that was 40 years or older. Results showed a limited association of this measure with the percent of tracts in a neighborhood that experienced gentrified, which is likely due to the fact that so much of the housing stock in New York
City is older. This suggests that while housing stock that was 40 years or older was attractive to higher-status households in other cities, housing in New York City must have reached an older age before becoming attractive to higher status households.

The measure of subway entrances related to the production and consumption explanations as it influenced property values due to the heavy reliance on public transportation in New York City, but was also an amenity that may have attracted middle and upper-class individuals to neighborhoods. Previous research on the association of public transportation and gentrification has produced mixed results as research by Brueckner and Rosenthal (2009) found that neighborhoods with access to public transportation were more attractive to impoverished residents, while research by Kahn (2007) found that gentrification was more likely to occur in neighborhoods within walking distance of public transportation. Given that the public transportation system in New York City was more of a “Walk and Ride” model, it was expected that the findings be similar to Kahn’s (2007). This association was only found for the 1990s, however, which suggests that other types of neighborhood amenities were more important predictors of gentrification.

A final point of interest in the results of the gentrification-specific analyses is the significant positive association of the spatial lag of the gentrification measure, which indicates support for the geographic expansion of gentrification. Previous research has suggested that investments made in gentrified neighborhoods often resulted in spillover investments in neighboring areas (Bailey, 1997; Ellen et al., 2001; Wyly and Hammel, 1999). For example, neighborhoods located near gentrified or gentrifying neighborhoods tend to attract individuals who cannot afford to live in a gentrified or gentrifying
neighborhood, but who want to have access to the amenities that gentrified neighborhoods provide (Bridge, 2006; Ley and Dobson, 2008). While frequently referenced in previous research, this association has not been directly assessed. The significant positive coefficient for the spatial lag of gentrification reported in Chapter 5 suggests that this phenomenon did occur.

FINDINGS OF THE ANALYSIS OF GENTRIFICATION AND CRIME

Analyses in Chapter 6 assessed the question of whether gentrification was associated with changes in the seven index crimes in New York City between 1980 and 2005/2009. Previous research has come to varying conclusions in regards to the association of gentrification and crime due to differences in the outcome and length of time analyzed, the operationalization of gentrification and the method of analysis, which are discussed in greater detail in Chapter 3. Even though previous research has come to different conclusions about the association of gentrification and crime, the overall research suggests that gentrification was differentially associated with specific forms of crime. The results of analysis of the association of gentrification with the seven index crimes in this study offer further support for claims that gentrification was differentially associated with specific forms of crime as the results identified negative associations of gentrification with all four violent index crimes for all three periods and limited support for a curvilinear association with larceny rates where gentrification was positively associated with larceny during the 1980s and negatively associated with larceny during the 1990s and 2000s, but only after controlling for changes in additional measures of
neighborhood change. Additionally, limited support for the association of gentrification with rates of burglary and motor-vehicle theft was found.

The overall finding that gentrification was differentially associated with the different crime types is interesting by itself but also because of the implications for how gentrification changed neighborhoods. The current study was unable to identify the causal mechanism for why gentrification was negatively associated with rates of assault, homicide, and robbery, but gentrification scholars have recognized that the processes resulted in changes to the population and culture of neighborhoods as it is widely agreed upon that gentrification resulted in increased representation of middle and upper-class residents in lower-class neighborhoods. From a population standpoint, this change was important because middle and upper-class individuals were less likely to engage in street crime such as assault or robbery, which made up the largest share of violent crime. From a cultural standpoint, this change was important because middle-class culture was less likely to encourage violence than lower-class culture (Anderson, 1990; 1999). The analyses conducted here suggest that the declines in violent crime during the 1990s and 2000s were the result of the increased representation of middle and upper-class residents in disadvantaged neighborhoods, but given that changes to the local culture could not be directly measured, it is difficult to determine to what extent this decline was also the result of changes to local neighborhood cultures. As the gentrification measure was more likely to be negatively associated with violent forms of crime, it appears that any cultural changes in disadvantaged neighborhoods that resulted from gentrification were more likely to alter cultural acceptable uses of violence, but not property crime. The analysis strategy in the current study does not, however, allow for the determination of why
gentrification was differentially associated with violent and property crimes, but this is an important question that should be addressed in future research.

The limited support for the curvilinear association of gentrification with larceny rates suggests that neighborhoods that experienced greater rates of gentrification during the 1980s featured significantly higher rates of larceny at 1990, while neighborhoods that experienced greater rates of gentrification during the 1990s and 2000s featured significantly lower rates of larceny at 2000 and 2005/2009 respectively. This association only became significant after controlling for the prevalence of subway entrances, which was a significant predictor of larceny in prior models. This suggests the change in larceny rates over time was the result of changes that occurred in the New York City subway system, such as efforts to remove graffiti and homeless people from subway stations during the late 1980s and early 1990s, which, from the perspective of the routine activities theory, decreased opportunities for potential offenders to loiter in wait of suitable targets. Kelling and Coles (1996: 151) report negative bivariate correlations of these changes with minor forms of crime, but the more sophisticated analysis strategy used in this study suggests that this change also had a substantial impact on more serious forms of crime also.

The current study was not intended to be a direct assessment of the social disorganization framework, but the results of the crime-specific analyses contribute to longitudinal research of social disorganization theory. Assessments of the social disorganization framework have found concentrated disadvantage to be one of the strongest predictors of crime, which was supported in the findings of the analyses in this study as the change in concentrated disadvantage was a strong predictor of crime. It is
interesting to note, however, the association of changes in concentrated disadvantage with crime was not consistent across time for all crimes. Specifically, results identified a negative association of the change in concentrated disadvantage during the 1980s with assault rates at 1990, which means that sub-boroughs where concentrated disadvantage increased during the 1980s tended to feature lower rates of assault at 1990. This is contrary to the findings of previous research, but as the results identified the expected positive association of change in concentrated disadvantage during the 1990s and 2000s, it appears that there was a factor unique to the 1980s. Given the limited amount of longitudinal research on crime in New York City that has included data from the 1980s, it is unclear what this factor was. This issue is explored further in the discussion of future research directions.

In contrast to the strong association of change in concentrated disadvantage with crime rates, the overall results in this study identified virtually no association of change in the percent foreign born or change in residential stability with each crime type. The weak association with change in the percent foreign born was surprising given recent research that has identified lower crime rates in neighborhoods characterized by immigrant populations (Browning et al., 2010; Peterson and Krivo, 2009). The contradictory finding here may be the result of New York City’s long tradition of being an immigrant gateway city, which was important because it resulted in not only large numbers of foreign-born residents living in city, but also the representation of many different immigrant groups. Research by Stowell and Martinez (2007: 578) suggested that the influence of immigration on crime rates may vary among ethnic groups, which means that assessing changes in the overall foreign-born population may mask changes
among immigrant groups that could have influenced changes in crime rates. Given the
diversity of ethnic groups in New York City, however, this was beyond the scope of the
current study.

The lack of significant associations in the multivariate analyses of the change in
residential stability and each of the crime types in the current study was also surprising as
previous literature on neighborhood change has found that neighborhoods with lower
rates of residential stability typically featured higher crime rates (Hipp, 2010; Peterson
and Krivo, 2010; Sampson et al, 1997). This most likely has to do with factors related to
the New York City housing market, which has long been characterized by intense
competition for affordable housing. Analysis of the 2011 New York City Housing and
Vacancy Survey found that 47 percent of the rental housing in New York City was either
rent stabilized or rent controlled, which means that rental prices on these units could not
be increased above a certain level until tenants moved out (Furman Center, 2012; New
York City Rent Guidelines Board, 2012). This intense competition resulted in minor
variation in residential stability rates at the sub-borough level between 1980 and 2000,
which was the period when crime rates in New York City varied most dramatically. It is
also possible that this null association was the result of the unit of analysis used as the
average sub-borough contained about 11 neighborhoods and 40 census tracts. Indeed,
much of the previous research that has found a negative association of residential stability
and crime rate assessed this relationship using census tracts or neighborhood areas
representing collections of census tracts similar to the New York City Department of City
Planning neighborhood areas used in the current study for the gentrification-specific
analyses described in Chapter 5, which suggests that this relationship is more likely to manifest in analyses that use smaller units of analysis.

In addition to their importance for the specific dimensions of the social disorganization framework, the results are important for the social disorganization framework more generally as recent research over the last thirty years has lamented the fact that much of the empirical assessments of the social disorganization perspective have been cross-sectional (Hipp, 2010; Schuerman and Kobrin, 1986). This is surprising given that Shaw and McKay’s (1969 [1942]) original statement of the social disorganization perspective emphasized that changes in neighborhood crime rates were the result of changes to the composition of neighborhood populations. While not intended to be a longitudinal assessment of the social disorganization framework, analyses in Chapter 6 assess the importance of changes in concentrated disadvantage, residential stability, and population heterogeneity over a 29-year period. Overall, the results showed that the importance of the change in concentrated disadvantage was not consistent over time and that the importance of changes in the measures of population heterogeneity, which include the gentrification measure and the change in the percent foreign born, and the change in residential mobility did not vary significantly over time. While these results suggest that the influence of factors associated with social disorganization may not be stable over time or even significant at all, the analyses in this study were not able to include a measure of the mediating concept of neighborhood collective efficacy. It is possible that the influences of changes in concentrated disadvantage, residential stability, and population heterogeneity over time on crime rates were mediated by changes in local community cohesion and organization.
With respect to hypotheses derived from the routine activities theory, gentrification research has suggested that incumbent residents were often resentful of or threatened by the presence of gentrifiers in their neighborhoods and that this fear may result in gentrifiers be targeted for criminal victimization (Atkinson, 2004; Mele, 2000; Taylor and Covington, 1988). This was not supported by the results in this study as the results showed that gentrification was negatively associated the violent index crimes and only significantly associated with larceny rates after controlling for changes across time. This study is somewhat unique, however, in that most of the previous research that has supported the routine activities theory has used individual-level data. While the overall findings suggest that gentrification was associated with decreased rates of assault, homicide, and robbery, neighborhoods that experienced gentrification continued to experience at least some crimes of these types. Therefore, it is possible that the remaining crimes that occurred in these areas after the neighborhood began to gentrify were committed by resentful incumbent residents.

LIMITATIONS AND FUTURE DIRECTIONS FOR RESEARCH
This project advanced the study of gentrification and crime together and independently, but the study was not devoid of limitations. One limitation pertains to generalizability, as this was a case study of New York City. Previous research such as that of Bostic and Martin (2003) and Freeman (2005; 2009) studied gentrification using nationally representative samples of census tracts that included New York City, but no study to date has empirically assessed differences in the gentrification process in New York City with other large American cities. Given factors such as New York City’s history as a global
city and the heavy reliance on public transportation, it is possible that the gentrification process unfolded in New York City in a fashion that was different from that of other cities during this period.

The limitation of generalizability also applies to the findings of the analysis of gentrification and crime. The first empirical assessment of gentrification and crime was conducted by McDonald (1986) and utilized a sample of neighborhoods from New York City and four other large American cities. The results of this study were limited due to the analytical strategy as the 14 neighborhoods sampled were “somewhat arbitrarily” selected (p. 169). Recent research has assessed the association of gentrification and crime with broader samples of neighborhoods in Chicago (Papachristos et al, 2011; Smith, 2012), Los Angeles (Lee, 2010), and Seattle (Kreager et al., 2011). The variety of research strategies used in the studies as well as in the current study makes it difficult to determine if the results are truly generalizable. In order to correct for this, future research should sample a large number of neighborhoods from different cities so that the same analytic strategy can be applied uniformly.

With respect to the specific limitations for each set of analyses conducted, the primary limitation of the gentrification analyses pertains to the operationalization of gentrification. Chapter 2 discussed the different methods of operationalizing gentrification used in previous research and highlighted the recent trend of quantitative studies to incorporate measures of culture, specifically the number of coffeeshops used by Papachristos et al. (2011) and Smith (2012). The current study grounded quantitative operationalizations of gentrification in the culturally defined operationalization of gentrification used by The New York Times staff between 1980 and 2009. While results
in Chapter 5 show that the operationalization developed by Bostic and Martin (2003) more closely matched the operationalization used by *The New York Times*, the weakly moderate to moderate association sizes identified in the crosstabulations identify room for improvement. *The New York Times* was selected as a cultural measuring rod because of its emphasis events in New York City, but it is possible that additional or alternative measures of neighborhood culture might better match with the census-based operationalizations. It is also possible that the operationalization of gentrification by *The New York Times* did not distinguish the concept of gentrification from similar concepts such as “urban renewal” and “urban revitalization.” In either case, it is clear that additional research needs to be conducted in regards to how quantitative operationalizations of gentrification might better incorporate measures of local culture.

It is also important to recognize that while the use of the hybrid fixed effects analysis strategy controlled for unmeasured predictors of gentrification, it is not possible to state exactly what was controlled for. Most of the predictors of gentrification used in the current study were focused on changes to neighborhood populations due to the longitudinal nature of this project, but possible reasons for gentrification that were unable to be controlled for in the current analyses include perceptions of property values, the prevalence of amenities such as bars, restaurants and shops, and architectural features of neighborhood buildings. Additionally, neighborhoods may have gentrified because of efforts by realtors to manufacture cultural identities in a neighborhood in order to attract gentrification (Douglas, 2012; Kasinitz, 1988; Mele, 2000). Given the possible influence of these unmeasured influences, future research should continue to explore the importance of predictors of gentrification that cannot be measured with census data.
An additional limitation in regards to the gentrification analyses pertains to the units of analysis used in the gentrification analyses. New York City Department of City Planning neighborhoods were used so that the results of the replication of the census-based operationalizations of gentrification could be compared to the operationalization of gentrification used by *The New York Times*. While it makes sense to use these areas given their association with colloquial neighborhood names, their usefulness is somewhat limited by the fact that the average Department of City Planning neighborhood contains 11 census tracts. It is generally agreed that gentrification results in changes to small portions of neighborhoods rather than to entire neighborhoods, which is supported in tract level results discussed in Appendix A that show most neighborhood areas contained four or fewer gentrified census tracts during a particular decade. Therefore, future analyses of gentrification in New York City would benefit from the analysis of changes using smaller units of analysis, specifically census tracts.

Shifting gears to the limitations of the analysis of the association of gentrification and crime, the use of sub-boroughs as units of analysis was an important limitation. Sub-boroughs have been used in previous research to operationalize neighborhoods, but the size of the population of the average sub-borough makes these areas equivalent to small cities. As discussed previously, gentrification typically results in changes to portions of neighborhoods while the analyses described in Chapter 6 did not account for the spatial distribution of gentrification within sub-boroughs. Given the findings of the results in this dissertation showing that gentrification was associated with changes in crime rates, it is reasonable to expect that sub-boroughs where gentrified tracts were more widely distributed would have experienced greater changes in crime rates than sub-boroughs.
where gentrification was more concentrated. The greater distribution of gentrification would provide a larger number of areas with the crime reduction benefits associated with gentrification, which in turn should lead to lower rates of crime throughout sub-boroughs. This was beyond the scope of the current project, but will be explored in future analyses.

Another limitation pertains of this study is its inability to determine exactly why gentrification and crime rates were associated. This limitation is not unique to the current study as no study to date has been able to assess this causal relationship. Recent research in the social disorganization tradition has discussed the concept of collective efficacy as mediating the influence of social structure on crime rates (Sampson et al., 1997; Sampson, 2012). Collective efficacy reflects the potential for community organization to resolve local issues such as high rates of crime, but might also be extended to other types of issues such as fear of neighborhood gentrification. While such efforts to resistance gentrification may be peaceful, they may also be associated with threats of violence of actual violence against gentrifiers such as the ‘mug-a-yuppie’ campaign (Atkinson, 2004; Mele, 2000). Given the lack of empirical research on this issue, however, it is unclear to what extent the association of gentrification and crime is mediated by such factors.

CONTRIBUTION TO THE FIELD

The findings of the current study contribute to both the gentrification and criminological literatures. One important contribution is the rigorous strategy used to operationalize gentrification employed here to measure gentrification. Recent research conducted by Papachristos et al. (2011) and Smith (2012) represented a major shift in the gentrification literature by operationalizing gentrification through a combination of changes in high-end
coffeeshops, a cultural symbol often associated with gentrification, in addition to census measures of neighborhood change, but reliable information on changes to the type of businesses located in neighborhoods is often difficult and costly to obtain. This was accounted for in the current study by reviewing *The New York Times*, which is available in most public libraries, in order to determine which of two census-based strategies of gentrification featured the largest number of agreements with *The New York Times* in regards to gentrified neighborhoods. The operationalization developed by Bostic and Martin (2003), which was more rigorous than other census-based operationalizations of gentrification, identified a larger number of matches with *The New York Times*, but was not a perfect match. This suggests that attempts to operationalization gentrification by analyzing variation in census characteristics or local accounts independently may result in the over or understatement of the extent of gentrification.

A second contribution to the gentrification literature pertains to the spatial analysis of gentrification. Gentrification scholars have made frequent references to the potential for spillover benefits of gentrified neighborhoods into neighboring areas, but much of the spatial data analysis these studies involves displaying maps that identify the location of sampled neighborhoods or the distribution of key census characteristics. These results in this type of analysis was useful in the same way that more traditional univariate or bivariate analyses help to highlight patterns in the data, but they do not explicitly test for the influence of changes in neighboring areas. By incorporating spatially lagged versions of the independent variables as predictors of gentrification, the current study represents a first step toward the inclusion of more sophisticated spatial analysis of gentrification. The results suggest that gentrification does indeed result in
spillover benefits to nearby areas such as the greater attraction of middle-class residents, but what those benefits are exactly was unable to be identified in the current study.

A final contribution pertains to the analysis of the association of gentrification and felony arrests for the seven index crimes. Gentrification and other types of neighborhood revitalization strategies, such as the Ten Year Plan discussed in Chapter 2, have become increasingly used by city governments in order to reduce the prevalence of social problems such as poverty and crime in cities. The results presented here suggest that gentrification was associated with declines in rates of five of the seven index crimes, which supports the logic of such initiatives. There is, however, widespread concern that gentrification related displacement disproportionately impacts the poor and racial minorities by pushing them from disadvantaged areas that have high potential for profit to disadvantaged areas without such resources. While empirical assessments have yet to definitively identify gentrification related displacement, it is findings of qualitative studies have repeatedly shown that incumbent residents of gentrified neighborhoods fear being displaced, decreasing the likelihood that incumbent residents will welcome gentrifiers into the local community. Therefore, initiatives that encourage gentrification as a crime reduction strategy should do so in a way that is least disruptive to the local community as multiple assessments of collect efficacy have found that the influence of changes to the social structure of neighborhoods on crime rates are mediated by the potential for collective efficacy in neighborhoods. Gentrification efforts that incorporated local community members would not only be less likely to be resisted, but would also likely have greater negative impacts on crime.
CONCLUSION

The overall conclusion from this study is that gentrification was associated with changes in crime rates in New York City during the 1990s and 2000s, but that gentrification was more likely to be associated with declines in violent crime types than property crime types. Statistics released by the New York City Police Department during May of 2013 show that the amount of crime in New York City has continued to decline during recent years (New York City Police Department, 2013). Given that gentrification has continued to spread throughout New York City neighborhoods, it will be interesting to see if future research on the association of gentrification and crime identifies patterns similar to those presented here or if these results were an artifact of the dramatic declines in crime that occurred in most major U.S. cities during the 1990s.
REFERENCES


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APPENDIX A: TRACT LEVEL REPLICATIONS OF THE BOSTIC AND MARTIN
AND FREEMAN OPERATIONALIZATIONS

Descriptive spatial data analysis shows that the tracts identified as gentrified by
the Bostic and Martin operationalization were spread throughout the five boroughs. Map
60 shows that there were pockets of gentrified tracts in the central Manhattan
neighborhoods of Clinton and the Upper West Side, the lower Manhattan neighborhood
of Chelsea and the Brooklyn neighborhoods of Park Slope/Gowanus and Prospect
Heights during the 1980s, but the univariate Moran’s I statistic of 0.144 shows that
gentrified tracts were weakly clustered. Previous research documented gentrification
during the 1980s in Clinton (Hackworth and Smith, 2001), the Upper West Side
(McDonald, 1986), and Park Slope/Gowanus (Carpenter and Lees, 1995; Kasinitz, 1988;
McDonald, 1986), but not in Chelsea or Prospect Heights. The fact that Prospect Heights
was overlooked during the 1980s could be due to fact that attention was focused more on
the neighboring area of Park Slope/Gowanus where gentrification was spread evenly
throughout the neighborhood. Previous research has documented gentrification in
Chelsea, but not until the 1990s, so it is likely that changes that began during the 1980s
were not widely recognized until the 1990s.

[Map 60 is located on page 359]

Map 61 appears to show that gentrified tracts tended be clustered together during
the 1990s, but the univariate Moran’s I of 0.121 shows that the clustering was weak.
Results for Manhattan show that while there continued to be a few gentrified tracts in the
Upper West Side and Clinton, there was a substantial cluster of gentrified tracts in
Harlem. In contrast, gentrification in Brooklyn continued to remain largely in the
northeastern section of the borough and appeared to have spread from Park
Slope/Gowanus to Clinton Hill and the area Down Under the Brooklyn Bridge frequently
referred to as DUMBO. Given the findings of research by Freeman (2006), Maurrasse
(2006) and Taylor (2002), it is not surprising to see that much of the gentrification in
Manhattan during the 1990s occurred in Harlem. It is also not surprising to see pockets
of gentrified tracts in the Brooklyn neighborhoods of Clinton Hill (Freeman, 2006) and
DUMBO (Hackworth, 2002; Hackworth and Smith, 2001).

[Map 61 is located on page 360]

Taken at face value, Map 62 shows that gentrification was more widely
distributed during the 2000s compared to the previous decades. The univariate Moran’s I
of 0.116, however, shows that the distribution of gentrified tracts during the 2000s was
similar to the previous decades. Even though gentrification was more dispersed during
this decade, the map reveals some specific pockets of gentrification. The cluster of tracts
in Hamilton Heights in upper Manhattan has not been documented in previous research.
The group of gentrified tracts in Harlem coincides with the findings of Zukin et al. (2010)
who report that gentrification continued to occur in Harlem during the 2000s. The cluster
of tracts in Brooklyn is looser than the clusters in Manhattan, but shows a general pattern
of gentrification that matches with the Clinton Hill neighborhood, which is likely the
continuation of gentrification that began during the 1990s.

[Map 62 is located on page 361]

In comparison to the Bostic and Martin operationalization, the Freeman
operationalization identified different spatial distributions of gentrification, but the
Moran’s I statistic of 0.076 shows an even greater distribution of gentrified tracts than the
Bostic and Martin operationalization for the 1980s. In regards to Manhattan data for the 1980s show that both operationalizations identified tracts in Harlem as having experienced gentrification. Results for Brooklyn reveal differences in the results from the two methodological strategies. The Bostic and Martin operationalization identified gentrified tracts in Park Slope/Gowanus and Crown Heights, while the Freeman operationalization identified tracts in Bedford, Bushwick, Crown Heights, and Stuyvesant Heights.

The results for the 1980s displayed in Map 63 show a much greater dispersion of gentrified tracts for the Freeman operationalization than was identified in the Bostic and Martin results. Even with the greater dispersion, clusters of tracts were identified in Chelsea and Harlem in Manhattan and in Bedford and Stuyvesant in Brooklyn. As discussed earlier, gentrification was not documented in any of these neighborhoods until the 1990s. This is not to say that gentrification did not occur in these areas during the 1980s, but instead it is likely that the gentrification of these neighborhoods during the 1990s was the results of changes that began during the previous decade.

[Map 63 is located on page 362]

Map 64 identifies the spatial distribution of gentrified tracts according to the Freeman operationalization for the 1990s. Three pockets of gentrified tracts stand out in this map, but the Moran’s I statistic of 0.134 shows that gentrified tracts were evenly spread throughout the five boroughs. The majority of the gentrified tracts in Manhattan were located in eastern and central Harlem and Yorkville, which are all areas that have been documented as gentrified by previous research. The results also identify a cluster of gentrified tracts in the Lower East Side, which has been documented as gentrifying
during the 1990s by Freeman and Braconi (2004) and Mele (1996; 2000).

[Map 64 is located on page 363]

Results displayed in Map 65 also show that the Freeman operationalization identified a substantially different distribution of gentrified tracts in Brooklyn during the 2000s. As discussed earlier and presented in Map 62, the Bostic and Martin operationalization identified gentrified tracts in the Brooklyn neighborhoods of Carroll Gardens, Clinton Hill and DUMBO. In contrast, the Freeman operationalization identified tracts in Bedford, Bushwick, Crown Heights, Stuyvesant Heights, and Williamsburg in addition to Carroll Gardens, Clinton Hill and DUMBO. The greater number of neighborhoods reflected in the results of the Freeman operationalization is most likely the result of the less stringent requirements for identifying gentrified tracts.

[Map 65 is located on page 364]

The distribution of gentrified tracts according to the Freeman operationalization during the 2000s displayed in Map 65 is visually quite different from the distribution identified by the Bostic and Martin operationalization (Map 62). Calculation of the bivariate Moran’s I statistic comparing the results of each operationalization revealed a coefficient of 0.108, showing that the two strategies were weakly associated. A visual comparison of Maps 62 and 65 show that tracts identified by the Freeman operationalization during the 2000s were much more concentrated than those identified by the Bostic and Martin operationalization. Univariate Moran’s I statistics confirm this finding, showing a value of 0.217 for the Freeman operationalization and 0.116 for the Bostic and Martin operationalization.

Similar to the map of tracts identified by the Bostic and Martin operationalization
during the 2000s (Map 65), Map 68 shows that the Freeman strategy identified gentrified tracts in the Manhattan neighborhood of Harlem and the northern Brooklyn neighborhoods of Bedford and Stuyvesant Heights. Unlike the Bostic and Martin operationalization, the Freeman operationalization identified a clustering of gentrified tracts in the Brooklyn neighborhoods of East New York and Brighton Beach. The identification of the East New York area is interesting given that previous research has not documented gentrification there. The identification of these tracts is likely the result of an increased percent of the population with a college education due to increased immigration as tracts in this neighborhood continued to feature educational attainment levels that were below the city average.

The identification of Brighton Beach is also interesting as research by Brown and Wyly (2000) documented gentrification efforts initiated by immigrants, which has yet to be documented elsewhere. As discussed by Brown and Wyly (2000: 103), Brighton Beach experienced large gains in the percent of college educated residents during the 1990s, which was a trend that likely continued into the 2000s. This is important for the Freeman operationalization as the primary criteria for identifying gentrified neighborhoods is changes in the percent of residents with a college education.
APPENDIX B: RESULTS OF THE ANALYSIS OF RAPE RATES

Discussion of the results of the rape analyses are presented separately from the discussion of the results pertaining to the other index crimes because rape rates are notoriously unreliable. Descriptive analysis of the rape rate over the study period shows that, similar to rates of burglary and larceny and counter to the trend in overall crime in New York City, rape rates began to decline during the 1980s (Table 22). The rape rate in the average sub-borough declined by 0.07 incidents per 1000 residents between 1980 and 1990, by 0.14 incidents per 1000 residents between 1990 and 2000 and 0.16 incidents per 1000 residents between 2000 and 2005/2009. Map 66 displays the distribution of changes in rape rates among the 55 sub-boroughs between 1980 and 1990.

[Table 22 is located on page 298]

[Map 66 is located on page 365]

Transitioning to results pertaining to changes in rape rates between 1990 and 2000, Map 67 shows that 53 of the 55 sub-boroughs experienced declines in rape. It is unclear why rape rates increased in Borough Park and Flatlands/ Canarsie as these areas were characterized by large foreign-born populations, which has been found to be a protective factor against violent crime in recent research. Results in Map 67 also suggest a negative correlation of gentrification and rape rates as the sub-boroughs of Central Harlem and Chelsea/ Clinton/ Midtown in Manhattan and Brooklyn Heights/ Fort Greene and Bedford Stuyvesant in Brooklyn were all characterized by large decreases in rape rates.

[Map 67 is located on page 366]
Results in Map 68 show that this dramatic decline in rape rates during the 2000s was the result of declines in rape rates in 53 of the 55 sub-boroughs. The distribution of changes in rape rates show the potential for a strong correlation as the Manhattan sub-boroughs of Central and East Harlem and the Brooklyn sub-boroughs of Bushwick and Bedford Stuyvesant were identified as experiencing large decreases in rape rates, while the Brooklyn sub-boroughs of Park Slope/Carroll Gardens, Brooklyn Heights, and Williamsburg were all experienced small decreases in rape rates. It is interesting to note, however, the lower Manhattan sub-boroughs of Chelsea/Clinton/Midtown, which contained neighborhoods that have been identified as gentrifying since the 1980s, experienced a small increase in rape rates during the 2000s.

[Map 68 is located on page 367]

The bivariate correlations of rape rates with the dependent variables at each time point are presented in Table 23. The correlations of rape rates with the independent variables identified inconsistent correlations during the time period. Contrary to what was expected, the correlations of rape rates with the change in concentrated disadvantage identified negative correlations for 1990 (r = -.237) and 2000 (r = -.314), which suggests that sub-boroughs where concentrated disadvantage increased were more likely to experience lower rates of rape. The bivariate correlations with residential stability were also inconsistent, but did identify the expected negative relationship at 2000 (r = -.432) and 2005/2009 (r = -.345). The bivariate correlations with the change in percent foreign born were not significant, which may be due to New York City’s history as an immigration gateway, which has resulted in very few homogenous neighborhoods. Bivariate correlations of the change in housing age, which reflects changes in the percent
of housing that was 40 years or older, were not strongly correlated with rape as only the
correlation at 1990 (r = -.508) was significant. The bivariate correlations of rape rates
and the percent of tracts within a sub-borough that contained subway entrances was
significant and positive at 1990 (r = .397) and 2000 (r = .397). Finally, the correlations of
the percent gentrified with rape rates identified relatively low correlations for 2000 (r =
.234) and 2005/2009 (r = .279).

[Table 23 is located on page 298]

Shifting to the results of the multivariate models, results in Table 48 identify the
significant predictors of rape rates. As expected given the dramatic decline in rape rates
between 1990 and 2000 described in the descriptive statistics as well as in the trends
presented in Figure 3 (Chapter 3), the coefficients for the dichotomous measures of time
in Model 48 show that rape rates were significantly lower at 2000 and 2005/2009 than
they were at 1990. The importance of time is unpacked in Models 32 and 33, which
include measures of the interactions of time with the primary independent variables.

[Table 24 is located on page 299]

Model 49 regressed rape rates on the percent of tracts within a sub-borough that
gentrified during each decade and controlled for significant declines in rape rates over
time. Even after controlling for time, the results show that sub-boroughs that experienced
greater rates of gentrification were more likely to be characterized by lower rates of rape.
The negative association with rape rates is contrary to the findings of Lee (2010) who
found that rape rates were not significantly associated with gentrification. This could be
due to differences in the measurement of gentrification or could be due to differences in
samples as Lee (2010) assessed the association of gentrification and crime in Los Angeles.

Results in Model 50 show that changes in concentrated disadvantage, and the age of housing were significant predictors of rape rates controlling for differences across time. These results show partial support for the social disorganization framework, specifically Hypothesis 9, as sub-boroughs that increased in concentrated disadvantage were more likely to feature higher rates of rape. This finding does not, however, support Hypotheses 15 and 16, which together argue that crime is more likely when members of social classes mix in a neighborhood.

Additionally, the results show that rape rates tended to be lower in sub-boroughs that experienced gains in the percent of housing aged 40 years or older. As suggested previously, neighborhoods that increased in the percent of housing in this age range tend to be more likely to gentrify, so it is possible that this variable is negatively associated with rape rates because gentrification was negatively associated with rape rates.

Model 51 regressed rape rates on the measure of gentrification in addition to changes in concentrated disadvantage, residential stability, foreign born, housing age and the time invariant measure of the percent of tracts within a sub-borough that contained subway entrances. The results show that even after controlling for the additional variables, sub-boroughs that experienced greater rates of gentrification featured significantly lower rates of rape. The results also show that sub-boroughs that increased in concentrated disadvantage tended to feature higher rates of rape, while sub-boroughs that increased in the percent of housing aged 40 years or older featured lower rates of rape.
Model 52 incorporated spatial lags of the independent variables. The results show that sub-boroughs tended to feature lower rape rates if they bordered sub-boroughs that experienced higher rates of gentrification. Further, the results continued to show that sub-boroughs that experienced greater rates of gentrification were characterized by lower rape rates. Additionally, the results in Model 31 continue to show that rape rates were higher in sub-boroughs that increased in concentrated disadvantage and lower in areas that increased in the percent of housing aged 40 years or older.

Model 53 explored the importance of time as a predictor of rape rates by interacting dichotomous measures for the 1990s and 2000s with the independent variables. The results show the association of gentrification and rape rates was significant during the 1980s and that the association of gentrification and rape rates was not significantly different during the 1990s or 2000s. In other words, sub-boroughs that experienced increased gentrification were more likely to feature lower rates of rape for all three periods.

Results in Model 53 also show that the change in concentrated disadvantage was associated with rape rates for all three periods, but that this relationship was significantly different during the 1990s and 2000s. In regards to the 1980s, the coefficient of -0.087 shows that sub-boroughs that experienced increases in concentrated disadvantage were more likely to feature lower rates of rape. In contrast, calculation of the coefficients for the 1990s results in a value of 0.029 and for the 2000s results in a value of 0.05, showing that sub-boroughs that increased in concentrated disadvantage during the 1990s and 2000s tended to feature higher rates of rape.
The results in Model 53 also highlight the importance of change in the percent of housing aged 40 years or older as a predictor of rape rates for the 1980s and 1990s, but not for the 2000s. The coefficient of -0.008 shows that sub-boroughs that increased in the percent of housing stock aged 40 years or older featured significantly lower rates of rape at 1990. Additionally, adding the interaction term for the 1990s (0.006) to the coefficient for the 1980s results in a value of -0.002, showing that sub-boroughs that increased in the percent of housing that was 40 years or older during the 1990s also featured significantly lower rates of rape.

Model 54 regressed rape rates on the combination of time interactions and spatial lags. In regards to gentrification, the results show that sub-boroughs that experienced greater rates of gentrification during the 1980s featured significantly lower rates of rape, but also that sub-boroughs tended to experience lower rate rates if they bordered sub-boroughs that experienced higher rates of gentrification. The results also show that sub-boroughs were significantly more likely to feature higher rates of rape if they experienced declines in concentrated disadvantage during the 1980s and increases in concentrated disadvantage during the 1990s and 2000s. Additionally, the results show that sub-boroughs that increased in the percent of housing aged 40 years or older during the 1980s and 1990s featured significantly lower rates of rape at 1990 and 2000 respectively.
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<td>-------</td>
<td></td>
</tr>
<tr>
<td>Kraeger, Lyons, and Hays (2011)</td>
<td>1982-2000</td>
<td>21 Seattle neighborhoods</td>
<td>Census tracts</td>
<td>Used neighborhoods that were identified as gentrifying by Wyly and Hammel (1999)</td>
<td>Three-year averages around 1990 and 2000 for property, violent, and total crime rates</td>
<td>Generalizability; aggregate crime rates; focus is primarily on the 1990s</td>
<td>Increased crime during early stages of gentrification; Decreased crime over time</td>
</tr>
<tr>
<td>Papachristos, Smith, Scherer, and Fugiero (2011)</td>
<td>1991-2005</td>
<td>343 Chicago neighborhood clusters</td>
<td>PHDCN Neighborhood Clusters</td>
<td># of coffeeshops; neighborhood disadvantage, immigrant concentration, and residential instability</td>
<td>Annual counts of homicides and robberies</td>
<td>coffeeshops is innovative, but problematic; do not account for decrease in crime across the country during this time period</td>
<td>Negative association with homicide and robbery for white and Latino neighborhoods; Negative association with homicide for black neighborhoods, but positive association with robbery</td>
</tr>
<tr>
<td>Smith (2012)</td>
<td>1991-2005</td>
<td>343 Chicago neighborhood clusters</td>
<td>PHDCN Neighborhood Clusters</td>
<td>Census Measures: Index of Mobile White Population and Index of Socioeconomic Status Private investment: # of coffeeshops State Intervention: demolition of public housing</td>
<td>Gang-motivated homicides</td>
<td>coffeeshops is innovative, but problematic due to spatial concentration; do not account for decrease in crime across the country during this time period; gang-related homicides are not frequent</td>
<td>Negative association of gang-motivated homicide with census measures and the number of coffeeshops; positive association of gang-related homicide with the demolition of public housing</td>
</tr>
</tbody>
</table>
Table 2. Number of Neighborhood Areas by the Number of Tracts that Experienced Gentrification*

<table>
<thead>
<tr>
<th>Operationalization</th>
<th>Bostic and Martin</th>
<th>Freeman</th>
<th>Bostic and Martin</th>
<th>Freeman</th>
<th>Bostic and Martin</th>
<th>Freeman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Gentrified Tracts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero</td>
<td>119 (63.3%)</td>
<td>119 (63.3%)</td>
<td>111 (59.0%)</td>
<td>84 (44.7%)</td>
<td>122 (64.9%)</td>
<td>91 (48.4%)</td>
</tr>
<tr>
<td>One</td>
<td>35 (18.6%)</td>
<td>35 (18.6%)</td>
<td>46 (24.5%)</td>
<td>45 (23.9%)</td>
<td>36 (19.1%)</td>
<td>38 (20.2%)</td>
</tr>
<tr>
<td>Two</td>
<td>17 (9.0%)</td>
<td>17 (9.0%)</td>
<td>16 (8.5%)</td>
<td>27 (14.4%)</td>
<td>13 (6.9%)</td>
<td>23 (12.2%)</td>
</tr>
<tr>
<td>Three</td>
<td>7 (3.7%)</td>
<td>11 (5.9%)</td>
<td>6 (3.2%)</td>
<td>10 (5.3%)</td>
<td>5 (2.7%)</td>
<td>13 (6.9%)</td>
</tr>
<tr>
<td>Four</td>
<td>6 (3.2%)</td>
<td>2 (1.1%)</td>
<td>5 (2.7%)</td>
<td>10 (5.3%)</td>
<td>5 (2.7%)</td>
<td>5 (2.7%)</td>
</tr>
<tr>
<td>Five or More</td>
<td>4 (2.2%)</td>
<td>4 (2.1%)</td>
<td>4 (2.1%)</td>
<td>12 (6.4%)</td>
<td>7 (3.7%)</td>
<td>18 (9.6%)</td>
</tr>
</tbody>
</table>

*Average Neighborhood Area Contains 11 Census Tracts
N = 188 Neighborhood Areas

Table 3. Summary of Bostic and Martin Gentrification Variables at the Tract Level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in the Percent with College Degree</td>
<td>5.3% (7.81)</td>
<td>4.72% (7.10)</td>
<td>5.73% (8.37)</td>
</tr>
<tr>
<td>Change in Average Family Income</td>
<td>$25072.75 (21616.10)</td>
<td>$17623.63 (27285.84)</td>
<td>$20028.15 (30505.64)</td>
</tr>
<tr>
<td>Change in Homeownership Rate</td>
<td>3.08% (12.84)</td>
<td>0.15% (6.97)</td>
<td>3.69% (8.34)</td>
</tr>
<tr>
<td>Change in the Percent Ages 30-44</td>
<td>4.47% (7.04)</td>
<td>0.39% (5.52)</td>
<td>-1.63% (5.89)</td>
</tr>
<tr>
<td>Change in the Percent White Non-Family Households</td>
<td>-0.41% (27.05)</td>
<td>-7.70% (16.63)</td>
<td>-34.78% (25.53)</td>
</tr>
<tr>
<td>Change in the Percent Employed in Managerial or Administrative Occupations</td>
<td>2.07% (6.91)</td>
<td>-0.24% (5.41)</td>
<td>1.18% (5.98)</td>
</tr>
<tr>
<td>Change in the Percent with Some College, but no Degree</td>
<td>2.61% (6.61)</td>
<td>1.22% (5.78)</td>
<td>-1.28% (6.04)</td>
</tr>
<tr>
<td>Change in the Percent Below Poverty</td>
<td>-0.01% (0.01)</td>
<td>0.02% (0.09)</td>
<td>-0.03% (0.09)</td>
</tr>
<tr>
<td>Change in the Percent Black</td>
<td>3.49% (10.28)</td>
<td>1.03% (11.70)</td>
<td>-2.82% (8.15)</td>
</tr>
</tbody>
</table>

N = 2135
### Table 4: Summary of Freeman’s Classification

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Featured an Average Household Income Below…</td>
<td>$17,053.44</td>
<td>$36,444.14</td>
<td>$48,575.28</td>
<td>N/A</td>
</tr>
<tr>
<td>Percent of Housing Stock Built in the Last 20 Years Below the Median for the City</td>
<td>90.16%</td>
<td>93.33%</td>
<td>95.37%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Characteristics of Gentrified Tracts

| Classified as Gentrifiable in 1980 | N/A |
| Increase in Educational Attainment Greater than… | 4.70% | 4.22% | 5.00% |
| Increase in Median Rent | Tract experienced an increase in median gross rent of at least one cent |

N = 2135

### Table 5. Number of Gentrifiable and Gentrified Tracts by Operationalization and Year

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bostic and Martin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentrifiable</td>
<td>152</td>
<td>154</td>
<td>138</td>
<td>n/a</td>
</tr>
<tr>
<td>Gentrified</td>
<td>n/a</td>
<td>152</td>
<td>154</td>
<td>138</td>
</tr>
<tr>
<td>Freeman</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gentrifiable</td>
<td>400</td>
<td>582</td>
<td>576</td>
<td>n/a</td>
</tr>
<tr>
<td>Gentrified</td>
<td>n/a</td>
<td>132</td>
<td>240</td>
<td>281</td>
</tr>
</tbody>
</table>

N = 2135

### Table 6. Gentrifiable and Gentrified Tracts According to the Freeman Operationalization During the 1980s

<table>
<thead>
<tr>
<th>Borough</th>
<th>Gentrifiable</th>
<th>Gentrified</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Bronx</td>
<td>107 (26.8%)</td>
<td>24 (18.2%)</td>
</tr>
<tr>
<td>Brooklyn</td>
<td>148 (37.0%)</td>
<td>47 (35.6%)</td>
</tr>
<tr>
<td>Manhattan</td>
<td>66 (16.5%)</td>
<td>34 (25.8%)</td>
</tr>
<tr>
<td>Queens</td>
<td>68 (17.0%)</td>
<td>23 (17.4%)</td>
</tr>
<tr>
<td>Staten Island</td>
<td>11 (2.8%)</td>
<td>4 (3.0%)</td>
</tr>
<tr>
<td>Number of Cases</td>
<td>400 (100%)</td>
<td>132 (100%)</td>
</tr>
</tbody>
</table>
Table 7. Number of Neighborhoods Identified as Having Experienced Gentrification

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bostic and Martin</td>
<td>69</td>
<td>77</td>
<td>66</td>
</tr>
<tr>
<td>Freeman</td>
<td>69</td>
<td>104</td>
<td>97</td>
</tr>
<tr>
<td>New York Times</td>
<td>44</td>
<td>27</td>
<td>32</td>
</tr>
<tr>
<td>Bostic and Martin and New York Times Agree</td>
<td>26</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Freeman and New York Times Agree</td>
<td>23</td>
<td>23</td>
<td>27</td>
</tr>
<tr>
<td>N = 188</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8. Crosstabulation of Census Operationalizations of Gentrification and New York Times

<table>
<thead>
<tr>
<th>Decade</th>
<th>Operationalization</th>
<th>Association with New York Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980s</td>
<td>Bostic and Martin</td>
<td>$\Phi = 0.257^*$</td>
</tr>
<tr>
<td></td>
<td>Freeman</td>
<td>$\Phi = 0.179^{**}$</td>
</tr>
<tr>
<td>1990s</td>
<td>Bostic and Martin</td>
<td>$\Phi = 0.337^{**}$</td>
</tr>
<tr>
<td></td>
<td>Freeman</td>
<td>$\Phi = 0.246^{**}$</td>
</tr>
<tr>
<td>2000s</td>
<td>Bostic and Martin</td>
<td>$\Phi = 0.497^{**}$</td>
</tr>
<tr>
<td></td>
<td>Freeman</td>
<td>$\Phi = 0.297^{**}$</td>
</tr>
<tr>
<td>N = 188</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
* $p < .05$; ** $p < .01$

Table 9. Means and Standard Deviations of Changes in Census Variables at the Neighborhood Level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Concentrated Disadvantaged Index</td>
<td>0.055</td>
<td>-0.057</td>
<td>0.39</td>
</tr>
<tr>
<td></td>
<td>(0.787)</td>
<td>(0.902)</td>
<td>(1.711)</td>
</tr>
<tr>
<td>Residential Stability</td>
<td>2.75%</td>
<td>-1.83%</td>
<td>15.62%</td>
</tr>
<tr>
<td></td>
<td>(7.44)</td>
<td>(4.70)</td>
<td>(4.81)</td>
</tr>
<tr>
<td>Percent Foreign Born</td>
<td>4.54%</td>
<td>6.94%</td>
<td>0.88%</td>
</tr>
<tr>
<td></td>
<td>(4.75)</td>
<td>(5.29)</td>
<td>(4.00)</td>
</tr>
<tr>
<td>Housing Age</td>
<td>6.50%</td>
<td>11.62%</td>
<td>13.08%</td>
</tr>
<tr>
<td></td>
<td>(12.64)</td>
<td>(9.42)</td>
<td>(8.74)</td>
</tr>
<tr>
<td>Housing Affordability Restrictions</td>
<td>13.91%</td>
<td>16.74%</td>
<td>17.22%</td>
</tr>
<tr>
<td></td>
<td>(18.11)</td>
<td>(25.41)</td>
<td>(26.44)</td>
</tr>
<tr>
<td>Subway Entrances</td>
<td>2.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.96)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 188</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table 10. Bivariate Correlations</td>
<td>X1</td>
<td>X2</td>
<td>X3</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Percent Gentrified 1990 (X1)</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Concentrated Disadvantage 1980 (X2)</td>
<td>- .141</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Residential Stability 1980 (X3)</td>
<td>- .102</td>
<td>- .241**</td>
<td>1</td>
</tr>
<tr>
<td>Foreign Born 1980 (X4)</td>
<td>- .068</td>
<td>- .196**</td>
<td>- .199**</td>
</tr>
<tr>
<td>Housing Older than 40 Years 1980 (X5)</td>
<td>.257**</td>
<td>.225**</td>
<td>- .163*</td>
</tr>
<tr>
<td>Percent of Housing Units with Affordability Restrictions Between 1980 and 1990 (X6)</td>
<td>.032</td>
<td>.611**</td>
<td>- .336**</td>
</tr>
<tr>
<td>Percent Gentrified 2000 (X7)</td>
<td>.105</td>
<td>.341**</td>
<td>- .055</td>
</tr>
<tr>
<td>Concentrated Disadvantage 1990 (X8)</td>
<td>- .245**</td>
<td>.977**</td>
<td>- .233**</td>
</tr>
<tr>
<td>Residential Stability 1990 (X9)</td>
<td>- .190*</td>
<td>- .168*</td>
<td>.628**</td>
</tr>
<tr>
<td>Foreign Born 1990 (X10)</td>
<td>- .153*</td>
<td>- .104</td>
<td>- .208**</td>
</tr>
<tr>
<td>Housing Older than 40 Years 1990 (X11)</td>
<td>.248**</td>
<td>- .035</td>
<td>- .028</td>
</tr>
<tr>
<td>Percent of Housing Units with Affordability Restrictions Between 1990 and 2000 (X12)</td>
<td>.041</td>
<td>.691**</td>
<td>- .364**</td>
</tr>
<tr>
<td>Percent Gentrified 2005/2009 (X13)</td>
<td>.277**</td>
<td>.343**</td>
<td>- .036</td>
</tr>
<tr>
<td>Concentrated Disadvantage 2000 (X14)</td>
<td>- .314**</td>
<td>.931**</td>
<td>- .206**</td>
</tr>
<tr>
<td>Residential Stability 2000 (X15)</td>
<td>- .237**</td>
<td>.055</td>
<td>.574**</td>
</tr>
<tr>
<td>Foreign Born 2000 (X16)</td>
<td>- .217**</td>
<td>- .120</td>
<td>- .067</td>
</tr>
<tr>
<td>Housing Older than 40 Years 2000 (X17)</td>
<td>.151*</td>
<td>- .090</td>
<td>.111</td>
</tr>
<tr>
<td>Percent of Housing Units with Affordability Restrictions Between 2000 and 2005/2009 (X18)</td>
<td>.009</td>
<td>.747**</td>
<td>- .327**</td>
</tr>
<tr>
<td>Percent of Tracts with Subway Entrances (X19)</td>
<td>.068</td>
<td>.089</td>
<td>- .303**</td>
</tr>
<tr>
<td></td>
<td>X10</td>
<td>X11</td>
<td>X12</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Foreign Born 1990 (X10)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housing Older than 40 Years</td>
<td>.252 *</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1990 (X11)</td>
<td></td>
<td>-.102</td>
<td></td>
</tr>
<tr>
<td>Percent of Housing Units</td>
<td>-.184 *</td>
<td>-.102</td>
<td></td>
</tr>
<tr>
<td>with Affordability Restrictions Between 1990 and 2000) (X12)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Gentrified 2005/2009</td>
<td>-.084</td>
<td>.228 **</td>
<td>.354 **</td>
</tr>
<tr>
<td>(X13)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concentrated Disadvantage</td>
<td>-.019</td>
<td>-.111</td>
<td>.617 **</td>
</tr>
<tr>
<td>2000 (X14)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential Stability 2000</td>
<td>-.096</td>
<td>-.236 **</td>
<td>-.113</td>
</tr>
<tr>
<td>(X15)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Born 2000 (X16)</td>
<td>.927 **</td>
<td>.251 **</td>
<td>-.204 **</td>
</tr>
<tr>
<td>Housing Older than 40 Years</td>
<td>.340 **</td>
<td>.879 **</td>
<td>-.204 **</td>
</tr>
<tr>
<td>2000 (X17)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Housing Units</td>
<td>-.186 *</td>
<td>-.062</td>
<td>.807 **</td>
</tr>
<tr>
<td>with Affordability Restrictions Between 2000 and 2005/2009 (X18)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Tracts with Subway</td>
<td>-.074</td>
<td>.120</td>
<td>.135</td>
</tr>
<tr>
<td>Entrances (X19)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11: Fixed Effects Analysis of Gentrification

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year = 1990s</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>0.178</td>
<td>-0.309</td>
<td>-0.147</td>
<td>-4.861*</td>
<td>-3.717*</td>
</tr>
<tr>
<td></td>
<td>(1.010)</td>
<td>(1.197)</td>
<td>(1.175)</td>
<td>(1.971)</td>
<td>(1.955)</td>
</tr>
<tr>
<td>Concentrated Disadvantage</td>
<td>-</td>
<td>2.696***</td>
<td>2.473***</td>
<td>5.874***</td>
<td>5.125***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.699)</td>
<td>(0.698)</td>
<td>(1.175)</td>
<td>(1.151)</td>
</tr>
<tr>
<td>Residential Stability</td>
<td>-</td>
<td>-0.021</td>
<td>-0.042</td>
<td>0.085</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.103)</td>
<td>(0.101)</td>
<td>(0.161)</td>
<td>(0.158)</td>
</tr>
<tr>
<td>Foreign Born</td>
<td></td>
<td>0.218†</td>
<td>0.134</td>
<td>0.565**</td>
<td>0.289</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.112)</td>
<td>(0.113)</td>
<td>(0.186)</td>
<td>(0.189)</td>
</tr>
<tr>
<td>Housing Age</td>
<td></td>
<td>-0.125*</td>
<td>-0.107†</td>
<td>-0.071</td>
<td>-0.033</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.054)</td>
<td>(0.056)</td>
<td>(0.087)</td>
<td>(0.087)</td>
</tr>
<tr>
<td>Affordability Restrictions</td>
<td>-</td>
<td>0.079***</td>
<td>0.038</td>
<td>0.149**</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.041)</td>
<td>(0.041)</td>
<td>(0.075)</td>
<td>(0.073)</td>
</tr>
<tr>
<td>Percent of Tracts with Subway Entrances</td>
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Standard errors in parentheses.
*** p > 0.001, ** p > .01, * p > .05, † p > .10.
### Table 12. Crime Rate Averages Across Sub-borough Areas

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N = 55

### Table 13. Summary of Census Variables at the Sub-borough Level

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*** p > 0.001, ** p > .01, * p > .05, † p > .10
Table 15. Bivariate Correlations with Property Crime Rates

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Table 16: Fixed Effects Analysis of Assault Rates

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Standard errors in parentheses; *** p > 0.001, ** p > .01, * p > .05, † p > .10.
Table 17: Fixed Effects Analysis of Burglary Rates

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Standard errors in parentheses; *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.10.
Table 18: Fixed Effects Analysis of Larceny Rates

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<td>-16.948** (0.733)</td>
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<td>-17.706** (1.295)</td>
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<td>-15.908** (2.044)</td>
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<td>-15.304*** (3.148)</td>
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<td>-14.484** (3.719)</td>
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<td>0.205** (0.061)</td>
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N = 165

Standard errors in parentheses. *** p < 0.001, ** p < 0.01, * p < 0.05, † p < 0.10.
Table 22. Rape Averages Across Sub-borough Areas

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N = 55

Table 23. Bivariate Correlations with Rape Rates

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N = 55

*** p > 0.001, ** p > .01, * p > .05, † p > .10
### Table 24: Fixed Effects Analysis of Rape Rates

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**N = 165**

Standard errors in parentheses. *** p > 0.001, **p > .01, *p > .05, †p > .10.
Map 1. New York City Census Tracts, Neighborhoods and Sub-boroughs
Map 2. Tract Level Changes in the Percent College Educated Between 1980 and 1990

Legend

- Experienced Decrease (321)
- Experienced Increase
  - Lower than Median
  - Increase for City (744)
- Experienced Increase
  - Greater than Median
  - Increase for City
    - (1,896)
- Area Did Not Contain Population for Entire Length of Study Period (82)
Map 3. Neighborhoods Identified by the Bostic and Martin and Freeman Operationalizations During the 1980s
Map 4. Neighborhoods Identified by the Bostic and Martin and New York Times Operationalizations During the 1980s
Map 5. Neighborhoods Identified by the Freeman and New York Times Operationalizations During the 1980s

Legend
- Identifies by Both (23)
- Freeman (58)
- New York Times (44)
- Non-populated Neighborhood Area
Map 6. Neighborhoods Identified by the Bostic and Martin and New York Times Operationalizations During the 1990s
Map 7. Neighborhoods Identified by the Freeman and New York Times Operationalizations During the 1990s

Legend
- Identified by Both (23)
- Freeman (104)
- New York Times (27)
- Non-populated Neighborhood Area
Map 8. Neighborhoods Identified by the Bostic and Martin and New York Times Operationalizations During the 2000s
Map 9. Neighborhoods Identified by the Freeman and New York Times Operationalizations During the 2000s

Legend

-4.00 - 2.00 (29)
-1.99 - 0.00 (39)
0.01 - 2.00 (37)
2.01 - 4.00 (19)
4.01 - 6.00 (3)
6.01 - 8.00 (1)

Non-populated Neighborhood Area

Legend
-20% - 0% (62)
1% - 20% (123)
21% - 40% (2)
41% - 60% (1)
Non-populated Neighborhood Area

Legend
-20% - -10% (8)
-9% - 0% (118)
1% - 10% (55)
11% - 20% (7)
Non-populated Neighborhood Area

Legend
- 1% - 10% (20)
- 11% - 20% (128)
- 21% - 30% (39)
- 31% - 40% (1)
- Non-populated Neighborhood Area

Legend
-10% - 0% (30)
1% - 10% (133)
11% - 20% (25)
Non-populated Neighborhood Area
Map 17. Change in Foreign Born 1990-2000

Legend

-20% - -10% (1)
-9% - 0% (11)
1% - 10% (32)
11% - 20% (41)
21% - 30% (3)
Non-populated Neighborhood Area

Legend

-20% - -10% (1)
-9% - 0% (72)
1% - 10% (112)
11% - 20% (3)
Non-populated Neighborhood Area
Map 19. Change in Housing 40 Years or Older 1980-1990

Legend
-50% - 25% (1)
-24% - 0% (48)
1% - 25% (129)
26% - 50% (9)
51% - 75% (0)
76% - 100% (1)
Non-populated Neighborhood Area
Map 20. Change in Housing 40 Years or Older 1990-2000

Legend
-25% - 0% (17)
1% - 25% (156)
26% - 50% (13)
Non-populated Neighborhood Area
Map 22. Percent of Tracts Containing Housing Units that had Affordability Restrictions Applied 1980-1990

Legend
- 0% (38)
- 1% - 20% (50)
- 21% - 40% (34)
- 41% - 60% (15)
- 61% - 80% (2)
- 81% - 100% (1)
- Non-Populated Neighborhood Area (195)
Map 23. Percent of Tracts Containing Housing Units that had Affordability Restrictions Applied 1990-2000

Legend

- 0% (34)
- 1% - 20% (39)
- 21% - 40% (24)
- 41% - 60% (14)
- 61% - 80% (8)
- 81% - 100% (9)
- Non-Populated Neighborhood Area (195)
Map 24. Percent of Tracts Containing Housing Units that had Affordability Restrictions Applied 2000-2005/2009

Legend

- 0% (102)
- 1% - 20% (32)
- 21% - 40% (19)
- 41% - 60% (13)
- 61% - 80% (14)
- 81% - 100% (8)
- Non-Populated Neighborhood Area (195)
Map 26. Change in Assault Rate 1980-1990

Legend
- Large Decrease (2)
- Small Decrease (2)
- Small Increase (34)
- Large Increase (17)
- Gentrified Tract (140)
- Non-Populated Tract (65)
Map 27. Change in Assault Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (36)
- Small Increase (1)
- Large Increase (0)
- Gentrified Tract (144)
- Non-Populated Tract (65)
Map 28. Change in Assault Rate 2000-2005/2009

Legend
- Large Decrease (18)
- Small Decrease (35)
- Small Increase (1)
- Large Increase (1)
- Gentrified Tract (139)
- Non-Populated Tract (65)
Map 30. Change in Burglary Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (37)
- Small Increase (3)
- Large Increase (0)
- Gentrified Tract (144)
- Non-Populated Tract (85)

Legend
- Large Decrease (18)
- Small Decrease (35)
- Small Increase (1)
- Large Increase (1)
- Gentrified Tract (135)
- Non-Populated Tract (85)
Map 32. Change in Larceny Rate 1980-1990

Legend
- Large Decrease (3)
- Small Decrease (39)
- Small Increase (7)
- Large Increase (6)
- Gentrified Tract (148)
- Non-Populated Tract (85)
Map 33. Change in Larceny Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (37)
- Small Increase (9)
- Large Increase (0)
- Gentrified Tract (144)
- Non-Populated Tract (65)
Map 34. Change in Larceny Rate 2000-2005/2009

Legend
- Large Decrease (8)
- Small Decrease (11)
- Small Increase (22)
- Large Increase (14)
- Gentrified Tract (136)
- Non-Populated Tract (65)
Map 35. Change in Homicide Rate 1980-1990

Legend
- Large Decrease (2)
- Small Decrease (1)
- Small Increase (34)
- Large Increase (18)
- Gentrified Tract (140)
- Non-Populated Tract (65)
Map 37. Change in Homicide Rate 2000-2005/2009

Legend
- Large Decrease (19)
- Small Decrease (35)
- Small Increase (1)
- Large Increase (0)
- Gentrified Tract (138)
- Non-Populated Tract (85)
Map 38. Change in Motor-Vehicle Theft Rate 1980-1990

Legend
- Large Decrease (4)
- Small Decrease (14)
- Small Increase (24)
- Large Increase (13)
- Gentrified Tract (148)
- Non-Populated Tract (85)
Map 39. Change in Motor-Vehicle Theft Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (37)
- Small Increase (3)
- Large Increase (0)
- Gentrified Tract (144)
- Non-Populated Tract (65)

Legend
- Large Decrease (14)
- Small Decrease (27)
- Small Increase (7)
- Large Increase (7)
- Gentrified Tract (138)
- Non-Populated Tract (85)
Map 41. Change in Robbery Rate 1980-1990

Legend
- Large Decrease (6)
- Small Decrease (11)
- Small Increase (24)
- Large Increase (14)
- Gentrified Tract (148)
- Non-Populated Tract (65)
Map 42. Change in Robbery Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (30)
- Small Increase (3)
- Large Increase (0)
- Gentrified Tract (144)
- Non-Populated Tract (65)
Map 43. Change in Robbery Rate 2000-2005/2009

Legend
- Large Decrease (14)
- Small Decrease (37)
- Small Increase (3)
- Large Increase (1)
- Gentrified Tract (136)
- Non-Populated Tract (65)
Map 45. Change in Concentrated Disadvantage 1990-2000

Legend
-1.99 - -1.00 (8)
-0.99 - 0.00 (19)
0.01 - 1.00 (24)
1.01 - 2.00 (4)
Map 47. Change in Residential Stability 1980-1990

Legend
- 10% - 15% (2)
- 5% - 10% (14)
- 1% - 5% (19)
- 1% - 0% (14)
- 10% - 15% (5)
- 16% - 20% (1)

Legend
-10% - -5% (6)
-4% - 0% (30)
1% - 5% (19)
Map 49. Change in Residential Mobility 2000-2005/2009

Legend

- 0% - 10% (2)
- 11% - 15% (13)
- 16% - 20% (27)
- 21% - 25% (11)
- 26% - 30% (2)
Map 50. Change in Foreign Born 1980-1990

Legend

-5% - 0% (8)
1% - 5% (23)
5% - 10% (19)
11% - 15% (5)
Map 51. Change in Foreign Born 1990-2000

Legend

- 5% - 0% (1)
- 1% - 5% (21)
- 5% - 10% (23)
- 11% - 15% (6)
- 16% - 20% (4)

Legend
-5% - 0% (8)
1% - 5% (14)
5% - 10% (18)
11% - 15% (12)
16% - 20% (4)
21% - 25% (1)
Map 53. Change in Housing 40 Years or Older 1980-1990

Legend
-20% - -10% (2)
-9% - 0% (8)
1% - 10% (32)
11% - 20% (9)
21% - 30% (4)
Map 56. Percent of Tracts that Contain at Least One Subway Entrance

Legend
- 0% - 15% (17)
- 16% - 30% (25)
- 31% - 45% (13)
- 46% - 60% (2)
Map 57. Percent of Tracts Within Each Sub-borough that Gentrified Between 1980 and 1990

Legend

- 0% - 15% (49)
- 16% - 30% (3)
- 31% - 45% (2)
- 46% - 60% (1)
Map 58. Percent of Tracts Within Each Sub-borough that Gentrified Between 1990 and 2000

Legend
- 0% - 15% (40)
- 16% - 30% (6)
- 31% - 45% (0)
- 46% - 60% (1)

Legend

- 0% - 15% (47)
- 16% - 30% (7)
- 31% - 45% (1)
- 46% - 60% (0)
Map 60. Tracts that Gentrified During the 1980s According to Bostic and Martin Operationalization

Legend

- Borough Boundaries
- Gentrified (146)
- Non-gentrified (1,985)
- Zero Population (65)
Map 61. Tracts that Gentrified During the 1990s’s According to Bostic and Martin Operationalization

Legend

- Borough Boundaries
- Gentrified (144)
- Non-gentrified (1,987)
- Zero Population (65)
Map 62. Tracts that Gentrified During the 2000s According to Bostic and Martin Operationalization
Map 63. Tracts that Gentrified During the 1980s According to Freeman Operationalization

Legend
- Borough Boundaries
- Gentrified (131)
- Non-gentrified (2,000)
- Zero Population (65)
Map 64. Tracts that Gentrified During the 1990s According to Freeman Operationalization

Legend
- Borough Boundaries
- Gentrified (239)
- Non-gentrified (1,892)
- Zero Population (65)
Map 65. Tracts that Gentrified During the 2000s According to Freeman Operationalization

Legend
- Borough Boundaries
- Gentrified (281)
- Non-gentrified (1,850)
- Zero Population (65)
Map 66. Change in Rape Rate 1980-1990

Legend
- Large Decrease (11)
- Small Decrease (23)
- Small Increase (13)
- Large Increase (8)
- Gentrified Tract (140)
- Non-Populated Tract (65)
Map 67. Change in Rape Rate 1990-2000

Legend
- Large Decrease (18)
- Small Decrease (35)
- Small Increase (1)
- Large Increase (1)
- Gentrified Tract (144)
- Non-Populated Tract (85)
Map 68. Change in Rape Rate 2000-2005/2009

Legend
- Large Decrease (17)
- Small Decrease (36)
- Small Increase (1)
- Large Increase (1)
- Gentrified Tract (139)
- Non-Populated Tract (65)