WHITE FLIGHT AND SPATIAL ASSIMILATION IN NEWLY MULTIRACIAL SUBURBS: THE CASE OF GWINNETT COUNTY, GEORGIA

by

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(Under the Direction of Steven Holloway)

ABSTRACT

As U.S. metropolitan areas and "white suburbs" transition towards a multiracial demographic structure, the significance of race to residential location must be re-examined to understand the prospects of racial residential integration. Gwinnett County, Georgia, an Atlanta suburb facing this demographic change, serves as a case study to scrutinize its recent racial diversification's effects, including the possibility of simultaneous segregation and integration between whites and non-whites. The findings indicate that this trend is occurring: While whites' responses to rapid racial diversification translate into white flight and greater segregation from non-whites, racial minorities are moving into once nearly all-white areas in accordance with the spatial assimilation model and thereby contributing to greater overall integration. Despite some optimism for integration, this study stresses the continuing salience of race and the need to explore the increasingly complex relationship between race and residential location and possible theoretical implications arising in the multiracial context.

INDEX WORDS: Atlanta, integration, multiracial, neighborhoods, race, residential location, segregation, spatial assimilation, suburbs, white flight

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CHAPTER 1

INTRODUCTION

Race and the Suburbs: Towards Integration and Segregation

> "Mary James, an empty-nester from Snellville, craves the in-town bustle. Michelle Forren is tired of planning life around rush hour in Duluth. And Louise Stewart is fed up with the Spanish-language business signs, backyard chickens and overcrowded homes in her Norcross-area neighborhood. Though their reasons vary, all three women plan to join an emerging demographic: whites leaving Gwinnett County." (Feagans 2005, B1)
>
> "The demographic shift is changing more than just the restaurants in the corner strip mall. Little-used softball diamonds at Lucky Shoals Park in Norcross were recently converted into soccer fields. When pop star Marc Anthony performed at the Gwinnett Arena in September, he sang in Spanish, not English, the language he used onstage in Atlanta. And officials who once expected to close schools around the aging neighborhoods of western Gwinnett are instead adding classrooms and English language teachers to accommodate the children of immigrants." (Feagans 2005, B5)

In November 2005, the article "Gwinnett's Changing Hue" in the *Atlanta Journal-Constitution* described an important and rapidly emerging change to the face of suburban Atlanta. As the excerpts above indicate, Gwinnett County's demographics are experiencing a significant shift as racial and ethnic minority groups, especially Hispanics, are making this county their home while long-time white residents are departing. A popular destination for white suburbanites up through the 1990's, the once "nearly lily-white county of old" has literally become a "mini-Ellis Island" (Feagans 2005, B1). This trend is not unique: Several scholars (Alba, Logan, and Stults 2000; Clark 2006; Frey 2001) have found similar demographic changes in other U.S. metropolitan areas as their suburbs are beginning to receive large numbers of racial minorities and face the possibility of white population losses.

Even as the alarm for suburban white flight and racial demographic changes is being sounded in Gwinnett County and other suburban areas, these trends highlight the continuing significance of race to residential location and challenge both the notion and the reality of "white suburbia." From mid-20th century works (e.g. Duncan and Duncan 1957; Taeuber and Taeuber 1965) to more recent studies (e.g. Krysan 2002; Zubrinsky-Charles 2000), over half a century of research has confirmed race as a major discriminatory driving force behind urban neighborhood changes. As spatial components to this issue, suburbanization and segregation have occupied central roles: Historically, the suburbs represented a safe retreat for whites fleeing from some non-whites, primarily African-Americans, in central cities, contributing to high levels of racial residential segregation in the 20th century (Massey and Denton 1993). In contrast, previous "non-white" European immigrant groups successfully achieved full spatial (as well as cultural, socioeconomic, and ethnic/racial) assimilation with the white middle class via suburbanization (Burgess 1925; Gordon 1964; White 1987).

In recent years, increasing numbers of non-European, "non-white" immigrants and African-Americans are contributing substantially to suburban population growth (Frey 2001). The increasingly multiracial nature of suburbs (and metropolitan areas in general) complicates the relationship between race and residential location and scholars' understanding of it. Until recently, researchers considered cities and neighborhoods in biracial terms and focused primarily on black/white segregation with less emphasis on the role of race for "non-white" (i.e. Asian and Hispanic) immigrants and its impacts on residential integration. Increasingly, though, scholars' are recognizing the importance of race for these groups (Alba and Nee 1997) and the need to consider the urban context as "multiracial" (Fong and Shibuya 2005; Iceland 2004). Further, although Asians and Hispanics are suburbanizing and arguably integrating with whites (Alba et

al. 1999), the influx of these currently "non-white" groups plus African-Americans also raises concerns about racially-motivated reactions from suburban whites and their results, including white flight and increasing racial segregation. Thus, racially integrative and segregative forces may co-exist within the same suburban space, potentially altering the prospects for racial residential integration. Although previous research (e.g. Crowder 2000; Iceland 2004; Krivo and Kaufman 1999; Logan, Stults, and Farley 2004) hints at the existence of a tension between white/non-white integration and segregation in multiracial settings, barring a few scholars' works (e.g. Cashin 2004; Maly 2005), this issue and its actual and theoretical impacts have yet to be adequately explored, particularly within the context of "white suburbs."

In order to re-examine the significance of race to residential location and the prospects for white/non-white integration in increasingly multiracial suburbs, I focus on Gwinnett County's racial diversification and its consequences in the 1990's. Its recent demographic trends present an intriguing case of how suburban (and, perhaps, metropolitan) areas might be accommodating non-white newcomers and raise crucial questions: For instance, how do whites adjust their residential location in response to a multiracial demographic shift? To what extent does white flight limit non-whites'/immigrants' prospects for integration and eventual assimilation into mainstream American society? How might one county's situation illustrate broader trends concerning racial diversification's consequences and the role of race vis-à-vis residential location? With no end in sight to current trends, the emergence of "multiracial suburbs" and their impacts require further attention as race continues to be a socially powerful force behind changes in the very places that most Americans call "home."

Research Purpose

As many suburbs shift from a predominantly white locale to a more multiracial one, issues related to the continuing significance of race to residential location must be re-examined. Specifically, this project will consider white flight and spatial assimilation as opposing forces affecting the prospects for meaningful integration within suburban areas undergoing a multiracial demographic shift and scrutinize the role of race within this context. Using Gwinnett County as a case study, I will address these issues by focusing on two interrelated research questions:

1) How does suburban racial diversification contribute to white flight and other changes in the white population's spatial distribution?
2) To what extent do the observed changes in whites' spatial distribution affect racial minorities' spatial assimilation with whites?

Using aggregate data for Gwinnett County's demographic characteristics at the block group level from 1990 to 2000, I will use multivariate regression to assess whether white flight is occurring in response to racial diversification at the neighborhood level and how this relationship is affecting whites' spatial distribution in the study area. To determine how much whites' spatial redistribution, via white flight or otherwise, is affecting non-whites' spatial assimilation with whites, I will employ a procedure developed by Holloway et al. (1999) to decompose a widely-used segregation index, Lieberson's (1981) *P**, in order to examine changes in residential segregation levels.

Given the importance of race in previous research, I expect my results to reveal that suburban racial diversification has had some negative impacts on white/non-white residential integration and will demonstrate that race is a still-central issue to residential location. While this research highlights the continuing salience of race, it also attempts to fill a gap in the current

literature. As noted previously, only recently are researchers addressing the urban context as a multiracial one. How the presence of multiple racial groups may alter the urban environment and how the outcomes of a multiracial (suburban) context may differ from currently theorized patterns remain obscure. The research results may offer a window towards alternative theorizations of urban racial dynamics. Also, the suburbs may no longer be a bastion of whiteness or a place for immigrant assimilation, and increasing demographic diversity has led some scholars (e.g. Wright, Ellis, and Parks 2005) to challenge more traditional notions of residential integration and assimilation, i.e. with whites. However, given the reality of racial discrimination and the deleterious effects of segregation in the African-American experience,[1] stable integration with whites is still a highly pertinent concern (Logan 2005), and understanding the prospects of this type of integration for all racial minorities is an ultimate goal of this study. While the door towards integration remains open, a sizeable proportion of today's non-white and immigrant groups, whether by choice or discrimination, may find themselves excluded, as the trends in Gwinnett County appear to indicate.

Thesis Design

In the remaining chapters, I will review the literature and describe the study area and methodology used to analyze the impacts of racial demographic changes, the results of which will be presented in order to draw some conclusions about the prospects of integration and the significance of race to residential location within an increasingly multiracial suburban context. In Chapter 2, the literature review follows the black/immigrant divide in this body of literature. I begin with a discussion of the role of race to residential location and mobility with specific reference to the African-American residential experience vis-à-vis white flight and segregation. Subsequent to this section, I proceed to Massey's (1985) spatial assimilation theory, the

dominant framework for explaining white/non-white integration and immigrant assimilation. Because scholars have just begun to consider the increasing racial diversity of metropolitan areas and the presence of multiple racial groups as consequential to racial residential integration, I review some recent studies which recognize the importance of this context and incorporate a multiracial dimension into their methodologies. Of particular interest is the co-existence of integration and segregation within racially diversifying places, a trend which Gwinnett County appears to be experiencing. The presence of both segregative and integrative forces in the same metropolitan space has produced widely varying conclusions about the impacts of a multiracial context on residential integration and reflects a major uncertainty in the current literature.

Chapter 3 describes Gwinnett County and its racial demographic trends and introduces the set of methodologies for analyzing the impacts of suburban racial diversification in relation to white flight and spatial assimilation. Gwinnett County's (and Atlanta's) historically biracial demographic structure and its image as a traditional "white suburb" have disappeared with racial diversification since the 1990's, making the county a prime example for examining the relationship between race and residential location within a newly multiracial setting which, theoretically, should serve as an area for assimilation. The methodology section discusses, first, the use of multivariate regression to model whites' responses to the entry of multiple racial groups in order to detect the presence of white flight and, second, a process to decompose the P^* index, a segregation measure which assesses the impacts of whites' spatial redistribution on non-whites' ability to integrate residentially.

In Chapter 4, the descriptive statistics of the variables in the regression model and for the P^* calculations are described and are followed by a discussion of the results from both the regression and P^* analyses. The descriptives section is intended to provide more details of the

patterns and trends across Gwinnett County's neighborhoods during the 1990's, particularly those pertaining to the racial demographics and the major racial groups' spatial (re)distribution. In the remainder of the chapter, I first review the basic regression results and the racial and non-racial (control) variables' impacts on changes in the white population, the dependent variable used to approximate this group's residential mobility. Then, before turning to the P^* decomposition results, I examine the segregation trends (measured by the P^* index) for the major racial groups. Following each of the two steps in the decomposition process, I discuss the effects of, one, compositional and spatial redistributive forces and, two, each racial group's spatial redistribution on changes in residential isolation and exposure levels.

Finally, Chapter 5 concludes the thesis by revisiting the research questions and presenting a summary of the findings and their significance placed within the broader context of the race and residential segregation literature. Then, I briefly bring up the limitations of this study, and to wrap up, I discuss some potential avenues for future research and highlight the ongoing need to promote more studies on the relationship between race and residential location as well as its consequences in order to continue the fight against racism in our society.

CHAPTER 2

LITERATURE REVIEW

Throughout the 20th century, U.S. metropolitan areas' racial and ethnic geographies have undergone dramatic shifts with the arrival of immigrants, African-Americans, and other groups providing the impetus for neighborhood demographic changes via residential succession and, ultimately, for white flight and assimilation. Within the Chicago School's ecological framework, the idea of residential succession has been utilized to explain racial turnover and white flight (Duncan and Duncan 1957; Taeuber and Taeuber 1965) and influenced spatial assimilation theory (Massey 1985). Interestingly, framing both white flight and spatial assimilation as products of residential succession appears contradictory since the two processes produce generally opposite outcomes for the residential location of racial/ethnic minorities and whites: Whereas neighborhood succession via white flight results in racial turnover and re-segregation (a scenario historically applicable to African-Americans) (Duncan and Duncan 1957), spatial assimilation presumes that the same process of succession directs racial/ethnic minorities (mostly immigrants) towards stable integration with the native-born, majority group (i.e. whites) (Massey 1985). Yet, despite the glaring black/immigrant differences in residential experience, neither proponents nor critics of the Chicago School seem to have thoroughly addressed this theoretical paradox in the literature.[1]

In the post-1965 era, the massive increase in African-Americans and non-white immigrant groups in the suburbs presents the possibility that both white flight and spatial assimilation co-exist within the same residential space, creating a tension between racial

segregation and integration. Uncertainty exists as to whether this newly multiracial context will become stably integrated among all groups and how the suburban (and metropolitan) residential geography vis-à-vis race will change. Following the black/immigrant divide in the literature, I first discuss white flight as it relates to residential mobility and racial segregation with primary reference to African-Americans; then, I present an overview of spatial assimilation theory, its applicability to post-1965 immigrants, and its current critiques vis-à-vis issues of race. The chapter ends with a section on the emerging multiracial context's impacts on residential location patterns, highlighting the tension between racial segregation and integration within this context.

Race, Residential Mobility, and Segregation: White Flight

As a popularized phrase for racially-motivated residential mobility among whites, "white flight" has theoretical roots which trace back to the Chicago School's model of ethnic "invasion and succession," or residential succession, as described by Park (1925) and Burgess (1925) to explain a facet of immigrants' integration into the American mainstream. Subsequent studies (e.g. Duncan and Duncan 1957; Taeuber and Taeuber 1965) argue that residential succession applies to African-Americans, but in contrast to the residential experience of most immigrant groups, neighborhoods undergoing white-to-black transition rarely achieved stable integration or allowed African-Americans to become fully "assimilated" with the white majority. The rapid movement of whites out of neighborhoods "invaded" by African-Americans, even when they possess socioeconomic and other non-racial characteristics similar to those of their white neighbors, resulted in racial turnover, racial segregation, and minority ghettoization (Duncan and Duncan 1957; Massey and Denton 1993).[2]

In scrutinizing race as a significant driving force behind residential mobility, late 20th century scholars have examined, at different scales, the connection among racial prejudice and

discrimination, white flight, and racial segregation. At the individual/community level, whites' racial prejudice, strong own-group preferences, and negative stereotypes about non-whites influence residential mobility decisions which contribute to the persistence of racial segregation across neighborhoods. For example, Schelling (1971) noted the presence of a "tipping point" associated with a neighborhood's non-white composition, at which even the most racially tolerant whites will leave or avoid the neighborhood, and researchers drawing from the Detroit Area Study (DAS) and Multi-City Study of Urban Inequality (MCSUI) came to similar conclusions (Farley et al. 1978; Farley et al. 1993; Farley, Fielding, and Krysan 1997; Zubrinsky and Bobo 1996). Among studies using the most recent MCSUI data, Krysan (2002) points out that whites' potential reasons for leaving a black/white integrated neighborhood include both racial prejudice and seemingly non-racial issues, such as decreasing property values and increasing crime, which respondents associated with neighborhood instability and racial integration. Related to these negative perceptions, whites' current residential preferences for white-dominant/majority neighborhoods still provide the impetus for whites to leave areas where racial minorities have a significant presence, forming a persistent barrier to meaningful integration (Adelman 2005; Krysan 2002; Krysan and Farley 2002; Zubrinsky-Charles 2000).

While small-scale factors have been important to whites' residential mobility, structural forces have also facilitated white flight and exacerbated racial segregation levels. Particularly, institutionalized forms of racial discrimination have consistently favored whites over non-whites (primarily African-Americans) and allowed whites greater ability to realize their own residential choices. As a historical example, the Federal Housing Administration's (FHA) policies and overt discrimination by lending and housing institutions effectively subsidized the post-World War II white suburbanization but blocked African-Americans from leaving the cities (Jackson

1985; Massey and Denton 1993). Currently, covert forms of racial discrimination still allow whites greater residential mobility than non-whites by providing them with a wider range of housing and neighborhood choices and better odds at realizing their own residential preferences, especially in regards to neighborhood racial composition (Yinger 1995).

With individual-level and structural factors consistently favoring white flight, a highly segregated urban spatial structure has evolved and persists to the present. Measurements of black/white segregation by Massey and Denton (1993) indicate that the exodus of whites *en masse* for the suburbs during the post-World War II period led to rising segregation levels across U.S. metropolitan areas as increasingly fewer whites and blacks shared the same neighborhoods or lived in close proximity to each other. Captured by Farley et al.'s (1978) metaphor "chocolate city, vanilla suburbs," the high white/black segregation levels since the mid-20th century have not decreased drastically in most metropolitan areas (Massey and Denton 1993), an observation supported by scholars using more recent data (e.g. Logan, Stults, and Farley 2004; Zubrinsky-Charles 2003). Also, African-Americans experience "hypersegregation" from whites in more metropolitan areas than any other racial/ethnic minority group (Wilkes and Iceland 2004).[3] In contrast, while Hispanic/white and Asian/white segregation indices remain low to moderate, whites consistently are more integrated with Hispanics and Asians and have a greater residential preference for them than for African-Americans (Logan, Stults, and Farley 2004; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000; Zubrinsky-Charles 2003).

Clearly, racial prejudice and discrimination serve as prime motivations for whites' residential mobility and as causal explanations for high racial segregation levels which perpetuate minority marginalization and disadvantage. As long as race remains a concern for residential choices, white flight is still a possibility, and any long-term racial integration between

whites and racial minorities seems precarious at best. On the other hand, eventual integration is as likely an outcome as persistent segregation, and as will be discussed in the next section, some currently racialized groups are reaching assimilation, residentially and otherwise, with whites.

Toward Residential Integration: The Spatial Assimilation Model

Assimilation has been a hallmark of American society as streams of immigrants have been absorbed into the U.S. and become (white) "American." The fundamental concepts of immigrant and ethnic assimilation ultimately stem from the Chicago School's observations of ethnic neighborhood succession patterns and their relationship to socioeconomic status. According to Burgess' (1925) model, as immigrants and successive generations improve their socioeconomic position and acquire better housing, they "invade" neighborhoods successively farther from the inner-city ethnic enclave and expand spatially outward towards the "'Promised Land' beyond" (Burgess 1925, 56) in the suburbs. In addition, the model implies an association between movement towards the urban fringe and loss of ethnic identity as the Americanization process gradually melds together ethnics and the native-born over time and space.

Incorporating the Chicago School's theoretical framework and more recent scholars' works (e.g. Gordon 1964), spatial assimilation theory (Massey 1985) formalizes the relationship between the cultural, socioeconomic, and spatial facets of assimilation and provides an important framework for explaining how immigrants and their descendents assimilate with the native-born. In this context, "assimilation" means that ethnics acquire the dominant society's culture and language, achieve upward socioeconomic mobility, disperse outside of ethnic enclaves into middle-class (and usually suburban) neighborhoods, gain acceptance by the majority population group, and, eventually, lose their ethnic identity by the third or fourth generation. In the 20th century U.S. context, although the model does not specifically address the issue of racial

assimilation, it implies a "whitening" process which follows from residential integration, the breakdown of social barriers, and intermarriage between whites and non-whites.

With the increase in Asian and Latin American immigration, recent scholars have grappled with the issue of assimilation among non-European ethnic groups. Although spatial assimilation theory draws primarily from the experience of 19th and early 20th century "old" European immigrants, Massey (1985) contends that non-European groups of the post-1965 "new" immigration follow the same assimilation trajectory as the "old" immigrants. Considerable support for the spatial assimilation model exists in relation to the contemporary experience of Asians and Hispanics. White (1987), Alba and Logan (1993), Alba et al. (1999), and other scholars contend that, generally, Asians and Hispanics are assimilating with whites on multiple dimensions as decreasing or stable white/minority segregation levels reflect these two groups' ability to achieve residential propinquity with suburban whites over time. Undoubtedly, whites' greater residential preference for these two groups (vis-à-vis African-Americans) has facilitated Asian and Hispanic entry into white neighborhoods (Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000). In addition, other assimilation indicators point to increasing proximity with whites: For example, the post-1965 second generation is showing strong signs of socioeconomic assimilation with their native-born counterparts (Farley and Alba 2002). Also, white/Asian and white/Hispanic intermarriage patterns are placing the two immigrant groups on the trajectory towards social assimilation with whites (Bean and Stevens 2003; Lee and Bean 2004; López 1999), and the increase in interracial/ethnic marriages appears to be facilitating the spatial dispersion of immigrants outside of their own ethnic enclaves and, presumably, to "whiter" neighborhoods (Ellis, Wright, and Parks 2006; Holloway et al. 2005). Accordingly, the assimilation of the "new" immigrants is following the pattern of earlier European immigrants,

and implicitly, these members of today's racial/ethnic "minorities" will gain full entry into the white middle-class "majority."[4]

While empirical studies have upheld spatial assimilation theory, its inability to account fully for the role of race to integration has brought forth critiques and alternative theories. In the case of African-Americans and ethnic groups with visible African ancestry (e.g. Puerto Ricans), Massey (1985) does recognize them as exceptions to the model because of the majority group's racial prejudice, and the difference in outcome for these groups' residential location vis-à-vis their socioeconomic status has led to the formulation of a place stratification theory (Logan, Alba, and Leung 1996). Yet, aside from racial prejudice, no other reasons exist to explain the low levels of integration and assimilation between blacks and whites, and thus, spatial assimilation theory should equally apply to persons of African descent if whites' racial prejudice and associated barriers to housing access were removed.

Further, spatial assimilation theory's inapplicability to a large segment of American society underscores not only the importance of race but also the implications for Asians and Hispanics. Some scholars have argued against the overall assimilability of Asians and some Hispanics *because of* their non-European origins and their greater distinctiveness in terms of skin color (Alba and Nee 1997). Perlmann and Waldinger (1999) also note that, unlike European immigrants, Asian and Hispanic immigrants are defined as "people of color" who may be in a less favorable position to assimilate racially (and, implicitly, spatially as well) with whites. While such an argument based on actual and perceived differences in phenotype has validity, however, the experiences of once racialized European groups (e.g. Italians, Irish) and their ability to assimilate partly counter this claim (Jacobson 1998; Roediger 2005). In addition, other researchers have presented more subtle challenges to spatial assimilation theory vis-à-vis

immigrant groups: For instance, research findings by Krivo and Kaufman (1999) and Crowder (2000) imply that large numbers of socioeconomically and culturally assimilated non-whites might not be able to achieve residential (or even social) proximity with whites. Also, Li's (1998) "ethnoburb" and Portes and Zhou's (1993) "segmented assimilation" suggest that the traditional assimilation trajectory may not apply to some racial minorities because of ethnic retention or downward assimilation with the underclass.

While criticisms of spatial assimilation theory highlight the potential for increasing white/non-white segregation levels in the future, assimilation remains a strongly rooted trend in the U.S. At least for now, the issue of race presents less of a roadblock for most non-white immigrant groups than for African-Americans on the path towards meaningful integration with whites. With no end to current immigration trends in sight, a predominantly multiracial context may become the norm and will complicate the dynamics of residential integration.

The Multiracial Context: Integration or Segregation? (or Both?)

With the rapid growth of various non-white groups, the American urban "melting pot" is truly becoming racially "prismatic" (Zubrinsky and Bobo 1996). Racial diversity in the suburbs has gained prominence during the previous several decades as Asians, Hispanics, and African-Americans have successfully gained access to majority-white neighborhoods (Alba et al. 1995; Alba, Logan, and Stults 2000; Frey 2001), and even suburban ethnic enclaves (the "ethnoburb") have sprung up near highly diverse cities such as Los Angeles (Li 1998). With racial minorities contributing to a substantial portion or all of suburban population growth across a large number of U.S. metropolitan areas (Frey 2001), this trend debunks the "vanilla suburbs" image (Farley et al. 1978), and suburban diversity will become the rule, rather than the exception, for the future.

More importantly, the emergence of the multiracial metropolis demands new ways of understanding how (suburban) racial diversification affects and complicates residential patterns. Specifically, scholars need to explore further how processes of residential integration and segregation between whites and racial minorities (i.e. white flight and spatial assimilation, respectively) fit into the emerging multiracial context. Some indications of a tension between integration and segregation within this context are reflected in the literature, highlighting the general ambiguity among academics about how issues of race will determine racial groups' locational outcomes and will impact the degree of white/non-white integration when multiple racial groups are present in significant numbers. While some scholars have expressed the importance of the "multiracial/ethnic effect" to racial integration (e.g. Cashin 2004; Frey and Farley 1996), others seem less optimistic about racial minorities' prospects of achieving a high degree of spatial propinquity with whites in a multiracial setting, at least in the near future (e.g. Krivo and Kaufman 1999; Logan, Stults, and Farley 2004). As an additional note, since few works focus specifically on suburban areas, I draw from the broader literature on race and residential location, which incorporates a multiracial dimension to develop the discussion of the impacts of suburban racial diversification on residential mobility and segregation.

In support of the "multiracial/ethnic effect," some studies uphold the argument for the possibility of stable integration in places with large numbers of racial minorities. For example, Alba et al.'s (1995) study of metropolitan New York over a two-decade period emphasizes the predominance of integration in the once white-majority suburbs and the relative lack of white flight with the entry of several non-white groups, although "integrated" areas often have few African-Americans. Among more recent works, Frey and Farley (1996) and Iceland (2004) have found evidence that Asians and Hispanics act as a "buffer" between whites and blacks and

ameliorate high black/white segregation levels, promoting an overall greater degree of racial integration. Zubrinsky-Charles (2000) also notes that, although the racial hierarchy in residential preference found by Zubrinsky and Bobo (1996) still holds, the paucity of respondents preferring neighborhoods with their own racial group only or in the majority increases the chances for substantial integration among all groups. While such studies indicate a path towards integration, others point to diversity as a key factor to maintaining residential areas' racial balance. In some communities, the presence of many racial and ethnic groups promotes a positive sense of diversity, such that it contributes to demographic stability in multiracial neighborhoods (Cashin 2004). Also, increasing rates of interracial marriage and multiracial household formation could translate into integration at both the neighborhood and metropolitan scales, as Holloway et al. (2005) have noted that mixed-race households do not readily fit into the racially segregated urban structure and tend to live in more racially diverse areas. Further, if spatial assimilation theory adequately describes the "new" immigrants' path to assimilation, Asians and Hispanics should face relatively few barriers towards integration with whites.

On the other hand, current research also hints at significant potential for segregation, particularly between whites and non-whites. Counter to the "multiracial/ethnic effect," some studies indicate that the presence of more than one minority group has little impact towards decreasing black/white segregation levels (Krivo and Kaufman 1999; Logan, Stults, and Farley 2004), nor does the growth in the Asian and Hispanic population automatically translate into a greater degree of integration among all racial groups (Iceland 2004). Part of the explanation for this trend lies in whites' preference to live in predominantly white neighborhoods and their desire to minimize residential contact with blacks *and* non-black minorities simultaneously, relegating many whites and minorities to separate neighborhoods where their own group is more

likely to be numerically dominant (Krivo and Kaufman 1999; Zubrinsky and Bobo 1996). Crowder's (2000) analysis of white flight also supports whites' lack of tolerance for all non-white groups and demonstrates that the size of a neighborhood's total racial minority population, regardless of ethnic composition, matters for whites' residential decisions and mobility. Although the literature on racially-motivated residential mobility has focused almost exclusively on the case of African-Americans, this study poses the possibility of white flight from Asians, Hispanics, and other non-black groups. Furthermore, if critiques of spatial assimilation theory are correct about non-black minorities' phenotypical differences and alternative assimilation trajectories, issues of race would be more consequential to these groups than previously theorized, and the suburbs may no longer serve as a receptive area for racial minorities and immigrants to assimilate with the majority white population. As a corollary, this possibility raises concerns about greater segregation from whites and minority ghettoization for current immigrant groups.

Also, while much of scholars' concerns center on white/non-white segregation, a multiracial context demands an understanding of residential location dynamics concerning not only between whites and racial minorities but also *among* racial minority groups. The few previous multiracial studies (e.g. Clark 2002; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000) on residential preferences using MCSUI data indicate the likelihood of both substantial integration and segregation among African-Americans, Hispanics, and Asians. First, as noted by Zubrinsky and Bobo (1996) and Zubrinsky-Charles (2000), compared to whites, members of all three racial minority groups express a greater preference for integration and more willingness to live in neighborhoods where their own group is the numerical minority. African-Americans in particular are open to a high degree of integration, a finding which previous studies support

(Farley et al. 1978; Farley et al. 1993; Krysan and Farley 2002). However, when preferences for specific out-groups are considered, the prospects for integration appear bleaker. Even though African-Americans are the most favorable to integration, other racial groups, particularly foreign-born Hispanics and Asians, consistently desire them the least as neighbors. Asians' and Hispanics' preferences with respect to each other are comparable to whites' preferences for these two groups, indicating some potential for Asian/Hispanic integration. Yet, these two minority groups (plus African-Americans) also tend to favor their own racial group and whites over other racial minorities, which suggests the potential for all minority groups to segregate from each other (and particularly non-black groups from African-Americans) to reach their ideal neighborhood composition (Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000). While Clark (2002) explains the pattern of own-group preference as ethnocentrism, other researchers point to racial prejudice and negative stereotypes as underlying causes (Krysan 2002; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000). Furthermore, this tension between integration and segregation among non-whites raises questions concerning common notions about the nature of integration and who is more likely to be incorporated into an "integrated" neighborhood.

With white-majority suburban neighborhoods transitioning towards multiracial and even "minority-majority" areas, the growing multiracial context presents a scenario in which the possibility for spatial assimilation and white flight could co-exist within the same residential space and heighten the tension between integration and segregation. As non-whites acculturate and move upward socioeconomically in accordance to the spatial assimilation model, their attempts to integrate residentially with (native-born) whites may clash with whites' ability to maintain residential distance from non-whites. With white flight as a probable response to significant racial integration, the status quo may exclude large numbers of racial minorities from

the advantages of living in a "white" residential area, even in the suburbs, and perhaps from meaningful assimilation into mainstream American society. Complicating this pattern, non-whites' greater openness to integration and attempts to distance themselves from other racial minorities outside of their own racial/ethnic group obscure scholars' understanding of residential patterns and possibilities for stable integration. The tension between integrative and segregative forces further underscores the continuing significance of race for all racial/ethnic groups and, at the same time, poses a prospective challenge to established theoretical frameworks.

While much uncertainty surrounds issues of race and residential location within the multiracial context developing in U.S. metropolitan areas, this area of research is particularly relevant for Atlanta, Georgia, a historically biracial metropolis which once attracted relatively few migrants but is now transforming and diversifying through population growth and immigration. Gwinnett County represents a microcosm of Atlanta's demographic shift and serves as an important site to explore the effects of racial diversification on the residential geography of metropolitan areas and, more specifically, their suburbs. Using Gwinnett County as a case study, I will examine recent demographic trends which will lead to a better understanding of an increasingly multiracial environment's impacts on residential patterns while scrutinizing the salience of race and prospects for meaningful integration within this context.

CHAPTER 3

STUDY AREA AND METHODOLOGY

The relationship between race and residential location has directed generations of scholars to explore, at various spatial scales and by different methodologies, the underlying causes of residential segregation and to advocate remedies for racial prejudice and minority ghettoization. With increasing demographic diversity in metropolitan areas and especially in the suburbs, this newly multiracial context presents fresh theoretical and practical challenges for scholars and raises questions about the future of U.S. metropolitan areas' racial geographies. In this thesis, I use Gwinnett County, Georgia, as a case study for examining the significance of race to residential location within an emerging multiracial suburban context. Through data analyses using multivariate regression and racial segregation indices, I explore patterns and relationships in detail and report results which can be compared with those from similar studies within the literature. In this chapter, I first describe Gwinnett County, focusing on its rapidly changing racial demographics. Afterwards, I discuss the data and methodological issues and end the chapter with the set of methodologies which will be used to answer the research questions and, ultimately, to determine the nature of the relationship between race and residential location in the county's newly multiracial context.

Case Study: Gwinnett County, Georgia

Located in the northeast quadrant of the Atlanta metropolitan area (Figure 3.1), Gwinnett County appears at first glance to be "typical suburbia," dominated by sprawl, the automobile, and the white middle class, while Atlanta's history and social structure, organized strictly along

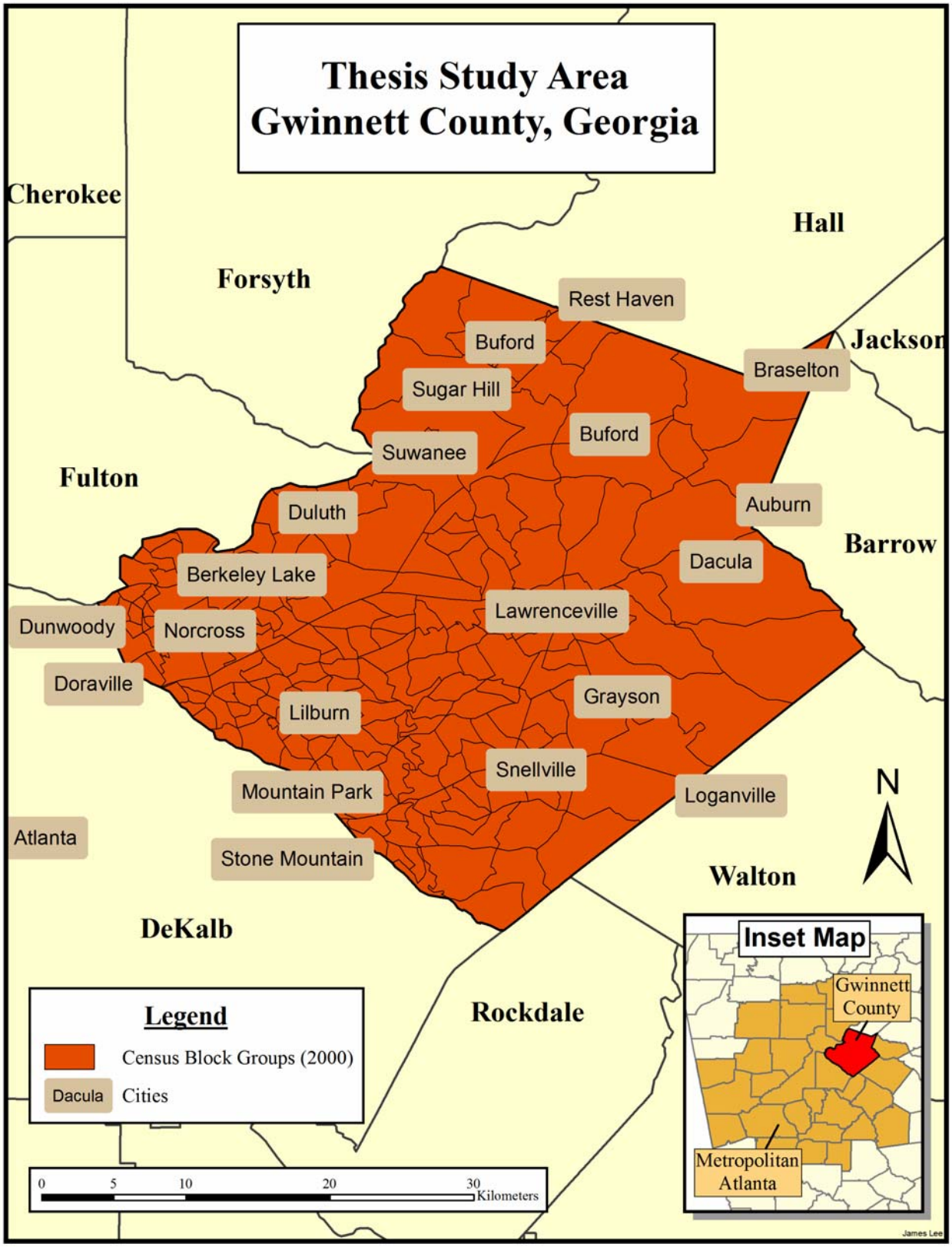


Figure 3.1: Thesis Study Area: Gwinnett County, Georgia, with inset map of the Atlanta Metropolitan Area

black/white racial lines, make this city a seemingly unlikely place for a study on multiracial demographics. However, since the 1960's, metropolitan Atlanta (including Gwinnett County) has experienced rapid economic and population growth, and with the area's increasing attractiveness to both domestic and international migrants, Atlanta has gained prominence as a new "immigrant gateway" (Singer 2004). As shown in Figure 3.2, with its Asian and Hispanic population increasing in recent years, the Atlanta metropolitan area is moving towards a more multiracial demographic structure which increasingly resembles that of other large, racially diversifying cities, including some "immigrant gateway" metropolises. More notably, Atlanta's growth in numbers and diversity is occurring in a region which missed previous waves of immigration (Neal and Bohon 2003; Schmid 2003; Walcott 2002), and thus, compared to traditional areas of immigrant reception, the demographic context developing in Atlanta is literally "newly multiracial."

Concomitant with Atlanta's recent growth and status as a migratory destination, Gwinnett County's population is edging towards a heavily multiracial composition, presenting an interesting case for examining the effects of suburban racial diversification on demographic and residential patterns. Figure 3.3 shows that prior to 1990, the county's population structure was biracial (white and black) with whites in the overwhelming majority and increasing their proportion relative to the total population due to suburbanization. However, more recent figures indicate that, indeed, Gwinnett County's image as a "nearly lily-white county of old" (Feagans 2005, B1) is quickly giving way to racial/ethnic diversity. From 1980 to 2005, even with whites' numerical gains, the non-white population's proportion soared to over 45% with increasingly more Asians, Hispanics, and African-Americans. Also, the county is in a distinctive position vis-à-vis other metropolitan Atlanta counties: Numerically and proportionally, Gwinnett County's

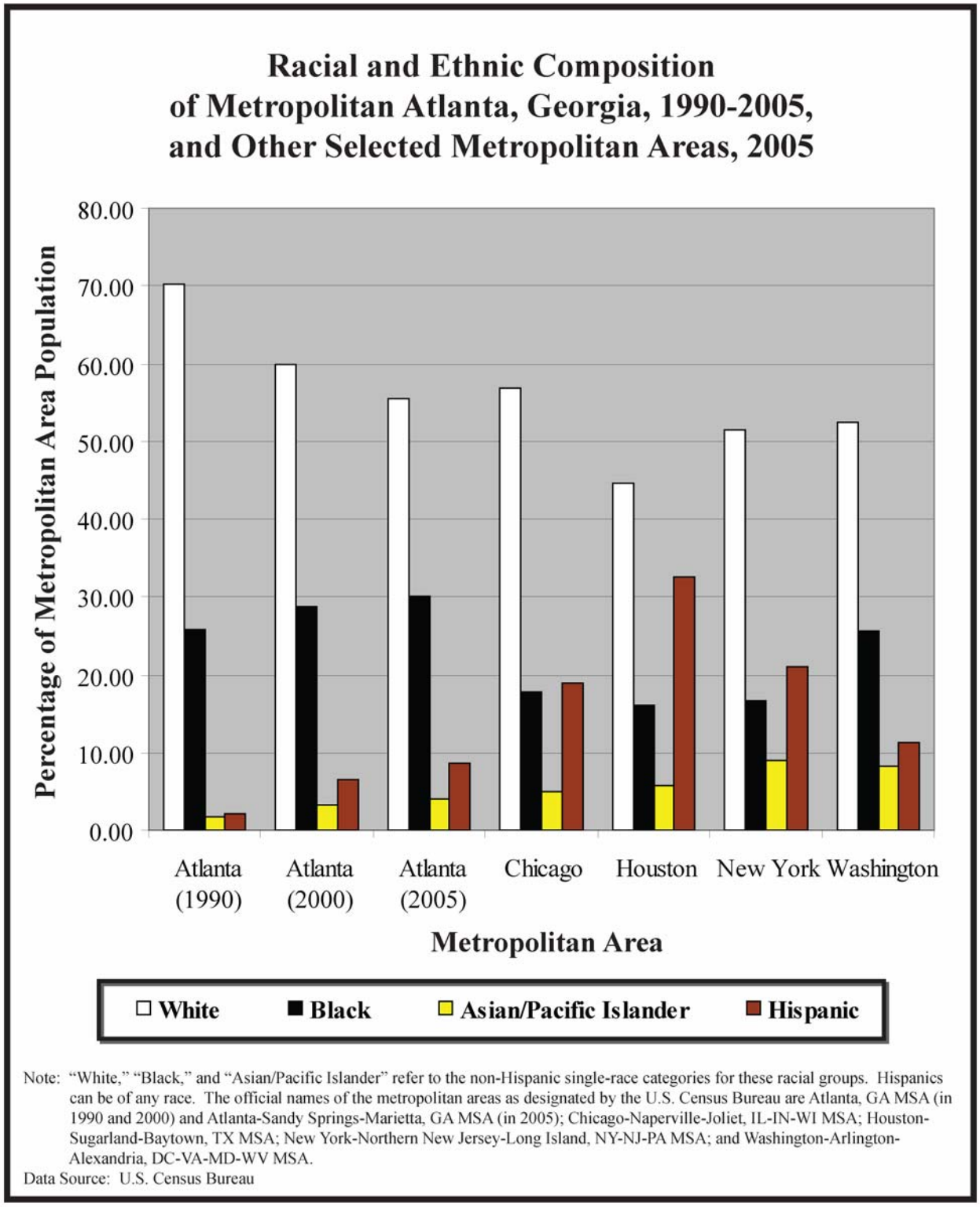
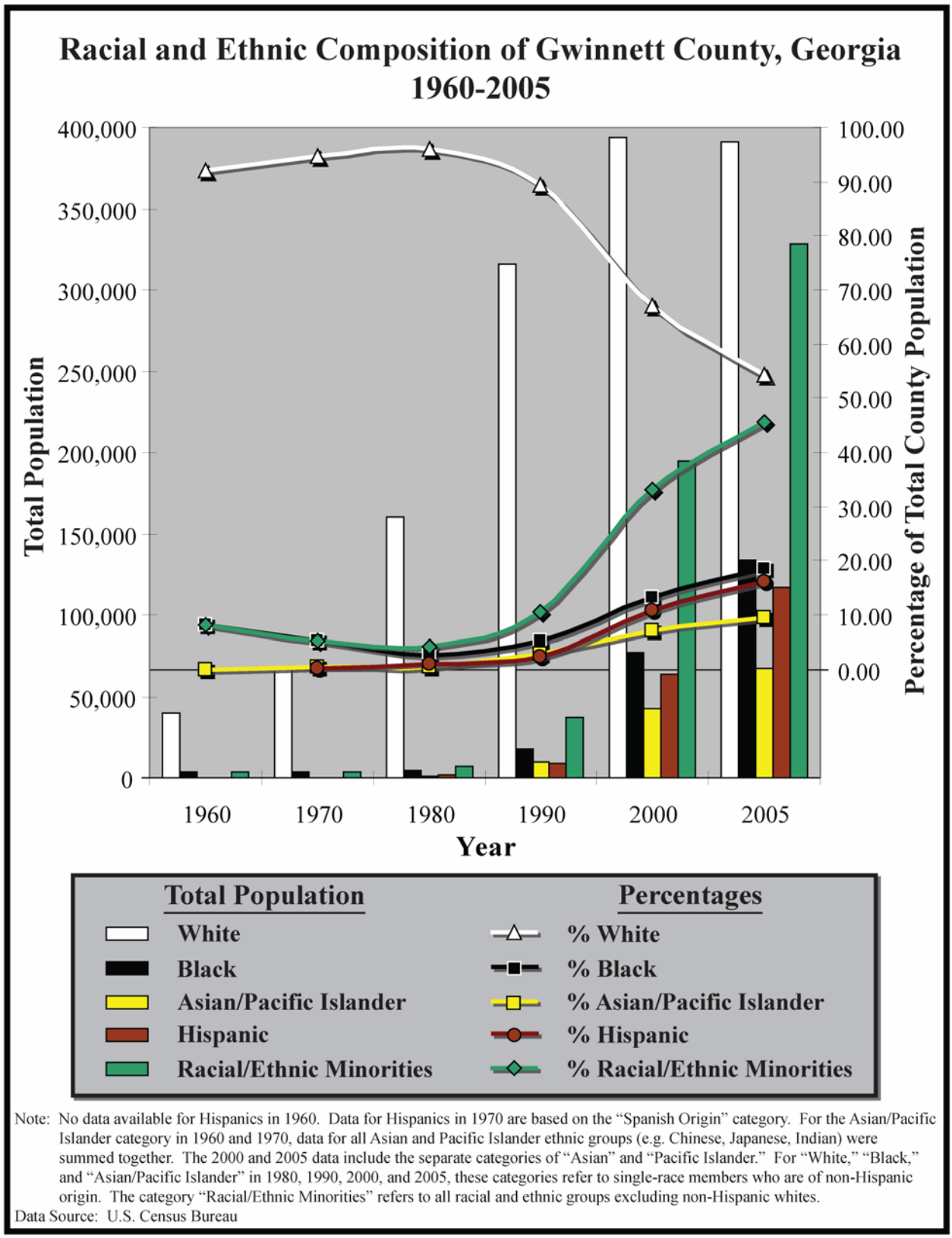


Figure 3.2: Racial and Ethnic Composition of Metropolitan Atlanta, Georgia, 1990-2005, and Other Selected Metropolitan Areas, 2005



Note: No data available for Hispanics in 1960. Data for Hispanics in 1970 are based on the "Spanish Origin" category. For the Asian/Pacific Islander category in 1960 and 1970, data for all Asian and Pacific Islander ethnic groups (e.g. Chinese, Japanese, Indian) were summed together. The 2000 and 2005 data include the separate categories of "Asian" and "Pacific Islander." For "White," "Black," and "Asian/Pacific Islander" in 1980, 1990, 2000, and 2005, these categories refer to single-race members who are of non-Hispanic origin. The category "Racial/Ethnic Minorities" refers to all racial and ethnic groups excluding non-Hispanic whites.

Data Source: U.S. Census Bureau

Figure 3.3: Racial and Ethnic Composition of Gwinnett County, Georgia, 1960-2005

Hispanic and Asian population is larger than any other counties', and the county also has a relatively large non-white population which is not disproportionately African-American, creating a more heterogeneous, truly multiracial demographic structure (Figure 3.4). Though unique in this respect, Gwinnett County also represents a rough microcosm of the growing racial diversity in Atlanta and other "immigrant gateway" cities at the metropolitan scale.

Although Gwinnett County as a whole is transforming into a multiracial place, race/ethnicity data at the census tract level in 1990 (Figure 3.5) and 2000 (Figure 3.6) present stark spatial patterns which suggest both racial integration and turnover during the 1990's. In 1990, nearly all tracts were predominantly white, and the four tracts with Hispanics, Asians, and blacks together comprising more than 25% of the population represent statistical outliers with many more racial minority residents than the average tract in Gwinnett County. In contrast, by 2000, a much larger area stretching from the western border through the central part of the county had tracts with more than 25% non-whites and even some "minority-majority" tracts. The county's racial/ethnic demographic patterns are roughly divided spatially into three groups: 1) The "minority-majority" areas clustered in western Gwinnett County; 2) the still heavily white-dominant suburban fringe in the northeastern, eastern, and southern parts; and 3) seemingly "integrated" tracts with a white majority and a large percentage of racial minorities buffering the two extremes.

A more optimistic observer might conclude that Gwinnett County's whites are maintaining a sense of racial tolerance as their neighborhoods absorb more racial minorities, yet the changes in the racial demographic patterns speak of a potential tension between integration and segregation. The explosion of majority-white "integrated" areas suggests that non-whites are successfully entering into white neighborhoods and, therefore, appear to fit the spatial

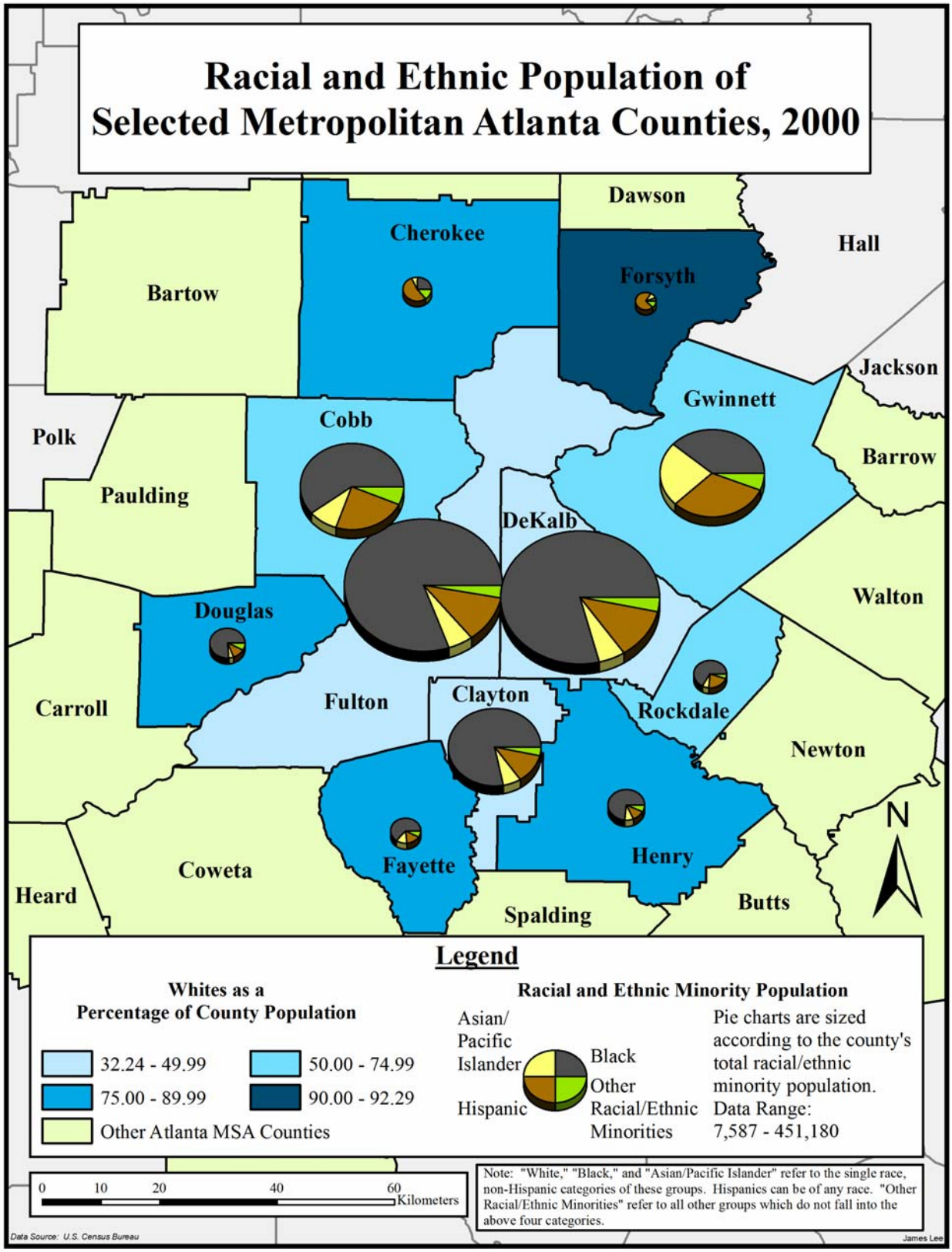


Figure 3.4: Racial and Ethnic Population of Selected Metropolitan Atlanta Counties, 2000

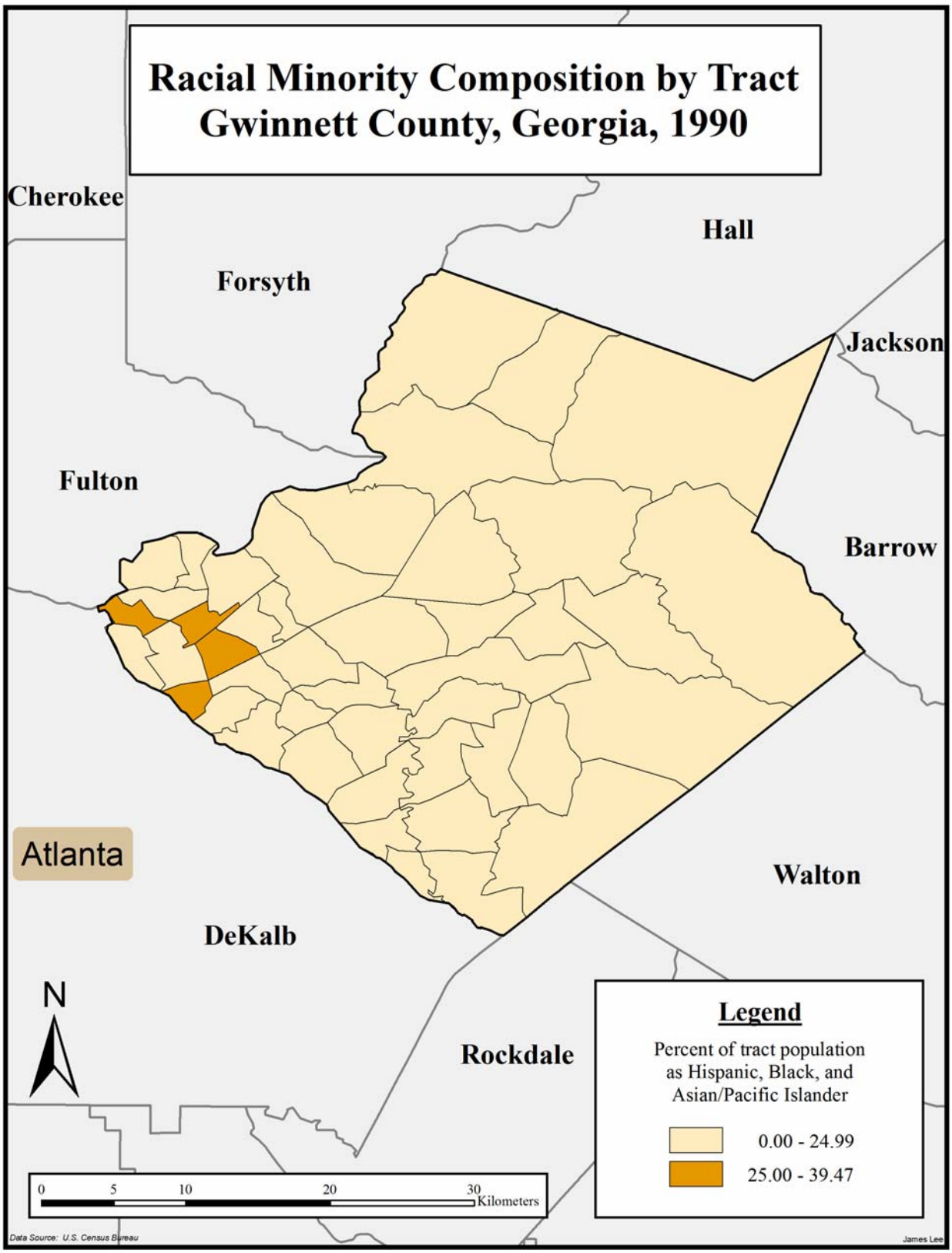


Figure 3.5: Racial Minority Composition by Tract, Gwinnett County, Georgia, 1990

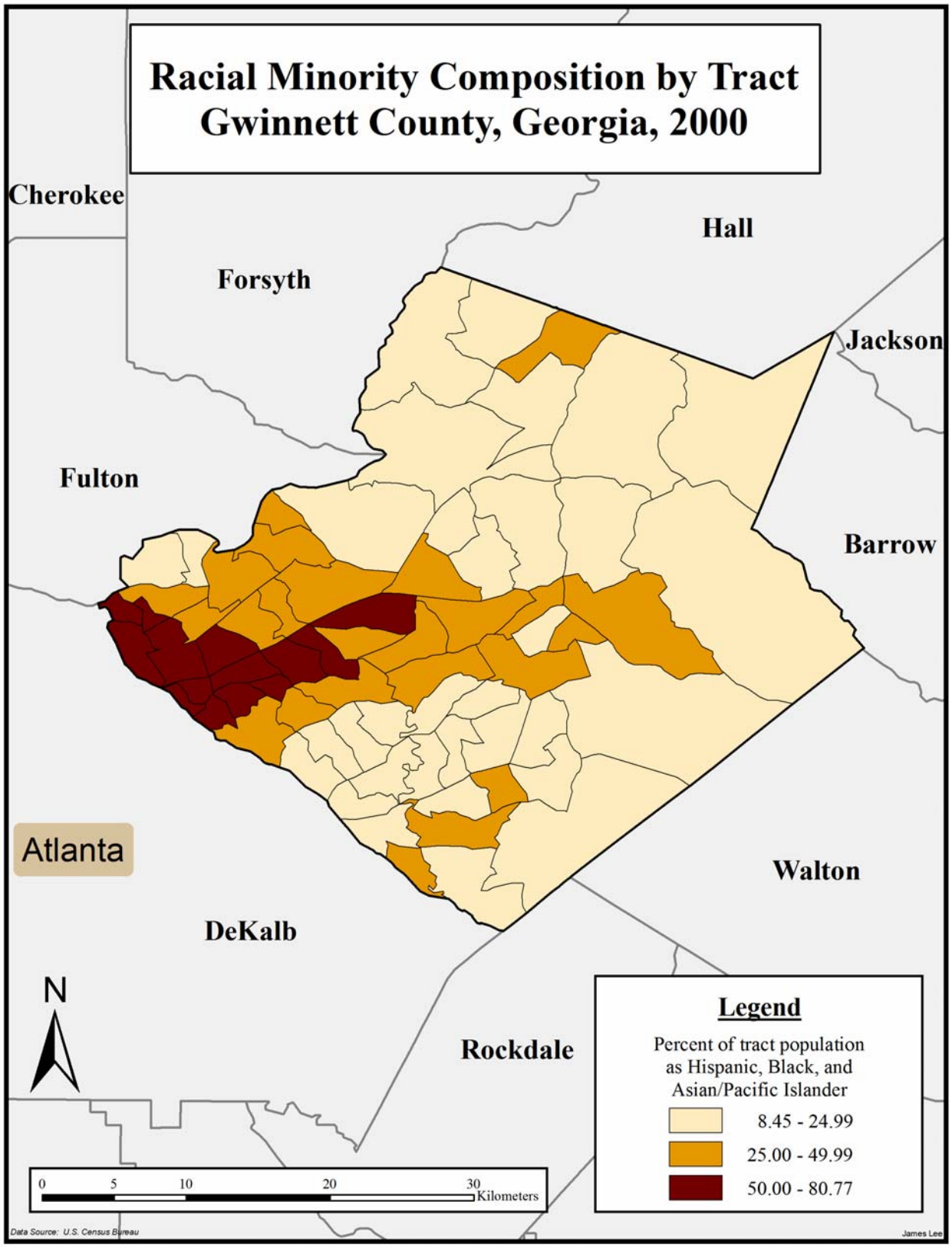


Figure 3.6: Racial Minority Composition by Tract, Gwinnett County, Georgia, 2000

assimilation model. However, along with a recent, slight drop in the white population measured at the county level (Figure 3.3), the increasingly prominent, uneven spatial distribution of racial minorities and the cluster of "minority-majority" tracts (Figures 3.5 and 3.6) point to possible white flight and white/non-white re-segregation.

Given the literature's support for the power of anti-black prejudice and, particularly, the lengthy history and severity of legalized racial discrimination and segregation in the South and elsewhere (Delaney 1998; Philpott 1978), a connection between the increasing numbers of African-Americans and white flight in Gwinnett County would come as no surprise. Less clear are how much integration whites and non-black minority groups will achieve and whether significant numbers of whites are relocating in response to the in-migration of these racial minorities into the suburbs. This uncertainty poses a challenge to the current understanding of suburbanization as a corollary to assimilation, to notions about the suburbs as a site for "whiteness" (and "whitening"), and to the role of race vis-à-vis integration and assimilation for immigrants and non-black minorities. While spatial assimilation scholars (e.g. Alba et al. 1999) continue to uphold the suburbs as the site for integration and eventual assimilation of immigrants with native-born whites, Wright, Ellis, and Parks (2005) have criticized them for maintaining the city/suburb and non-white/white divides in research which, they claim, are no longer pertinent to assimilation research. Frey's (2001) assessment of metropolitan growth during the 1990's also questions the meaning of suburbanization for today's racial minorities and immigrant groups vis-à-vis assimilation: With racial diversification directly confronting the "vanilla suburbs" image (Farley et al. 1978), the growing non-white presence may be seen as a socio-spatial threat by white suburbanites, which may translate into greater racial prejudice and increasing marginalization of all non-whites. In Gwinnett County's case, these theoretical challenges and

issues could be surfacing as it transitions from a white suburb to a multiracial one where non-white immigrants, though achieving some spatial integration with whites, may not be facing the most optimal prospects for more long-term integration and assimilation.

In addition, much of the uncertainty surrounding white/immigrant integration rests on the place occupied by non-black minorities within the U.S. racial hierarchy, and while these groups do not readily fit socially and spatially into the pre-existing white/black racial structure, they still face xenophobia and racial prejudice (or both) from whites and the native-born (Neal and Bohon 2003; Schmid 2003). Similar to the initial experience of "old" European immigrants, Asians and Hispanics in the South are encountering anti-immigrant attitudes from the native-born in response to increasing immigrant visibility in the region (Neal and Bohon 2003; Schmid 2003). Yet, xenophobic and racist attitudes towards them may prove only temporary as some scholars (e.g. Bean and Stevens 2003; Lee and Bean 2004) have pointed out the increasing social proximity between whites and Asian and Hispanic groups. While anti-immigrant attitudes and (racialized) prejudices are neither unique to the South nor to the current immigration wave, they do pose a challenge to immigrant groups' ability to assimilate, spatially and otherwise, because of the threat of racialization and potential exclusion from some (white) residential spaces. Thus, the possibility of white flight from non-black minorities and immigrant groups places a tremendous need to continue to scrutinize the significance of race to residential location for all those currently defined as "not white."

With Gwinnett County's newly multiracial context presenting a tension between integration and segregation among racial minorities and whites in the suburbs, white flight, spatial assimilation, and the significance of race to residential location need to be re-visited. While spatial assimilation theory dictates integration for immigrant groups (Massey 1985),

racism against African-Americans and possibly other non-whites and immigrants could contribute to white/non-white segregation via white flight. In the next sections, I outline the methodology to be used to investigate the spatial impacts of racial diversification and the prospects for residential integration in Gwinnett County and, ultimately, to understand the significance of race to residential location within an increasingly multiracial suburban context.

Methodology

With a few exceptions, previous research examining the relationship between race and residential location has incorporated quantitative approaches: For instance, spatial assimilation studies (e.g. Alba et al. 1999) utilize multivariate regression to establish how well non-whites translate cultural and socioeconomic assimilation into residential integration with suburban whites. Similarly, Crowder (2000) and Lee, Oropesa, and Kanan (1994) also employ regression models to determine the impacts of neighborhood characteristics, including racial composition, on whites' residential movement. Other studies (e.g. Massey and Denton 1993; Massey and Mullan 1984; White 1987) rely on the Index of Dissimilarity (*D*) and, to a lesser extent, the Exposure Index (*P**) to examine racial segregation at various scales.

To reiterate the focus of this thesis, I intend to re-examine the relationship between race and residential location within an increasingly multiracial suburban context by considering white flight and spatial assimilation as opposing forces affecting the prospects for meaningful integration among whites and racial minorities, issues addressed through two research questions:

1) How does suburban racial diversification contribute to white flight and other changes in the white population's spatial distribution?
2) To what extent do the observed changes in whites' spatial distribution affect racial minorities' spatial assimilation with whites?

In order to answer the research questions, I use quantitative methods to assess the impacts of simultaneous segregative and integrative forces on racial groups' residential location at a local scale within Gwinnett County. For the first research question, an ordinary least squares (OLS) regression model analyzes the relationship between non-Hispanic whites' population changes (as a measure of whites' residential mobility and response to local conditions) and neighborhood characteristics captured by racial and non-racial variables. With this approach, while controlling for the effects of major non-racial contextual variables, I concentrate on race to determine whether whites are moving out of or avoiding neighborhoods because of the presence of one or several non-white groups and changes in the racial demographic structure. Evidence of this type of relationship will provide strength to the argument for white flight and the significance of race.

A different approach will be used for the second research question: To determine how much whites' residential relocation, because of white flight or otherwise, has affected racial minorities' ability to assimilate spatially with whites, I follow a method developed by Holloway et al. (1999). This method decomposes the *P** index to determine changes in interracial residential exposure (and same-group isolation) due to each racial group's spatial redistribution and change in population size. I focus primarily on changes in white/non-white exposure and same-group isolation due to spatial redistributional forces which negatively affect residential integration between whites and racial minorities.

For both parts of the analysis, all Gwinnett County block groups, as delineated in the 2000 census, serve as observations ($N = 208$) and as a proxy for "neighborhoods,"[1] and the time frame is confined to the intercensal period between 1990 and 2000, which coincides with a decade of rapid growth and spatial diffusion by racial minorities as illustrated in Figures 3.3, 3.5, and 3.6. I obtained all data from the U.S. Census Bureau's Summary Tape File 1 (100% data)

and Summary Tape File 3 (1-in-6 sample data) for 1990 and 2000. Summary Tape File 1 provided the majority of the data, including data for constructing the racial variables, but for several non-racial variables, Summary Tape File 3 was the only available data source. The 1990 data were normalized to the census block group boundaries in 2000 by interpolation and combined with unaltered data for 2000 to form a new data set from which I constructed the variables.

Before proceeding to the details of the regression model and P^* decomposition, I discuss some important methodological issues to highlight the limitations imposed on the thesis study and possible effects on the interpretation of results. These issues relate to restrictions on data access affecting the methodology design, the choice of block groups to represent neighborhoods, and the data interpolation method used to fit the 1990 data to 2000 census boundaries.

Restrictions on Data Access and the Use of Aggregate Data

While residential mobility studies usually utilize data at the individual/household level, this thesis deviates from this practice by excluding this type of data entirely. Due to the U.S. Census Bureau's policies on data confidentiality, I was unable to access any individual and household-level information, or microdata, associated with small geographic areas (e.g. census tracts, block groups) and, thus, needed to consider this issue while designing an appropriate methodology. Scholars without access to microdata at this scale generally rely on either aggregate data for demographic, socioeconomic, and housing characteristics at a sub-county level or draw from publicly available microdata from the Census Bureau's Public Use Microdata Sample (PUMS), which are identified geographically by Public Use Microdata Areas (PUMAs). While the sole use of aggregate data severely limits attempts to consider individual and household-level factors, solving this problem by drawing on PUMS microdata creates its own set

of problems. Because PUMAs are relatively large in population and area, they are poor approximations of "neighborhoods," and PUMS data lack the geographic detail and precision which smaller units provide (Wright, Ellis, and Parks 2005).

Without being able to resolve both issues by having access to microdata at the tract or block group level, I opted to use aggregate data with small geographic units instead of PUMS data for two reasons: First, as some scholars (e.g. Lee, Oropesa, and Kanan 1994) argue, some components of neighborhood or local context, including racial composition, are important causal factors behind residential mobility, and aggregate data are obtainable for a wide variety of contextual characteristics at the local scale. While aggregate data at the PUMA level can also measure "neighborhood context" or "local conditions," however, reflecting Wright, Ellis, and Parks' (2005) criticism, PUMAs poorly delineate the boundaries of any neighborhood or even a set of neighborhoods, and the difference in scale between PUMAs and commonly or formally defined "neighborhoods" makes claims about the impacts of neighborhood context at the PUMA level questionable. Thus, the choice between using local-scale aggregate data and PUMS data is also essentially a choice to examine contextual factors rather than individual/household-level factors, and the necessity of examining the racial aspect of context (i.e. an area's racial composition) weighed heavily on the former choice. Second, since a single PUMA encompasses all of Gwinnett County, employing PUMS data would require expanding the study area to encompass more or all of the Atlanta metropolitan area. This tactic would include many places which are racially diversifying primarily with the entry of African-Americans, and including such areas could make the entire study area less representative of an increasingly multiracial context.

Therefore, because of data restrictions, the usual methods of examining the impacts of race on residential mobility and location underwent modifications to accommodate the sole use of aggregate data. For the regression model, spatial units (block groups or "neighborhoods"), rather than individuals or households, serve as observations, and the form of the relationship established in the model occurs between one neighborhood/block group trait (as the dependent variable) and a suite of other characteristics (as independent variables) at the same geographic level. This methodology varies from that of many residential mobility studies (e.g. Crowder 2000; Lee, Oropesa, and Kanan 1994), where regression analyses focus on the relationship between individual/household mobility and characteristics at the scale of the individual, household, neighborhood, and, depending on the size of the study, metropolitan area and/or region. As a corollary, using data aggregated to a single scale precludes more direct measurements of residential mobility (e.g. whether a household or individual relocates) and runs the risk of omitting significant explanatory factors at the individual/household scale (e.g. gender, age, and household size) and, therefore, of underestimating the actual magnitude of non-racial factors' impacts. Otherwise, like the residential mobility models by Crowder (2000) and other scholars, the model in this thesis is set up to determine the impact of racial and non-racial factors on whites (or any pre-defined demographic group) as the response variable so that the results have some comparability with those by other scholars.

The technique of decomposing the P^* index as a proxy measure for spatial assimilation was selected to accommodate the lack of microdata and to provide some methodological comparability with existing works. Among spatial assimilation studies, whereas many (e.g. Alba et al. 1999; Iceland and Wilkes 2006) employ regression models focusing on *individual or household-level* assimilation, others (e.g. Massey and Mullan 1984; Hou 2006; White 1987)

compare segregation indices over time and by race and intersecting non-racial characteristics to determine *group-level* assimilation, but both types are concerned with racial/ethnic minorities' residential proximity to whites. The use of the *P** index in this thesis places it methodologically with the latter category. Again, because census data access restrictions preclude measurements of individual and household-level characteristics, I opted for the alternative of using a segregation index, which does not necessitate any microdata. However, instead of examining racial exposure and isolation alone or in conjunction with other factors (e.g. socioeconomic status, linguistic ability, generation/nativity cohort) which could affect residential mobility and segregation levels, I deviate from this practice with the use of the *P** decomposition process for several reasons: First, because widely accepted indices, including *P**, were originally designed for a two-group context, incorporating multiple groups leads to difficulties in calculating and interpreting results. To limit the number of groups and make the analysis more manageable, I focus on only racial categories and ignore non-racial factors. As a related reason to the first, aggregate census data for income/class status, length of residence in the U.S., English language ability, and other aspects of assimilation are not tabulated by both race and Hispanic ethnicity (except for whites in 2000) and, therefore, cannot be compared directly with the racial categories (which classifies Hispanics of all races as one "racial" group) used in this thesis. Still, despite the omission of non-racial factors, since the related research question does not attempt to address non-racial characteristics directly, the *P** decomposition method provides an adequate measure for "assimilation" for the purposes of this thesis. Finally, as an advantage, the decomposition method directly quantifies temporal changes in residential exposure due to each racial group's population growth and spatial relocation (Holloway et al. 1999) and allows in-depth assessment of one group's overall effects on integration.

The Use of Block Groups

A second major methodological consideration is the choice of the census block group as the spatial unit of analysis and as a proxy for a "neighborhood." Although the census tract is the most commonly used sub-county unit in residential studies, I selected the smaller block group for this study for several reasons: First, though less common, the use of block groups is neither unprecedented nor inappropriate as other researchers (e.g. Adelman 2005; Fischer et al. 2004; Lee, Oropesa, and Kanan 1994) have already used or suggested this geographic level as a unit of analysis. Second, more observations are preferred for statistical analyses, and because the study area spans one county and spatial units serve as observations for the regression model, having an adequate number of units at an appropriate scale is crucial. Using tracts would yield only 71 observations if standardized to the 2000 census geography (46 observations for the 1990 geography), far fewer than the 208 observations at the block group level.

Also, I considered issues of scale in defining an appropriate geographic unit to stand for "neighborhoods" and to represent as accurately as possible the degree of residential segregation. Although any definition of a "neighborhood" is inherently subjective (Lee, Oropresa, and Kanan 1994), arguably, common notions of one's neighborhood space encompass at least a limited area and population within which a specific combination of characteristics influences residential decisions. While one can debate over how limited this area and population should be, based on a preliminary analysis of U.S. Census data for Gwinnett County, the block group appears to be the best representation of a neighborhood because of its average area and population size and, therefore, was selected over census tracts and census blocks. First, tracts appear to be somewhat too large in terms of population and area and may extend across many neighborhoods or even entire communities. Using census data, I calculated the average area and population for

Gwinnett County's tracts and block groups in 2000. While the average tract size is more than 15 km², the average block group size is only about 5 km²; compared to the average tract population of 8,288, the average block group population is 2,850. Further, given the average tract's spatial extensiveness, residential indices may miss significant clustering, which results in apparently lower segregation levels. Although segregation measurements taken at the block group level suffer from similar problems of sufficiently capturing the spatial structure of an area's racial composition, compared to the tract level, any spatial unevenness is less likely to be "smoothed out" at the block group level.

On the other hand, although the thousands of blocks in the study area make this unit more ideal for purposes of statistical analysis and for capturing the spatial distribution of racial groups, they are deemed unsuitable since the size of the population and land area at the block level are generally too small to be considered as "neighborhoods," though the population and area distribution across blocks differ widely.[2] Also, a primary concern of residential segregation studies is the lack of interracial exposure across *neighborhood* boundaries. While the block's small and highly variable size approximates neighborhoods poorly, segregation levels computed at the block level may be significantly inflated because measurements capture spatial separation at too fine of a scale. Thus, one could question the accuracy of block-level segregation values in representing residential segregation. In addition, because of sampling and confidentiality issues, Summary Tape File 3 (1-in-6 sample data) does not report statistics for the block level, making it virtually useless in an analysis requiring more than very basic demographic information.

Geographic Normalization of the Data

The final major methodological issue concerns the means used to normalize the 1990 data to 2000 census boundaries. Unlike tract-level data, the U.S. Census Bureau does not

produce files which fit block group data from one census year to the geography of another census year. To resolve this problem, I rely on a data interpolation method developed by Holloway (personal communication). In the interpolation process, polygon layers for 1990 and 2000 block groups are overlaid in a GIS and intersected, dividing the 1990 block group areas into block group "slices" which are reconstituted according to the 2000 block group boundaries. Data attached to the 1990 geography are likewise divided up and reconstituted in proportion to the area of the block group slices: For numeric counts, some percentage of a data value (for population, housing units, etc.) from a pre-interpolated block group becomes part of the value for a post-interpolated block group. Data obtained as median values (e.g. median housing value) are weighted according to the block group slice's area to determine how much of the value from a pre-interpolated block group is transferred to and summed with other weighted median values to derive the post-interpolated block group's median figure. Block group slices created from a few block groups with a zero median value were excluded from the calculation because, in this case, a zero value represents the lack of available data and not the characteristic's actual value.

The interpolation process creates some issues which may affect the study's results. The more consequential matter relates to the interpolation technique's manner of data distribution described above. Because the interpolation process divides up data proportionally by area, it also assumes that characteristics are evenly distributed within each block group, ignoring any actual spatial clustering or disparities. In other words, assuming that a block group in 1990 with 100 persons were split evenly in half to make up the entire area of two block groups in 2000, each one receives 50 persons. In the case of median values, the post-interpolated data value for each block group is exactly the same as the pre-interpolated value. Although this problem may be insignificant for block groups which had minor boundary changes in the 2000 census, many

single block groups in 1990 were split into two or more units in 2000 or have large overlaps with block groups in 2000, particularly those in eastern and northern Gwinnett County, and within these areas, the data's accuracy may be slightly questionable. Unfortunately, without access to census microdata, no means of verifying the post-interpolated figures exist, and the data derived from this technique must be accepted as the best available.

As a related but less serious problem, different georeferencing systems were used for 1990 and 2000, causing the placement of cartographic boundaries to differ slightly even when the U.S. Census Bureau made no actual changes. Therefore, the post-interpolated data values for block groups whose boundaries remained the same in both census years still vary slightly from the pre-interpolated data values. For the most part, this issue does not compromise the accuracy of the overall data since no data is actually lost in the interpolation process; block groups usually lost or gained a percentage of data values from neighboring block groups within the study area while the post-interpolated figures are not rounded off. Some loss of data does occur at the edges of the study area where block group slices and their data which belong to Gwinnett County with the 1990 boundaries are transferred to neighboring counties with the 2000 boundaries. Because no data for block groups bordering these edge block groups were collected, block group slices and their data which became part of another county's block group during interpolation were lost without data being compensated from those counties. However, the loss of data is minute at the county level: The largest loss occurred with the non-Hispanic Asian/Pacific Islander category at nearly 0.26% with the average across all data categories at approximately 0.15%; that is, if the pre-interpolated population is 10,000, 15 persons are lost through the interpolation process. To verify the results for the median values, I conducted a *t*-test for difference in means between the pre-interpolated and post-interpolated values across all block

groups. The median housing value *t*-test indicates a high level of confidence for no difference between the two sets of values ($t = 1.032$), but for the housing stock's median age, t has a value of -2.962, with 99% confidence that a difference does exist. This discrepancy is present because block groups which were split were also more likely to have newer housing units; essentially, the interpolation process biases the post-interpolated mean downward by creating more observations with a younger housing age. However, given the difference of less than two years between the pre-interpolated mean (11.37) and the post-interpolated mean (9.52) and the ongoing housing construction which is tied to the county's rapid suburban expansion, the latter mean's value may be reasonable. Thus, the post-interpolated values are accepted as fairly accurate.

With the above methodological considerations in mind, the set of methodologies and the thesis study itself must be considered to be limited and imperfect to a certain degree and are open to criticism. However, like all research, limitations on the ability to measure real-world phenomena and gather data exist. Despite the issues and constraints imposed on this study, the set of methodologies is designed to produce logical results which have some comparability to existing studies. I now proceed to explain in detail the methodology used to answer the research questions. I will first discuss the regression model, measuring the relationship between racial diversification and fluctuations in the white population to establish the presence of white flight. Then, I will end the chapter with the P^* decomposition process, which captures the effects of whites' spatial relocation on racial minorities' spatial assimilation.

White Flight Regression Analysis

In order to answer the first research question (*How does suburban racial diversification contribute to white flight and other changes in the white population's spatial distribution?*), I focus on the relationship between whites' residential mobility and racial minority growth to

determine how growing numbers of different non-white groups may be spurring white flight. The numeric change in non-Hispanic whites by block group between 1990 and 2000 serves as the dependent variable and as a proxy measure for whites' residential mobility. Variables measuring race include block group racial composition for three major racial/ethnic minority groups in 1990 and each group's compositional changes between 1990 and 2000. To control for block groups' non-racial characteristics, demographic, socioeconomic, housing, and population stability variables are added to measure neighborhood conditions in 1990 and their changes between 1990 and 2000.[3]

Measuring Whites' Residential Mobility

Among previous studies, scholars have modeled residential mobility using dummy variables to indicate the presence or absence of movement from a place of residence among individuals or households (Crowder 2000; Lee, Oropesa, and Kanan 1994; Speare 1974). For this thesis, because of the lack of microdata in the analysis and the use of block groups as observations, I use the intercensal arithmetic difference in non-Hispanic whites by block group to approximate this population group's residential mobility; data for this variable are derived from Summary Tape File 1. Since some block groups lost whites, the range for this variable spans both positive and negative values.

Unfortunately, the variable's values do not precisely capture mobility because fertility and mortality can also cause any population group's numbers to fluctuate and because residential movements within a block group are not counted. Thus, the net change in the number of whites must be considered as representative of the amount of this group's overall residential mobility with two assumptions: One, the combined impact of fertility and mortality results in zero or negligible change in population, and, two, persons moving from one residence to another within

the same block group do so for reasons other than contextual factors (or else they would move to another block group with a different set of neighborhood conditions). Also, with the study area's rapid pace of population shift and growth, one can suppose that much of the observable change in a group's numbers is largely due to residential mobility.

Even though this tactic of representing residential mobility has drawbacks, it does share a conceptual similarity with more conventional methods which use individual/household-level data. Because the observations are block groups with aggregate numbers as data values, the mobility measurement is essentially "scaled up" from the individual/household level to the neighborhood level. Although one cannot think of a block group as "moving" or "not moving," it can have either a net gain or loss in whites as a consequence of individuals'/households' mobility, and the variable's data value can be interpreted as whether, in response to a specific factor or set of factors, relatively more whites (as opposed to an individual or household) are moving out of a block group than those who are moving in or staying.

Racial Variables

To capture the effects of racial diversification on whites' residential mobility, the regression model includes seven racial variables. As noted in many previous studies (e.g. Crowder 2000; Farley et al. 1978; Farley et al. 1993; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000), the existing neighborhood racial composition and changes resulting from the entry of racial minorities influence whites' residential decisions and mobility. To account for these conditions and capture the presence of multiple racial groups, six variables for three racial/ethnic minority groups measure the racial composition in 1990 and its change from 1990 to 2000. These variables are based loosely on those in Crowder's (2000) study, which, unlike previous works, take into consideration a multiracial (as opposed to biracial) context but has

some of the inherent complications associated with modeling interactions among multiple groups. While my method attempts to represent the racial context as simply and as accurately as possible, it likely fails to capture the full complexity of multiracial residential dynamics and only presents a limited picture of the relationship between race and residential location.[4] Finally, an extra racial variable for the total non-Hispanic white count in 1990 acts as a control variable.

Drawing from data in Summary Tape File 1, racial categories consist of four mutually exclusive groups: non-Hispanic White, non-Hispanic Black, non-Hispanic Asian/Pacific Islander, and Hispanic; non-whites of other racial/ethnic groups and non-Hispanic persons of two or more races in 2000 are not present in sufficient numbers to conduct a meaningful analysis. Because the U.S. Census Bureau split the Asian/Pacific Islander category from the 1990 census into two separate racial categories for the 2000 census, data for Asians and Pacific Islanders in 2000 are combined into one group for the sake of comparability. Although Hispanics consist of an ethnic group and can be of any race, the Hispanic category is treated as a single racial group.[5]

The first variable in the regression equation is the 1990 numeric count of the total white population by block group. Because the dependent variable is a value for the arithmetic difference in whites rather than a proportional change, it does not take into account of the ratio of this value to the base population of whites within its respective block group. The 1990 numeric count addresses this problem by partialling out the relationship between the numeric change in whites and the total white population.

For the remaining six racial variables, I calculated each racial minority group's (black, Asian, and Hispanic) proportion of the total block group population in 1990 and the percentage point difference between 1990 and 2000 in each group's proportion of the total block group population. The first three variables measure the racial context as it existed at the beginning of

the study period; while most block groups were overwhelmingly majority white in 1990, a handful of neighborhoods had a significant percentage of non-whites and may have been undergoing a racial demographic shift already. The other three variables serve as indicators of the amount of racial compositional change and diversification during the 1990's as more racial minorities moved into Gwinnett County neighborhoods and altered the local racial context.

In theorizing the relationship between the racial variables and the numeric change in whites, I expect two logical possibilities. The first possibility is a significant and negative relationship in which block groups with proportionally more racial minorities and larger increases in the percentage point change of racial minorities (i.e. a greater shift in racial composition) exhibited greater declines in the white population, net of other factors. In this case, the relationship indicates white flight, pointing to the continuing significance of race since the presence of a large non-white population and racial diversification serve as motivating factors for whites' residential relocation and/or avoidance of places with these characteristics. As the second possibility, a non-significant relationship (which could be either negative or positive) would not support arguments for the presence of white flight: Within this scenario, racial context and racial compositional shifts have no or minimal effect on changes to the white population and, therefore, are largely independent of whites' residential mobility. In addition, this relationship would lend indirect support for spatial assimilation theory as the more appropriate model for describing racial minorities' residential experience.

Given the literature's documentation of persistently strong anti-black prejudice among whites, I expect that the first possibility holds true for African-Americans. Less clear is whether this relationship also applies to Hispanics and Asians. Because these two groups have both a racialized status and a greater likelihood of integrating with whites, they are simultaneously

similar to and distinguished from African-Americans. If race is an important factor for these two groups and an influx of Asians or Hispanics induces white flight, as in the case of African-Americans, the relationship with the dependent variable should likewise be significant and negative. However, since whites are generally more open to integration with either Asians or Hispanics than with African-Americans (Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000), the effects on whites' residential mobility by Asians' and Hispanics' presence and neighborhood entry should be less pronounced. On the other hand, if the study area's Asians and Hispanics follow the spatial assimilation model, as many other scholars (e.g. Alba et al. 1999) have noted, then a large and growing Hispanic or Asian presence matters little to whites, rendering the relationship between race and whites' mobility insignificant for these groups.

Control (Non-Racial) Variables

Besides race, other factors influence mobility decisions, such as those related to life cycle and individual status (Rossi 1955), neighborhood context (Lee, Oropesa, and Kanan 1994), and housing availability (South and Crowder 1998). Therefore, the regression model includes control variables for some non-racial characteristics. Again, due to the sole reliance on aggregate data, I am unable to test the effects of individual and household characteristics on whites' residential mobility. Also, the use of neighborhoods/block groups as observations restricts the analysis of non-racial factors to this geographic level, thereby excluding relevant characteristics which may be more appropriately captured by larger-scale (e.g. metropolitan-level) variables. Thus, with the non-racial variables in my regression model limited to assessing characteristics for block groups, any interpretation of the results can only apply to this geographic level, and the model itself likely underestimates the relationship between non-racial factors and whites' residential mobility.

Since block groups represent neighborhoods, I rely on Lee, Oropesa, and Kanan's (1994) conceptualization of neighborhood context to identify and model factors which impact residential mobility. In addition to their study, I consulted similar or related works (e.g. Crowder 2000; South and Crowder 1998) for other important factors and variables. Some, albeit not many, of the non-racial variables are expected to be of statistical significance because the model in this thesis is set up to measure the direct relationship between non-racial contextual factors and residential mobility: Although a number of studies indicate that non-racial dimensions of neighborhood context can be just as influential on residential mobility as race (Frey 1979; Lee, Oropesa, and Kanan 1994), these non-racial contextual factors' impacts tend to work indirectly through one's perceptions of and satisfaction with neighborhood conditions initially, which affect decisions about mobility before they are translated into an actual change of residence (Lee, Oropesa, and Kanan 1994; Speare 1974).

Using data from Summary Tape Files 1 and 3, I constructed 15 variables which measure different aspects of neighborhoods' physical quality and social milieu as they existed in 1990 as well as changes in these contextual factors during the ensuing decade.[6] First are four demographic variables: Two of these, the 1990 population density and the 1990-2000 percentage change in population density, serve as indicators of neighborhood crowding and pace of growth, respectively. The other two, the 1990 proportion of households with at least one person under 18 years old and the 1990-2000 percentage point change in households with at least one person under 18 years old, pertain to the degree of familism and type of social environment. Also, since the household income distribution and, especially, the presence of poverty affect neighborhoods' physical and social conditions, which in turn influence residential decisions and mobility (Crowder 2000; Jargowsky 1997; Lee, Oropesa, and Kanan 1994), two socioeconomic

variables measure class composition as neighborhood poverty rates: The 1990 proportion of households at or below the poverty level and the 1990-2000 percentage point change in households at or below the poverty level.

In addition, a set of eight housing-related variables gauges physical structural conditions, tenure, and housing supply: Three variables, the median age of the housing stock in 1990, the median housing value (in thousands of dollars) in 1990, and the 1990-2000 percentage change in median housing value, evaluate the average state of housing units and provide a glimpse into the overall physical condition of housing units and neighborhoods. For the tenure mix, two dummy variables are modeled for the 1990 proportion of housing units which are rental units ($\geq$ 30% = 1) and for the 1990-2000 percentage point change in rental housing units (positive change = 1). Three housing supply variables capture the effects hypothesized according to the housing availability model (South and Crowder 1998) but at a "scaled down" level: The percentage of housing units in 2000 built between 1990 and March 2000 (as a measure of the amount of new housing) and two dummy variables for vacancy (to gauge overall housing availability), the 1990 proportion of housing units which are vacant ($\geq$ 8% = 1) and the 1990-2000 percentage point change in vacant housing units (positive change = 1).

Finally, a residential stability variable, calculated as the percentage of households in 1990 which remained in the same place of residence in 2000,[7] is a proxy count for the percentage of long-term residents. This variable indirectly captures the effects of community attachment and social bonds, which are positively correlated with length of residence and tend to inhibit residential mobility (Kasarda and Janowitz 1974; Speare 1974).

Incorporating the above variables into the regression model, I estimate the impact of racial composition, non-racial contextual factors, and their changes over time at the block group

level on whites' residential mobility, measured as the numeric change in whites by block group. The basic multivariate regression equation with the list of all variables appears in Table 3.1.

Initial Diagnostics

In the initial steps of constructing the model, I first centered all variables (except the dummy variables, which are dichotomous and cannot be centered) on their respective mean so that results can be interpreted relative to average conditions, and before estimating the final model, I resolved issues concerning multicollinearity. Prior to interpreting the regression results, diagnostic tests were performed to determine if the model violates any of the basic OLS regression assumptions.

In order to verify the existence of multicollinearity, I examined the bivariate correlation matrix and Variance Inflation Factor (VIF) among a list of 32 variables originally chosen to be in the model. Since more than half of these variables had VIFs greater than 4.00 and were highly correlated with one or more variables (where $r > 0.75$), many of them (all non-racial) were eliminated or transformed in order to reduce multicollinearity and for the sake of parsimony. I carefully eliminated variables based on their high VIF and correlation values, whether they have any theoretical significance, and whether other variables in the original list represent a similar concept or component of neighborhood context. In the case of the tenure and vacancy variables, I transformed them into dummy variables rather than remove them to reduce their VIF to acceptable values since no other variables (and additional census data) adequately capture these important aspects of context. For the same reason, I retained the new housing variable; despite mild multicollinearity (VIF = 4.88), its removal from the model neither generated large changes to the other parameter estimates nor reduced standard errors. In addition to examining VIF and correlation values, I estimated preliminary models with all 32 variables and with different

Table 3.1: White Flight Regression Model, with brief descriptions of the variables

White Flight Regression Model
Basic Equation: $Y_i = b_0 + b_1X_1 + b_2X_2 + b_3X_3 \ldots + e_i$ Where: Y_i = Numeric change in non-Hispanic whites in block group *i*, 1990-2000 b_0 = Constant term of the model b_k = Parameter estimate for variable X_k X_k = Independent variables (see list below for all variables) e_i = Error term
Observation Unit: Block Group ("Neighborhood") (*N* = 206)
Racial Variables:
Total non-Hispanic white population in block group *i*, 1990
Percent non-Hispanic black in block group *i*, 1990
Percent non-Hispanic Asian/Pacific Islander in block group *i*, 1990
Percent Hispanic in block group *i*, 1990
Percentage point change in non-Hispanic blacks in block group *i*, 1990-2000
Percentage point change in non-Hispanic Asian/Pacific Islanders in block group *i*, 1990-2000
Percentage point change in Hispanics in block group *i*, 1990-2000
Non-Racial Variables:
Demographic
Population density in block group *i*, 1990
Percentage change in population density in block group *i*, 1990-2000
Percent households with one or more persons under 18 years old in block group *i*, 1990
Percentage point change in households with one or more persons under 18 years old in block group *i*, 1990-2000
Socioeconomic
Percent households at or below poverty level in block group *i*, 1990
Percentage point change in households at or below poverty level in block group *i*, 1990-2000
Housing
Median age of housing stock in block group *i*, 1990
Median housing value (in $1,000's) in block group *i*, 1990
Percentage change in median housing value in block group *i*, 1990-2000
Percent rental units in block group *i*, 1990 (< 30% = 0; ≥ 30% = 1)
Percentage point change in rental units in block group *i*, 1990-2000 (negative change = 0; positive change = 1)
Percent new housing units (built between 1990 and March 2000) in block group *i*
Percent vacant units in block group *i*, 1990 (< 8% = 0; ≥ 8% = 1)
Percentage point change in vacant units in block group *i*, 1990-2000 (negative change = 0; positive change = 1)
Residential Stability
Percent households in 1990 in block group *i* in the same place of residence in 2000

combinations of variables removed to observe how the statistical results changed. Across all of these models, the adjusted-R^2 values varied little while most parameter estimates appear to be generally stable in terms of slope direction and significance, and removing variables significantly reduced the standard errors.

Afterwards, having set the model in its final form with the variables listed in Table 3.1, I performed diagnostic tests and created scatter plots to determine whether heteroskedasticity, non-linearity, autocorrelation, and influential observations were present. An initial plotting of the dependent variable on X_k and of the dependent variable's residual values on its predicted values led to some suspicions of heteroskedasticity and non-linearity, but when the dependent variable's residual values are plotted on the *partialled out* independent variables, the relationships appear linear and homoskedastic. Likewise, partial leverage plots do not point to any noticeable heteroskedasticity or non-linearity, and White's test also indicate no statistically significant heteroskedasticity. Therefore, enough reasonable evidence exists in support of conformity to OLS assumptions regarding homoskedasticity and linearity. The model satisfies assumptions regarding independent errors as well, as demonstrated by the results from the Durbin-Watson test and Moran's *I*, measuring serial and spatial autocorrelation, respectively.

Based on initial inspections of scatter plots and results from a series of diagnostic tests for leverage, DFITTS, DFBETAS, studentized residuals, and Cook's D, eight observations deemed to be highly influential were dropped from the original model in order to assess overall differences in the regression results. Although many other observations had at least one value which exceeded the relative criteria for undue influence among the diagnostic tests, each of the eight omitted block groups had a very large amount of influence on the model as a whole and/or on specific parameter estimates, and their removal enlarged the amount of explained variance

and shrunk standard errors, resulting in greater efficiency in the model. As further justification for their omission, some of these block groups have one or more unusual characteristics in terms of their size, growth, demographic composition, and other contextual factors while three of them had the largest residual values. In Chapter 4, I report the model's results with and without the influential observations and discuss them in more detail.

Aside from the omitted observations due to heavy influence, two additional block groups are also not included in the model because of missing values. Because the U.S. Census Bureau either did not collect or report data for the median housing value for these two block groups in 2000, their percentage change in median housing value could not be calculated. The statistical analysis program which I use (SAS) automatically excludes observations which have missing values for any variable in a particular model. I estimated a model without the variable for the percentage change in median housing value in order to incorporate all 208 block groups, and overall, the results from this model very closely parallel those for the model with this variable but omitting the two observations with missing data values.

With the completion of the white flight regression model, I will examine in the next chapter the relationship between the independent variables and changes in the white population; the focus centers on the racial variables to establish whether non-white composition and racial diversification are linked to whites' residential mobility and, consequently, whether white flight and shifts in whites' spatial distribution have occurred. Before progressing to chapter 4, the next section outlines the methodology for the second research question, the *P** index decomposition.

Measuring Spatial Assimilation: The P Index Decomposition*

For the second research question (*To what extent do the observed changes in whites' spatial distribution affect racial minorities' spatial assimilation with whites?*), Lieberson's

(1981) exposure and isolation index (*P**), a type of segregation index, serves as an indirect, limited method to measure spatial assimilation. Although spatial assimilation is better modeled with multivariate regression equations to account for individual and household-level factors, some scholars (e.g. Massey and Mullan 1984; Hou 2006; White 1987) have used segregation indices. In this thesis, I couple this method of quantifying spatial assimilation with the use of a *P** index decomposition process developed by Holloway et al. (1999). This process can isolate the amount of change in the *P** indices due to the spatial redistribution of each racial group, which provides a way to determine how whites' spatial relocation within the study area impacts racial minorities' ability to assimilate spatially with the former group.

P as a Segregation Index*

As a segregation index, Lieberson's (1981) *P** quantifies the degree of residential exposure between two population groups (exposure index) and the degree of residential isolation of a single population group (isolation index) within a specified area. In other words, the exposure index indicates the average probability of a person in group X encountering someone in group Y while the isolation index measures the average probability of a person in group X encountering someone else of the same group. As the exposure index, the formula is

$$ {}_xP^*_y = \sum_{i=1}^{I} (x_i / X) \times (y_i / t_i) $$

where x_i is the number of members in group X in area unit i, X is the total number of group X members in i area units, y_i is the number of members in group Y in area unit i, and t_i is the total population of area unit i. The isolation index substitutes group Y for group X, such that isolation is interpreted as exposure between members of the same population group. As the isolation index, *P** is computed as

$$_{X}P^{*}_{X} = \sum_{i=1}^{I} (x_i / X) \times (x_i / t_i)$$

where x_i, X, and t_i are the same variables as in the exposure index. With two or more mutually exclusive groups, the indices for group X's isolation and for group X's exposure to all other groups sum up to one. Although each P^* index value indicates segregation between only two groups at a time, in a multiple group scenario, comparing the suite of P^* values across all pairwise groups provides a way of determining overall segregation levels and trends.

For this study, block groups represent the area units, x_i is the number of racial group X in block group i, X is the total number of racial group X members in Gwinnett County, y_i is the number of racial group Y in block group i, and t_i is the total population of block group i. For the racial groups, I use the same categories as those in the white flight regression model: Non-Hispanic White, non-Hispanic Black, non-Hispanic Asian/Pacific Islander, and Hispanic. Also, because the exposure and isolation indices for group X equal one, a fifth "Other" racial group for persons who do not fall into one of the four above categories is included to verify all P^* calculations but will not appear in the results chapter since this group consists of a very small proportion of the study area's total population.

As an initial comparison, I calculate P^* levels for all pairwise groups in 1990 and 2000 plus intercensal changes in P^*. This first step allows me to inspect the general trends in segregation levels and provides a glimpse of how population growth and shifts may have affected inter-group segregation. For example, a decrease in the overall white/non-white exposure level and an increase in the overall isolation among non-whites could signal the presence of extensive white flight and/or a growing non-white population. After calculating this set of exposure/isolation indices, they are decomposed into compositional and redistributive components and, then, by each racial/ethnic group's spatial redistribution.

P Decomposition*

Because *P** is sensitive to both group size and spatial distribution, this property has the advantage of capturing the effects of both compositional and redistributive changes, which are distinguishable by decomposing the *P** index. The same process can also be used to determine how the spatial rearrangement of a specific population group impacts residential exposure and isolation levels (Holloway et al. 1999; Strait 2006). With this two-step process, the *P** decomposition is particularly useful in pinpointing more decisively to what extent whites' spatial redistribution is negatively affecting racial residential integration. The decomposition process follows the same method used by Holloway et al. (1999) and Strait (2006), using a modified *P** formula which is

$$x_{0|9}P^*x_{0|9} = \sum_{i=1}^{I} (x_{i\,0|9} / X_0) \times (x_{i\,0|9} / t_{i\,0|9})$$

where $x_{i\,0|9}$ is the number of members of group X in block group *i* in 2000 if their spatial distribution across Gwinnett County were the same as in 1990. This counterfactual figure is calculated using the formula

$$x_{i\,0|9} = X_0 \times (x_{i\,9} / X_9)$$

where X_0 indicates group X's total county population in 2000, $x_{i\,9}$ is the number of members of group X in block group *i* in 1990, and X_9 is group X's total county population in 1990. Also, $t_{i\,0|9}$ represents the total block group population in 2000 if all groups were distributed in the same manner as in 1990 and is calculated as (assuming only three groups present)

$$t_{i\,0|9} = x_{i\,0|9} + y_{i\,0|9} + z_{i\,0|9}$$

where $y_{i\,0|9}$ and $z_{i\,0|9}$ are computed in the same way as $x_{i\,0|9}$ but with each of their respective groups.

Using the same pairwise groups described above, the P^* indices are decomposed first into their compositional and redistributive components and then by each racial group's spatial redistribution. In the first step, I compute each block group's counterfactual population for all five racial groups, the sum of which equals the value of $t_{i_{0|9}}$; afterwards, holding all groups to their 1990 spatial distribution, all counterfactual P^* values are calculated with the modified P^* formula. For each pairwise group, the P^* value in 1990 is subtracted from the counterfactual P^* to derive the compositional changes' effects while the difference between the actual P^* value in 2000 and the counterfactual P^* value denotes the amount of change due to redistributive forces. For the purposes of cross-pairs comparisons, the compositional and redistributive components as a percentage of the total intercensal change in P^* are also calculated.

While the first step of the decomposition highlights the effects on residential exposure/isolation as a result of compositional and redistributive changes across all groups, the second step of the decomposition pinpoints the amount of redistribution attributable to each racial group. In this part, I repeat the P^* calculations for each pairwise group but hold, one at a time, a single racial group's spatial distribution to 1990 levels while allowing the remaining four groups to redistribute to their 2000 levels. As in the initial decomposition, the counterfactual P^* measure (but with one group spatially constrained) is subtracted from the actual P^* value for 2000; this difference indicates the redistributive change due to the spatially constrained group.

Focusing the analysis on the redistributive component, I will determine from the P^* decomposition how whites' spatial redistribution during the 1990's may have affected racial minorities' ability to assimilate spatially with whites. Although the decomposition process cannot directly assign causality or point to specific migration patterns (Holloway et al. 1999), drawing on theoretical expectations, I expect several general outcomes: First, actual white/non-

white exposure index values would be much larger than their counterfactual figures, and racial minorities would be likely contributing much of the gain towards integration. In this case, whites' spatial redistribution would more likely have negligible to positive impacts on spatial assimilation as racial minorities enter white-majority neighborhoods without spurring extensive white flight and re-segregation. Given the strong arguments for spatial assimilation theory's applicability to the "new" immigrants (Massey 1985; Alba et al. 1999), white/Asian and white/Hispanic exposure levels are expected to follow this trend. White/black segregation may exhibit this pattern as well if greater diversity and the "multiracial/ethnic effect" (Cashin 2004; Frey and Farley 1996) do facilitate greater overall integration.

On the other hand, if the actual white/non-white exposure indices in 2000 are significantly less than their respective counterfactual values (or if actual white isolation is greater than its counterfactual value) and if the second decomposition step ascribes much of the intercensal P^* change to the redistribution of whites, this set of results would provide reason to suspect white flight creating greater difficulty for racial minorities to achieve spatial assimilation.[8] This situation would most likely apply to African-Americans, the group which continues to be the most segregated from whites (Wilkes and Iceland 2004) and least preferred by them as well as by other non-black racial groups (Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000). Also, reflective of the conclusions by Crowder (2000), Krivo and Kaufman (1999), and Iceland (2004) about growing racial diversity's negative effects on integration, Asians and Hispanics may also be susceptible to re-segregation despite their general conformity to the spatial assimilation model.

An equally probable third possibility is a combination of the two above scenarios with the simultaneous redistribution of non-whites towards majority-white areas and whites away from

in-coming non-whites. This set of counteracting forces would place the actual P^* value close to the counterfactual value but would only be detectable in the second decomposition process, which would point to whites' spatial redistribution as having a negative impact on spatial assimilation but only sufficient enough to overcome non-whites' ability to "catch up" spatially as they move into less racially diverse (i.e. "whiter") areas. In this case, this pattern would reflect most definitively the tension between integration and segregation with spatial assimilation and white flight as equally important forces at work. Again, much ambiguity remains even as different scholars have made tentative conclusions about the multiracial context's impacts on overall integration levels. Finally, more complex segregation dynamics as a result of having several racial groups present may influence the general trends above and create alternate possibilities in regards to racial minorities' ability to assimilate spatially with whites.

Drawing from both the regression and P^* analyses, the results will strengthen the understanding of the relationship between suburban racial diversification, the continuing significance of race, and residential location. In re-addressing white flight and spatial assimilation within an increasingly multiracial suburban context, the analysis of Gwinnett County's demographic trends will shed some light on potential consequences for all racial groups and prospects for racial residential integration. The next chapter will first present the descriptive statistics for the variables in the white flight regression model and the P^* decomposition with specific focus on the racial demographics; then, the results for the regression model and P^* decomposition will be discussed in turn.

CHAPTER 4

DESCRIPTIVES AND RESULTS

As an ultimate goal, this thesis seeks to re-examine the significance of race to residential location and the prospects for stable racial residential integration within an increasingly multiracial suburban context. While the literature seems ambiguous about the consequences of racial diversification in metropolitan areas and their suburbs, this uncertainty also reflects a developing tension between segregation and integration within the multiracial context. A once nearly all-white suburb transitioning rapidly into a multiracial place, Gwinnett County appears to exhibit this tension with indications of both white flight and spatial assimilation occurring simultaneously. Thus, the study area provides a small but important example of how a multiracial demographic shift affects the possibility for meaningful integration.

In this chapter, I first present the descriptive statistics for the variables (in their original, uncentered form) used in the data analysis and focus on the racial variables in order to provide a better understanding of the characteristics and trends occurring across block groups or "neighborhoods." Afterwards, I discuss in detail the results for the regression model and *P** decomposition. I begin with whites' response to racial diversification at the block group level by assessing the modeled relationship between changes in the white population, which serve as an aggregate measure of whites' residential mobility, and a set of racial variables which capture neighborhoods' racial composition and diversification. Second, I discern whether whites' spatial redistribution has affected racial minorities' spatial assimilation with whites by decomposing the *P** segregation index, which breaks down changes in residential exposure into compositional and

redistributive components and by each racial/ethnic group's spatial redistribution. Finally, a section to summarize the data analysis results ends the chapter.

General Descriptive Patterns

Table 4.1 combines the descriptive statistics for all variables in the regression and *P** decomposition analyses. In addition to the mean and standard deviation, the sums of numeric count variables appear in a separate column. Among the most notable features, the average population (by total numbers and density) increased during the 1990's, continuing a trend of rapid growth from previous decades which has transformed Gwinnett County into a moderately crowded, maturing suburban area. Also, with few exceptions, the demographic and housing statistics present an image of "typical suburbia" with mostly middle-class homeowners living in or moving into recently built, affordable, and appreciating neighborhoods: In general, the county has low and stable poverty rates, a relatively new housing stock, moderate and rising housing values, low and decreasing vacancy rates, and a considerable amount of residential mobility, and the overwhelming majority of housing units across a large number of block groups are owner-occupied. For most variables, their small standard deviations indicate that the majority of these trends apply to large parts of the county. However, changes in poverty rates across block groups appear to vary widely around the mean, pointing to considerable increases or decreases in many neighborhoods, while many block groups had disproportionately more newly built housing units.

Yet, contrary to the notion of the suburbs as a family-oriented place, less than half of the households in the average block group have children under 18 years of age with this percentage decreasing slightly in the 1990's, although in many neighborhoods, this household type is still the dominant one and is increasing in proportion to other household types. Also, Gwinnett County appears to have identifiable rental districts, as indicated by a significant number of block

Table 4.1: Descriptive Statistics for White Flight Regression and *P** Decomposition Variables, Gwinnett County, Georgia, 1990-2000

Descriptive Statistics for White Flight Regression and *P Decomposition Variables Gwinnett County, Georgia, 1990-2000**			
Variable	***Sum***[1]	***Mean***	***SD***
Total population (1990)	352395	1694.21	797.43
Total population (2000)	588448	2829.08	2049.78
Numeric change in Whites	79065	380.12	1351.08
Whites (1990)	315099	1514.90	738.09
Whites (2000)	394164	1895.02	1689.52
Blacks (1990)	17943	86.26	128.44
Blacks (2000)	76837	369.41	373.68
Percent Black (1990)		5.15	8.02
Asians (1990)	10089	48.50	65.44
Asians (2000)	42391	203.80	225.97
Percent Asian (1990)		2.80	2.88
Hispanics (1990)	8459	40.67	39.52
Hispanics (2000)	64137	308.35	409.74
Percent Hispanic (1990)		2.34	1.79
Percentage point change in Blacks		8.21	7.39
Percentage point change in Asians		4.35	4.89
Percentage point change in Hispanics		8.60	9.75
Population density (1990)		662.76	541.94
Percentage change in population density		67.72	95.22
Percent households with persons under 18 years old (1990)		45.95	12.47
Percentage point change in households with persons under 18 years old		-2.03	8.34
Percent households in poverty (1990)		4.06	4.23
Percentage point change in households in poverty		1.09	4.86
Median age of housing stock (1990)		9.52	5.68
Median housing value (in $1,000's) (1990)		100.68	28.24
Percentage change in median housing value[2]		43.58	31.63
Percent rental units (1990) ($\geq$ 30% = 1)		0.33	0.47
Percentage point change in rental units (positive change = 1)		0.30	0.46
Percent new housing (built 1990-2000)		32.21	22.60
Percent vacant units (1990) ($\geq$ 8% = 1)		0.27	0.44
Percentage point change in vacant units (positive change = 1)		0.14	0.35
Percent of households in 1990 remaining in the same place of residence in 2000		34.74	17.19
All Gwinnett County Block Groups: $N = 208$			

[1] Sums are shown for numeric count variables only.

[2] Values are for only 206 observations; two block groups in 2000 have no reported median housing values.

Data Source: U.S. Census Bureau

groups with a relatively high and/or an increasing percentage of rental units. These household and housing characteristics may be more reflective of broader patterns, such as declining fertility trends, greater lifestyle choices, and changes in housing consumption patterns, which are related to a rural-to-urban transition and have been occurring at a national scale as the U.S. economy continues to become more service and consumer-oriented. Still, even if the suburbs in general are losing their traditional image with regards to housing tenure mix and household type, not all parts of Gwinnett County have been affected equally by these types of changes.

The next section continues the discussion of the descriptive statistics and focuses on the racial variables with particular attention to the spatial distribution of the four racial groups (whites, African-Americans, Hispanics, and Asians) and their compositional change. Afterwards, the chapter proceeds to the data analyses results.

Racial Composition and Demographic Changes

As already noted, Gwinnett County has transformed into a multiracial suburb whose racial demographics no longer fit the traditional image of "white suburbs." Table 4.2 presents the same racial variables (plus total population) as those in Table 4.1 but with the addition of averages and standard deviations for the white percentage in 1990 and 2000 and for the black, Asian, and Hispanic percentages in 2000 to facilitate the discussion of racial demographic trends in this section. Reviewing the county-level data, the study area was overwhelmingly white in 1990 but quickly developed a multiracial composition in the ensuing decade because of the exponential growth in several non-white groups; however, whites still increased the most in absolute numbers. While 79,000 more whites resided in Gwinnett County by 2000, the number of blacks and Asians quadrupled to more than 76,000 and 42,000, respectively, and the Hispanic population increased by approximately 55,000, or more than 7.5 times.

Table 4.2: Descriptive Statistics for Racial Composition and Change, Gwinnett County, Georgia, 1990-2000

Descriptive Statistics for Racial Composition and Change Gwinnett County, Georgia, 1990-2000			
Variable	***Sum***[1]	***Mean***	***SD***
Total population (1990)	352395	1694.21	797.43
Total population (2000)	588448	2829.08	2049.78
Numeric change in Whites	79065	380.12	1351.08
Whites (1990)	315099	1514.90	738.09
Whites (2000)	394164	1895.02	1689.52
Percent White (1990)		89.49	10.49
Percent White (2000)		66.74	21.68
Blacks (1990)	17943	86.26	128.44
Blacks (2000)	76837	369.41	373.68
Percent Black (1990)		5.15	8.02
Percent Black (2000)		13.36	11.34
Asians (1990)	10089	48.50	65.44
Asians (2000)	42391	203.80	225.97
Percent Asian (1990)		2.80	2.88
Percent Asian (2000)		7.14	5.82
Hispanics (1990)	8459	40.67	39.52
Hispanics (2000)	64137	308.35	409.74
Percent Hispanic (1990)		2.34	1.79
Percent Hispanic (2000)		10.93	11.10
Percentage point change in Blacks		8.21	7.39
Percentage point change in Asians		4.35	4.89
Percentage point change in Hispanics		8.60	9.75
All Gwinnett County Block Groups: $N = 208$			

[1] Sums are shown for numeric count variables only.
Data Source: U.S. Census Bureau

Also, the average block group in 1990 literally had only a handful of racial minorities, who were more likely to be African-American than either Hispanic or Asian, but underwent racial diversification with all racial groups growing in numbers. Reflective of the county-level statistics, the mean proportion of whites declined from 89% to 66%, though the average numeric gain for whites (380) is greater than that of each of the other racial groups. For African-Americans, Asians, and Hispanics, the average percentages climbed to more than 13%, 7%, and

10%, respectively, a sizeable gain particularly for Asians and Hispanics since most block groups in 1990 had fewer than 5% of each of these two groups. Although the average block group retained a white majority but became more racially diverse, the wider ranges of values for racial group percentages in 2000 (as compared to 1990) indicate greater variability in neighborhood racial composition while the change-oriented variables denote that block groups differ widely in terms of how their racial composition altered, with some neighborhoods having a much larger demographic shift than others. For example, the white numeric change variable's very large standard deviation suggests that a sizeable number of block groups either lost or gained large numbers of whites. Similarly, for the African-American and Hispanic variables, their standard deviations point to disproportionate growth and/or concentration of these groups in some block groups after 1990. As noted by the percentage point growth and the group percentage in 2000, many neighborhoods either acquired a sizeable African-American and/or Hispanic presence or continued to have very few of either group. In contrast, Asians' contribution to block group racial compositional changes and their percentage of the block group population were more likely to be smaller and closer to each variable's respective means, indicating that this group remained less concentrated and that its proportion of the block group population shifted more uniformly across neighborhoods.

To illustrate in detail the spatial configuration of Gwinnett County's racial diversification trends, I present a series of maps depicting racial makeup and its change over time. Showing the racial minority composition for 1990 and 2000 in Figures 4.1 and 4.2, respectively, these two maps are essentially the same as Figures 3.5 and 3.6 but with data aggregated at the block group level instead of the tract level. Except for a few minor differences, the figures reveal the same type of demographic transition which is suggestive of simultaneous integration and segregation:

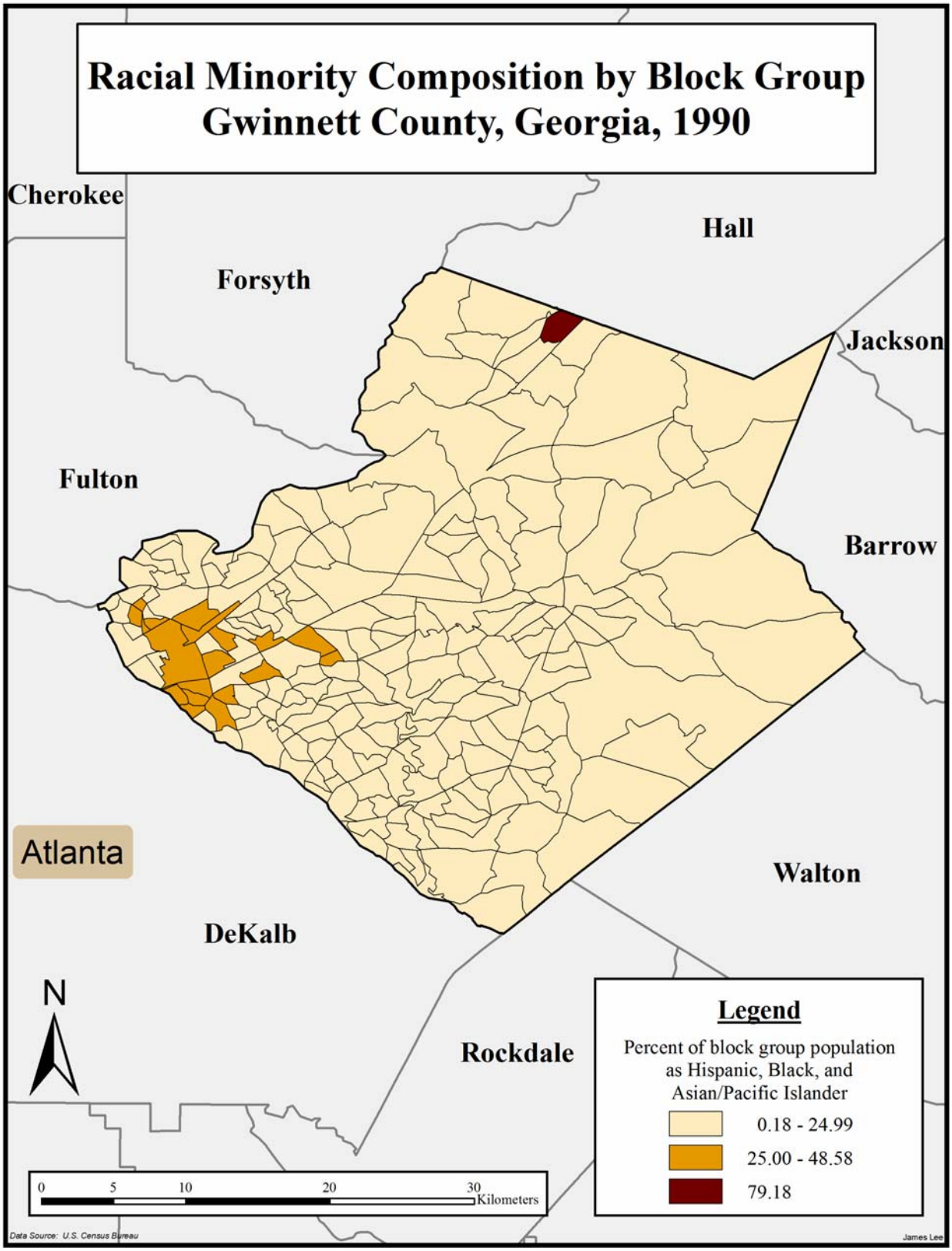


Figure 4.1: Racial Minority Composition by Block Group, Gwinnett County, Georgia, 1990

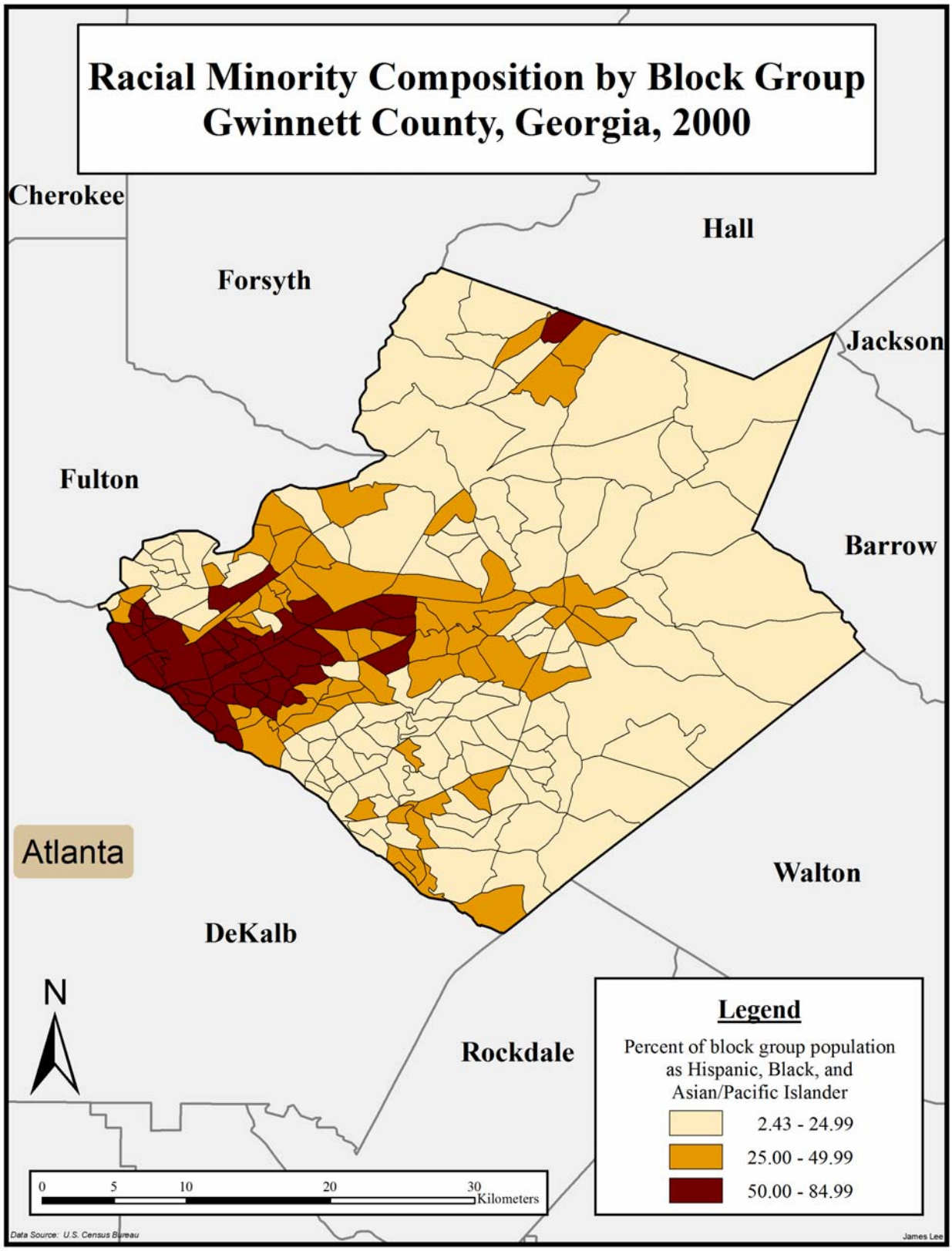


Figure 4.2: Racial Minority Composition by Block Group, Gwinnett County, Georgia, 2000

Only a few block groups had a sizeable non-white population in 1990, but "minority-majority" areas separated from heavily white neighborhoods by "integrated" block groups had formed by 2000. Thus, the racial demographic trends observed at the tract level are not unique to this geographic scale but holds true for the block group level as well.

In Figures 4.3 and 4.4, Asians', African-Americans', and Hispanics' percentage of the total block population in 1990 and 2000, respectively, are mapped out; at first glance, each group shows similar patterns to those in Figures 4.1 and 4.2. As indicated in Figure 4.3, generally, a higher proportion of African-Americans, Asians, and Hispanics has existed in western Gwinnett County since 1990 although some block groups with higher than average African-American percentages are located in northern, eastern, and central Gwinnett County (particularly in and near the cities of Lawrenceville and Buford), far from the main cluster in the county's western part. Also, reflective of the county's previously biracial demographic structure, many more block groups in 1990 had higher proportions (more than 10%) of African-Americans than of either Hispanics or Asians. Although a few areas may have been visibly multiracial by 1990, most of Gwinnett County at this time had yet to experience any significant racial diversification, and places which had done so added racial minorities who were mostly African-Americans.

With non-whites dispersing towards the suburban fringe during the 1990's, neighborhoods became more racially diversified but differed widely in how their racial composition changed. Figures 4.4 and 4.5 present some interesting spatial contrasts in terms of the proportion of the total block group population in 2000 and the percentage point growth by racial minority group. Looking at Asians first, block groups with higher than average Asian percentage point growth are scattered mostly in the county's western half, particularly near Duluth, Lilburn, Suwanee, and Berkeley Lake. Many of these block groups overlap those with

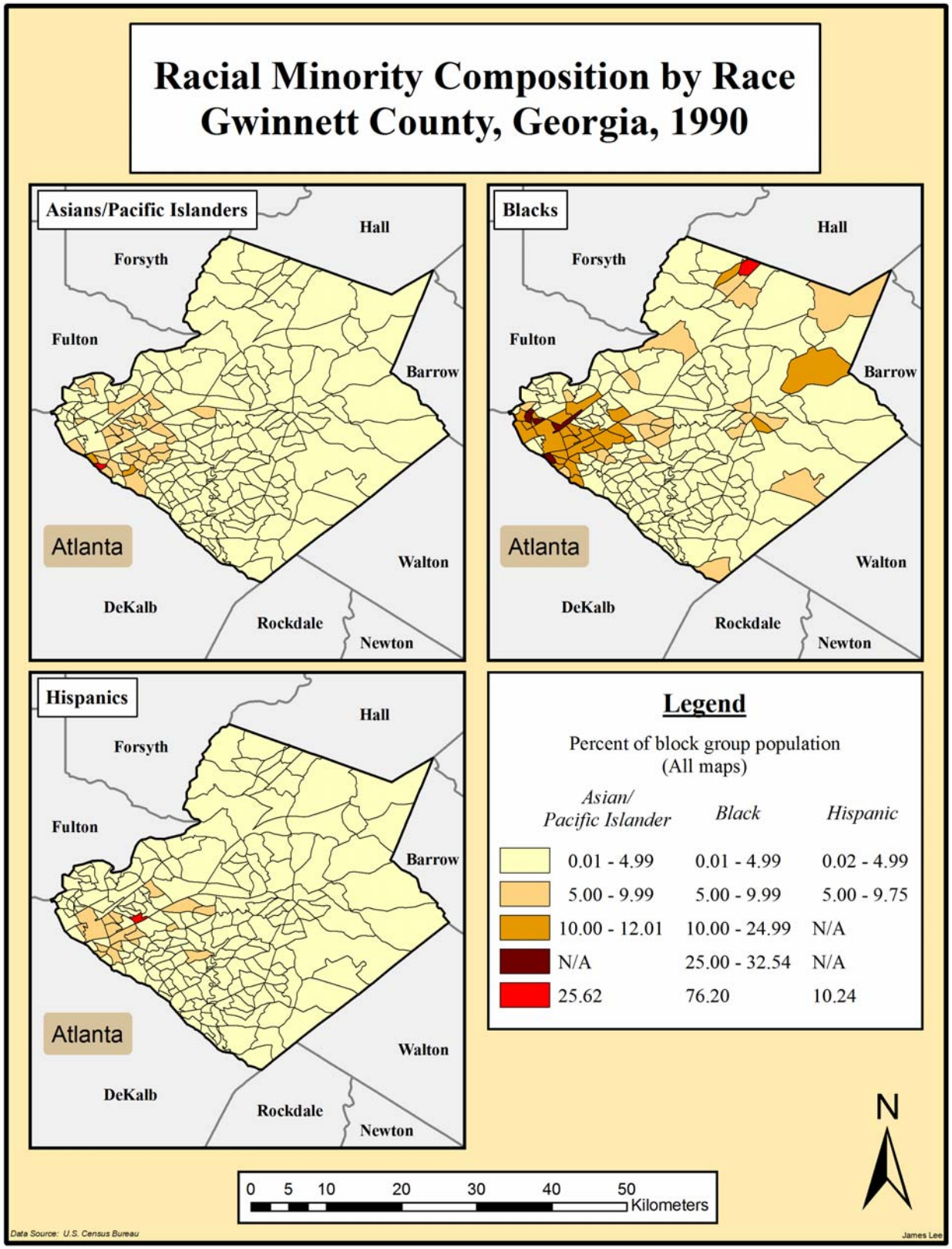


Figure 4.3: Racial Minority Composition by Race, Gwinnett County, Georgia, 1990

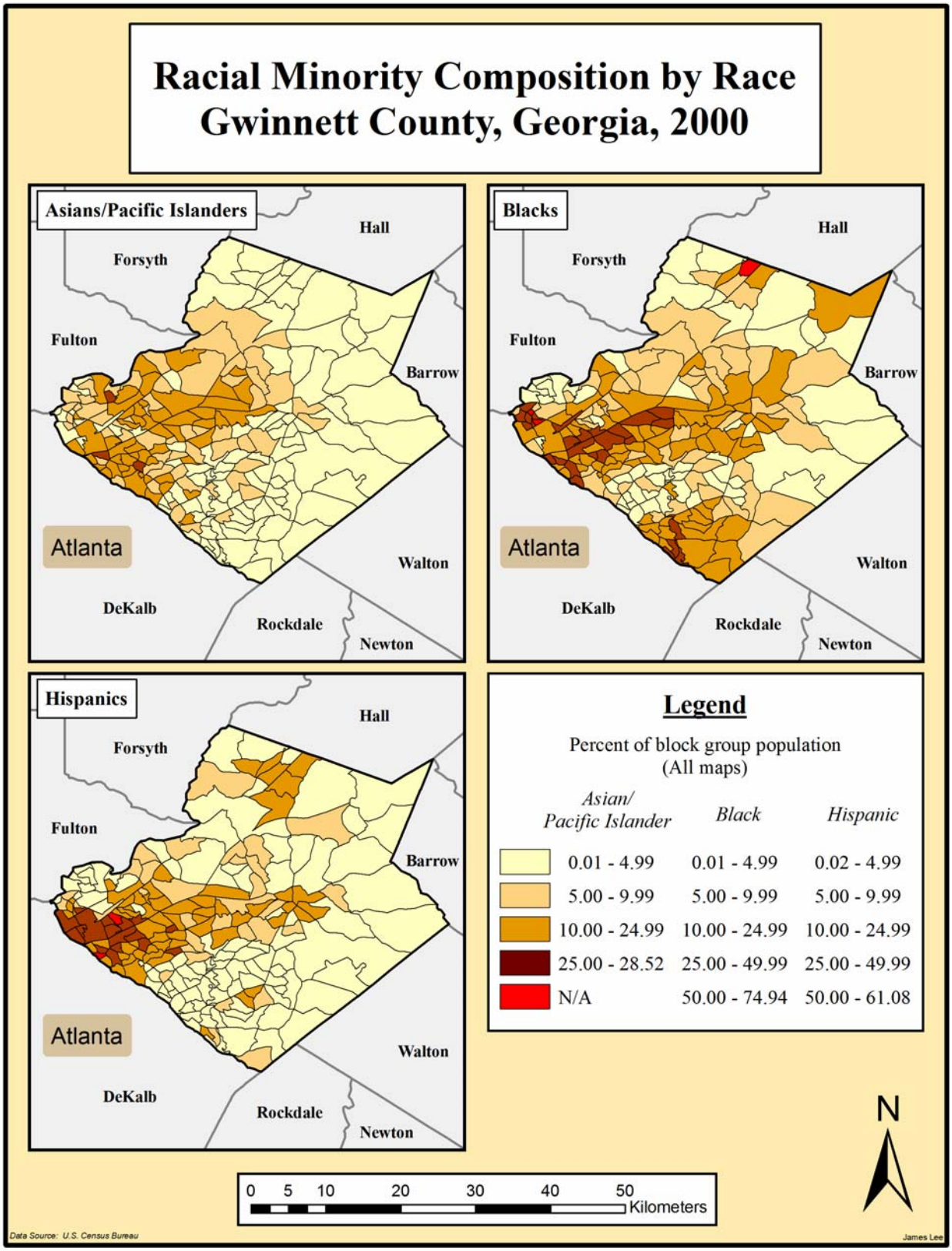


Figure 4.4: Racial Minority Composition by Race, Gwinnett County, Georgia, 2000

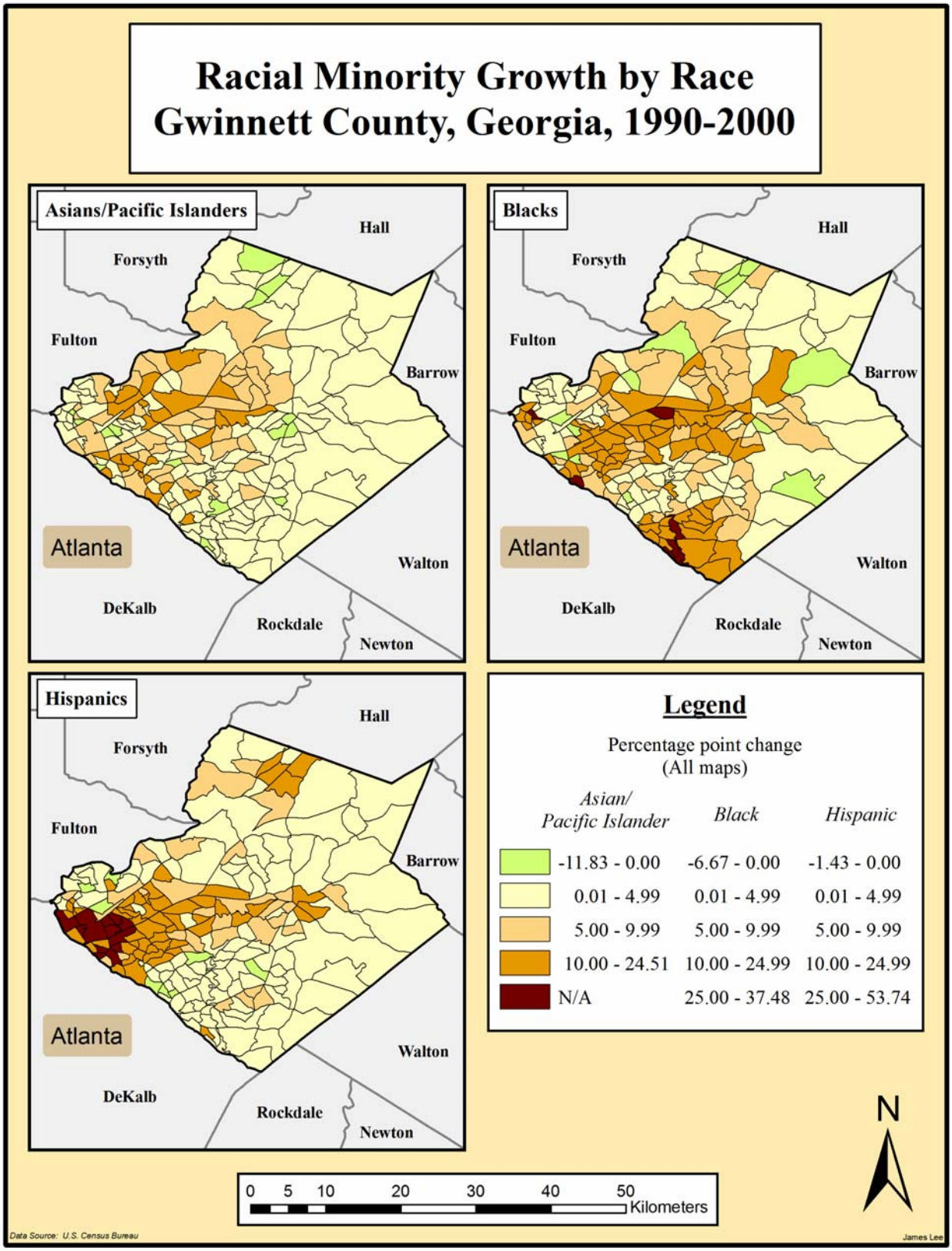


Figure 4.5: Racial Minority Growth by Race, Gwinnett County, Georgia, 1990-2000

near or higher than average Hispanic or African-American percentage point gains, and some are in places which had few racial minorities in 1990. Also, relatively few block groups increased by 10 percentage points in Asians and none by more than 25 percentage points, and no distinct cluster of neighborhoods showing a sizeable compositional shift in Asians exists, which hints at a lack of spatial concentration. By 2000, block groups with above average Asian percentages appear to be equally distributed between "minority-majority" areas in western Gwinnett County and "whiter" areas to the north and east, indicating that many Asians not only remained behind or preferred to settle in more racially diverse areas but also entered heavily white neighborhoods.

Referring again to Figures 4.4 and 4.5, Hispanics and African-Americans as well made sizeable gains in places with initially more racial minorities and in once nearly all-white neighborhoods, but unlike Asians, more defined clusters of block groups with higher than average compositional shift in these two groups exist. Also, in support of the racial diversification trends extrapolated from Table 4.2, many block groups' racial composition shifted disproportionately more in favor of a large African-American and/or Hispanic presence, and four block groups actually became majority Hispanic or African-American by 2000. In examining the Hispanic group, a large cluster of block groups with near or above average percentage point gains extends west to east from the western edge of Gwinnett County towards Duluth, Lawrenceville, and Lilburn, with the greatest shift in Hispanic composition (higher than 25 percentage points) occurring around Norcross. In addition, a second smaller cluster exists in the county's northern part around Buford. Because Hispanics formed such a small proportion of the population in almost all block groups in 1990, the ones which had above average Hispanic percentages in 2000 tended to be those which also had higher than average Hispanic percentage point gains.

In contrast, the spatial patterns for African-American percentage point growth and composition in 2000 vary considerably from the Hispanic patterns. For instance, one identifiable cluster of block groups with higher than average percentage point growth of African-Americans is found in southern Gwinnett County near Snellville and Stone Mountain, which experienced relatively little change in the Hispanic (and Asian) composition and maintained a more biracial demographic structure than other racially diversifying places in the county. Two other clusters which partially overlap with the larger Hispanic cluster are also apparent: One extends through western and central Gwinnett County (roughly from Lilburn and Norcross to Lawrenceville), and a much smaller one borders on Fulton and Dekalb Counties near Dunwoody. Block groups with above average percentages of African-Americans in 2000 mostly overlay these three clusters, although some block groups around Norcross which had below average percentage point growth retained their large African-American population from 1990. Curiously, African-Americans appear to be more dispersed than Hispanics, an observation which counters theoretical expectations because it suggests that the former group has had more success with entry into white neighborhoods and residential integration than the latter one.

Finally, Figure 4.6 shows the spatial distribution of the intercensal numeric change in the white population, the regression model's dependent variable. Despite the county's large total increase in whites and their average net gain during the 1990's (Table 4.2), these figures conceal significant disparities across different parts of the study area. Indeed, Figure 4.6 reveals that, although much of the county gained whites in the 1990's, more than half (111) of the 208 block groups had fewer whites in 2000 than in 1990; nearly one-quarter of this set decreased by more than 500 whites, a substantial loss considering that the average block group in 1990 had just over 1,500 whites. Also, the map reveals a distinct spatial pattern: The white population declines

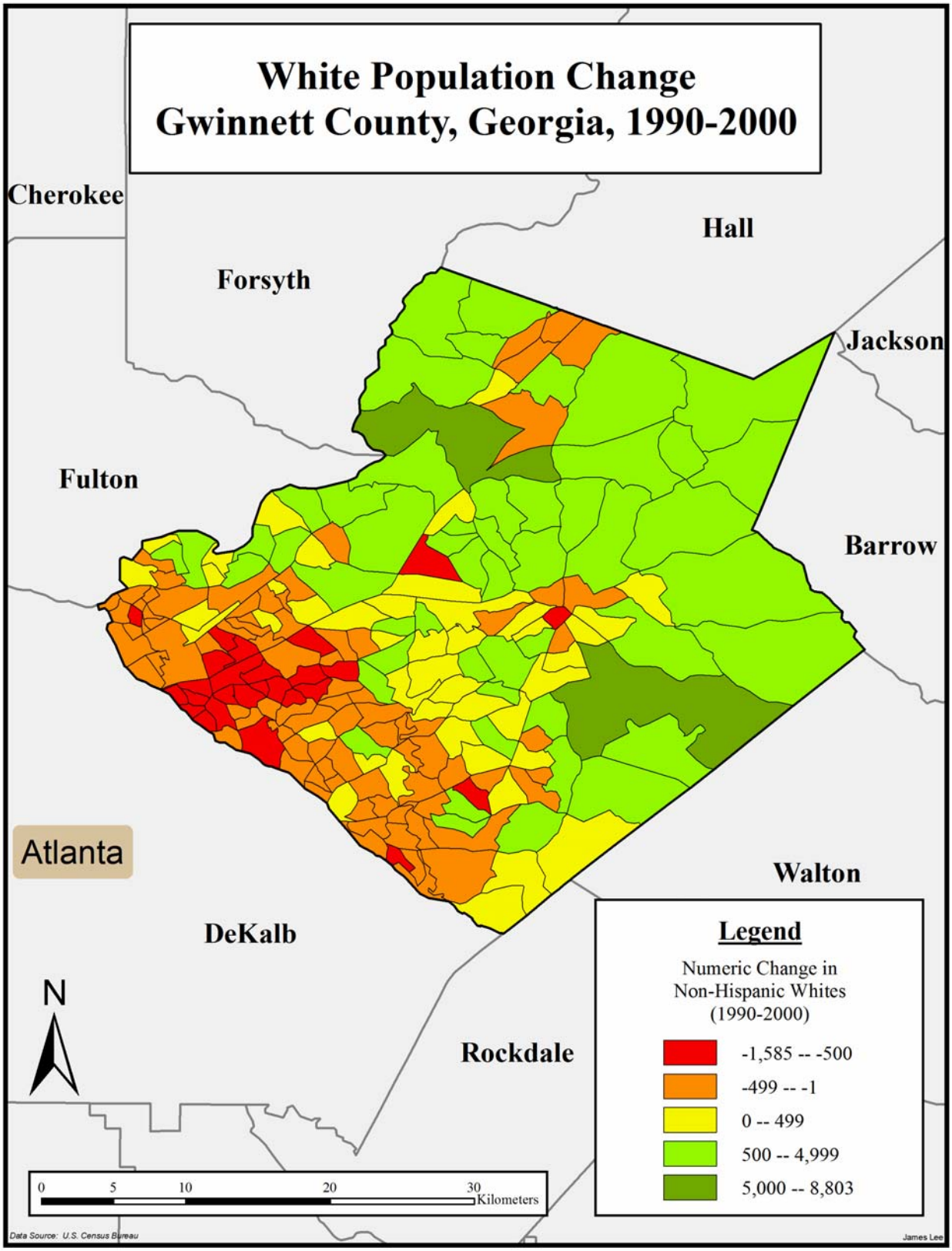


Figure 4.6: White Population Change, Gwinnett County, Georgia, 1990-2000

occurred primarily in western and southwestern Gwinnett County, where a cluster of high losses exists, as well as in smaller pockets around Lawrenceville (in the central part of the county) and Buford (in the northern part of the county). Most notably, a sizeable portion of the high white-loss area in western Gwinnett County coincides with block groups which had above average percentage point gains in Asians, Hispanics, and/or African-Americans and had become "minority-majority" by 2000 (Compare Figures 4.4, 4.5, and 4.6.), providing more reason to suspect white flight. Also, some block groups with white losses are tentatively "integrated" (white-majority areas with a significant proportion of racial minorities), which suggests that racial integration may become unstable well before whites become the numerical minority and that non-whites may be in a precarious situation vis-à-vis their ability to assimilate spatially.

The remaining 97 block groups gaining whites mostly represent places which stayed "whiter" and less racially diverse and span from the northwestern, central, and southern parts of the county and outward to the suburban fringe. With a much greater variability in their range of values among these block groups than the ones losing whites, more than half of the white-gain block groups added more than 500 whites, and as Figure 4.6 shows, two of these stand out because of their very large increases: In the Grayson/Loganville area abutting Walton County, one block group's white population grew by 6,808 while another one just north and east of Suwanee in northern Gwinnett County jumped by 8,803. Although the figures for these two block groups appear unusually huge partly due to their relatively vast areal extent, such very large gains may not be remarkable, given that many other block groups also increased their white population by several thousand and that Gwinnett County had doubled its population roughly every ten years since 1960 due to white suburbanization. Thus, neighborhoods in the high white-gain areas are merely following a trend which more urbanized parts of the county had already

experienced for decades and may also be receiving white flight from racially diversifying places in western Gwinnett County. In contrast, block groups with fewer positive gains in whites may be "racially transitioning" areas as most are adjacent to or near white-loss block groups and have an above average percentage point gain in one or more of the racial minority groups, yet these areas together do not constitute a visibly distinguishable "buffer zone" between white-loss and high white-gain areas.

To round out the discussion on the racial variables and to obtain a preliminary look at whether whites' spatial redistribution exacerbates racial minority concentration, Table 4.3 presents each racial group's numeric count and percentage of the county's group total by white-loss/gain block groups. Although most white-loss block groups decreased by only a few hundred whites each, the cumulative loss is staggering and contributed to tremendous changes and unevenness in whites' spatial distribution across Gwinnett County: This set of block groups lost slightly more than a quarter of its whites, and the nearly evenly divided distribution of whites in 1990 between white-loss and white-gain block groups became more lopsided with more than 70% of whites living in white-gain block groups by 2000. Unsurprisingly, all non-white groups made large gains in both white-loss and white-gain block groups, and with the jump in each respective group's proportion in white-gain block groups, racial minorities are arguably integrating with whites. However, the increases across all groups are not uniform: Whereas the Hispanic proportion shifted the least, the Asian and African-American proportions became nearly even between white-loss and white-gain block groups. By 2000, only 38% of Hispanics lived in white-gain areas (compared to 35% in 1990), but nearly half of African-Americans and a small majority (57%) of Asians did so. These patterns suggest that, despite spatial dispersion, Hispanics are more concentrated into white-loss areas than other racial minorities, and the

Table 4.3: Racial Composition and Change by White-Loss and White-Gain Block Groups, Gwinnett County, Georgia, 1990-2000

Racial Composition and Change by White-Loss and White-Gain Block Groups Gwinnett County, Georgia, 1990-2000			
	1990	***2000***	***Percentage Change***
Total Population	352395	588448	66.99
Population in white-loss block groups	*179806*	*216560*	*20.44*
% of total population	*51.02*	*36.80*	*-27.87*
Population in white-gain block groups	*172589*	*371888*	*115.48*
% of total population	*48.98*	*63.20*	*29.04*
Total Whites	315099	394164	25.09
Whites in white-loss block groups	*153470*	*113739*	*-25.89*
% of white population	*48.71*	*28.86*	*-40.75*
Whites in white-gain block groups	*161629*	*280425*	*73.50*
% of white population	*51.29*	*71.14*	*38.70*
Total Blacks	17943	76837	328.23
Blacks in white-loss block groups	*13059*	*40295*	*208.55*
% of black population	*72.78*	*52.44*	*-27.95*
Blacks in white-gain block groups	*4884*	*36542*	*648.26*
% of black population	*27.22*	*47.56*	*74.73*
Total Asians	10089	42391	320.18
Asians in white-loss block groups	*7332*	*18278*	*149.29*
% of Asian population	*72.68*	*43.12*	*-40.67*
Asians in white-gain block groups	*2757*	*24113*	*774.70*
% of Asian population	*27.32*	*56.88*	*108.17*
Total Hispanics	8459	64137	658.23
Hispanics in white-loss block groups	*5482*	*39635*	*622.99*
% of Hispanic population	*64.81*	*61.80*	*-4.65*
Hispanics in white-gain block groups	*2977*	*24502*	*723.12*
% of Hispanic population	*35.19*	*38.20*	*8.56*
All Block Groups: $N = 208$ White-Loss Block Groups: $N = 111$; White-Gain Block Groups: $N = 97$			
Data Source: U.S. Census Bureau			

dramatic loss of whites in western Gwinnett County during the 1990's may have adversely affected Hispanic/white segregation levels more so than Asian/white or black/white segregation levels.

Given the visually detectable patterns and relationships, further concerns must be raised about white flight as a response to a multiracial demographic shift, a reaction which limits the

prospects for meaningful racial integration among all groups. Although the dispersion of racial minorities into once nearly all-white neighborhoods demonstrates the possibility for some integration, part of the observed trends also points to race as a motivating factor behind whites' residential mobility and to high segregation levels as an equally likely outcome. With such patterns as the apparent correlation of white-loss areas with those which had a large racial minority compositional shift and became "minority-majority" or the significant percentage of racial minorities, especially Hispanics, being "left behind" in more minority-dominant neighborhoods, they signal that the relationship between race and residential location is a highly pertinent issue within an increasingly multiracial suburban context. In the next section, the regression model results provide more definitive conclusions about racial diversification's relationship to whites' residential mobility. Then, I present the P^* decomposition results to assess racial minorities' ability to assimilate spatially with whites despite probable white flight.

White Flight Regression Model

In order to determine more definitively how racial diversification contributes to white flight, I employ multivariate regression to examine this relationship at the block group level. First, I present a general overview of the regression results with and without influential observations. Then, focusing on the racial variables, I scrutinize the relationship between racial composition and diversification and changes in the white population to establish the presence of white flight within Gwinnett County's increasingly multiracial context and to indicate if, indeed, race plays a significant role in whites' residential mobility. Afterwards, a detailed discussion of the control variables will examine the impacts of important non-racial factors.

Regression Results

From the white flight regression model's results, displayed in Table 4.4, racial diversification has a strong and negative relationship with changes in the white population. These findings support the white flight theory and the continuing significance of race and provide evidence suggesting that an increasingly multiracial setting engenders shifts in whites' spatial distribution, which promote residential segregation between whites and all non-white groups. However, whites' residential mobility is not entirely racially motivated as a few non-racial characteristics are also important explanatory factors.

Because some observations seem to have undue influence on the model and specific parameter estimates, I report the results for two additional models with influential observations removed. Model 1 includes all 206 original observations,[1] Model 2 eliminates the four most influential observations (which surpassed the absolute criteria for one or more diagnostic tests), and the omission of four additional observations also deemed to be overly influential produced Model 3's results.[2] Since observation deletion is a fairly *ad hoc* way of addressing influential observations and may create bias in the regression results that depends on which observations are removed, I chose to report three sets of results rather than only two (i.e. with and without influential observations). This approach allows for cross-comparison of the models to determine how observation deletions affect the parameter estimates and the model's integrity and whether the omission or retention of certain observations introduces possible bias into the results. Overall, Models 2 and 3 improve on the original model's efficiency as indicated by the increase in adjusted-R^2 values while most parameter estimates across all models remained relatively stable. Several variables did change directions or statistical significance in Models 2 and 3; closer scrutiny of the regression diagnostics revealed that one or more of the omitted

Table 4.4: White Flight Regression Model Results, with and without influential observations

White Flight Regression Model Results			
	Model 1 [a]	***Model 2*** [b]	***Model 3*** [c]
Independent Variable (centered)	b_k	b_k	b_k
White population (1990)	+0.422***	+0.203***	+0.233***
Percent Black (1990)	+5.932	-6.655	-5.263
Percent Asian (1990)	+3.068	-10.426	-1.384
Percent Hispanic (1990)	+4.940	+14.622	+10.715
Percentage point change in Blacks	-20.402**	-20.635***	-21.532***
Percentage point change in Asians	-23.477*	-30.945***	-28.837**
Percentage point change in Hispanics	-27.427**	-25.282***	-25.952***
Population density (1990)	-0.263*	-0.152	-0.285*
Percentage change in population density	+11.028***	+10.224***	+11.240***
Percent households with persons under 18 years old (1990)	-8.099	-7.015	-7.068
Percentage point change in households with persons under 18 years old	-4.002	-3.562	-5.730
Percent households in poverty (1990)	+34.157†	+29.623†	+22.888
Percentage point change in households in poverty	+4.933	+7.042	+0.111
Median age of housing stock (1990)	-17.186	-22.389*	-18.847*
Median housing value ($1,000's) (1990)	-0.296	-1.270	-0.997
Percentage change in median housing value	-0.869	+0.324	+0.012
Percent rental units (1990) (≥ 30% = 1)	-230.027	-77.329	-40.515
Percentage point change in rental units (positive change = 1)	-156.957	-149.088†	-143.713†
Percent new housing (built 1990-2000)	-2.246	+0.551	-2.076
Percent vacant units (1990) (≥ 8% = 1)	-49.362	-162.895	-185.713†
Percentage point change in vacant units (positive change = 1)	-85.764	-14.339	+56.122
Percent households in 1990 remaining in same residence in 2000	+6.396	+6.653†	+4.351
Constant	+139.083	+81.836	+64.797
	$N = 206$	$N = 202$	$N = 198$
	$df = 22$	$df = 22$	$df = 22$
	$R^2_a = 0.8022$	$R^2_a = 0.8232$	$R^2_a = 0.8332$

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed test)

[a] Model includes all influential observations.

[b] The four observations omitted from Model 2 are Block Group 1 in Tract 501.05, Block Group 1 in Tract 502.02, Block Group 1 in Tract 506.04, and Block Group 1 in Tract 507.05.

[c] Four additional observations are removed from Model 3: Block Group 2 in Tract 502.02, Block Groups 1 and 3 in Tract 503.16, and Block Group 2 in Tract 504.18.

observations had a large amount of influence on these variables' coefficients in Model 1. However, because the results for the statistically significant racial variables, the main interest of this study, are reasonably similar across models, my interpretations and conclusions are based mostly on Model 1's findings, but where necessary, I refer to Models 2 and 3 when the results from one or both of the latter two models are considered to be more accurate.

The adjusted-R^2 values range from 0.8022 in Model 1 to 0.8332 in Model 3, indicating that the regression equation's 22 independent variables account for a high proportion of the dependent variable's variability. Considering that the sole use of aggregate data precludes more direct measurement of individual and household characteristics and residential mobility, these adjusted-R^2 values were expected to be smaller even though aggregate data tend to produce large R^2 values. The high adjusted-R^2 figures do suggest that, in general, both racial and non-racial characteristics of neighborhood context have important roles in driving residential mobility, though this conclusion does not imply individual/household-level factors (or those occurring at other scales) as insignificant.

First among the parameter estimates, the white numeric count in 1990 is a highly significant variable with a positive effect and remains so across all three models. When compared to Model 1, the drop in the coefficient's value in Models 2 and 3 is due primarily to the removal of one observation which acts as both a variable (or "X") and regression outlier and has the largest values of any observation for DFITTS, studentized residuals, and DFBETAS. The very large positive influence appears to be attributable to some of the observation's unique characteristics: Situated in the Grayson/Loganville area, this block group had the largest white population in 1990 (5,496) and the second largest numeric increase in whites (6,808), with both values beyond four standard deviations from their respective means. While the enormous white

population size and increase may be typical of some suburban places, relative to other block groups in the study area, this observation does stand out in terms of these two features. Also, the unusually high numbers may be a function of location and the spatial unit's size as the block group was positioned at the leading edge of Atlanta's suburban expansion during the 1990's and is notable for being the largest block group in Gwinnett County by area, the size of which allows for the inclusion of a substantial population within its boundaries.

Surprisingly, the variables for initial racial composition have virtually no effects on the dependent variable. On the other hand, across all models, the three change-oriented racial variables are highly significant, and all coefficients occur in a negative direction with Asian or Hispanic percentage point change (depending on the model) predicting the largest effect in absolute terms, while the Hispanic and African-American percentage point change coefficients have the most significant values. As a noteworthy remark, once influential observations are dropped from Model 1, the percent black and percent Asian variables' positive parameter estimates become negative because two statistical outliers not present in Models 2 and 3 are primarily responsible for the directional switch. If the variables were statistically significant, their negative coefficients in the latter two models would be considered to be more representative of the variables' actual relationship with the dependent variable.

Turning to the non-racial variables, most are not statistically significant, yet the percentage change in population density is one of the most significant variables in the entire model. Other significant variables include the 1990 population density (at $\alpha = 0.05$), and once influential observations are omitted, the median housing age in 1990 and percentage point change in rental units become significant (at $\alpha = 0.05$ and $\alpha = 0.10$, respectively). While the latter three variables are negatively associated with the dependent variable, the population

density change coefficient runs in a positive direction. Two variables for residential stability and vacancy which moved into significance in Models 2 and 3, respectively, are not considered to be important predictors since they gained significance only at the $\alpha = 0.10$ level and may have done so only because of observation deletion bias. Likewise, although the 1990 poverty rate is marginally significant in Models 1 and 2, this variable is deemed to be not significant because one observation with a large positive influence on the parameter estimate was not eliminated until Model 3 was calculated. Finally, the constant is not significant in any of the three models.

Racial Variables' Results

In examining the effects of racial composition and diversification, the model produced both expected and startling results, which are plotted out for the significant racial variables using their original, uncentered values and the parameter estimates stated in Model 1 while holding all other independent variables at their mean values to represent otherwise "average" conditions.[3] First, as both a racial and control variable, the non-Hispanic white count in 1990 has a positive and significant coefficient, indicating that block groups with an initially larger than average number of whites are predicted to gain more whites, net of other factors (Figure 4.7). Also, white loss is expected to occur where very few whites (less than 250) resided. Since previous studies (e.g. Farley et al. 1993; Zubrinsky-Charles 2000) have repeatedly confirmed that whites prefer to live in "whiter" neighborhoods with few racial minorities of any group, the results represent an unsurprising find. Although the variable measures a count and not a proportion and, therefore, cannot determine the relative size of the white population to the number of non-whites, neighborhoods with numerically more whites may appear subjectively "whiter" proportionally and, therefore, are considered by whites to be more attractive places to reside.

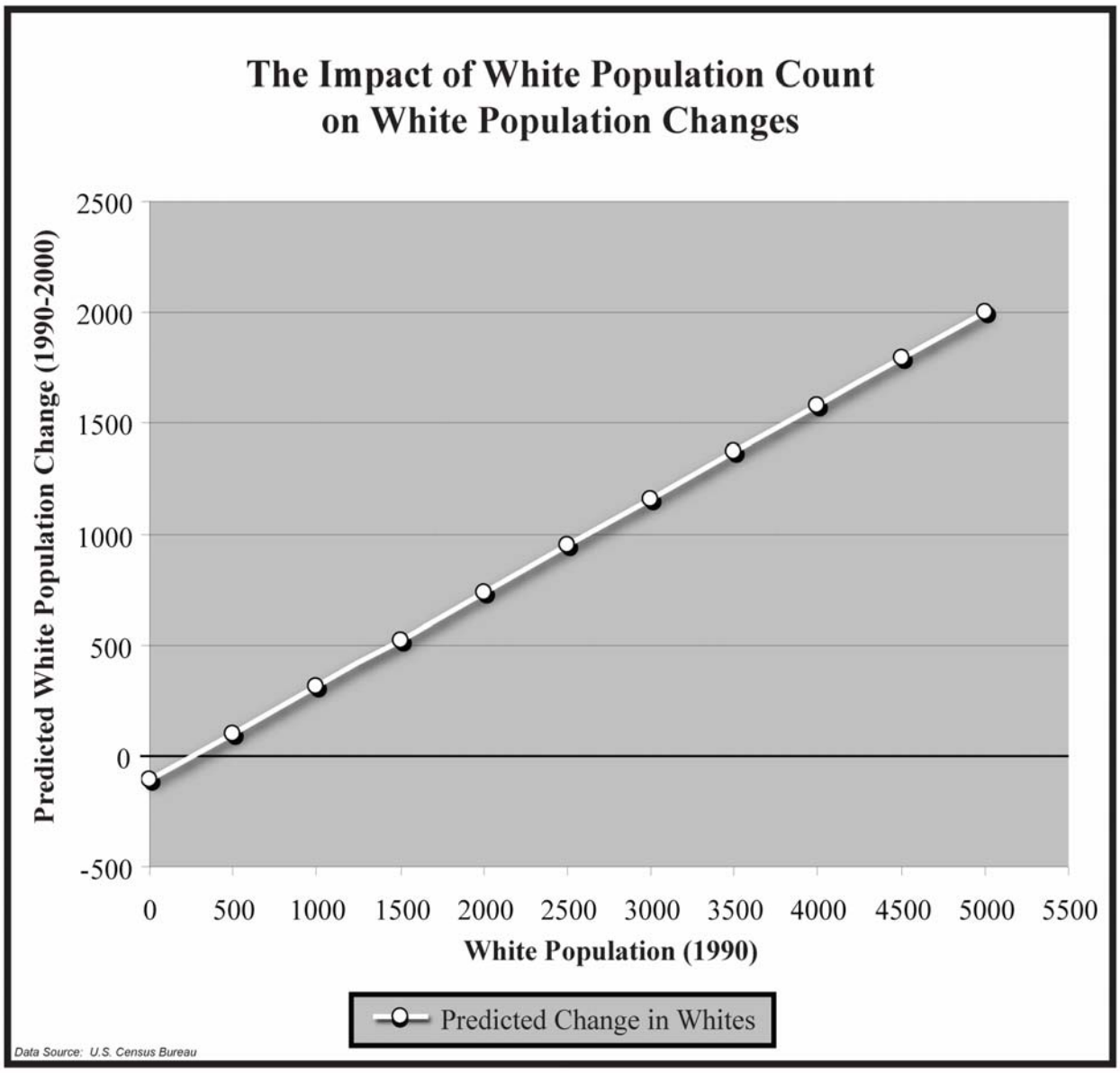


Figure 4.7: The Impact of White Population Count on White Population Changes

Among the remaining six racial variables, some of the results were anticipated, but others point to unexpected and disturbing trends. Oddly, none of the initial racial composition variables (percent black, Asian, or Hispanic in 1990) are significant, and the Asian and African-American coefficients run in a negative direction (according to Models 2 and 3) while the one for Hispanics is positive. For the Asian and Hispanic variables, the lack of statistical significance is not surprising: Both groups are generally considered to have more success integrating with whites,

and therefore, their presence is less likely to generate white flight. Further, since nearly all block groups in 1990 had few (less than 10%) Asians or Hispanics, their population size then was likely not sufficient enough to cause neighborhoods to "flip" racially. For the African-American composition variable, given the long-standing desire among whites to avoid blacks in residential settings, the coefficient's negative sign is expected; however, the non-significance of its parameter estimate appears puzzling. One probable explanation for this result may be due to a lack of sufficient observations with an initially large African-American population in the study area. Despite the existence of more than two dozen block groups in 1990 with at least 10% of their population as African-American, more of such observations may be needed to produce a significant coefficient for this variable. As another related possibility, whites may be less sensitive to racial composition if non-whites are present in fairly small numbers. Since most block groups had proportionally few African-Americans (and other racial minorities), assuming no non-black minorities present, a neighborhood which is 1% black versus another one which is 5% black may still appear to be very "white" with the difference in racial composition being barely noticeable and, thus, neither neighborhood being significantly more or less likely to induce residential mobility among whites.

In contrast to the 1990 racial composition variables, all three of the percentage point change variables are significant and run in a negative direction. As shown in Table 4.4, the parameter estimates differ slightly for each racial group and range from -20.402 (for African-Americans) to -27.427 (for Hispanics) with the Asian coefficient's value (b_k = -23.477) between these two. Thus, block groups with more compositional change in any racial minority group are predicted to have smaller gains (and, at some point, increasingly greater losses) in their white population. Curiously, the Asian and Hispanic coefficients are steeper than the one for African-

Americans: A block group is predicted to gain fewer whites with a one percentage point rise in Asians or Hispanics than with an equivalent increase in African-Americans, net of other factors. Because the results imply that whites are comparatively *less* responsive to a larger than average African-American compositional shift, they contradict the literature's conclusions about whites' greater unwillingness to live with African-Americans than with either Asians or Hispanics.

While the regression model clearly establishes the negative relationship between racial diversification and whites' residential mobility, plotting out the independent variable's values onto the predicted white population change provides additional details about how the study area's multiracial demographic shift contributes to white flight. In Figure 4.8, a comparative view of each racial group's coefficient slopes and predicted values across each variable's range is depicted, and a fourth line shows the combined effects of all three change-oriented variables on the dependent variable if their values were allowed to vary by an equal number of percentage points from zero (i.e. where no compositional shift in any group occurred). Of particular interest in the graph are the percentage point change values at which white population loss should begin to occur due to whites leaving in large numbers and/or relatively fewer whites moving in. Again, each line is plotted with the variables' uncentered values and the model's other independent variables held at their respective means.

First, despite a close link between racial diversification and white flight, since "average" conditions across all independent variables still predict white gain, neighborhoods with a compositional increase in any one or a combination of racial minority groups would not necessary experience rapid white out-migration nor appear unappealing to many in-coming whites. Even some block groups with higher than average compositional gains in all three groups should gain whites, though only in very small numbers. On the other hand, block groups

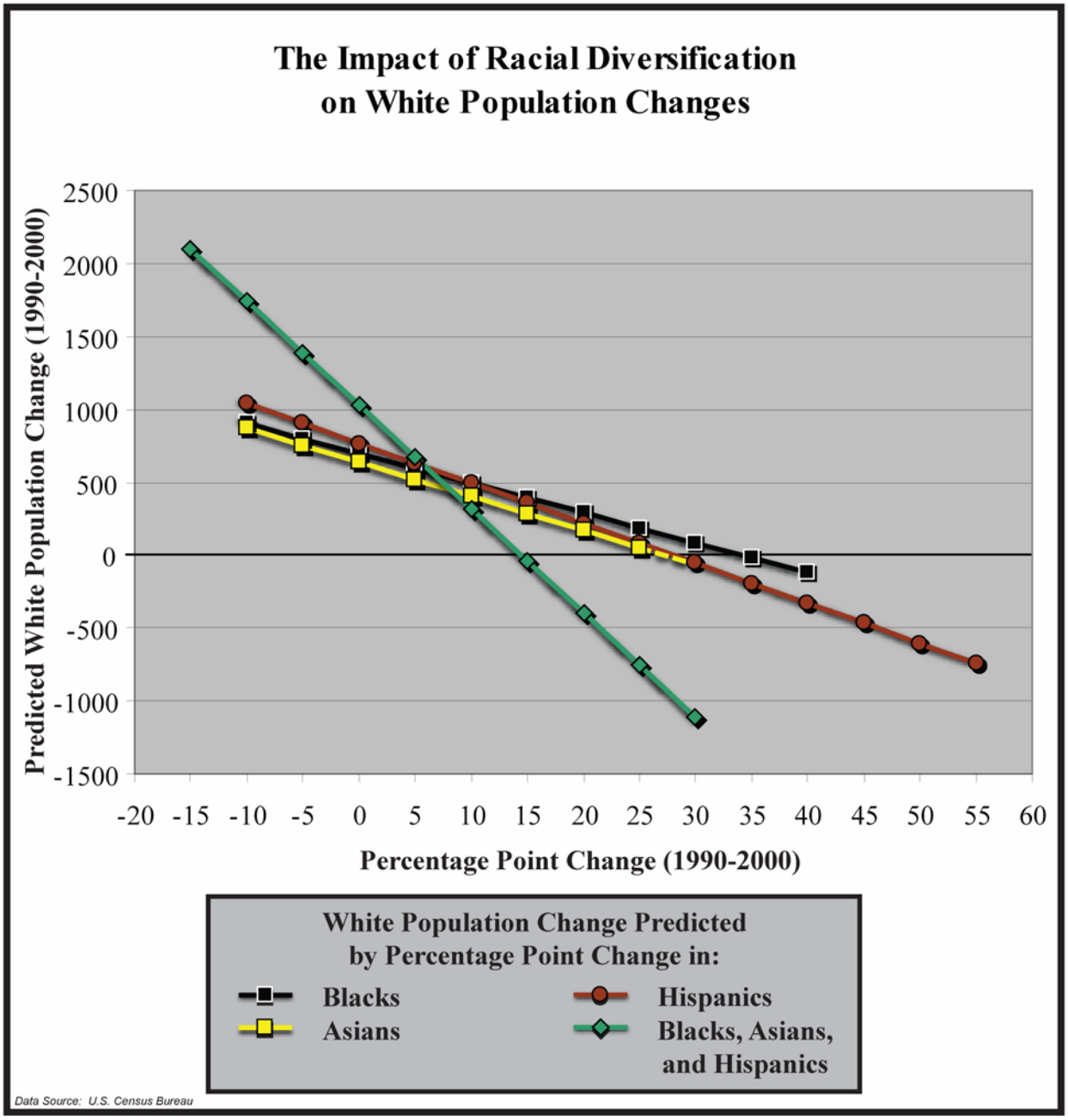


Figure 4.8: The Impact of Racial Diversification on White Population Changes

whose proportion of non-whites remained fairly constant or decreased most likely retained or added to their substantial white majority as these areas tend to attract whites in large numbers.

As the right-hand side of Figure 4.8 shows, white flight is expected in neighborhoods which experienced a very large compositional shift in any of the three groups, and block groups

which had a greater than average percentage point increase in more than one non-white group are even more likely to have white population declines. In looking at each variable's effects separately, the critical point for white loss is predicted with a 27 percentage point gain in Asians under otherwise average conditions; in contrast, the critical point as predicted by the Hispanic or African-American variables are higher at 28 and 34 percentage points, respectively, because of their higher mean values and, in the case of African-Americans, the shallower slope. However, since the Asian variable has the smallest range of values and has a maximum change of 25 percentage points (hence, the dashed line beyond this number in Figure 4.8), no block group in the study area with higher than average Asian compositional change should lose whites. As a similar situation, only a few observations with higher values of African-American compositional change are expected to have declines in the white population because the variable's maximum value at 37 percentage points lies just 3 percentage points above the critical point for white loss. In contrast, with the Hispanic variable having the widest range of values, many more block groups are predicted to have white loss with a larger than average Hispanic percentage point change. Once all three variables' effects are combined, though, white loss is predicted with a nearly 15 percentage point increase and above in all groups (net of other factors), a substantially lower value than if each variable were considered separately. Also, the predicted white population change values shift much more with a one percentage point increase across all three groups than in the one-group cases, which means that neighborhoods with a disproportionately large compositional shift in more than one racial minority group possess a greater likelihood of having a white population decline.[4]

Overall, these patterns indicate that, although some whites are seemingly willing to tolerate a sizeable multiracial demographic shift, many others still react negatively to non-

whites' entry and are discouraged from remaining in or moving into rapidly diversifying neighborhoods. In contrast, more compositionally stable, "whiter" areas are more preferred by whites. Thus, racial demographic trends and, more generally, race still matter to the study area's white suburbanites and many white newcomers settling there and ultimately affect their residential decisions and choice of neighborhoods. In turn, these processes contribute to white flight and the growing spatial imbalance in the white population at the county level: Recall from Table 4.3 and Figure 4.6 that the white population declined by more than a quarter in white-loss block groups, many of which overlap with places whose racial composition shifted dramatically in the 1990's, even as many white-gain block groups received whites by the thousands.

When considered alone under otherwise average conditions, the compositional shift in Hispanics appears to be the most important contributing factor to white flight,[5] which represents an intriguing discovery since scholars have repeatedly argued that Hispanics' residential patterns should theoretically follow the spatial assimilation model toward stable integration with whites. Equally striking, only a small number of block groups with a larger than average compositional shift in African-Americans is predicted to have white loss under average conditions, which points to the possibility of substantial black/white residential integration where non-black minorities are growing in smaller numbers, a pattern which does occur in some parts of Gwinnett County. Also, a greater amount of multiracial diversification as measured by above average compositional gains in more than one racial group amplifies the probability of white flight, and whites are even more likely to leave or avoid neighborhoods undergoing such a transition.

Control Variables' Results

In addition to the racial variables, the model's control variables capture the effects of non-racial components of neighborhood context on whites' residential mobility. Although few

of these variables are statistically significant, the results may partially reflect an overall lack of direct links between neighborhood context and actual mobility, a relationship documented by some scholars (e.g. Lee, Oropesa, and Kanan 1994; Speare 1974). For the four significant variables (1990 population density, percentage change in population density, median housing age, percentage point change in rental housing), their respective parameter estimates occur in the direction that one would more likely expect when considering how the contextual factors represented by these variables would impact residential mobility.

With a positive and highly significant coefficient, the percentage change in population density predicts large white gains in block groups with relatively high growth rates. Since existing residents could perceive a rapid pace of growth and change around their neighborhoods as a threat to their lifestyle and would respond accordingly (e.g. in the form of "NIMBY," legal action, and ultimately, relocation), the variable's result seems initially counterintuitive. Instead, as another possible interpretation, areas of high growth appear to be more attractive places to newcomers and especially whites because of their location relative to low growth areas and may actually be receiving white flight. In the study area, most low and negative growth block groups occur in already built-up, racially transitioning areas of western and southern Gwinnett County, and high growth block groups are found in the county's less dense northern and eastern parts where suburban expansion was taking place during the 1990's. Thus, low growth may be more reflective of white losses due to white flight and other factors while the variable also seems to be capturing the effects of white suburban expansion in block groups with above average change.

As moderately significant variables, the coefficients for population density and the median housing age in 1990 run in a negative direction, which signifies that more crowded, older neighborhoods should gain fewer whites, net of other factors. Conversely, places which are

more "open" and have a newer housing stock are predicted to have a greater than average influx of whites.[6] Not surprisingly, many block groups with a higher than average population density and aging neighborhoods are located in western and southwestern Gwinnett County, which had experienced the first waves of white suburbanization in the 1970's and 1980's, while low density block groups with a younger housing stock are generally found in central and eastern Gwinnett County, which lay approximately along the suburban fringe in 1990 and had just begun to grow rapidly at that time.

Finally, the percentage point change in rental units is marginally significant and occurs in a negative direction, and because it is an intercept dummy variable, the coefficient's value is added to the model's constant before interpreting. The large negative parameter estimate indicates that, net of other factors, block groups which have a greater proportion of its housing stock as rental units in 2000 than in 1990 increased their white population by a smaller number than all other block groups, and because the combined value of the coefficient and the constant is negative, otherwise average conditions would predict white loss. Instinctively, this outcome makes sense: Rental property tends to be viewed (especially by homeowners) in a negative light because renters are more mobile, less invested in the local community, and tend to belong to different demographic groups in terms of age, race, class, and other characteristics from the "typical" suburban homeowner (i.e. middle-aged, white, middle class). With a noticeable increase in rental units, existing and potentially new white residents may expect such neighborhoods to "go downhill" in anticipation of higher poverty and crime rates, more racial minorities, and less physical upkeep and, therefore, would be more inclined to move or stay away from these places.

Spatial Assimilation and P Decomposition*

As established in the regression model, racial diversification is linked to residential mobility among whites and significantly contributes to white flight and changes in whites' spatial distribution; as a consequence, racial minorities may face more difficulty integrating residentially with whites. As an indirect way of determining spatial assimilation, the use of the *P** index and decomposition process allows for measurement of segregation levels and changes due to each racial group's spatial redistribution. Specifically, in order to address the relevant research question, I utilize this procedure to examine the impacts of whites' overall redistribution on each racial minority group's ability to assimilate spatially with whites. First, I present the *P** calculations for 1990 and 2000 plus intercensal changes for all crosswise pairs for the four major racial groups (whites, blacks, Asians, and Hispanics), which follows with the initial step of the decomposition process to distinguish changes in segregation levels due to compositional growth and spatial redistributive forces. The second step to decompose *P** by each racial group's spatial redistribution is presented last to pinpoint more precisely the effects of whites' redistribution on white/non-white group segregation levels.

P Results*

In Table 4.5, the residential exposure and isolation values for 1990 and 2000 and both the absolute and percentage change for the 1990's provide an overview of segregation trends. In 1990, whites were highly isolated and had less than a 10% chance of encountering a non-white person within their own neighborhood. Also, all three racial minority groups had a high degree of exposure to whites (greater than 0.75) and were more likely to reside near African-Americans than either Asians or Hispanics. However, the *P** index takes into account each racial group's population size in the entire study area, and because Gwinnett County's population was nearly

Table 4.5: Change in Exposure Levels (*P**) Among Whites, Blacks, Asians, and Hispanics, Gwinnett County, Georgia, 1990-2000

Changes in Exposure Levels (*P) Among Whites, Blacks, Asians, and Hispanics Gwinnett County, Georgia, 1990-2000**				
Exposure of	**1990**	**2000**	**Total Change**	**Percentage Change**
Whites to				
Whites	0.9059	0.7416	-0.1642	-18.1290
Blacks	0.0433	0.1032	+0.0599	+138.2523
Asians	0.0262	0.0612	+0.0351	+134.0529
Hispanics	0.0224	0.0771	+0.0546	+243.6824
Blacks to				
Whites	0.7609	0.5295	-0.2313	-30.4028
Blacks	0.1512	0.2070	+0.0558	+36.9291
Asians	0.0464	0.0857	+0.0393	+84.6116
Hispanics	0.0386	0.1553	+0.1167	+302.6142
Asians to				
Whites	0.8170	0.5693	-0.2477	-30.3203
Blacks	0.0825	0.1553	+0.0727	+88.1465
Asians	0.0620	0.1151	+0.0531	+85.7299
Hispanics	0.0359	0.1389	+0.1030	+286.5225
Hispanics to				
Whites	0.8351	0.4735	-0.3616	-43.2993
Blacks	0.0818	0.1860	+0.1042	+127.3867
Asians	0.0429	0.0918	+0.0489	+114.1971
Hispanics	0.0376	0.2268	+0.1892	+503.7563
Data Source: U.S. Census Bureau				

90% white and consisted of relatively few non-black minorities, the patterns in 1990 reflect the large white majority and biracial demographic structure in existence then and say less about any particular racial group's likelihood of achieving significant integration with or becoming more segregated from another racial group.

By 2000, the county's racial demographic shift created some noticeable changes in residential exposure. Most noticeably, all four groups were less exposed to whites and more to racial minorities. With an isolation index value of 0.74, whites still had a much greater likelihood than any non-white group of living near other whites, and in terms of absolute and

percentage change, each non-white group's exposure to whites decreased by more than white isolation did. Remarkably, Hispanics actually became the *most* isolated non-white group and more likely to live with other racial minorities than with whites even though some of the figures in Table 4.5 would have signaled otherwise: For example, out of the three non-white groups, Hispanics had the lowest isolation index (0.04) and were most exposed to whites in 1990 (with a Hispanic-to-white P^* value of 0.84). In addition, whites', African-Americans', and Asians' probability of residing with Hispanics (as opposed to some other group) increased by more than 200%, the most in terms of percentage change. On the other hand, black isolation rose by only 37%, a low growth figure even when considering the index's relatively higher base value, and at 0.21, African-Americans were slightly less isolated than Hispanics. Also, African-Americans, Asians, and whites still had a higher chance of encountering another African-American than another Asian or Hispanic, perhaps because of the former group's larger population. Conversely, partly due to their smaller numbers, residential exposure to Asians by any group had the lowest values, and Asian isolation grew modestly by 0.05, or 86%, and remained at a fairly low value of 0.12. Seemingly, these patterns give some initial indications of the tension between integration and segregation in the study area, as exemplified by specific trends such as whites increasingly sharing residential space with non-whites and the threat of greater minority isolation, especially among Hispanics. Yet, because of the inherent properties of P^*, the figures in Table 4.5 alone cannot definitively distinguish changes in the indices' values due to compositional growth and spatial redistribution or precisely pinpoint which groups are relatively more or less responsible. Thus, these shortcomings necessitate the decomposition process.

P Decomposition Results*

In presenting the *P** decomposition results, I display in separate tables the initial step in the decomposition process, which breaks down the compositional and redistributive impacts on *P**, and its second step, which isolates the effects on changes in *P** resulting from each racial group's spatial redistribution. Here, although various trends involving different sets of racial groups are evident, I focus mostly on redistributive forces which affect residential isolation levels and the degree of residential exposure between whites and each racial minority group.

Table 4.6 shows the total change in each pairwise group's *P** value, the absolute amount of intercensal change attributable to compositional growth and spatial redistribution, and each component's percentage of the total change. Because of the explosive growth in the racial minority population and especially in "new" immigrants, residential exposure between different racial groups in 2000 should be greater than in 1990 primarily due to compositional change. Indeed, in many cases, the compositional component does contribute to nearly all of the change in exposure or isolation levels with redistributive forces having apparently minimal impact. For example, the Asian-to-white exposure index value decreased by 0.2477, but as a result of population growth from all racial groups, the counterfactual *P** value in 2000, or the value which *P** would have been without any spatial redistribution during the 1990's, is lower than the actual 1990 *P** value by 0.2454; redistributive forces further shrinks the counterfactual change value by 0.0023 to arrive at the actual change value. Thus, accounting for more than 99% of the total actual change, compositional growth is responsible for nearly all of the decrease in Asians' residential exposure to whites with the spatial redistribution component being a negligible factor.

Nevertheless, redistributive forces appear to have relatively large and possibly important effects on some of the *P** values. As an extreme case, the actual black isolation in 2000 is much

Table 4.6: Decomposition of Changes in Exposure Levels (*P**) into Compositional and Spatial Redistributive Components, Gwinnett County, Georgia, 1990-2000

Decomposition of Changes in Exposure Levels (*P) into Compositional and Spatial Redistributive Components Gwinnett County, Georgia, 1990-2000**					
Exposure of	***P*** Total Change**	**Compositional**	**% Total Change**	**Spatial Redistribution**	**% Total Change**
Whites to					
Whites	-0.1642	-0.1790	+108.9674	+0.0147	-8.9674
Blacks	+0.0599	+0.0531	+88.6072	+0.0068	+11.3928
Asians	+0.0351	+0.0353	+100.7044	-0.0002	-0.7044
Hispanics	+0.0546	+0.0745	+136.3044	-0.0198	-36.3044
Blacks to					
Whites	-0.2313	-0.2663	+115.1337	+0.0350	-15.1337
Blacks	+0.0558	+0.1157	+207.1622	-0.0598	-107.1622
Asians	+0.0393	+0.0407	+103.6503	-0.0014	-3.6503
Hispanics	+0.1167	+0.0937	+80.3138	+0.0230	+19.6862
Asians to					
Whites	-0.2477	-0.2454	+99.0728	-0.0023	+0.9272
Blacks	+0.0727	+0.0753	+103.5710	-0.0026	-3.5710
Asians	+0.0531	+0.0601	+113.0751	-0.0069	-13.0751
Hispanics	+0.1030	+0.0950	+92.3209	+0.0079	+7.6791
Hispanics to					
Whites	-0.3616	-0.2397	+66.2920	-0.1219	+33.7080
Blacks	+0.1042	+0.0767	+73.5879	+0.0275	+26.4121
Asians	+0.0489	+0.0437	+89.3229	+0.0052	+10.6771
Hispanics	+0.1892	+0.1034	+54.6474	+0.0858	+45.3526
Data Source: U.S. Census Bureau					

lower than its counterfactual value due to the spatial redistribution of all racial groups. With compositional change alone, the rise in black isolation would have been 0.1157, but redistributive forces more than halves this figure to 0.0558. To present a different example, the Hispanic isolation figure increased due to both compositional and redistributive forces. While slightly more than half (0.1034 or 55%) of the actual intercensal change is attributable to the county's racial demographic shift, the remaining 45%, or 0.0858, from spatial redistribution adds to the group's already climbing isolation level.

In further examining the results of the initial part of the decomposition, some distinct patterns are discernible: First, while redistributive forces increased white and Hispanic isolation, they decreased black and Asian isolation. As noted above, the effects of spatial redistribution significantly altered the isolation of African-Americans and Hispanics with the former group being *less* exposed to its own members and the latter group being *more* so, which again is a surprising find since African-Americans have been historically more segregated than any other racial or ethnic group in the American urban context. In contrast, the actual white and Asian isolation figures differed little from their counterfactual values; spatial redistribution raised the level of white isolation by 0.0147, or nearly 9% of the total P^* change, and reduced Asian isolation by 0.0069, or 13% of the total P^* change.

Second, as mentioned already, residential exposure between whites and non-whites should increase mostly through compositional change due to rapid racial diversification, but with the simultaneous occurrence of white flight (and perhaps other outcomes of residential mobility such as ethnic clustering), this factor may push exposure levels downward. This trend is most apparent in the P^* figures for white/Hispanic segregation and occurs to a very minor extent between whites and Asians: Because of redistributive forces, whites' exposure to Hispanics and Asians is less than their counterfactual values by 0.0198 and 0.0002, respectively, while Hispanics' and Asians' exposure to whites decreased, respectively, by 0.1219 (more than 33% of the total P^* change) and 0.0023 (less than 1% of the total P^* change). Intriguingly, African-Americans are the only racial minority group to have *more* exposure to whites (and vice versa) as a result of the redistributive component. With the presence of spatial redistribution, whites' probability of encountering an African-American grew by an additional 0.0068, which consists

of 12% of the total change in *P**, and as a result, the actual black-to-white exposure is greater than its counterfactual value by 0.0350.

Finally, among the racial minority groups alone, only Hispanics had a greater probability of sharing a neighborhood with Asians and African-Americans than predicted by compositional growth alone. Spatial redistribution actually decreased Asians' and African-Americans' likelihood of encountering each other, albeit by a small degree, but increased both groups' exposure to Hispanics.

Spatial Redistributive Decomposition Results

Because the initial decomposition step just separates out the redistributive and compositional components' effects on *P**, the reported figures thus far only reveal the impacts due to the spatial redistribution of *all* groups. The second step of the decomposition process isolates the impacts of each racial group's spatial redistribution and allows for more detailed interpretations of the forces which alter segregation levels. Displayed in Table 4.7 for each pairwise group, the figures for the change in *P** attributable to the spatial redistribution of whites, African-Americans, Asians, and Hispanics are listed with the actual change in *P** and the total change in *P** due to the redistributive component derived from the first decomposition step.

As a notable feature which I discovered by accident and defied my initial expectations, the values in each row for the change resulting from the spatial redistribution of whites, African-Americans, Asians, Hispanics, and other racial/ethnic groups (not shown) do not sum up to the total amount of *P** change due to redistributive forces (from the first decomposition step) for each pairwise group. However, the results are deemed to be accurate for several reasons: First, as discussed in Chapter 3, the method of calculating the counterfactual *P** values for both decomposition steps is virtually the same, and in both cases, the counterfactual *P** values are

Table 4.7: Decomposition of Changes in Exposure Levels (*P**) by Each Racial/Ethnic Group's Spatial Redistribution, Gwinnett County, Georgia, 1990-2000

Decomposition of Changes in Exposure Levels (*P) by Each Racial/Ethnic Group's Spatial Redistribution Gwinnett County, Georgia, 1990-2000**						
Exposure of	***P*** Total Change***	**Total Spatial Redistribution**	***Change resulting from spatial redistribution of***			
			Whites	**Blacks**	**Asians**	**Hispanics**
Whites to						
Whites	-0.1642	+0.0147	+0.0252	-0.0225	-0.0093	+0.0072
Blacks	+0.0599	+0.0068	-0.0098	+0.0253	-0.0009	-0.0002
Asians	+0.0351	-0.0002	-0.0020	-0.0022	+0.0101	0.0000
Hispanics	+0.0546	-0.0198	-0.0129	0.0000	+0.0003	-0.0070
Blacks to						
Whites	-0.2313	+0.0350	-0.0502	+0.1299	-0.0044	-0.0008
Blacks	+0.0558	-0.0598	+0.0232	-0.1213	+0.0050	-0.0039
Asians	+0.0393	-0.0014	+0.0034	+0.0101	-0.0069	-0.0022
Hispanics	+0.1167	+0.0230	+0.0225	-0.0214	+0.0061	+0.0074
Asians to						
Whites	-0.2477	-0.0023	-0.0185	-0.0204	+0.0944	-0.0002
Blacks	+0.0727	-0.0026	+0.0062	+0.0184	-0.0124	-0.0040
Asians	+0.0531	-0.0069	-0.0018	-0.0019	-0.0489	-0.0019
Hispanics	+0.1030	+0.0079	+0.0147	+0.0044	-0.0340	+0.0066
Hispanics to						
Whites	-0.3616	-0.1219	-0.0795	-0.0001	+0.0016	-0.0433
Blacks	+0.1042	+0.0275	+0.0269	-0.0256	+0.0073	+0.0088
Asians	+0.0489	+0.0052	+0.0097	+0.0029	-0.0225	+0.0043
Hispanics	+0.1892	+0.0858	+0.0408	+0.0221	+0.0130	+0.0293
Data Source: U.S. Census Bureau						

compared with their respective actual *P** values to determine the effects of spatial redistribution. Because the second decomposition's counterfactual measures are not directly derived from the first decomposition's results, the former set of values does not constitute a true decomposition of the values from the initial decomposition step. Therefore, one should not anticipate the combination of each group's contribution to the change in a single *P** value to be equal to the total amount of change resulting from the simultaneous redistribution of all groups, even if this expectation seems to be the most logical. Second, as a mathematical property of the *P** index,

the values indicating the change in P^* (due to redistributive forces, a single group's redistribution, etc.) for group X's isolation and exposure to all other groups cancel out. In my analysis, this property holds true with any single racial group's contribution to the set of five P^* values for group X's isolation and exposure equaling zero; the same result occurs when the sum of all racial groups' contribution to a pairwise group's change in P^* value is added with the sums for the remaining four pairwise groups. Finally, in examining the patterns for the second decomposition step across all pairwise groups, the direction and magnitude of change attributable to each racial group do not appear to contradict in a substantial way the conclusions drawn from the results in the initial P^* decomposition step or the white flight regression model.[7]

In Table 4.7, focusing first on whites' spatial redistribution, white flight's impacts can be discerned across indices: While white isolation was raised by a small but noticeable amount (0.0252), whites' and racial minorities' exposure to each other decreased; in some cases, such as Hispanics' and African-Americans' exposure to whites, the declines appear relatively large, which suggests that many whites moved to distance themselves from the two non-white groups. Also, unsurprisingly, whites' spatial redistribution increased racial minorities' probability of sharing a neighborhood with each other, particularly for African-Americans and Hispanics.

Despite the negative effects of whites' spatial redistribution on racial segregation, this factor seems to pose little, if any, difficulty for some racial minorities to integrate successfully with whites and, therefore, to assimilate spatially, a trend which applies best to Asians and African-Americans. While their combined impact (0.0225 for African-Americans and 0.0093 for Asians) on white isolation compensates for whites' redistributive effects, the two racial minority groups' spatial redistribution also lowered segregation levels between them and whites. Particularly noticeable are the effects on blacks' and Asians' exposure to whites: African-

Americans increased their exposure by 0.1299, which practically cancels out the redistributive effects of other racial groups, and the Asian-to-white P^* value grew by 0.0944 from Asians' spatial redistribution. The same trends also resulted in relatively large drops in black and Asian isolation, which suggests that the two groups' dispersion in the study area is aiding their ability to "catch up" (in a spatial sense) with whites fleeing from racially diversifying neighborhoods.

In contrast, not only are many Hispanics being "left behind" in minority-dominant areas by white flight but also the group appears to be exhibiting some clustering, processes which contributed to greater segregation from whites and a higher level of exposure to racial minorities, especially other Hispanics. Because of the group's spatial redistribution, white isolation *increased* by a small amount (0.0072) while residential exposure between whites and Hispanics *decreased* (by 0.0070 for white-to-Hispanic exposure and by 0.0433 for Hispanic-to-white exposure). Also, whereas Asians' and African-Americans' spatial redistribution is a small factor in lessening their exposure to other racial minorities, the opposite holds true for Hispanics, which is especially evident in each group's contribution to Hispanic isolation. Since many block groups which experienced rapid, above average compositional change in Hispanics are found in a section of the county where many neighborhoods were becoming "majority-minority," the relatively slow pace of spatial dispersion (when compared to Asians and African-Americans) and increasing residential exposure to racial minorities should be expected. Still, given that Hispanics are theorized to follow the spatial assimilation model, the possible consolidation of their population into a racial or ethnic "enclave" within an existing suburban area via clustering and white flight lacks easy explanations and may involve other intersecting characteristics (e.g. class, nativity, etc.) which are not explored in this analysis.

Drawing upon the results from both steps of the *P** decomposition process, although whites' spatial redistribution does raise this group's residential isolation and exacerbates white/non-white segregation levels, it also seems to have little impact on the spatial assimilation of Asians and, curiously, African-Americans. The most noteworthy part of the *P** analysis turns out not to be whites', but African-Americans' and Hispanics', spatial redistribution patterns; as in the regression model, these two racial minority groups stand out because their residential mobility patterns vis-à-vis segregation have thus far defied theoretical expectations. As the only racial minority group to have greater residential exposure to whites than predicted by compositional growth alone, African-Americans as a group were able to overcome the effects of white flight and reduce black/white segregation. In contrast, many Hispanics fail to follow the same pattern with the combination of white flight and clustering (or at least slower dispersion) both increasingly isolating them and inflating white/Hispanic segregation levels. Finally, in a broader sense, these patterns do reveal the tension between integration and segregation with white flight and spatial assimilation affecting residential segregation levels between whites and non-whites, though each force's influence on different racial groups can vary widely and lead to greater segregation for some racial minorities than others.

Results Summary

As a case study for examining the consequences of suburban racial diversification on residential location and integration, my analysis of Gwinnett County's racial demographic patterns produced both expected and disturbing findings. Although the relationship between race and residential mobility in a multiracial setting is highly complex, the overall results support arguments for the existence of white flight in Gwinnett County. More specifically, racial minorities' compositional growth stands out as one of the few factors to which whites respond

negatively in the regression model: Within some neighborhoods undergoing relatively greater diversification by one or more racial minority groups, increasingly more whites seem to find these places less attractive. As a result, while white residents already living in these neighborhoods are more inclined to (and may actually) move out, less whites are willing to move into them. At some point, a large enough compositional shift in racial minorities predicts a net loss in the white population due to greater numbers of whites leaving than those moving in. On the other hand, compositionally stable neighborhoods with a large white population appear more attractive to whites and exhibit the opposite trend; these places continue to experience a net gain in whites and most likely are receiving whites fleeing from more racially diverse neighborhoods. Finally, with these trends combined, whites' spatial distribution across the county is becoming more unbalanced: As the most conspicuous pattern, the "whiter" suburban fringe in eastern, central, and northern Gwinnett County is not only making sizeable net gains in whites but also has an increasingly larger proportion of the white population. The reverse holds true for already built-up, more racially diverse areas of western Gwinnett County which experienced the first waves of white suburbanization before the 1990's and, since then, have had a white population decline.

Also, few indications of a "multiracial/ethnic effect," in which the growth of non-black minority population groups and increasing racial diversity promote overall integration (Cashin 2004; Frey and Farley 1996), exist in my findings. Rather, they are more reflective of Krivo and Kaufman's (1999) and Crowder's (2000) findings about whites' desire to minimize residential contact with all racial minorities simultaneously: Seemingly, once the pace of racial diversification reaches some threshold, a specific non-white group's contribution to the population matters less than the fact that the total racial minority population is expanding rapidly

enough to threaten whites' existing numerical majority. However, the results do point to the possibility for some integration: In my analysis, growing racial diversity does not necessarily lead to a decline in the white population since the average neighborhood made gains in both whites and racial minorities; this outcome resonates with the findings of some residential preference studies which indicate that whites are willing to tolerate some non-whites (Farley, Fielding, and Krysan 1997; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000). In addition, the regression model's results point to whites as being more responsive to compositional growth in Hispanics than in African-Americans, an intriguing outcome because scholars (e.g. Massey and Denton 1993; Philpott 1978) have repeatedly noted immigrant groups', but not African-Americans', ability to integrate with native-born whites. I return to this issue later to discuss why these groups appear to have "switched places."

Despite white flight and its impacts on whites' spatial distribution, these trends do not appear to affect some racial minorities' ability to assimilate spatially with whites. Even as many whites leave or avoid more racially diverse places, racial minorities are dispersing towards the suburban fringe and entering neighborhoods which only recently had been nearly all-white. This scenario applies more to Asians and African-Americans: Segregation levels between whites and each of the two non-white groups do not differ much from the values predicted by compositional change alone as Asians' and African-Americans' residential mobility appears to have allowed them to "catch up" (in a spatial sense) with whites and maintain a relatively moderate degree of residential integration, at least for the time being. On the other hand, Hispanics as a group fail to follow this trend partly because of white flight and clustering: The P^* decomposition attributes some of the rise in Hispanic/white segregation levels to the spatial redistribution of whites and Hispanics, even though some Hispanics are dispersing farther into the suburbs. Since Asians

tend to follow the spatial assimilation model and have been noted to disperse quickly into the suburbs upon immigration (Alba et al. 1999; Iceland and Wilkes 2006), the Asian/white segregation trends are not surprising. However, like the regression analysis, the results for Hispanics and African-Americans defy theoretical expectations. Given the still high levels of black/white segregation in metropolitan areas (Frey 2001; Wilkes and Iceland 2004; Zubrinsky-Charles 2003) and whites' relatively low preference for black neighbors (Krysan 2002; Zubrinsky and Bobo 1996; Zubrinsky-Charles 2000), the trends for African-Americans in this analysis represent a break from the literature and point to cautious optimism for greater white/black integration. Hispanics, who should follow the spatial assimilation model (Alba et al. 1999; Iceland and Wilkes 2006; Massey 1985), appear not to be doing so, or at least not as rapidly as the other racial minority groups are.

Because the theoretical expectations for African-Americans and Hispanics do not hold up in the data analysis results, I provide two broad explanations for this inconsistency with the literature, which I hope that future research can empirically verify. First, racial minority groups' non-racial characteristics, which were excluded from the analysis, may partially account for the observed trends. For example, as Wilson (1978) has claimed, class status is a more important factor than race in determining African-Americans' life chances, and if his argument is correct, then my results could reflect the impacts of this group's overall class status (as well as race) on whites' residential decisions and black/white segregation levels. Likewise, class may be important for Hispanics but for different reasons. Because spatial assimilation theory postulates that immigrants arrive in the U.S. at the bottom of the socioeconomic ladder, rely on their ethnic connections and communities, and remain more segregated from native-born whites before achieving upward socioeconomic mobility and better English skills (Massey 1985), many of the

Hispanics in the study area could be relatively recent, poor immigrants, and whites' reactions could be the result of classism and xenophobia. Also, if the study area's Hispanics are mostly just beginning the trajectory towards spatial assimilation, the trend indicative of clustering in the data analysis would likely point to *ethnic* clustering since, traditionally, spatial proximity to co-ethnics provides immigrants a greater ability to take advantage of ethnic resources. Further, the ethnic clustering effect may be produced partly by higher fertility rates or selective in-migration of larger households. As a caveat, because Hispanics and African-Americans (or any other pre-defined racial group) constitute highly heterogeneous populations, I caution against over-emphasis of any particular, "all-inclusive" explanations which focus on only one or a few factors and are applied to an entire group. While future studies on Gwinnett County which incorporate non-racial characteristics could start with generalizations and suppositions like the ones above, they should also work towards more nuanced conclusions about the observed residential patterns.

Second, the results could be place- and/or time-specific; in other words, they could have been reflective of or influenced by factors unique to the study area and the time period. As one related explanation, the weaker relationship between whites' residential mobility and black compositional growth, as well as the lower than predicted black/white segregation levels (when compared to Hispanics), could be a consequence of larger numbers of African-Americans contributing to rapid racial diversification in neighborhoods where few other racial minorities moved in. As noted previously, parts of southern Gwinnett County experienced racial diversification mostly through the entry of African-Americans (with few Hispanics and Asians), but large Hispanic compositional growth generally occurred in block groups, mostly in western Gwinnett County, which also had sizeable gains in non-Hispanic racial minorities. As a result, Hispanics' greater isolation and higher level of residential exposure to other non-whites could be

a mere coincidence of more Hispanics than African-Americans moving into less racially stable neighborhoods. Therefore, a trend which appears to indicate whites' greater openness towards integration with African-Americans than with Hispanics actually reflects the latter groups' unique spatial dispersion patterns and their consequences. As another explanation, the time frame of this thesis study may not be long enough to capture adequately segregation trends. With the possibility of many Hispanics being recent, poor immigrants, their spatial assimilation with whites could take decades or even a generation; hence, the residential trends in the 1990's vis-à-vis Hispanics may be specific to that time frame, and a longer study period would be needed to determine their prospects for integration with whites. Likewise, the full impacts of African-Americans' entry into white neighborhoods may not have been detected in my analysis. Although previous scholars (e.g. Duncan and Duncan 1957; Philpott 1978) described the quickness of white-to-black turnover (usually within a decade), whites' greater racial tolerance could be slowing the pace of residential succession, and thus, while whites' negative responses to African-Americans' residential entry are not as rapid now as in the past, a continuing shift towards a larger African-American composition may lead to racial re-segregation in the future.

As the results from the white flight regression model and the P^* decomposition demonstrate, the significance of race and concerns about racial integration are highly pertinent issues to suburban (and metropolitan) areas undergoing a multiracial demographic shift. Even as the relationship between race and residential location continues to persist, it has taken on new importance as the "new" immigrant groups' presence and racialized status do seem to matter in residential choices. Despite greater racial tolerance than in the past and considerable room for integration, a neighborhood's racial makeup and expectations of racial demographic changes still influence residential choices which could threaten to marginalize racial minorities. Further,

scholars must consider the (sub)urban context as "multiracial" in order to gauge more accurately the consequences of current demographic trends and to obtain a more nuanced understanding of the complexities behind interracial residential dynamics when several racial groups are present. With increasingly more non-whites of different racial and ethnic backgrounds in the "white suburbs," the simultaneous occurrence of both integrative and segregative forces generated by racial diversification alters and complicates the prospects for stable integration, and clearly, one can no longer consider the suburbs to be *the* place for immigrants to assimilate successfully into the American mainstream or for whites to insulate themselves from non-whites.

With this case study, I provide just one example of how a newly and increasingly multiracial suburban area is accommodating non-white newcomers. While other suburbs may differ from Gwinnett County and, therefore, may not exhibit the same patterns and trends, this thesis study demonstrates the ongoing need to examine the significance of race to residential location but to do so outside of the biracial framework which has dominated the literature until recently. In the next chapter, I revisit the research questions and the significance of my findings before concluding the thesis.

CHAPTER 5

CONCLUSION

Race and the Suburbs Revisited: Integration and Segregation at Work

As many suburbs' racial demographics become more multiracially heterogeneous with the entry of African-Americans and "new" immigrant groups, the effects of this trend highlight the continuing significance of race to residential location and the need to re-examine the prospects for meaningful integration across all groups within the suburbs' (and metropolitan areas') increasingly multiracial context. In this study, I use Gwinnett County as a case study to address these issues through two interrelated research questions:

1) How does suburban racial diversification contribute to white flight and other changes in the white population's spatial distribution?
2) To what extent do the observed changes in whites' spatial distribution affect racial minorities' spatial assimilation with whites?

My research has uncovered that within an increasingly multiracial suburban context, indeed, race still matters to residential location and choices, but this relationship is complicated by such forces as the tension between white flight and spatial assimilation. As many whites leave or avoid certain neighborhoods in response to racial diversification, some racial minorities remain behind in increasingly minority-dominant areas, though others manage to overcome segregative forces to make a positive contribution towards integration. Curiously, my analysis suggests that Hispanics, an immigrant group, are most negatively affected by the observed racial

demographic trends while the prospects for black/white integration appear more optimistic than expected.

With the "prismatic metropolis" (Zubrinsky and Bobo 1996) being the rule rather than the exception in the near future, scholars must consider the types of impacts which such a context might bring and how the presence of different racial groups alters and complicates residential dynamics, particularly in regards to the tension between segregation and integration. My results provide little support for the "multiracial/ethnic effect," which, as some scholars (e.g. Cashin 2004; Frey and Farley 1996) have noted, promotes overall integration because of the presence of racial diversity. Rather, greater diversity contributes to white flight, an increasing unevenness in whites' spatial distribution, and, in some cases, higher than expected white/non-white segregation levels. Overall, the observed trends more likely reflect the explanations in studies which argue for whites' preference to live in "whiter" neighborhoods and minimize residential contact with all non-whites (Crowder 2000; Krivo and Kaufman 1999; Zubrinsky-Charles 2000). With significant numbers of racial minorities entering the suburbs, the effects of racial diversification on segregation levels may place some of them away from the traditional pathway of assimilation towards whiteness via suburbanization and, instead, in the worst case scenario, towards social, spatial, and economic marginalization. Thus, with the beginning of an apparent, observable disconnectedness among suburbanization, assimilation, and whiteness, the current use of the city/suburb and white/non-white binary framework and the association of suburbanization with assimilation in the literature should be called into question, as some scholars (e.g. Frey 2001; Wright, Ellis, and Parks 2005) have already done.

However, the findings also point to some promising conclusions. Although racial diversification generates a negative residential response among whites, the data analysis does

indicate some possibility for integration: In the average neighborhood, the number of whites grew even with a compositional gain in racial minorities, and with a relatively greater ability to maintain residential integration with whites, Asians and African-Americans appear to be following the spatial assimilation model. For some racial minorities, then, their prospects for stable integration with whites and eventual assimilation could be realized. Particularly noteworthy are the results in relation to African-Americans since, having been the most segregated racial/ethnic group in U.S. history (Philpott 1978; Massey and Denton 1993), they appear to have more success than some immigrants in achieving significant integration. Still, given the limitations imposed on this study, I caution against having too much optimism regarding future prospects for integration between whites and blacks (or any other non-whites) or any haste in discounting the significance of race. Also, in light of these trends, theories already established on the Chicago School's ecological framework (i.e. residential succession, spatial assimilation theory) should not be discarded altogether but rather should incorporate a more nuanced view of residential dynamics. In the process, scholars may need to re-think the current black/immigrant divide in the literature and the role of race for both African-Americans and the "new" immigrants.

Even as this case study demonstrates the need to re-examine the significance of race to residential location and the effects of this relationship, it also reveals a need to scrutinize other places which are experiencing a multiracial demographic transition. Undoubtedly, Gwinnett County's experience likely illustrates broader trends at work as various racial and ethnic minority groups continue to move in sizeable numbers to the suburbs as well as metropolitan areas outside of the traditional "immigrant gateways." Yet, this study recognizes that the observed patterns may partly reflect the outcome of unique factors or sets of conditions and the

constraints imposed by the methodology and by the necessity of having a defined study area and time period. For these and other reasons, this analysis of Gwinnett County represents an initial exploration, and further studies of the multiracial suburban/metropolitan context, its residential dynamics, and its impacts on residential segregation in other urban areas are urgently needed.

Limitations

For various reasons, all studies, including this one, have inherent limitations. In this thesis, the use of quantitative data presents challenges which other scholars conducting similar types of studies face. First, loss of information inevitably occurs when complex, real-world phenomena are represented through numbers. Without some contextual and qualitative information about the area and time frame of interest, the subject or issue under study, and other pertinent factors, the interpretation of one's research findings may be incomplete, biased, and/or less insightful. Because most residential mobility and segregation studies are quantitative in nature, the use of quantitative methodologies is still recommended for the sake of comparability but could be supplemented by qualitative methods for more in-depth analyses.

Also, as discussed in length in Chapter 3, some methodological issues, particularly in regards to the use of aggregate data, prevented this study from being able to evaluate more fully the relationship between residential location and race as well as different types of non-racial attributes at various scales. Because of the lack of access to census microdata, the analysis excludes individual and household-level characteristics and possibly important explanatory factors and necessitates more indirect ways of measuring residential mobility and spatial assimilation. Therefore, in line with most other studies, the incorporation of microdata (and data at different scales) is recommended if available.

Recommendations for Future Research and Final Thoughts

While this thesis makes a small contribution to the literature by drawing attention to some critical issues concerning the role of race within the suburbs' increasingly multiracial context, it also raises more questions concerning the future of U.S. urban neighborhoods and their residential geographies as well as the need for more studies to address related issues. Several possible avenues for further research exist: As one option, future studies could broaden out the spatial and temporal scope to compare the effects of racial diversification between places and over a longer period of time in order to verify the conclusions made in this thesis and by other similar studies. Also, while race remains as one of the primary concerns among urban scholars, other intersecting characteristics (e.g. class, gender, nativity, fertility, etc.) provide fruitful areas for research, especially in regards to their impacts when combined with race. In addition, since commonly used segregation indices, such as P^* (the Exposure Index) and D (the Dissimilarity Index) were originally designed for two-group cases and have limited application to multiple-group cases, these methods of capturing the effects of a multiracial setting can grossly simplify or are unable to uncover fully the complexities of interactions across multiple groups. Thus, scholars should explore additional methods and modifications of existing ones which can more accurately represent the multiracial context. Finally, of particular interest is whether a city's historical and social contexts in relation to race affect current patterns of assimilation and segregation among all racial groups. For example, as a city located in the heart of the South, Atlanta has a history of strong black/white racial divisions which continue to shape the social interactions of the region's citizens. However, with new groups who are neither white nor black entering the scene, one can question if the city's (and the South's) legacy of institutionalized

segregation and remnants of its biracial demographic structure have significant effects on the residential landscape which differ from those observed in other "immigrant gateways."

As the 21st century unfolds with a continuing influx of "new" immigrants and racial minorities, issues of racism and assimilation remain at the forefront, and unveiling the continuing significance of race to residential location is an important step in the fight against the power of racism still prevalent in U.S. society. Although the "new" immigrants hold the same dreams for success as their European predecessors had, they may also face more difficulty with integration and assimilation because of their racial distinctiveness (Alba and Nee 1997), and as the African-American experience reveals, without full spatial integration with whites, racial minorities face a severe cycle of socioeconomic disadvantages (Massey and Denton 1993). Thus, the inability to integrate residentially with whites poses a real barrier to aspirations for the "American Dream," and (white) racism could potentially relegate all racial minorities to a second-class status or an underclass corresponding to today's African-American ghetto, the "American Nightmare." In response, scholars must continue to address, within a multiracial context, questions about race, residential location, and the possibility for assimilation between whites and racial minorities at different scales. Scrutinizing current trends and comprehending the underlying causes of residential patterns among different racial/ethnic groups will enhance the fight against racism for a more just and equitable society.

NOTES

Chapter 1

1. Massey and Denton's (1993) *American Apartheid* provides a thorough treatment of white flight's and racial segregation's negative consequences for blacks, particularly in relation to the problem of poverty concentration and the neighborhood effects derived from exposure to high levels of poverty. Other examples (e.g. Kruse 2005) of how white flight and re-segregation between whites and blacks are related to racial inequality and disinvestment in minority-dominant areas by the state and other institutions abound in the urban literature.

Chapter 2

1. One exception is Philpott's (1978) *The Slum and the Ghetto*. His descriptions of life in Chicago during the late 19th and early 20th centuries shed light on some reasons behind the black/immigrant differences in residential experience, which, seemingly, stem from the simultaneous inclusion of immigrants into and exclusion of African-Americans from "mainstream" American society. Driven by fears around immigrants' lack of assimilation, native-born whites made active attempts to educate and provide assistance to immigrants, especially those residing in the city's ethnic enclaves, with the hopes of facilitating assimilation; such efforts produced many of Chicago's most famous institutions, including Hull House and other settlement houses. In contrast, no similar attempts were extended to African-Americans, and in fact, businesses and non-profit establishments vigorously opposed their presence. Likewise, many neighborhoods, particularly those dominated by immigrant groups, did not welcome African-Americans. Also, immigrant groups (but not African-Americans) already occupied important positions of power in the early 20th century, giving the former considerable influence and resources which likely contributed to integration. While these reasons highlight crucial explanations for the black/immigrant divide, Philpott somehow misses that, as some scholars (Jacobson 1998; Roediger 2005) have noted, white Americans at that time perceived eastern and southern European immigrants and African-Americans to be racially distinct from themselves. Thus, as a shortcoming, *The Slum and the Ghetto* does not directly address the role of race in immigrant groups' social and spatial integration into the American mainstream or why racial discrimination against African-Americans has consistently been more severe. More recent works (e.g. Jacobson 1998; Roediger 1991; Roediger 2005) which discuss the importance of race and "whiteness" for European immigrant groups fill some of the gaps left behind by Philpott.

2. To clarify, early and mid-20th century scholars did not use the term "white flight" to describe this pattern of neighborhood transition, but Duncan and Duncan's (1957) observations suggest the presence of white flight, while contemporary scholars (e.g. Kruse 2005) examining similar changes in the past do label the process as white flight.

3. Wilkes and Iceland (2004) define "hypersegregation" according to criteria related to the five dimensions of segregation as described by Massey and Denton (1988).

4. Various scholars (e.g. Alba et al. 1999) suggest that some Asian groups deviate from the theoretically prescribed pattern of assimilation because they have been observed to achieve suburban residence without the associated cultural and socioeconomic assimilation. Yet, because these groups are still "assimilating" in the spatial sense, this observation has been argued as indicative of support for the spatial assimilation model rather than as contradictory to it.

Chapter 3

1. In the remainder of this thesis, I refer to block groups and neighborhoods interchangeably. However, this way of referencing does not imply that the block group boundaries, which are artificially established by the U.S. Census Bureau, coincide with neighborhood areas, which may be defined differently by various individuals, groups, or entities and tend to have more fluid, subjective boundaries.

2. In a previous paper on a portion of Gwinnett County, I utilized census blocks as a proxy for "neighborhoods" to determine the feasibility of using this geographic level for future studies. In the selected study area, the total block population ranges from zero to 2,326, and the largest block by area is 1.31 square miles, or 3.4 km². Out of the 853 blocks in the study area, 641 have fewer than 100 people, and slightly over a quarter of all blocks (primarily non-residential areas) are unpopulated. By land area, 840 blocks occupy less than 0.50 square miles (1.3 km²), with 221 blocks having less than 0.01 square miles (0.03 km²), considerably smaller than most residential subdivisions. Thus, aside from the skewed distribution in population and land area, at least for Gwinnett County, many blocks hardly constitute "neighborhoods" even by very geographically narrow definitions.

3. From this section forward, any mention of the 1990 data refers to the interpolated data conforming 1990 numbers to 2000 block group boundaries, unless otherwise noted.

4. Much of the debate in the literature about quantifying the effects of multiple groups has been centered on segregation indices (e.g. Massey and Denton 1988; Reardon and Firebaugh 2002), and given the relative complexity and newness of multi-group research, few scholars readily agree on a single or small set of approaches to measure residential interactions across multiple groups. I expect the same types of issues and problems associated with the use of segregation indices to apply to regression models incorporating several racial groups, and further research should be carried out to determine more precise ways of modeling the effects of a multiracial context.

5. From this point forward, "white," "black"/"African-American," and "Asian/Pacific Islander" (or "Asian") refer specifically to the non-Hispanic portion of the respective racial categories and "Hispanic" to all persons of Hispanic origin, regardless of race. "Racial minority" or "non-white" refers to the entire population excluding single-race non-Hispanic whites. Although the 2000 census allowed multiple-race responses for the first time, given the small

number of persons who chose more than one race in Gwinnett County, the multiple-race option does not compromise the comparability of data on race for 1990 and 2000. Therefore, I chose to exclude the multiple-race group as well as non-Hispanic single-race groups which are not white, black, or Asian: In 1990, less than 0.0023% of Gwinnett County's population belonged to these other groups, and no block group had more than 0.9496% of its population in the excluded groups. Despite exponential growth, at the county level, the excluded non-Hispanic single-race groups in 2000 consist of only 0.0037% of the total population, and only 0.0149% of the non-Hispanic population is multiracial. The respective percentages for the block groups with the highest proportion of each group are 1.5024% and 3.6523%.

6. In addition to these 15 variables, other variables were also considered to capture as many aspects of neighborhood context as possible but were eventually eliminated because of their lack of theoretical significance or multicollinearity.

7. The values used to calculate the residential stability variable are derived from census data categories in Summary Tape File 3 which actually indicate the time period in which the *householder* moved into his/her place of residence, but since each household has only one householder, "household" can be substituted for "householder" to describe the variable. However, one should be aware that a slight variation between the number of householders and the number of households exists in the census records because of sampling error in all Summary Tape File 3 data.

8. Racial/ethnic clustering would have the same effect on the white/non-white exposure indices in the first decomposition step and can be discerned from white flight only by examining the second step to determine whether whites or racial minorities contribute more to redistributive forces which negatively affect integration.

Chapter 4

1. As discussed in Chapter 3, two observations were automatically eliminated from the original model because they lacked median housing values in 2000, which are necessary to calculate the percentage change in median housing values during 1990-2000. The two models with influential observations removed also do not have these two observations.

2. The four observations omitted from Model 2 are Block Group 1 in Tract 501.05 (in Buford), Block Group 1 in Tract 502.02 (in Suwanee), Block Group 1 in Tract 506.04 (in the Hamilton Mill area), and Block Group 1 in Tract 507.05 (in Grayson and Loganville). The additional four observations not included in Model 3 are Block Group 2 in Tract 502.02 (in Suwanee), Block Groups 1 and 3 in Tract 503.16 (in the Peachtree Corners/Norcross area), and Block Group 2 in Tract 504.18 (south of Norcross).

3. For the dummy variables, the values are held at zero to represent "average" conditions although, in reality, they include both below and slightly above average conditions. In the process of transforming the rental and vacancy variables into dummy variables, which were originally calculated as proportions and percentage point changes, values close to and below each respective variable's mean were coded as "0." Thus, when the text mentions "average"

conditions, it actually means that only the continuous variables are held at their mean values while referring to near and below average percentages of and percentage point change in rental and vacant housing units. I simply use "average" as a shorthand way of describing this set of conditions.

4. Separate calculations to model the effects of compositional increase from more than one group by allowing each independent variable's values to vary by the same standard deviation or percentage point change from its respective mean (instead of by percentage point change from zero) produce different values for each racial group at which a white population decline is predicted. However, the general conclusion is the same in that, in block groups which had above average compositional gains in two or more racial groups, the combined effects result in a larger predicted amount of change in the white population with one percentage point or standard deviation increase and in white loss being predicted at lower percentage point change values than if each group's effects were modeled independently.

5. Though not reported with the regression results, the standardized coefficients (b_k*) also support the conclusion that the Hispanic percentage point change variable has a relatively stronger relationship with the dependent variable than either the African-American or Asian percentage point change variable. In the three models listed in Table 4.4, the Hispanic variable's standardized coefficient is greater than the other two variables' coefficients and spans from -0.198 in Model 1 to -0.221 in Model 3. In contrast, b_k* for the Asian and African-American variables ranges from -0.085 to -0.135 and -0.109 to -0.139, respectively, across models.

6. Surprisingly, the variable for the percentage of new housing does not allow for this interpretation because of its lack of significance (in all models) and negative sign (in Models 1 and 3). Several reasons are suspected as to why this result occurred, such as the possibility of other variables capturing the effect which would have otherwise been attributed to the new housing variable and/or mild multicollinearity with the independent variables. After the initial diagnostic tests were performed, this variable was kept despite its statistical insignificance for the original reason of capturing an aspect of housing availability (rather than neighborhood or housing stock age) and because eliminating the variable had little effect on the model's other parameter estimates and their statistical significance.

7. Even without substantive proof for my initial expectations, I remain partially puzzled about the full nature of the relationship between the counterfactual P* values from both decomposition steps. I speculate that, among other reasons, the calculated figures are not taking into account the full complexity of multiracial segregation dynamics or are revealing a relationship whose interpretation is not readily apparent. Despite the apparent weakness of this one aspect of the P* decomposition process, the methodology has significant utility in future research, and further work is recommended to explore the application and mathematics of the P* decomposition process for two-group and multiple-group cases.

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