

**MOBILITY AND ISOLATION:
LATINO IMMIGRANT ADJUSTMENT IN ATLANTA, GEORGIA**

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ABSTRACT

In the automobile society of the United States, virtually every adult needs a car to work, shop, and participate in social institutions. However, not everyone has a car. One of the populations with low access to vehicles is the Latin American immigrant population. This study asks to what extent Latino immigrants experience spatial constraints due to lack of mobility, what mobility strategies do they use in order to function in a context of automobility, and to what extent transportation limitations are associated with another socially isolating factor – English proficiency. I investigate these questions for employed Latino immigrants in the Atlanta, Georgia metropolitan area, which is a new Latino destination that has a particularly poor transportation system. Data sources include US Census summary files for 1980-2010, data from the Census Transportation Planning Package from 2000, and American Community Survey 2006-2010 pooled microdata.

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CHAPTER 1: MOBILITIES AND CONTAINMENT

Immigrants experience the contradictory processes of mobility and containment, which scholars recognize as characteristics of globalization. The large scale of contemporary immigration forms one of the bases for Sheller and Urry (2006) to propose a theoretical framework of the *new mobilities paradigm*. They write: “All the world seems to be on the move...the scale of this travelling is immense” (p. 207). Sheller and Urry (2006) identify and encourage an expansion of the theoretical arena where social science and transportation research have overlapped, as scholars of mobility from many disciplines seek to understand how social relations are embedded in different forms of transport and the public issues that emerge. They define the paradigm broadly to include the movement of anything – people, materials, information – as well as the systems that enable their movement. Although factors constraining mobility by default are included within this new paradigm, naming the paradigm *mobilities* places the emphasis on the factors that enable and facilitate movement.

Pointing to the prevention of the movement of unwanted immigrants, both across and within borders, Shamir (2005) opposes the emphasis on mobility, openness, and movement, and proposes that processes of closure, entrapment, and containment operate simultaneously with the processes that give rise to increased mobility. In explaining the processes of closure, he asserts that the control and regulation of movement by a *global mobility regime* has become a stratifying force in the global social hierarchy, and that the regime operates according to a *paradigm of suspicion* because the regulation of mobility rests on perceived threats of dangerous people. Under a paradigm of suspicion, policies restrict mobility based on the conflation of crime, undesired immigration, and terrorism, particularly when the population in question is also poor. The strategies that restrict movement of people emerge on all scales, from the local to the global.

Shamir (2005) points to two specific strategies used to protect the privileged population from dangerous people. One is the quarantine, manifesting in the form of prisons and ghettos, and the other is privately guarded safe havens, such as gated communities, patrolled shopping malls, and guarded workplaces. In Shamir's analysis, the governance of mobility encourages those who travel for profit and condemns those who travel for survival. Mobility regulations thus focus on screening out the unwanted travelers. Policies that regulate visas – and I would add driver's licenses – formally permit the movement of some and withhold permission to travel from others.

In emphasizing the processes of closure, Shamir (2005) takes the point of view of those who do not have the privilege of easy movement internationally or locally. In discussing a *mobility regime* instead of *mobilities*, he emphasizes how regulations of movement favor those in power and serve to exclude those who live on the margins. In discussing a *paradigm of suspicion*, he refers to the fear that those in power have of those who are not similarly privileged, which manifests in regulations that constrict their movements.

These perspectives emphasize two opposing faces of mobility. Sheller and Urry (2006) focus on the “openness” aspect of mobility, broadly discussing aspects of increased mobility of people, materials and information, and the issues that result from the increased movement. Shamir (2005) focuses on the “closure” of mobility, with processes actively and intentionally restricting the movement of those who fall into a vaguely-defined but growing category of suspicious persons. I believe that both perspectives are important. The increased mobility enjoyed by the privileged and the systems upon which the mobility depend – such as roads and airports, gasoline and geopolitical relationships, urban planning and local politics – impact the global context and the lives of virtually everyone.

The impact of the increased mobility, however, is not the same for everyone, and contributes to an ever-widening mobility gap. More mobility for some results in less mobility for others – both relative and absolute. Scholars in the environmental justice and civil rights movements point out that the decisions regarding where to build transportation infrastructure result from discussions among powerful stakeholders, representing the political and economic priorities rather than concerns regarding equity, transportation rights and equality (Bullard and Johnson 1997; Cairns, Greig, and Wachs 2003). This unequal power in the decision-making process results in disparate impacts. If a highway is constructed through an impoverished neighborhood, then those who travel along the highway benefit from the highway. However, those who live in the neighborhood who cannot drive due to legal reasons, medical reasons, or expense, and they experience less relative mobility because others who have vehicles experience more mobility. They also bear many of the costs and negative externalities of the highway. Residents of the community may lose their homes and businesses due to the land needed for the construction of the highway; they may face a physical barrier through their community that limits local mobility and endangers pedestrian safety; they may live with the noise and air pollution and the resulting poorer health and quality of life; and they may experience the distancing of jobs, shops, and amenities that spatially disperse because of the increased mobility of others in society. Insofar as the spatially-based costs and negative externalities disproportionately affect minorities, then the context is institutionalized racism and the result is discrimination, whether or not it was explicitly and intentionally targeted at minority groups (Bullard and Johnson 1997; Cairns, Greig, and Wachs 2003; Feagin and Eckberg 1980). The mobility regime thus plans and regulates mobility according to the priorities of the privileged, and the paradigm of suspicion excludes and isolates minorities through spatial expressions of

institutional racism as well as through formal legislation and active institutional practices. If such processes leading to closure are omitted in the study of mobilities, then the analysis is likely to be biased and incomplete, and it may serve to mask processes of closure that reinforce unequal levels of mobility.

Pushed by forces such as global economic restructuring and displacement, or pulled by transnational ties, recruitment agencies for employers, or economic opportunities (Kandel and Parrado 2005; Massey, Durand, and Malone 2003), immigrants traverse land, water and air to enter the United States. Immigrants may commonly be considered as a mobile population because of the long distances between their community of origin and their destination in the United States. However, upon arrival in a local destination, like almost any other resident in the United States, immigrants still must travel to meet their daily needs. The mode of travel poses a dilemma, because many immigrants do not drive and driving in a motor vehicle is the most common and preferred method of travel among adults in the United States.

In fact, personal vehicle ownership is virtually a necessity for all households in the United States because the built environment is structured around the car. The urban form and physical infrastructure have developed around the automobile, both reflecting its widespread use and enforcing automobile dependence. The development of highways and road systems during the twentieth century contributed to residential and industrial suburbanization (Mieszkowski and Mills 1993). Unlike urban centers, suburban areas tend to have low density of employment and housing, with areas zoned for a single use only. Due to the dispersion of housing and employment locations, people living in metropolitan areas must travel longer distances in order to travel to work, to purchase groceries, or engage in other activities (Wilson 1987).

Alternative forms of travel generally are not a viable option. The large geographic spread between residences and destinations makes walking – and to some extent, biking – impractical or impossible in most areas (Cervero 2002; Cervero, Sandoval, and Landis 2002). Residential subdivisions in suburban areas also frequently lack sidewalks, bike lanes and bus service. In places where public transit is extended to suburban areas, it may operate as a commuter service with limited hours and few stops, connecting to a park and ride parking lot (Dickins 1991). Thus, even among the suburbanites who commute via public transit, they are also likely to supplement their trips with automobiles. Rural life is also particularly dependent on the automobile, as the distances to large stores, doctor's offices and hospitals virtually requires travelling long distances in a private vehicle (Arcury et al. 2005; Morton and Blanchard 2007). Those living without personal vehicles, those who do not know how to drive, those who are legally restricted from driving, or those who cannot afford to cover the expenses of driving experience limited accessibility to virtually everywhere.

Those without a car are more geographically isolated than those who have their own personal vehicle at their disposal, and this isolation has many unfortunate consequences. Lack of access to transportation may block individuals from job locations or educational options, preventing upward economic mobility and therefore perpetuating poverty (Ong 2002). Lack of transportation also may lead to unhealthy diets, as the literature on food deserts has found that low-income neighborhoods have fewer grocery stores, and the food stores that are located in lower-income areas tend to sell less nutritious food at higher prices (Morton and Blanchard 2007; Walker, Keane, and Burke 2010). Additionally, lack of transportation may block individuals from accessing medical facilities and free public health events, which reduces the use of preventative medical care and increases risks of illness and disease (Bohon, Stamps, and Atilas

2008; Cristancho et al. 2008; Flores G 1998; Saha S 1999). Limited vehicle access thus serves to reinforce poverty, prevent access to medical care, limit diets to convenient food that is available locally, and generally prevent individuals from participating fully in social life (Currie and Delbosc 2001).

Scholars have found that immigrants are among the groups in the United States that disproportionately lack access to a private vehicle. According to data from the 2009 American Community Survey, a higher proportion of foreign-born households lack a vehicle than US-born households (13.1 percent and 8.2 percent, respectively). The average immigrant household size is also larger than the typical native-born household (3.39 and 2.51 people on average, respectively), and vehicles may be more extensively shared in larger households. Thus, at the household-level and at the individual level within households, immigrants may have less access to vehicles than the US-born.

Since less access to a vehicle in the automobile-dependent US society results in less travel, and immigrants have fewer vehicles than the US-born population, immigrants travel less. National data reveals that immigrants take fewer trips and travel less distance daily compared to the native born population (Tal and Handy 2005). The lack of personal mobility is particularly striking for new immigrants; using the 2007 American Community Survey, Chatman and Klein (2009) find that 33.0 percent of immigrants who have been in the United States less than one year drive alone to work, which is significantly lower than the 79.1 percent of US born workers that commute by driving alone to work. This difference decreases for immigrants who have been in the US for longer periods of time, but mobility levels of immigrants continue to be lower even after 20+ years in the United States. The findings that immigrants have less access to vehicles and that they travel less than the native-born population suggest that they may experience

blocked opportunities due to geographic isolation to a greater degree, although few studies investigate the consequences of limited mobility on the lives of immigrants (the exception is Bohon, Stamps, and Atilas 2008).

The relative immobility of immigrants results from both situational factors and constraints on travel imposed by the mobility regime. Situational factors include the lack of familiarity with driving upon arrival in the United States (Federal Highway Administration 2006), since other societies may not be as dependent on automobiles as the United States (Smart 2010). Low-skilled immigrants may also not make enough money to purchase and maintain a personal vehicle, particularly if they are supporting a family at home or in their countries of origin. These factors change over time, with immigrants learning to drive and accruing the financial capital needed to cover the initial and ongoing costs of vehicle ownership with more time in the United States (Blumenberg and Shiki 2007).

Institutional and structural factors also reduce the mobility of immigrants, and these factors are less likely to attenuate over time. One structural factor that affects the mobility of the foreign-born as well as the native-born population is that the policy makers and urban planners in the United States prioritize infrastructure for private vehicle travel and fail to provide infrastructure for alternative modes of travel. The public investment in the road system, to facilitate travel by private vehicle, began in the early twentieth century. The political fight between the railroad tycoons and the emerging motor vehicle industry ended up with the government clearly on the side of the motor vehicle industry. The Federal Aid Road Act of 1916 authorized federal funding for highway construction, and set the precedent for publicly funded roads to compete with privately funded railroads. The government instated a gas tax in 1932, and “climbing tax revenues meant more roads to hold more cars to generate more taxes to build

more roads” (Goddard 1997: 38), and the cycle of US society’s dependency on motor vehicles began. The construction of road and highway infrastructure throughout the twentieth century emphasized motor vehicle travel and enabled the geographic dispersion of population and industry, which has in turn increased dependency on the automobile for transportation.

The continuing emphasis on motor vehicle travel can be viewed through public financing of transportation projects via the gas tax, which “generates considerable revenues for transportation because of the sheer quantity of gasoline consumed in this country” (Puentes and Prince 2003: 4). Of each dollar raised from the federal gas tax, 80 cents is earmarked for highways, and 20 cents is earmarked for public transportation, although states do not use all of the public transportation funding available (Sánchez, Stolz, and Ma 2003). On the state level, only eleven states spend more than five percent of their gas tax revenues on public transit purposes, and thirty states explicitly dedicate revenues from the gas tax for highway uses (Puentes and Prince 2003). These are examples of how transportation funding in the United States is primarily allocated to maintaining the road and highway system, which results in the exclusion of alternatives. As Goddard points out, “As the highwaymen of old robbed travelers on the road, so modern highwaymen have robbed Americans of a choice of travel options” (Goddard 1997: 38).

Since immigrants are among the population groups in the United States that have lower access to vehicles, the support of automobile travel and the lack of alternatives is one factor that creates the relative immobility of immigrants compared to the native population. Within the foreign-born population, immigrants from Latin American countries experience more mobility obstacles than immigrants from other countries. Latino immigrants make less money on average than immigrants from other regions (American Community Survey 2009b), so they are

likely to face greater financial barriers to vehicle ownership. In addition, the majority of unauthorized immigrants are from Latin American countries (Passel and Cohn 2011), so these immigrants are particularly vulnerable to the exclusionary policies and driver's license limitations that target the unauthorized population.

A number of governmental policies specifically target unauthorized immigrants. The primary policy directly aimed at preventing the mobility of unauthorized immigrants is the federal REAL ID Act of 2005, which created more stringent requirements for the issuance of driver's licenses, including applicants providing proof of lawful status. As of February 15, 2013, nineteen states have met the REAL ID requirements, and others are making progress (Department of Homeland Security 2013). Once fully implemented, this requirement will render any immigrant without clear authorized status ineligible for driver's licenses, a group that included about 11.2 million individuals in 2010, of which about 6.5 million were from Mexico (Passel and Cohn 2011). In many locations, local law enforcement agencies cooperate with Immigration and Customs Enforcement (ICE) in the identification of unauthorized immigrants when enforcing routine traffic laws. This results in increased surveillance in the streets, a spike in racial profiling of people who look Latino, and a climate of intimidation and fear (Arnold 2002; Romero 2006). The formal goal of the cooperation of law enforcement agencies may be to identify unauthorized immigrants, but the enforcement results in a sense of fear and intimidation experienced by all Latinos.

Although scholars have recently started to develop a deeper understanding of why immigrant travel patterns differ from the travel patterns of the native-born population, most of this research is based on national patterns or on data collected from immigrants living in traditional gateways. Immigrants have increasingly moved away from the traditional gateways

and have settled in new destinations, which are locations that previously had little experience with foreign-born residents. As scholars have begun to study immigrants in new destinations, transportation barriers have emerged from their findings as an important barrier to integration. I provide two examples of such studies. Both studies look at adaptation challenges of recent immigrants in the United States.

In the first study, Odem (2009) investigates the local political struggle over the regulation of public space in Atlanta, Georgia. She frames the struggle as resistance against the attempts of authorities to exclude Latinos from public space and therefore to limit their ability to sustain life. She writes:

The use of automobiles and public roads has been another arena of struggle between Latino immigrants and local authorities. Latino immigrants frequently use buses and taxi services, but the South's low-density suburban development, dispersed job locations and limited public transportation systems virtually require the use of personal vehicles. Many immigrant workers in metro Atlanta have to travel long distances to get to job sites; they depend heavily on automobiles to go shopping, visit health facilities, and take children to and from school. Yet Georgia, like most states in the country, has prohibited unauthorized immigrants from obtaining driver's licenses by requiring proof of legal residence or valid social security cards as identification. Thousands of immigrants in Georgia have been arrested, fined and sometimes jailed for driving without a valid license. (P. 117)

In this excerpt, Odem points to how the structure of the built environment creates the necessity of driving, and how the mobility regime acts to prevent Latino immigrants from using

automobiles and travelling along the roads. The limitations on travel make it difficult for Latino immigrants to meet basic life needs.

In the second study, Nawyn and her colleagues (2012) focus on language as a scarce noneconomic resource among the highly linguistically isolated population of Burundian and Burmese refugees in Lansing and Grand Rapids, Michigan.

Access to other information is also a challenge; even reading street signs feels beyond the reach of linguistically isolated refugees. Ernest's wife, Donathe, explained, 'Most of the time where ever I have to go I have to take the bus [and I can't navigate the bus system] because I don't know how to read and write.' With the limited bus routes in both Lansing and Grand Rapids, refugees benefit greatly from having a driver's license. However, they must take the test in English, so most had to find employment that was accessible by public transportation unless they knew someone who could drive them. (P. 266)

These scholars emphasize how poor English prevents the use of transportation systems, which would also apply to Latino immigrants with limited English proficiency, but the consequences of limited mobility are also evident. The limited public transportation system and the inability to drive place severe limits on the employment options of the refugees, and block them from being able access locations that are not along the bus routes. The authors also mention that two of the study's participants didn't make it to the focus groups because of transportation difficulties.

Findings from these two studies suggest that the impact of transportation barriers on the lives of immigrants may be gravely underestimated. That transportation barriers prevented immigrants from being able to participate in focus groups led by immigration scholars points to the extent to which transportation issues may be commonly overlooked.

The infrastructure of new immigrant destinations may also intensify the extent to which immigrants experience transportation barriers. Traditional immigrant gateways such as San Francisco, New York, and Chicago all had established immigrant communities located in the central cities that received new arrivals, and immigrants gradually moved to integrated suburban areas as they assimilated socially and culturally (Singer 2004) through a process known as *spatial assimilation* (Massey 1985). However, contemporary immigrants have increasingly bypassed the central cities, settling directly in suburban areas, with over half of the national immigrant population living outside of central cities in the year 2000 (Lichter et al. 2010). Furthermore, Southern cities, many of which have become new immigrant destinations, have smaller central cities and are more suburban in form than the traditional industrial immigrant gateways (Singer 2004). Immigrants living in suburban areas have more limited transportation options, since they tend to lack pedestrian infrastructure, bicycle lanes and quality transit service, so the suburbanization of the immigrant population may also result in an increase in the geographic and social isolation of the immigrant population.

The failure to recognize transportation limitations of immigrants in a time when the legal and institutional limitations on mobility are increasing, and in a time when the urban form of immigrant destinations exacerbates transportation limitations, may have serious and undesirable consequences. Lack of transportation may impede the adaptation process of the immigrants. Adaptation refers to a process of learning how to negotiate all aspects of American life, which includes learning to speak English, obtaining jobs similar to those held by the US-born, attaining levels of education and earnings similar to those of the US-born, and developing the ability to complete daily tasks as easily the US-born (Atilas and Bohon 2002). In addition, scholars advancing *segmented assimilation theory* have emphasized the urgency of rapid adaptation and

incorporation of immigrants in today's context in order to avoid downward assimilation of the next generation (Portes and Zhou 1993; Rumbaut 1994). Downward assimilation occurs when opportunities are blocked and cultures of resistance and deviant lifestyles consequently emerge for children and grandchildren of first-generation immigrants. Deviant lifestyles may be defined by indicators such as rates of teenage pregnancy, school attrition, arrests, incarceration, unemployment and poverty (Portes, Fernandez-Kelly, and Haller 2005). Although currently the majority of immigrants do not assimilate in a downward direction (Stepick and Stepick 2010; Waters et al. 2010), scholars are concerned that a significant minority in some places do experience downward assimilation, and that this proportion may increase over time due to blocked opportunities and social exclusion (Portes and Fernandez-Kelly 2008). Transportation barriers may serve to enforce geographic exclusion, blocking the opportunities of immigrants to gain skills, change to better jobs, improve English language abilities, or take advantage of other opportunities. In limiting the participation of Latino immigrants in US society in multiple ways, the lack of transportation may impede the incorporation processes of immigrants in their receiving communities.

The Atlanta Context

To explore transportation limitations and new destination immigration, I use Atlanta as a case study. The burgeoning Atlanta metropolitan area features a new and fast-growing immigrant community and transportation policies and infrastructure that reinforces – virtually requires – driving as the only safe, fast, and efficient mode of mobility. The economy and the population of Atlanta have expanded since World War II, but the greatest growth period—resulting in massive sprawl—has occurred since the 1980s (Sjoquist 2000). Atlanta provides a global and regional transportation and information hub, with the Hartsfield-Jackson airport

ranking as the world's busiest airport in 2006 (Tharpe 2007). Atlanta also ties for third in the country in terms of the number of multinational corporate headquarters it hosts, including companies such as Coca-Cola, Delta Airlines, and United Parcel Service (CNN Money 2011). Diverse industries such as banking, service, retail, and wholesale have expanded (Keating 2001), and in 2011 the top five occupational sectors of employment included office and administrative support (22 percent), management and business and financial operations (16 percent), sales (14 percent), food preparation and serving (10 percent), and transportation and material moving (9 percent; Metro Atlanta Chamber of Commerce 2012)(Metro Atlanta Chamber of Commerce 2012). This economic growth in a variety of occupations and industries generated population growth in Atlanta.

The population of the Atlanta metropolitan area more than doubled between 1980 and 2010, growing from about 2.0 to 5.2 million (U.S. Census Bureau 1980; 2010). As of 2010, non-Hispanic whites—who are a minority in the City of Atlanta--comprised 50.7 percent of the Atlanta metropolitan area's population, down from 74.3 percent in 1980. In 1980, blacks comprised almost the rest of the population, with 24.5 percent; at that time, the city was a starkly black/white city. Now, in 2010, non-Hispanic white numbers are followed by non-Hispanic blacks with 31.9 percent, Latinos with 10.4 percent, and non-Hispanic Asians with 4.3 percent of the population (U.S. Census Bureau 2010).

The growth of the Latin American population in Atlanta has prompted the metropolitan area to be characterized as a new Latino destination, according to a widely used typology defined by Suro and Singer (2002). Rather than settle in locations that have historically acted as immigrant gateways to the United States, such as Los Angeles and New York, Latinos immigrants have increasingly settled in locations in the Midwest, Northwest, and Southeast –

such as Atlanta. The growth of the Latino population from virtually nonexistence in 1980 to comprising over 10 percent of the population in Atlanta, and the social and economic consequences of this growth, has gathered an increasing amount scholarly attention (Asamoah et al. 2004; Ishizawa 2009; Lippard 2006; Peponis, Ross, and Rashid 1997; Smith and Winders 2008; Wang and Walcott 2010).

Rampant sprawl has accompanied the economic and population growth of the metropolitan area. The Atlanta – Sandy Springs – Marietta Metropolitan Statistical area (which I will call “Atlanta” for simplicity) included 15 counties in 1980, and expanded to 20 counties in 2000 and 28 in 2010. The Office of Management and Budget defines a metropolitan statistical area as a geographic entity that contains a population nucleus of at least 50,000 together with adjacent communities having a high degree of social and economic integration with that core, as measured by commuting to work. In simple terms, this means that counties adjacent to the central city or counties adjacent to those counties that have a large number of commuters to the central city are included in the metropolitan area, even if portions of those counties are rural. The Atlanta metro area contains more counties than any other metropolitan area in the United States due to the sprawling population growth and Atlanta’s ability to develop outward without encountering political or geographical barriers (Hartshorn and Ihlanfeldt 2000; Orszag 2009).

Reflective of its racially dichotomous past, Atlanta remains highly segregated between blacks and whites, with blacks living in and moving into regions neighboring the historic black areas in the center and inner suburban areas to the south of the city (Hartshorn and Ihlanfeldt 2000). That the impoverished black neighborhoods are located in the central and southern areas of the metropolitan area, and that the economic growth has occurred in the largely white northern counties, results in a large geographic distance between the poor black population and economic

opportunity. Scholars argue that this *spatial mismatch* has excluded low-skilled blacks from the possibility of benefitting from the economic growth in Atlanta and therefore contributes to the perpetuation of poverty in the central black ghettos (for example, Ihlanfeldt 2002; Ihlanfeldt and Sjoquist 2000; Stoll, Holzer, and Ihlanfeldt 2000; Sultana 2005). In fact, Ihlanfeldt and Sjoquist assert that “There is no doubt that spatial mismatch is a problem in Atlanta” (2000:118).

Scholars find that Latinos also experience segregation in Atlanta, although to a lesser degree (Hartshorn and Ihlanfeldt 2000). Whether Latinos also experience a similar spatial disadvantage in Atlanta is not yet known, but Latino immigrants have struggled against spatial constraints in Atlanta. Odem (2009) documents how public and private authorities in Atlanta regulate space in order to constrict the movement and limit their ability to sustain social life. Examples include police raids in apartments and workplaces, the banning of the ability of day laborers to gather on private property, and even the Catholic Church initially disparaging the cultural aspects of religion important to Latin American immigrants and creating an unwelcome environment in spite of a doctrine of inclusion.

Given the level of sprawl, Atlanta’s transportation system is particularly inefficient. Historical and contemporary racial segregation is built into the physical transportation infrastructure, resulting in impeded mobility. Both the streets and public transportation were constructed in part to maintain residential and social segregation. For example, roads have strange ends and missing segments in historically black neighborhoods, and therefore few roads provide continuous north-south passage through the metro area (Bayor 1988). The construction and expansion of interstates and state highways also fuel the dispersion of the population as well as the dependency on automobiles. This transportation infrastructure, together with low rates of vehicle ownership among poor minorities in central cities, has exacerbated urban social

inequalities (Rabin 1973). Henderson (2006) calls the use of the automobile in order to physically separate oneself from spatial configurations -- like higher urban density, public space, or the city altogether -- “secessionist automobility,” and discusses the blunt racialized, anti-urban politics that accompanies automobility using Atlanta as an example. The level of automobile dependency in this sprawling metropolis results in traffic congestion and gridlock; the Texas A&M Transportation Institute reported that the average peak travel period commute was 50 minutes in Atlanta, ranking third in the country in 2011, and that the average commuter spent 51 hours stuck in traffic (Schrunk, Eisele, and Lomax 2012).

In terms of public transportation in Atlanta, the Metropolitan Atlanta Rapid Transit Authority (MARTA) bus and rail system operates solely in Fulton and DeKalb Counties, not expanding beyond these two counties since it was originally approved in 1965 (Atlanta Regional Commission 2012), and largely failing to reach the northern counties that experienced the greatest economic growth. The bus system barely reaches beyond these two counties, although two other counties (Gwinnett and Cobb) as well as the Georgia Regional Transit Authority have developed their own independent and largely unconnected bus systems. Furthermore, it stands as the only major transit agency in the United States that does not receive state funding, and metropolitan voters turned down a referendum in 2010 that would have increased revenue for improving transportation infrastructure, half of which would have gone to public transportation (Happe 2009). This occurred even after Atlanta became the first city in the country to have federal transportation funds withheld in 1998 due to the dangerous level of smog, or ground-level-ozone, which is primarily caused by automobile emissions and coal-fired power plants and is particularly harmful to children, the elderly, and those with respiratory problems (Henderson 2004).

As for bicycling and walking, the immense sprawl is one indicator of the difficulty of covering distance in Atlanta via a non-motorized means. However, even to access nearby locations, walking and biking are not generally an option. The Atlanta Regional Commission undertook a study to evaluate the conditions for bicycling and walking, and the study “confirmed that conditions for biking and walking are very challenging across the Region” (Atlanta Regional Commission 2007: vi). Specifically, most segments of the 700 miles surveyed found that bicyclists are exposed to vehicles travelling at a high speed, large vehicles, narrow lanes, and the absence of a rideable shoulder or bike lanes contribute to the poor level of bicycle service score. Similarly, the absence of sidewalks leaves “pedestrians to choose between walking at the edge of the roadway itself, close to the heavy flow of traffic, or along improvised and unpaved trails along the roadside” (Atlanta Regional Commission 2007: 26).

It is thus particularly important to have a car to navigate around Atlanta, and those who do not have private vehicles, or who cannot drive, experience limited mobility. Furthermore, higher proportions of minority households report a lack of vehicle availability. As of 2000, 7.3 percent of non-Hispanic white households in the United States did not have a vehicle available, and the percent was 23.8 for non-Hispanic blacks, 17.2 for Latinos and 12.7 for non-Hispanic Asians (U.S. Census Bureau 2000). Immigrants face an additional obstacle to driving legally. In order to apply for a driver’s license, an immigrant must prove lawful presence (Georgia Department of Driver Services 2012) and produce a birth certificate, which even legal immigrants from less developed countries can have difficulty producing (Bohon, Stamps, and Atilas 2008). The population of unauthorized immigrants in the state of Georgia is estimated to be approximately 425,000 (Passel and Cohn 2011), so this barrier prevents a significant number of immigrants from receiving a license to drive.

Atlanta is thus a growing metropolis where space is regulated by authorities -- and the voters -- to maintain social divisions, and transportation systems are created to constrain the movement of poor minorities and further contain them spatially. The metro area thus provides an interesting context for exploring the dimensions of neighborhood space and mobility of immigrants in a new Latino destination, and the connection between mobility and the adaptation of immigrants.

Research Questions

Few scholars of immigration and transportation place questions regarding the mobility of immigrants in the center of their analyses. Immigration scholars rarely discuss transportation. Transportation scholars tend to recognize different transportation patterns among the immigrants and discuss the significance for transportation systems (Blumenberg 2009; Pucher and Renne 2003; Purvis 2003), but they do not explore the significance of these patterns in the lives of the immigrants themselves.

Two recent research projects have broken ground in identifying the impacts of transportation limitations on the lives of immigrants and the process of adaptation. One group of scholars of transportation and urban studies at the University of California incorporated focus groups of Mexican immigrants into a larger research project that sought to understand the reasons behind the distinct travel patterns of the state's immigrant population (Handy et al. 2008). The results included a deeper comprehension of how travel needs and transportation constraints combine to produce the patterns of movement of the immigrants' lives.

The second group of scholars with the University of Georgia embarked on a project to identify the primary needs of the new Latino immigrants in Georgia, engaging key figures that interface with the Latino immigrant community as well as leading focus groups with immigrants

(Atilas and Bohon 2002). Transportation emerged as one of the primary unmet needs of the Latino immigrants. As the authors report, transportation barriers pose a bottleneck to participation in multiple aspects in society, constraining the ability to take advantage of opportunities such as changing employment, taking advantage of healthcare facilities and services, pursuing further education and other opportunities (Bohon, Stamps, and Atilas 2008). They assert that, insofar as transportation limitations block social participation in general, they also block opportunities for immigrants to gain and improve English skills, and English language proficiency may be the most important and best documented factor that facilitates advancement in US society.

The focus of this dissertation is to use quantitative methods to build on these qualitative insights regarding the transportation patterns of immigrants, and to test how transportation limitations may be related to the English acquisition process. I focus on employed Latino immigrants in the new immigrant destination of the Atlanta-Sandy Springs-Marietta Metropolitan Statistical Area (which hereafter I will refer to as “Atlanta” for simplicity) as a case study for learning more about the role transportation plays in their lives as they adapt to life in the United States. The primary goals of my study are as follows:

1. To examine the effect of residential segregation on the commute length of Latino immigrants in Atlanta
2. To identify the extent to which Latino immigrants in Atlanta experience transportation limitations
3. To determine if there is a relationship between mobility levels of Latino immigrants and English language proficiency

Given these general aims, I pursue the following specific research questions:

1. Do segregated Latinos live spatially distant from the locations of job growth?
2. Does the commute time experienced by Latino immigrant workers change significantly as the degree of segregation, measured by Latino residential concentration, increases?
3. How do income and vehicle availability affect the mode of commute of Latino immigrant workers?
4. How does the degree of ethnic embeddedness, measured by residential segregation and specific niche sector of employment, impact the mode of commute of Latino immigrant workers?
5. Do transportation limitations, indicated by limited vehicle availability and mode of commute, have an impact on English language proficiency?

This dissertation has seven chapters including this introductory chapter. In chapter two, I discuss the theoretical arenas of automobility, unequal access to transportation, and immigrant adjustment, and I discuss how the transportation limitations and mobility strategies of Latinos relate to each theoretical area. In chapter three, I present my methodological approach. I discuss the measures and statistical models that I use to investigate each research question. Chapter four presents results from an investigation of the spatial patterns of living, working, and commuting of Latino immigrants in Atlanta. In chapter five, I look at the mode of commute as an indication of the strategies of mobility used by the Latino immigrant population in order to meet the basic transportation need of getting to and from work. I also investigate how the method of commuting changes based on income and vehicle availability, level of ethnic residential concentration, and employment in particular economic sectors. The final analytical section, chapter six, investigates

the connection between two indicators of mobility – the cars available in each household and the mode of commute – and English language proficiency. In chapter seven, I summarize the findings, discuss theoretical implications of the findings, and I acknowledge the limitations of this study and explore potential directions for future research.

CHAPTER 2: AUTOMOBILITY

In the twentieth century, the car reconfigured urban life with novel ways of dwelling, working, travelling, and socializing in time and space, the study of which scholars of mobility call *automobility* (Hannam, Sheller, and Urry 2006). Offering privacy and insulation from the outside world and a sense of power (even if only illusory) in addition to freedom and flexibility of mobility (Volti 1996), the automobile spread in use through the population throughout the twentieth century. With the ownership of a vehicle, Americans gained a means of personal mobility that only the wealthy had been able to enjoy before the 1950s (Walsh 2008). In 1910, there was one car registered for every 200 people (Giuliano and Gillespie 1997), and by 2010, the ratio of licensed drivers to registered vehicles was .87, which equates to more vehicles registered than licensed drivers (Federal Highway Administration 2010). In terms of daily miles traveled in vehicles, the average per person increased by about 50 percent between 1969 and 2001, from 20.64 to 32.73 miles per person per day (Hu and Reuscher 2004).

The technology of the automobile spawned fundamental changes in the US economy and society. Flink (1972) summarizes the profound changes. In terms of economic change, the automobile heralded in the Fordist style of production with the use of assembly lines and the de-skilling of labor, which rippled through other sectors of the economy. The automobile industry grew to become the backbone of a consumer-goods oriented economy, ranking first among American industries in value of product and third in value of exports in the 1920s, and it supported numerous ancillary industries. By spawning the construction of local roads and the interstate system, the automobile led to the decentralization of business and residences, the consolidation of retail and wholesale industries, the disappearance of downtown general stores

and businesses, a suburban real estate boom, and the ability to avoid urban problems by escaping and moving to the suburbs. Society was thus reshaped to fit the automobile.

In the second half of the twentieth century, the problems of the automobile system caught up with society. The primary social problems recognized included safety issues with vehicles, which led to the National Traffic and Motor Vehicle Safety Act of 1966; air pollution which led to the Motor Vehicle Air Pollution Act of 1965; and issues of urban decline and environmental degradation due to suburban expansion and the construction of highways (Flink 1972). The resolution of the issues, however, has been piecemeal and partial, and social and economic dependence on the automobile continues.

The transportation infrastructure and urban form continue to develop around the motor vehicle to such a degree that alternatives are seldom available. At the neighborhood level, modern residential development typically means suburban development with wide, meandering roads and houses featuring big garages. Such developments—which are the most common—clearly are built with ease of driving, rather than human interactions, aesthetic sensibilities, or child safety as a priority. Looking at neighborhoods in two metropolitan areas in California, Cervero and Gorham (1995) found that neighborhoods built before 1945 around public transit maintained a relatively high public transit user base, whereas neighborhoods built with an orientation toward cars after 1945 had a much lower public transit usage rates. If there are no alternatives, then people do not have the ability to choose a different travel mode.

At the metropolitan area level, urban sprawl continues to grow as new homes continue to be built outside of metropolitan areas. According to an Environmental Protection Agency report, 79 percent of all new homes built in the vicinity of metropolitan areas were constructed in previously undeveloped areas (Environmental Protection Agency 2012). The sheer distance

between housing locations and other destinations makes other forms of travel nearly impossible, since people tend to walk a maximum of a about quarter mile to a public transportation stop (Ming 2006). Furthermore, businesses tend to be located along highways and at intersections of major roads, which makes access difficult and dangerous for walkers or bikers (Litman 2003).

Public expenditures supporting the road system and the under-estimation of the cost of private vehicles also contributed to the growth of -- and continue to perpetuate the use of -- automobiles for travel in the United States (Goddard 1997; Litman 2009). For example, people tend to equate the cost of driving with the cost of gas needed for the trip, which leaves out the purchase price and financing of the vehicle, insurance, maintenance, car and road taxes, added police patrols, traffic courts, and the cost of the geopolitical access to foreign oil (Goddard 1997). Lemp and Kockelman (2008) found that the external costs of vehicles --including emissions of air pollutants, crash costs, roadway congestion, and space consumption among others -- nearly matched the purchase price of the vehicles themselves. These costs are not covered by vehicle drivers, resulting in the subsidization of automobile travel by the general population--including those who do not drive--and the lack of investment in other forms of travel. From another angle, the largest source of funding for surface travel in the United States is the gas tax, and thirty states (including Georgia) restrict the use of the funds to the funding and maintenance of roads, thus forbidding using the funds for investment in other forms of travel (Puentes and Prince 2003). The pricing and funding of driving thus results in the lack of travel alternatives, leaving people with virtually no choice other than to either travel by car or not travel at all.

Travel patterns reflect this automobile-oriented growth. Over 90 percent of households in the United States have at least one vehicle available, and nearly 90 percent of commuters

travel to work in a personal vehicle, either by carpooling or driving alone (American Community Survey 2009b). According to the Census Bureau, which collects data on automobile availability, a vehicle is “available” if it is kept at home for use by members of the households. Thus an available vehicle does not necessarily have to belong to the person driving it, but that is usually the case. The proportion of households owning three or more cars more than quadrupled in the past forty years, and the number of households owning three or more cars grew nearly tenfold (Santos et al. 2011).

For those who drive, automobiles have provided unprecedented levels of freedom. The widespread use of automobiles has restructured social life around the geography and flexibility of the car. As Urry, a founder of the new mobilities paradigm, describes, cars enable people “to travel at any speed, at any time in any direction along the complex road systems of western societies that link together most houses, work places and leisure sites” (2006: 19). At the same time, the car has spatially and socially reorganized society, facilitating automobility and discouraging other forms of human movement, thus also “disabling those who are not car-drivers (children, the sight impaired, those without cars) by making their everyday habitats dangerously non-navigable” (Urry 2006: 20). Left unanswered are questions regarding the consequences of automobility on the lives of those without cars. Who is left out of the system of automobility? How do they travel? How does automobility affect where they live, work, worship, shop, and study?

Unequal Mobility

As driving became the norm in the twentieth century, some groups including the poor, racial/ethnic minorities, the children and elderly, and the disabled experienced a relative increase in spatial restriction and containment (Keenan 2010; Moran et al. 2002; Murakami and Young

1997; Pucher and Renne 2003; Rosenbloom and Stahl 2002). Two of the major factors leading to limited mobility, other than physical limitations, stem from social and economic disadvantages. This is especially problematic because the exclusion from driving serves to reinforce the disadvantages. For those who are too poor to afford a car, not being able to drive to look for better jobs, or not being able to take advantage of education training and programs because of lack of transportation, perpetuates the poverty. African-Americans also experience limited levels of mobility, and transportation limitations and residential segregation combine to result in alarming degrees of social isolation in the impoverished urban black communities. The isolation contributes to truncated social networks and high levels of joblessness, as well as the development of negative social consequences and pathologies such as high numbers of female-headed households, teenage pregnancy, and criminal activity (Massey and Denton 1993; Wilson 1987).

Scholars have recently identified the foreign-born population as comprising another group that experiences relatively low rates of mobility (Chatman and Klein 2009; Handy et al. 2008; Myers 1997; Purvis 2003; Tal and Handy 2005). Immigrants are both poorer on average than the native-born population and they tend to be phenotypically distinct (with the majority coming from Asian and Latin American countries) and therefore may also experience racial discrimination. Immigrants must adapt to the US society and learn norms of interaction with US institutions. Therefore, in addition to restricting the socioeconomic mobility and the spatial and social isolation from the US born population that immigrants may experience, the lack of transportation may also prevent them from interacting with US institutions and society. If this is the case, the lack of transportation also directly impedes their ability to adapt and become successfully incorporated economically, politically and socially into the receiving community.

Poor people experience limited mobility, as demonstrated by a variety of measures. Low-income households tend to have fewer available vehicles than more affluent households. In 2001, three out of every four households with no vehicles available were households making under \$25,000 (Hu and Reuscher 2004). Members of households with no vehicles use public transportation and walk to destinations far more frequently than members of households with vehicles available. In 2001, members of households with no vehicles available made 19.1 percent of their trips via public transit whereas members of households with one vehicle made only 2.7 percent of their trips by public transit; the members of households with no vehicles made 41.1 percent of their trips walking whereas the members of households with one vehicle made 13.2 percent of their trips by walking (Pucher and Renne 2003). Those that live in households with no vehicles make fewer trips in private cars (driving alone or carpooling) than those living in households with cars (34.1 percent and 81.8 percent, respectively; Pucher and Renne 2003). Therefore those living in households with no vehicles – the majority of which are low-income households – have much less access to personal mobility or the flexibility that a vehicle provides.

Those living in households without a vehicle experience *transport poverty*, or lack access to resources accessible only via automobile (Cahill 2010). For example, those without cars who commute to work by public transit must live and work within walking distance of a public transit stop, so their employment and housing choices are limited by the transit system. Although these households do not incur the costs of owning a car, the cost of housing may be higher in locations that have access to public transportation or in locations that are geographically close enough to access important destinations by walking (Currie and Delbosc 2001). Therefore, the households

without a vehicle may not only lack access to resources accessible only via personal vehicle but also may pay more for housing.

People living in low-income households also travel less overall than wealthier households. According to information from the 2009 National Household Travel Survey, the highest income households (greater than \$80,000) make about two and a half times as many personal trips as the lowest income households (less than \$10,000; Santos et al. 2011). In addition to making fewer trips, those in low-income households make shorter trips, travelling almost half the total daily mileage as those living in the highest-income households (Pucher and Renne 2003). People living in poor households are thus cut off from some destinations they need to reach because they cannot afford the automotive transportation or the gas needed to access most destinations. Pucher and Renne (2003) write that the lack of access to many destinations “is especially serious in the case of inaccessible job sites, since poverty is thus directly perpetuated. Moreover, inability to reach medical, educational, training, shopping, and recreational facilities can also seriously impair the quality of life of poor households” (p. 54).

Many of the households without cars are households with the lowest income levels, but the majority of even the poorest households own cars in spite of the cost. In three-quarters of the poorest households in the United States, someone owns a car (Pucher and Renne 2003). This point suggests that a vehicle is one of the most important purchases, even if it strains a limited budget. On average, people spend nearly twenty percent of their income on transportation, which comprises the largest household expense except for housing; they spend more on transportation than on food, education, or health care (Surface Transportation Policy Project 2003). The burden is heavier on low-income households; the nation's poorest families spend more than forty percent of their take home pay on transportation. *Forced car ownership* occurs

when individuals are coerced into owning a car due to lack of transportation alternatives, and low-income people may spend more on travel costs than they can afford (Currie and Delbosc 2001; Jones 1987).

The relative immobility of low-income individuals and families tends to be discussed as a consequence of individual misfortune (in terms of poverty) and as a consequence of systematic changes as the culture of automobility developed which have added to the financial burdens of the poor. In contrast, scholars studying the relationship between race and space point to the use of space by white society as a tool for the deliberate physical containment and social exclusion of African Americans (Henderson 2006; Lipsitz 2007; McCann 1999). For example, at the same time that middle and working class Americans were buying cars and moving to the suburbs, Jim Crow laws and segregation policies prevented African Americans from enjoying the same freedom of movement (Seiler 2007). Seiler summarizes the multiple forms of exclusion of blacks from the supposed equal realm of the “republic of drivers”:

From the earliest days of automobility, overlapping and mutually sustaining racist laws, social codes, and commercial practices have attenuated the mobility of the black driver: segregated roadside mechanical and medical aid, food, and shelter; the discriminatory membership policies of motoring organizations such as the American Automobile Association; profiling of minority drivers by law enforcement; the racial-spatial politics of highway planning and placement, especially in urban areas; the race-bound economics of auto financing and insurance underwriting; and the venerable practice of general police harassment for ‘driving while black’ (2006: 1094).

The exclusion of blacks from driving is not only historical. The household vehicle availability for blacks continues to be the lowest of all with nearly one out of five non-Hispanic

black households lacking a vehicle (19.8 percent; American Community Survey 2009b). Racial factors continue to operate to exclude and spatially isolate African Americans systemically. As mentioned above, one of the cultural currents feeding the reconfiguration of space around the automobile is the desire to escape the problems of the city (Flink 1972). Scholars of race point to the racist undertone of suburbanization, calling it *secessionist automobility* (Henderson 2006), or *white flight* (Frey 1979) as whites continue to move further into suburban areas. The desire to avoid travelling in close proximity to those considered to be socially inferior – such as the poor and/or blacks – may have accompanied the desire for privacy and individualism mentioned above (Thacker 2006). The refusal of populations to endorse the construction or expansion of public transit systems may be motivated in part by the desire to prevent inner-city blacks from travelling to white suburban areas (Henderson 2006).

Surprisingly little research focuses on racial differences in transportation patterns and how these patterns are intertwined with social, political, and economic currents. Seiler comments on the “paucity of scholarly work specifically treating race and mobility,” and points out that “One would suppose the recent surge of theoretically sophisticated work focusing on automobility—much of it coming from a sociological perspective—would put race to the fore of its analytical agenda; but it has tended to assume a deracialised subject” (2007: 309). There is also a paucity of work on ethnicity and mobility. Insofar as white society uses transportation barriers as a tool to heighten exclusion of urban minorities from suburban space, the exclusion would surely also impact immigrants, especially immigrants of color.

Transportation scholars have identified immigrants as comprising another segment of society that experiences low rates of mobility compared to the US population as a whole. According to data from the 2009 American Community Survey, a higher proportion of

households with a foreign-born heads of household lack a vehicle than households with a US-born household head (13.1 percent and 8.2 percent, respectively). The average immigrant household size is larger than the typical US-born household (3.39 and 2.51 people on average, respectively), and vehicles may be more extensively shared in larger households. This suggests that immigrants may have less access to the vehicles attached to their households than what is available among the US-born. Similar differences in mobility levels emerge when looking at commute modes. Lower proportions of foreign-born workers commute by driving alone than US-born workers (64.3 percent and 78.3 percent respectively), and higher proportions of foreign-born workers commute using all other forms of transit – including carpooling, taking public transit and walking than US-born workers.

Of the foreign-born population, recent immigrants experience particularly low levels of mobility. Using the 2001 National Household Travel Survey, Tal and Handy (2010) investigate the effect of years in the country and region of origin on travel patterns of immigrants, and they found that recent immigrants who had lived in the United States ten years or less made significantly fewer daily trips, drove fewer miles and owned fewer vehicles than the US-born population. These differences decreased with time in the United States, but differences in the average yearly miles driven and vehicle ownership remained between the foreign-born who had been in the country twenty years or more and the native population. Using the 2007 American Community Survey, Chatman and Klein (2009) find that only 33.3 percent of immigrants drive alone to work in their first year in the United States. About half of the immigrants who have been in the country for approximately five years drive alone to work, and the proportion reaches nearly three-quarters for immigrants who have been in the country for more than twenty years. For immigrants in California, Blumenberg and Shiki (2007) find similar patterns in the positive

association between years in the country and driving solo and call the converging transportation patterns with the US-born *transportation assimilation*.

In describing the pressures of transportation assimilation from the immigrant's perspective, Lovejoy and Handy report that of the Mexican immigrants in their focus groups in California, "Most participants considered driving the most preferred mode, mostly because it was what everyone else in California does and therefore is what the transportation system best accommodates. Those that didn't have cars hoped to buy one; those that had one, wanted a second; more auto access implied more freedom and a better quality of life, although to a greater or lesser extent in different cities and for different individuals" (2007: 5).

As discussed above, income is positively associated with mobility measures, with higher-income households having more vehicles per person, making more trips and travelling longer distances (Hu and Reuscher 2004; Pucher and Renne 2003). On average, immigrants have lower household incomes than the native born, with a median income of \$46,828 compared to \$50,764 (American Community Survey 2009), and recent immigrants tend to have lower income than those who have spent more years in the United States (Chiswick and Miller 2002). Thus, along with other low-income individuals, immigrants face a heavy financial burden of purchasing a car and paying for upkeep.

Immigrants also face immigration-specific barriers to driving that add to income-related constraints and spatial factors, and immigrants from Latin American countries experience more mobility obstacles than immigrants from other countries. Latino immigrants make less money on average than immigrants from other regions, with an average household income of \$38,349 in 2009, compared to \$65,666 for immigrants from Asian countries, \$45,958 for immigrants from African countries, and \$53,727 for immigrants from European countries (American Community

Survey 2009b). In addition, the majority (about 81 percent) of unauthorized immigrants are from Mexico and other Latin American countries (Passel and Cohn 2011), so these immigrants are particularly vulnerable to the exclusionary policies and driver's license limitations that target the unauthorized population. Unauthorized Latino immigrants also fear police confiscating their vehicles and charging a prohibitively high fee for retrieval – possibly more than the value of the car itself – as well as financial and legal implications of facing accident fees without insurance (Lovejoy and Handy 2007).

Immigrants have less experience driving in their home country, as only about 60 percent of new immigrant men and 45 percent of new immigrant women are drivers, compared to 92 percent of adults in the United States (Federal Highway Administration 2006). That fewer immigrants know how to drive than the US-born population reflects the dominance of vehicles in the United States. The United States ranked second in the world in terms of the number of motor vehicles per 1,000 people, following only Monaco (World Bank 2008). For example, the largest immigrant-sending country, Mexico, had 265 motor vehicles per 1000 people, compared to 815 motor vehicles per 1000 people in the United States, and other top immigrant-sending countries trail Mexico. United States is thus among the top motor-vehicle dependent countries in the world, and immigrants arriving in the United States must adapt to United States' particular system of automobility.

Immigrants also must go through the bureaucratic process of getting a driver's license in the United States, and they may have more difficulty accessing financing for purchasing a vehicle (Casas, Arce, and Frye 2004; Chatman and Klein 2009; Garni and Miller 2008; Smart 2010). Most new low-income immigrants have no credit history, which makes mainstream sources of credit out of reach. In addition, ethnic minorities – a group that includes immigrants –

experience discrimination when purchasing an automobile and receive higher finance markup rates than whites (Cohen 2012). The immigrants unable to prove lawful status are barred from legally obtaining a license per the REAL ID Act of 2005, and fear of police and vehicle impoundment act to supplement this legal barrier to driving (Lovejoy and Handy 2008; Odem 2009).

Despite the consistent findings of travel barriers for the poor, minorities, and immigrants, it is important to keep in mind that the research findings on the travel patterns of immigrants to date tend to result from national snapshots (Blumenberg and Smart 2010; Chatman and Klein 2009; Hu and Reuscher 2004; Pucher and Renne 2003) or from analyses conducted in California (Blumenberg and Shiki 2007; Handy et al. 2008; Lovejoy and Handy 2007) or in other traditional immigrant gateways with established immigrant-receiving communities (Cline, Sparks, and Eschbach 2009). Less is known about the transportation patterns of immigrants – particularly immigrants from Latin American countries – who are settling in increasing numbers in new metropolitan destinations and rural areas, including places such as the US South where urban sprawl and lack of public transportation infrastructure emphasizes private vehicle ownership even more than large established metropolitan gateways (Bullard and Johnson 1997; Henderson 2011).

Alternative Transportation Strategies

Each mode of transportation features advantages and disadvantages and is associated with specific type of supporting infrastructure. Those without exclusive access to a private vehicle must meet transportation needs with the alternative transportation options available. Immigrants rely on driving alone in lower rates and on all alternative transportation methods in higher rates than the US-born population. The needs of individuals and the travel modes

available generate distinctive transportation patterns. The transportation patterns then define the possible realm of spatial and temporal movements and therefore which opportunities and institutions are spatially accessible to the individuals.

Driving solo allows for the fastest speed, the ability to travel regardless of the schedules of other riders or the mass transit schedule (Sanchez 1999), and the best access to employment locations and residential neighborhoods – some of which are solely accessible by automobile (Henderson 2006; Sanchez 1999). Driving alone also makes it easier to carry passengers, such as children, and other necessities, such as groceries, shopping bags or books (Lovejoy and Handy 2007). Frequently in newer suburban business areas, office complexes are spaced far apart with vast expanses of parking acreage in between and often offer more real space for cars than for the people who drive them, which creates a spatial configuration difficult for travelling in any mode other than automobile (Leinberger and Lockwood 1986; Ross and Dunning 1997). The infrastructure supporting auto travel – roads and highways – tends to receive the most funding, research and attention of all travel methods (Goddard 1997; Smart 2010).

Driving alone is the default commuting strategy, as over three-quarters of all workers in the United States drive alone to work (76.1 percent, American Community Survey 2009a). Some trips require an automobile. Lovejoy and Handy (2008) found getting rides or borrowing cars to be fairly common practices among Mexican immigrants who do not have a vehicle available, and they point out that those who live in a household without a vehicle still travel in a car at times.

Factors deterring rates of driving alone include high congestion levels and expensive or scarce parking, in addition to the cost of purchasing and maintaining a vehicle (Ross and Dunning 1997; Smart 2010). Higher income not only enables households to own more cars per worker, but also makes gasoline, maintenance, and upkeep of a car more affordable, reducing the

need and incentive to rideshare with others or take other less convenient modes of transportation. Those with more income can also afford more dependable and fuel-efficient automobiles. Additional limiting factors of driving alone, which pose limitations on immigrants in particular, include the cost and maintenance of the vehicle and the necessity of knowing how to drive and having access to a driver's license (Lovejoy and Handy 2008).

The three most common alternative transportation strategies to driving alone are carpooling, taking public transportation, and walking. Carpooling has some of the advantages of driving solo, in that the speed of travel is fast and that the route flexible (unlike public transit systems), and individuals carpooling together can reach locations built specifically for auto accessibility. Scholars found that Latino immigrants who rely on carpooling are able to travel to and from work, and possibly make an additional trip to a store or Laundromat on the weekend (Bohon, Stamps, and Atilas 2008).

Carpooling also has significant disadvantages, particularly if the riders turn to carpooling out of necessity rather than choice. It requires two or more individuals to match schedules and pick-up and drop-off locations (Ferguson 1997; Lee 1984), so carpooling arrangements as a strategy used by those without cars for commuting to work may prevent the carpool participants from pursuing better housing or employment options, or pursuing training at a community college. Carpooling out of necessity also includes a social relationship of one person giving a ride to another, and so it may entail an unequal social exchange resulting in feelings of guilt, dread, or indebtedness (Lovejoy and Handy 2008).

Those who give rides may also charge the passengers a fee, thus running an informal jitney business. Informal transportation services tend to be more expensive than formal transportation systems. One group of scholars found that a typical fee was \$10 per person per

week for commuting among Latino immigrants in Georgia, with extra fees for trips to the store. This costs more than the compared to about \$30/month fee for public transportation (Bohon, Stamps, and Atilas 2008). This arrangement may provide door-to-door service and riders may feel more comfortable with drivers they know, particularly if both parties speak a common language other than English (Bohon, Stamps, and Atilas 2008; Valenzuela Jr., Schweitzer, and Robles 2005). However, the cost of travelling by an informal carpool limits the trips made and limits the ability to save money to use the money elsewhere (such as purchasing a vehicle).

Carpooling is the next most commonly used transportation method used for commuting to work after driving alone in the United States with 10 percent of US workers carpooling to work (American Community Survey 2009a). However, when including all trips made – including for shopping, social events, to attend school and church, as well as for getting to work and work-related travel – then the most common travel method is carpooling (Pucher and Renne 2003). Carpooling in this sense includes a driver and any passenger, so a driver with a child in the car is considered to be carpooling. High rates of carpooling for trips other than for employment purposes are due to the fact that family members often travel together on shopping trips, recreation, church or school, but they less frequently travel together to work. But it is important to note that the research on carpooling is not typically focused on immigrants. In a typical US household, family members may travel together to run errands. In an immigrant household without an available vehicle, an immigrant may pay a neighbor to take him or her to and from work, but their ability to travel to other places is severely restricted (Bohon, Stamps and Atilas 2008).

Due to the disadvantages of carpooling, the argument can be made that carpooling to work results from constrained transportation options rather than personal preference. The

correlates of carpooling support this argument, as carpooling is positively related to lower incomes, trip length, and limited access to household vehicles – all of which are likely due to the cost-savings aspect of carpooling (Teal 1987). Carpooling is also positively related to the number of workers in the household, and this is probably due to the convenience of starting intra-household carpools from the same location (Ferguson 1997). The constraints of carpooling and the reasons individuals carpool contrast starkly with the attempts to increase carpooling rates by appealing to personal values and community goals, such as decongesting the roads, decreasing pollution, and reducing consumption of gasoline (Chan and Shaheen 2012; Hall 1995; Jacobson and King 2009).

The second alternative to driving alone is to take public transit. Public transit is generally less expensive than driving alone and receives emphasis from planners because it reduces traffic congestion and stress on the infrastructure (Murray et al. 1998). However, public transportation runs on a set schedule and route, so it tends to entail infrequent and limited service, long waits and indirect routes, and lack of punctuality and reliability. Due to these limitations, transportation focus groups with Mexican immigrants in California have found that even those living in households without cars rarely travel exclusively by transit rather than automobile and therefore are also not truly transit-dependent (Lovejoy and Handy 2007). Since people tend to walk to and from transit stops, pedestrian infrastructure is also an important part of public transportation infrastructure (Cervero 2002).

The quality of public transportation systems varies widely between and within metropolitan areas. The major outlier in public transportation infrastructure and use is New York City, due to its dense urban form and extensive public transportation network; in fact, over one-third of the nation's public transportation trips take place in New York City (Smart 2010).

However, many locations do not have a public transportation system at all. According to the American Community Survey (2009a), about 5.0 percent of US workers commute by rail or bus. When including all trip purposes, however, the 2001 National Household Transportation Survey reports that individuals use public transit for only 1.6 percent of their trips (Pucher and Renne 2003).

The third alternative to driving alone considered in this study is travelling by walking or biking. Some analyses combine walking and biking as one non-motorized method of travel, and others consider them separately. One of the benefits of walking is that it is free (Lovejoy and Handy 2007). The health benefits of walking and biking are also widely touted by those concerned about the declining state of public health (Lee and Buchner 2008; Sallis et al. 2004). Non-motorized methods of travel are used more among people living in densely populated neighborhoods, near areas with dense employment, and in residential areas that feature nearby destinations such as in mixed-use zones that combine residences, offices, shops, restaurants, banks and other activities (Cervero 2002; Frank and Pivo 1994; Smart 2010). People are more inclined to walk in areas that include pedestrian infrastructure like sidewalks, crosswalks, and stop lights (Kitamura, Mokhtarian, and Laidet 1997). The width of the sidewalk, the level of separation of pedestrians from traffic due to buffer strips, and the speed, volume and mix of traffic also affect the sense of security of pedestrians and contribute to pedestrian use (Atlanta Regional Commission 2007). Similar spatial and safety considerations for bike lanes affect the sense of security of bikers. Most developments, however, do not prioritize pedestrian infrastructure or zoning that makes walking a viable mode of transit.

The pooled data from the 2006-2010 American Community Survey reports both walking and bicycling statistics (unlike the American Community Survey 2009a, which only include

walking), and 2.85 percent of US workers commute to work by walking and .51 percent of US workers commute to work by bicycle. When looking beyond the trip to work for all trip purposes, the proportion of trips made by walking is much higher at 7.7 percent (Smart 2010) or 8.6 percent (Pucher and Renne 2003), depending on the sample extraction method used. These statistics tend to understate the importance of walking. Walking is necessary to travel to and from public transit stops or parking lots, and therefore not counted as the primary mode used for a particular trip. Additionally, survey respondents may under-report short, discretionary trips at a higher rate than motorized trips (Hassounah, Cheah, and Steuart 1993).

Walking is particularly important for low-income individuals, who make 41 percent of their trips by walking (Pucher and Renne 2003). Mexican immigrants discussed walking as the default method of travelling; if it were possible for an immigrant to walk to a destination, they would walk, mainly because it saved either gas money or a transit fare (Lovejoy and Handy 2007). For low-income individuals who rely on walking, the increasing distances between destinations creates the necessity of spending higher proportions of their income on travel, facing the transport poverty, and experiencing pressure toward forced car ownership. The association between pedestrians and poverty is well recognized in some locations. Romero (2006) discusses walking as a sign of poverty in Arizona, unless the person is in exercise clothes or walking a pet, because the heat deters those in the middle and upper classes from walking and biking. The mark of poverty becomes particularly damaging when officials engage in class-based racial profiling, such as when local police and Border Patrol officers carried out a five-day immigration raid in Arizona in 1997, known as the Chandler Roundup, in which 432 suspected unauthorized Mexicans were arrested. Romero (2006) reports that 24 of the 91 people who filed complaints were walking when asked for proof of citizenship during the raid.

Among the transportation modes available, driving alone best fits the system of automobility that surrounds our lives. High rates of carpooling reflect the need to drive in order to reach needed destinations of work, school, shopping, and other places. The practices of carpooling, paying for rides, and borrowing cars reflect the necessity of having access to a vehicle as one of the transportation options available. Those who have limited access to a vehicle experience constraints on their movement.

The relatively few who live without a personal vehicle must adapt to the normalized role of the car and function in a society built to fit the automobile. Teal (1987) points to the dominance of the drive alone mode for work trips, particularly among commuters from households with at least as many vehicles as workers, as an indicator that most workers consider carpooling and transit to be inferior commuting choices. Pucher and Renne (2003) point to the proportion of low-income households who have vehicles as an indication of the necessity of having a car. Some scholars assert that the extensive use of private vehicles by Mexican immigrants in spite of the legal limitations and resulting fears reflects the compelling need of travelling in a private vehicle rather than personal preference (Lovejoy and Handy 2007). Some thus make financial and legal sacrifices necessary to travel by car.

Immigrants also use other transportation strategies. Beyond destinations within walking or biking distance, the alternative transportation strategies render the traveler dependent on another person's schedule or on the public transit system (if it exists locally). Teal (1987) finds that, when weighing the options, the choice between public transportation and carpooling generally depends on the quality of the public transportation system. In locations with high quality public transit systems, workers tend to choose public transit over carpooling, presumably reflecting transit's substantial temporal flexibility advantage over carpooling.

Another response to automobility by those without cars is to travel less overall in terms of frequency and distance. This response results in the immobility and geographic entrapment relative to those who have cars. These adaptations are not mutually exclusive; those with limited access to cars both travel less and travel using other methods. There are, however, social consequences resulting from these patterns of mobility and immobility.

Consequences of Limited Mobility

The restriction on the geography, schedule, and mobility of individuals has profound economic and social consequences. The research on consequences of restricted mobility has tended to focus on economic consequences of transportation, but scholars have recently asserted the need to recognize the social consequences as well (Bohon, Stamps, and Atilas 2008; Bullard and Johnson 1997).

The economic consequences of limited mobility that scholars have explored tend to revolve around how individuals get to work, which is related to where they work vis-à-vis where they live and vice versa. A number of scholars hypothesize that negative economic effects – including high levels of joblessness, lower wages or more costly commutes in terms of time and money -- result from the tripartite combination of segregated housing, limited transportation, and suburbanization of employment opportunities, and describe it as the *spatial mismatch hypothesis* (Kain 1992; Kasarda 1989; Wilson 1996). These factors were originally combined by Kain (1968), who argued that the distance between segregated inner-city minorities and suburbanized employment opportunities made opportunities inaccessible and therefore contributed to the high levels of joblessness of inner-city blacks in Detroit and Chicago.

Kain's hypothesis generated a research area in which scholars investigated the effects of spatial mismatch between inner-city housing and suburbanized job opportunities on the

economic outcomes of blacks (for a review, see Kain 1974), and spatial mismatch research was more recently revitalized in the late 1980s by scholars including Wilson (1987) and (Kasarda 1989). In spite of the hundreds of studies (reviewed in Holzer 1991; Ihlanfeldt and Sjoquist 1998; Jencks and Mayer 1990; Kain 1992; Preston and McLafferty 1999), results regarding the existence and the magnitude of the effect of increasing distances between segregated minority neighborhoods and job opportunities on unemployment rates and wages of minorities are inconclusive and dependent on the context of study. For example, after reviewing the more recent and methodologically improved studies, Ihlanfeldt and Sjoquist (1998) concluded that spatial mismatch may account for a modest proportion of wage and employment inequalities particularly in the cities that experienced deindustrialization and high levels of segregation. However, numerous studies have confirmed bivariate connections between residential segregation and mobility, the suburbanization of employment and mobility, and the connection between mobility and economic hardships.

The lack of mobility constrains economic options and, therefore, increases economic hardships. Those who do not own cars cannot travel to many employment locations and their employment options are geographically constricted. Those that do have jobs may face a greater risk of losing their jobs than those who own cars if unexpected delays occur in the transportation arrangement, whether carpooling or public transit. With transportation, however, low-income individuals are more likely to find jobs, work more hours, and earn higher wages. When studying the likelihood of welfare recipients transitioning to work in Alameda County, Cervero, Sandoval, and Landis (2002) found that living within walking distance to a bus or and rail stop was positively related to finding employment, and that car ownership was even more effective in increasing the odds of finding employment, assisting most those with the lowest levels of

education and those with children. The importance of vehicle accessibility in the success of welfare recipients finding a job led Taylor and Ong (1995) to conclude that private vehicles are an “indispensable employment tool” (p. 1471). Those with cars are also able to work more hours because they may spend less time commuting, particularly when compared to those travelling to work on public transit, and therefore they may have higher monthly earnings than those without cars (Raphael and Rice 2002).

The lack of car ownership may also constrain the residential options available to an individual or family. Glaeser, Kahn, and Rappaport (2008) found that poor residents of the inner-cities remain in their neighborhoods at least in part to have access to public transportation systems. This suggests that transportation may exert a segregating influence, at least along economic lines. These scholars focused on public transportation, but shared private transportation resources may have the same effect of providing a place-constrained transportation strategy and therefore discourage individuals from moving away from the community. In other words, individuals who rely on carpooling with a household member or neighbor as the primary method of commuting to work may not be able to consider changing housing location without a viable alternative transportation option (Bohon, Stamps, and Atilen 2008).

The impact of transportation limitations on housing options may be particularly strong for members of minority groups because transportation may be a form of social capital shared within and between households. Charles and Kline (2006) found that the practice of carpooling was strongest within members of the same race or ethnicity, and that individuals were more likely to engage in carpooling if a greater proportion of their neighbors shared the same racial/ethnic identity. Blumenberg and Smart (2010) have also hypothesized that the higher carpooling rates

are a result of inter- and intra-household resource sharing among immigrants, since typical predictors of carpooling fail to account for the differences in carpooling rates of the native population and the immigrant population. If residents of a neighborhood rely on local social connections in order to travel to and from work, then transportation considerations may contribute to the residential location. This means that transportation needs may contribute to the perpetuation of residential segregation along racial and ethnic lines.

Although the segregation of racial and ethnic communities may enable a greater degree of resource sharing, segregation also exerts a limiting effect. Residential segregation is particularly problematic when neighborhoods experience high levels of economic disadvantage, with few individual resources (including vehicles) available to share with neighbors. Particularly for those without cars, neighborhood amenities—including institutions, businesses, stores, and transportation systems—impact the range of opportunities that are available to social groups. Impoverished neighborhoods also frequently experience disinvestment with the closure of businesses and institutions (Massey and Denton 1993). Fernandez-Kelly (1995) uses the term *toponomical* to describe how social capital is contingent on both an individual's physical location and social location in relational networks. In impoverished areas where residents experience both truncated social networks and limited resources in geographic space, the residents may find few advantages via the social capital available in social networks. High levels of neighborhood-level poverty impacts the effectiveness of social networks in Latino *barrios* as well as in black ghettos (Elliott and Sims 2001).

Transportation may directly lead to negative labor market outcomes, and it may also indirectly lead to unemployment or depressed wages insofar as it contributes to the perpetuation of segregation. In the absence of racial segregation, lower-income workers tend to live closer to

their places of employment, and this distance increases as income increases and individuals trade commuting costs for improved neighborhood amenities (Madden 1985; Preston, McLafferty, and Liu 1998; Taylor and Ong 1995). However, residential segregation by race may prevent members of a minority group from moving closer to employment growth (Stoll 1998). Scholars have found this to be particularly true for blacks. Scholars have found that blacks are less likely than whites to move when an integrated firm relocates (Fernandez 2008), and that the distribution of minority neighborhoods within metropolitan areas appears to shape the residential options of individual minority households (Ross 1998). Blacks who move to neighborhoods with a higher socioeconomic status may experience longer commutes than whites because of the limited geography of high income black neighborhoods (Clark and Huang 2004).

For immigrants, living in a segregated neighborhood may simultaneously provide and limit economic opportunities. Local social networks may informally channel network members into particular jobs, helping individuals navigate through the social hierarchy and discrimination that influences standards of desirability held by employers. Ethnic niches then develop when workers from a particular national origin become disproportionately concentrated in a particular industry or occupation relative to other workers (Aldrich and Waldinger 1990; Waldinger 1994). Andersson, Burgess, and Lane (2009) found that members of a social network living in an ethnic community are more likely to be employed in the same firm as their geographic neighbor than immigrants who do not live in ethnic communities; however, if members of a social network do not have jobs then the social network is not likely to assist an individual in locating a job opportunity.

Furthermore, the jobs found through social networks may provide little opportunity for advancement and therefore present a *mobility trap*. For example, Wang (2010) speculates that

living in an area with a high concentration of co-ethnic workers offsets disadvantages in transportation mobility for immigrants living in Chinese ethnic neighborhoods in finding employment, although the employment—particularly for Chinese women—may tend to be in a niche industry without opportunity for upward economic mobility. In another example, McLafferty and Preston (1992) found that a large proportion of Latina women in New York City work in the same sub-county area where they live, and they also tend to walk or bike to work. For these Latina women, the close proximity of their residential location to employment opportunities enabled them to work, albeit in low-paying manufacturing and service positions. These examples suggest that living in a segregated ethnic community, working in an ethnic niche and having limited transportation may provide immigrants with an environment that protects them from discrimination in the larger economy. At the same time, these factors may prevent immigrants from exposure to opportunities beyond the confines of the ethnic network. Bohon, Stamps, and Atilas (2008) found that Latino immigrants in Georgia without cars work in a handful of industries, such as agriculture, poultry production or landscaping and are not able to take better-paying jobs elsewhere, such as in the construction industry.

Scholars have focused primarily on the economic consequences of mobility for two main reasons. First, transportation is considered one of the key factors influencing positive employment outcomes of welfare recipients following passage of the Personal Responsibility and Work Opportunity Act of 1996, and so scholars have investigated the issues surrounding transportation as welfare recipients face the transition to work (Blumenberg and Manville 2004; Chapple 2001b; Rogalsky 2010). Second, the US Census long form (which has recently transitioned into the American Community Survey) collects information regarding commuting time and modes, making data only on the trip to work available at the local level.

However, people travel to meet many needs in their lives. Employment-related journeys form only about one-fifth of the trips made by household members in their daily lives (Santos et al. 2011); household members generate just as many trips for shopping, errands and other personal reasons, and for social and recreational purposes as for employment purposes. Limited transportation makes all trips more challenging, not just the journey to work.

Summarizing the impact of transportation limitations on the lives of immigrants in Georgia, Bohon, Stamps and Atilas state that: “For Latinos who are immigrants the lack of transportation goes beyond limiting upward economic mobility. It acts as a bottleneck to adjustment in that it impedes the adjustment process in several domains of social life simultaneously” (2008: 288). The concept of transportation limitations acting as a bottleneck provides an apt metaphor. Transportation limitations may not be the primary obstacles to a variety of desired outcomes, but they prevent individuals from facing and overcoming the primary obstacles.

If Latinos stay in ethnic neighborhoods in part due to transportation limitations, in spite of better housing options, then, as Bohon, Stamps, and Atilas (2008) speculate, spatial constraints may contribute to overcrowded housing conditions observed in the Latino communities. In constraining residential options, limited transportation also reduces the chances that Latino immigrants reap the benefits of positive neighborhood effects in areas that may be more desirable. Researchers have shown that neighborhood characteristics in impoverished communities negatively influence the lives of residents in a variety of ways, including negatively impacting their health and physical activity (Ellen, Mijanovich, and Dillman 2001), their sense of self-efficacy (Rosenbaum, Reynolds, and Deluca 2002), and child well-being on a variety of

measures (for a review, see Leventhal and Brooks-Gunn 2000). Limited transportation thus limits opportunities and overall quality of life by restricting residential location.

Limited transportation also limits opportunities directly. Researchers have found that transportation barriers prevents activities such as health care utilization (Asamoia et al. 2004), attendance in community college classes, and participation of immigrants in the events at the schools of their children (Bohon, Stamps, and Atilas 2008). Participation in activities, events, and institutions are important instances where immigrants may benefit from the services or activity, but such participation also increases exposure of immigrants to the US society. Exposure to the US society is one major factor that impacts English language acquisition of non-English-speaking immigrants (Espenshade and Fu 1997; Stevens 1999), and English language proficiency in turn affects an immigrant's adaptation to the United States.

The importance of exposure to US society in learning English lies in the fact that people use language to talk to other people, and so incentives and opportunities to use English with others affects the motivation of learning English (Stevens 1992; Stevens 1999). Researchers have found that exposure to English speaking society improves English language proficiency on a number of indicators, and conversely, that isolation from English speaking society impedes English language acquisition (Hwang and Xi 2008). For example, receiving formal education in the United States, participating in the paid labor force, and having an English-speaking spouse who does not speak the immigrant's language are factors that are associated with improved English language ability (Espenshade and Fu 1997; Stevens 1992). On the other hand, living in families or in linguistically segregated neighborhoods, having a spouse who is from the same non-English-speaking country, and participating relatively infrequently in the paid labor market are factors associated with poor English language ability (Stevens 1992). The concept of

institutional completeness reflects the degree to which services such as religion, media, and employment can be performed by those of the same ethnicity (Breton 1964)—or in this case, those who speak the same language. If immigrants become embedded in dense same-language interpersonal networks, and live, work and commute with other Spanish-speaking persons, then they are more likely to maintain their own language – but at the expense of not learning the dominant language (Stevens 1992).

English language proficiency significantly affects an immigrant’s adaptation to US society. Language skills comprise one aspect of human capital – along with education – that determines successful integration in the US labor market. Lack of English language abilities reduces earnings within occupations and limits occupational mobility (Kim 2011; McManus, Gould, and Welch 1983; Park 1999), and Kossoudji (1988) finds that immigrants—particularly from Latin American countries—who are not proficient in English are actually “pushed down” the occupational ladder. English language proficiency also increases immigrants’ electoral participation as measured by naturalization and voting rates, and English language proficiency increases nonelectoral participation as measured by lobbying, protesting, and influencing political decisions (for a review, see Marrow 2005). On one hand, immigrants who make greater gains in English language proficiency experience more feelings of happiness and a greater sense of well-being (Kim, Ehrich, and Ficorilli 2012). Nawyn and colleagues (2012) propose that English language proficiency is a noneconomic resource, providing access to information, creating social power, increasing independence, and reducing uncertainty and anxiety. On the other hand, English nonfluency among Latinos in new destinations is linked to an elevated risk of drawing hostility or becoming a victim of homicide, particularly in new Latino destinations

(Shihadeh and Barranco 2010). English proficiency thus forms a crucial determinant of eventual success in the US economy society for most immigrants.

Immigrants face many obstacles simultaneously in adjusting to life in the United States, and the ability to speak and understand English forms perhaps the most important barrier to opportunities, resources, and social and institutional connections. If transportation acts as an adaptation bottleneck, reducing the exposure and ability to participate in events in US society, then the most serious consequence may be impeded acquisition of the English language.

CHAPTER 3: METHODS

In this study, I aim to create a better understanding of the extent to which Latino immigrants experience transportation limitations and how these transportation limitations affect the adaptation processes of Latino immigrants in the United States. My first research question asks whether the Latino population is growing near locations of job growth. In order to address this question, I create maps to gain a visual understanding of the Latino population and employment changes in Atlanta. My second research question asks whether the distance to work, measured in commute time, changes significantly for Latino immigrant workers as the degree of ethnic residential concentration increases. To explore this question, I run ordinary least squares regression analyses with aggregate-level data and with individual-level data.

I then turn to explore the transportation limitations experienced by Latino immigrants, and how transportation strategies used vary according to different characteristics of the immigrants. In answering the third research question, how income and vehicle availability affect the mode of commute of Latino immigrant workers, I build a multinomial regression model, comparing how characteristics of Latino immigrant commuters influence the transportation mode used to travel to work. The fourth question asks how the degree of ethnic embeddedness impacts the mode of commute of Latino immigrant workers. To answer this question, I build two multinomial regression models, the first focusing on how commute mode changes depending on the degree of ethnic residential concentration, and the second focusing on how the commute mode changes depending on the niche sector of employment.

My fifth question asks whether or not levels of mobility are related to English language proficiency. To learn if a relationship exists, I build a binomial logit model that focuses on whether household vehicle availability and mode of commute predict whether a Latino

immigrant speaks English well or very well. Results of these analyses will expand our understanding of the transportation patterns of Latino immigrant workers, the transportation limitations they experience, and how transportation constraints may affect English acquisition, one important factor in adapting to US society.

Goal 1: Residential Segregation and Commute Length

To examine the effect of residential segregation on the commute length of Latino immigrants in Atlanta, I use three approaches. I first use maps to spatially investigate where Latinos live in Atlanta, and whether Latinos tend to live in close proximity to the locations that have experienced the greatest employment growth. I then use small-area aggregate data to determine whether segregation is related to the proportion of Latinos that experience short commute times. The final approach uses individual-level data to test for whether the PUMA-level of segregation is related to each individual's commute time, controlling for individual characteristics such as personal income and mode of commute.

The Residential Concentration Quotient: A Measurement of Segregation

Scholars have developed many methods for measuring and describing segregation (Brown and Chung 2006; Duncan and Duncan 1955; Massey and Denton 1988; Wong 1993). In this study, I use the Residential Concentration Quotient (*RCQ*) as the measure of segregation, calculated as follows:

$$RCQ_j = (P_{ij}/P_j)/(P_{im}/P_m)$$

where *RCQ_j* is the residential concentration quotient for residential area *j*, *P_{ij}* is the population of group *i* in residential area *j*, *P_j* is the total population of residential area *j*, *P_{im}* is the population of group *i* in metro area *m*, and *P_m* is the total population of metro area *m*. The *RCQ*

thus measures a group's share of a neighborhood's population relative to the group's share of total population in the overall region. A quotient equal to 1 represents parity in a residential area; that is, the group's population share in the residential area is equal to its share in the region as a whole. Anything above 1 reflects a disproportionate concentration of a group in a tract; below 1 represents an underrepresentation. For example, a group with a quotient value of 2 in a particular tract is represented at two times its expected share of the tract's population if the group were evenly distributed across the region. Other scholars use the *RCQ* as a measure for the level of ethnic residential concentration (Liu 2009; Parks 2004a), although some use the term *Location Quotient* (Brown and Chung 2006; Sharma 2011) to describe the same formula

Scholars disagree about using the *RCQ* as a measure of segregation. The term "concentration" typically refers to the population per areal unit, for example the number of blacks per square mile. In this sense, the level of concentration reflects the extent to which white society has spatially confined minorities to a small, crowded area (Massey and Denton 1988). In addition, the geographer Wong (2008) points out that concentration is actually not a measure of segregation, since segregation refers to the spatial separation of groups.

The most well-known study of segregation measures is Massey and Denton's (1988) comparison and categorization of twenty indices of segregation, which the authors divided into five conceptual dimensions: evenness, exposure, concentration, centralization, and clustering. *Evenness* refers to the degree to which the percentage of minority members within residential areas equals the citywide minority percentage; *exposure* is the degree of potential contact between minority and majority members, reflecting the extent to which groups share neighborhoods in common; *clustering* is the extent to which minority areas adjoin one another in space; *centralization* is the degree to which minority members are settled in and around the

center of an urban area, usually defined as the central business district; and *concentration* is the relative amount of physical space occupied by a minority group.

The most commonly used indices of segregation as recommended by Massey and Denton (1988), such as the index of dissimilarity to measure the evenness of the distribution of two population groups across urban space, or the exposure/isolation indices to measure levels of exposure of group members to each other, are appropriate for comparisons across metropolitan areas and the change in metro-level segregation across time (see for example: Iceland and Scopilliti 2008; Iceland, Weinberg, and Steinmetz 2002; Johnston, Poulsen, and Forrest 2003; Logan, Stults, and Farley 2004; Massey and Denton 1987). However, such measures summarize the spatial configuration of groups in one value, and for the purposes of investigating the intra-urban population dynamics, they do not work.

The five dimensions of segregation proposed by Massey and Denton (1988) are also problematic at smaller geographical scales because the conceptual categories blur. Unevenness of the population dispersion across space at one geographic level (such as a census tract) results from clusters of population at a smaller geographic level (such as block groups). For this reason, Reardon and O'Sullivan (2004) and Wong (2008) propose two conceptual dimensions: evenness/clustering and exposure/isolation, with concentration and centralization as subcategories of evenness/clustering.

In applying this rationale to the *RCQ*, if the value of *RCQ* were 1.0 in all subunits of an area, then the minority population would be evenly distributed across the area. Insofar as the distribution of a minority population is uneven, the *RCQ* can provide the locations of the neighborhoods where the minority population is over-represented, containing clusters of the minority population at lower levels of geographic aggregation. However, the *RCQ* does not take

into account adjoining units, and therefore does not identify agglomerations and larger clusters of areas where the minority population is over-represented. For this reason, Brown and Chung (2006) describe *RCQ/LQ* as a measure of concentration in contrast to Moran's *I* as a measure of clustering, which is a measure that takes into consideration population proportions in the surrounding tracts. This differs from Massey and Denton's (1988) formulation of concentration, which takes into account the areal size of the units in order to determine the relative share of urban space occupied by one group compared to another group.

Following Brown and Chung (2006), I describe *RCQ* as a measurement of spatial concentration of a minority population, with the understanding that concentration is related to the evenness/clustering dimension of segregation. This conception of concentration refers to the proportion of Latinos living in a given census tract relative to the overall proportion of Latinos in the metropolitan area, as compared to the ratio of proportions of the non-Latino population. This definition thus does not incorporate the the physical measurement of the areal square footage. Although *RCQ* values demonstrate the extent to which each tract diverges from an ideal of 100 percent even distribution across space, relative neighborhood concentration is the relevant concept for this research rather than evenness of the overall distribution of the Latino population.

Approach 1: Mapping Latino Neighborhoods and Employment Growth

This study begins with a visual investigation as to whether segregated Latinos live in areas that are geographically distant from locations of employment. Specifically, I explore whether context of spatial mismatch exists in Atlanta for Latinos. The necessary conditions for spatial mismatch to exist include the following: (1) minority communities live in segregated neighborhoods; (2) these segregated neighborhoods tend to be in centralized areas geographically distant from locations of employment growth (3) employment growth occurs in

suburban areas that may be inaccessible for low-skilled minority workers (Kain 1968; Kasarda 1989; Wilson 1987).

I create a total of three maps. The first map shows the level of population concentration of Latinos in 2010. I calculate the residential concentration quotient (*RCQ*) from the tract-level population information from the 2010 American Community Survey 5-year estimates, which are based on pooled data from 2006-2010. The *RCQ* value for each tract in 2010 will be displayed on a map of Atlanta to visually depict the locations of the neighborhoods and clusters of neighborhoods that have higher levels of Latino residential concentration.

The second and third maps display the county-level growth in employment positions between 1990 and 2010, and the county-level growth in the Latino population between 1990 and 2010, respectively. I turn to county geographic level because employment information is not available at a smaller level of geography. The employment information comes from the Quarterly Census of Employment and Wages, produced by the Bureau of Labor Statistics. The county-level population data for Latinos in Atlanta come from the 1990 Census of Population, Social and Economic Characteristics publication for Georgia and from the 2010 US Census Summary File 1 for 2010. I use the US Census Bureau TIGER/Line Shapefiles for the geographic boundaries of the counties, and I include all counties that comprise the 28-county Atlanta metropolitan area in 2010. The map of the employment growth will depict the extent to which the growth occurred in suburban areas. The map of the Latino population growth and the map of the employment growth can then be compared to determine whether the Latino population tended to grow in close proximity to the locations of employment growth. To supplement the visual information, I calculate the Pearson correlation coefficient to determine

whether the correlations between the growth in employment and the growth in the Latino population are statistically significant.

Approach 2: Investigating Commute Time with Aggregate Data

After mapping the spatial characteristics of job growth and Latino neighborhoods in Atlanta, this study turns to an analysis of commute time based on small area data. The tract-level summary data come from the US Census 2000 and the Census Transportation Planning Package 2000 (CTPP). The US Census 2000 Summary Files 3 contained most of the data needed for this analysis, and the CTPP 2000 Part 1 data provided the commute time and mode for Latinos. The CTPP contains a set of special tabulations designed by transportation planners, so it contains more transportation-related details than the summary files, but these files for 2010 were not yet available at the time of this writing. Summary data are available for Latinos, but it is not possible to disaggregate US-born from foreign-born Latinos from these tables, so my first analysis uses data that includes all Latinos.

The availability of summary data for small geographic areas enables the analysis to focus on how neighborhood conditions affect commute time. I use census tracts, which are Census-designated relatively permanent subdivisions of a county whose boundaries follow permanent, visible features, such as streets, rivers, railroads, and high-tension power lines (United States Census Bureau 2000b). Census tracts contain a population between 1500 and 8000¹, and local census statistical area committees initially draw them according to the Census Bureau guidelines to be as internally homogeneous as possible. The Atlanta metro region included 20 counties in 2000, comprised of 502 tracts containing a residential population of at least 30 Latino workers.

¹ Prior to 2000, census tracts contained at least 2500 residents; however, census tracts and block numbering areas (BNAs) were combined, slightly shifting the criteria for census tracts (United States Census Bureau, 2000b)

The arbitrary cut-off of thirty Latino workers provides some variation in commute time in each tract, preventing a tract containing one or two respondents from skewing results.

Many scholars use tracts to represent the boundaries of a neighborhood (Cervero, Sandoval, and Landis 2002; Ihlanfeldt 2002; Ishizawa 2009; Massey and Denton 1988; Wagmiller 2007; Wang 2010), although this practice is problematic for several reasons. The first problem is that there is no consensus regarding the definition of a neighborhood (Durlauf 2004; Guest and Lee 1984; Haeberle 1988), and the use of tracts represents convenience and data availability.

A second problem points to statistical problems resulting from the fairly arbitrary areal space of census tracts, called the modifiable areal unit problem (MAUP; Fotheringham and Wong 1991; Reardon and O'Sullivan 2004; Wong 1997). The MAUP problem includes two modifiable parts. The first is the effect of the scale of the unit of analysis on the results, since smaller units (such as blocks) tend to contain less variation (Wong 1997). The researcher's choice of the unit thus affects the results. The second is the question of zoning, as the boundaries of the tract may not represent meaningful social/spatial divisions (Reardon et al. 2008). For example, a census tract may initially represent fairly homogenous groupings of the population, but the boundaries do not shift as the population shifts. Allen and Turner (1995) found that about half of the census tracts in Los Angeles contained block-level non-random unevenness inside tract boundaries, and this was particularly evident in transition zones between large ethnic settlements.

However, as Massey and Denton (1988) point out, these issues remain regardless of the scale of interest, and more racial and ethnic data are available for tracts than smaller geographic

units. For this same reason, I also use census tracts for this analysis looking at the effect of ethnic concentration on distance to work.

Dependent Variable: Percent Latinos Experiencing a Short Commute

The dependent variable for this section is the percent of Latino workers who experience a shorter than average commute time. The CTPP data provide categorical breakdowns of the time Latinos spend commuting by census tract, broken down into five minute intervals, such as the number of Latinos travelling to work in less than five minutes, in 5-9 minutes, to the highest category of 90 minutes or more². Using the mid-point of each interval as the commute time, and 97 as the upper limit, I found the average commute time for Latinos in Atlanta to be 29.2 minutes. I thus defined Latinos who experience a short commute as the workers in each tract that commute to work in less than 30 minutes.

Using commute time as an indicator of distance to work is one measure of job accessibility used in studies focusing on spatial mismatch (Gabriel and Rosenthal 1996; Liu 2009; McLafferty and Preston 1996; Plaut 2006; Taylor and Ong 1995). Using commute time as a proxy for distance to work is problematic, however, because time represents distance only insofar as the speed is constant. Distance to work measured by a 25 minute walk is quite a different distance from a 25 minute commute by car, barring severe traffic jams. Controlling for speed within each mode, such as interstate access and congestion factors for driving alone or number of transfers if taking public transit, would be ideal but such data would be difficult to obtain and use with information from the US Census. Trip-chaining, such as stopping for

² I excluded those working from home in this study altogether. The Census/ACS records “working at home” as one mode of commute; however, it is unclear whether these individuals are telecommuters or small entrepreneurs based at home. Those working at home only 1.44 percent of the employed individuals included in the summary data, and excluding them should not affect the results.

groceries or to pick up a child from school on the way to or from work, may also factor into commute time responses (Preston and McLafferty 1999).

Another approach to measuring distance to work is to calculate the geographic distance. This data is not generally available for small areas except in cases of primary data collection (Fernandez 1994; Fernandez 2008) or confidential data extracts (Clark and Huang 2004; Parks 2004a). Some scholars are developing methods of disaggregating data from matrices of information available from the CTPP Parts 1, 2, and 3, which include place of residence information, place of work information, and a residence/employment destination matrix (O'Kelly and Lee 2005; Sang, O'Kelly, and Kwan 2011), although the ability to control for multiple variables is limited.

In this study, I use commute time as the indicator of distance because it is available at the tract level for Latinos. The results must be carefully considered, as longer travel times or distances may result from housing segregation, from increased housing choices, or a number of other factors (Ihlanfeldt and Sjoquist 1998); researchers demonstrate that commute times increase with income (Plaut 2006; So, Orazem, and Otto 2001), but also that commute times may be high due to poor job availability nearby (Gabriel and Rosenthal 1996; Sultana 2005).

Independent Variables

To test whether minorities tend to experience a longer commute time when living in segregated neighborhoods, the first variable of interest is the residential concentration of immigrants. To determine whether residential concentration is related to commute time, I used tract-level aggregate data from the US Census 2000 Summary File 3 to calculate the *RCQ* for each census tract.

The first control measure includes the average level of financial resources in the Latino community, for which I use average Latino household income. Households with higher incomes may be able to locate in places with higher housing values, trading off commuting time and costs for desired neighborhood amenities (Plaut 2006). Households with lower incomes would be expected to have a shorter commute time on average (Jackson 1979). However, this is not necessarily the case for blacks or Latinos (Gabriel and Rosenthal 1996; Sultana 2005), and one possible reason for this is residential segregation (Kain 1968). In terms of other socioeconomic controls³, I also include the percent of the Latino population over twenty-five years of age who graduated from high school and the percent of the Latino households that rent (Plaut 2006).

Transportation-related controls are included in the model. Controlling for commute mode is important (Ihlanfeldt and Sjoquist 1998), but difficult when working with aggregate data; I therefore control for the percent of Latino workers in a census tract that commute via driving alone, as this is the fastest, most flexible and most common mode of commute (Taylor and Ong 1995). The percent of Latinos in a census tract who live in a household with no vehicle available is also included, as these individuals are the most likely to take public transit or walk, which are the slowest modes of commute (Cervero, Sandoval, and Landis 2002; Taylor and Ong 1995).

I include demographic variables in the model that other researchers using aggregate-level data have demonstrated affect commute time. The variables in my model include: the percent of Latino workers who are male, because women tend to have shorter commutes in terms of distance and time (Johnstonanumonwo 1992; Plaut 2006); the percent of Latino householders who have a child under eighteen years of age because family responsibilities may constrain

³ I also tried including Latino unemployment rate, Latino poverty rate and housing value, but these did not improve the fit of the model.

individuals from spending longer amounts of time commuting, which is shown particularly to be the case for mothers (Johnstonanumonwo 1992); the percent of the population in the tract that is black because of the spatial disadvantages experienced by the populations living in African-American communities (Stoll and Holzer 1999); Latino household size, as multiple adults in a household is correlated with higher rates of carpooling (Parks 2004a), and a worker may also be more likely to add other life-supporting travel purposes -- such as transporting children or purchasing groceries -- to the commute, and thus experience longer commute times (Blumenberg 2004); and immigration factors including the percent of the Latino population that is foreign-born and the percent of the Latino population that arrived between 1990 and 2000 because recent Latino immigrants travel less distances and for less time than native-born Latinos (Blumenberg and Shiki 2007; Liu 2009; Parks 2004a).

Aggregate-level Model for Commute Time

I build an ordinary least squares linear regression model to test for segregation effects on the commute time to work. The model is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_nX_n + e$$

where

Y = Percent of working Latinos commuting under 30 minutes

X₁ = The tract-level residential concentration quotient,

X₂ = Tract-level average Latino household income,

X₃ = Percent of Latinos in a census tract graduating high school,

X₄ = Percent of Latino-headed households in a census tract that rent,

X₅ = Percent of Latino workers in a census tract who drive alone to work,

X_6 = Percent of Latino-headed households in a census tract with no vehicle available,

X_n = A vector of tract-level demographic characteristics, and

e = sampling error

The vector of aggregate-level demographic characteristics includes the percent of Latino workers in a tract that are women, the percent of Latino households with a child present, percent of the total tract population that is black, the average Latino household size, the percent of Latinos who are foreign born, and the percent of Latinos who arrived in the United States in the last ten years.

Prior to running the model, I ran regression diagnostic tests to check that the data fit the mathematical assumptions that underlie ordinary least squares (OLS) regression: random distribution, normal distribution, linearity, homoskedasticity, and independence. I checked for random distribution, and there are no missing cases. To check for normality, I created a leverage versus residual squared plot, which displayed several questionable points. I calculated Cook's distance, which yielded no values greater than 1, which is a threshold recommended by some statisticians (Weisberg 1982), so I concluded that the data are normally distributed enough and I did not eliminate any of the cases. To check for linearity, I graphed a scatterplot matrix, and the only questionable plot was the graph of RCQ and the percent commuting under thirty minutes. I also checked the residual-versus-fitted values plots for each of the predictors with the dependent variable, and the same dimensions – the percent commuting under thirty minutes and the RCQ-- were questionable⁴. However, when I checked for heteroskedasticity using the Breusch-Pagan/Cook-Weisberg test, there was no significant evidence of heteroskedasticity ($p > .05$). I

⁴ I also tried taking the natural log of the RCQ. This improved the scatterplot, suggesting that an improvement in linearity. However, when running the regression model, there was no significant relationship between the level of residential ethnic concentration and commute time. It is likely that the model I present here is underspecified, due to data limitations with using aggregated data.

therefore concluded that any systematic variation among the errors would not significantly affect the standard errors. I also checked for multicollinearity. The variance inflation factor (VIF) for all the independent variables was less than 10 and the tolerance test ($1/VIF$) was less than .1 for all the variables. I therefore concluded that the independent variables are not correlated to the degree that would cause tests of significance to be invalid and result in misleading or meaningless conclusions. I therefore conclude that the OLS estimators are BLUE (best linear unbiased estimators).

Limitations of Aggregate Data

The analysis based on aggregate data will reveal whether Latino residential concentration or average household income affects the proportion of Latinos experiencing a short commute time. However, solely using available aggregate data has a number of limitations. First, the model is limited by the information available at the aggregate level, and important variables are thus excluded, which could result in improperly specified models and therefore incorrect conclusions (Robinson 1950). One reason for excluded variables is that some individual-level categorical variables do not translate well to the aggregate level. For example, it does not make sense to discuss or control for the “average commute mode.” The percent of Latinos who use each commute mode is available but using all of these percentages in the model distorts the standard errors. Mode of commute is thus not adequately accounted for in this aggregate model, and commute mode has a profound impact on the distance covered in a given amount of time.

Secondly, as Schwartz (1994) points out, individual-level and aggregate-level variables have different meanings. Household income (or poverty status) measured at the individual level and at the neighborhood level have different meanings. The acute lack of financial resources at the neighborhood level results in the concentration of poverty and is correlated with (and

therefore at least partially controls for) additional factors such as proximity to economic institutions and employment opportunities (Wilson 1987). At the individual or household level, however, poverty status controls for individual resources but may not be related to poorly performing schools, broken playground equipment in public playgrounds, abandoned buildings, and an environment of general public and institutional disinvestment.

The third limiting factor of research that only includes aggregate information is that some constructs make more sense to measure at smaller units than a census tract, and some theoretical questions are by nature cross-level (Schwartz 1994). Given that relevant information is available, individual-level data allow the scholar to calculate information at the relevant level of analysis. The current research question under investigation is cross-level, asking whether ethnic concentration (a neighborhood-level construct) and financial resources (which may be conceptualized at the individual, household or community level, each of which are important for different reasons) affect the distance between place of residence and place of work (which is best conceptualized at the individual level).

Although individual-level data are not automatically better suited for all research questions, as Hanushek, Jackson, and Kain (1974) warn, individual-level data –when available – allows the researcher greater flexibility in correctly specifying the model and therefore may yield less biased results. Therefore, the final approach addresses the question of the effect of residential ethnic concentration and financial resources on commute time using data available on the individual level.

Approach 3: Investigating Commute Time with Individual-level Data

I turn to individual-level data to test whether ethnic neighborhood concentration and financial resources are related to commute time. Using this approach, I will be able to discover

whether the results are consistent with the results from the aggregate level. I used data from the American Community Survey (ACS) pooled 2006-2010 microdata sample provided by the Integrated Public Use Microdata Series (IPUMS; Steven Ruggles 2010), which is a project that compiles, harmonizes, and disseminates microdata samples from the US Census and ACS. I also extracted ethnicity information from the American Community Survey (ACS) pooled 2006-2010 aggregate data for the census tracts in order to calculate the *RCQ*.

Fully implemented by the Census Bureau in 2005, the ACS is the new source for the information previously collected through the decennial census long form, but it collects information from households monthly and disseminates the information annually rather than once every decade (U.S. Census Bureau 2009b). The ACS collects information monthly from a sample of households in the United States, stratified by census blocks within each county, and annual population estimates are released based on data pooled across time. Data are pooled for sixty months (or five years) months to represent the smallest statistical, legal, and administrative entities, such as census tracts, block groups, and small cities and towns. These data are available in the aggregate form, in the summary files. Pooled data from 36 months or 12 months accurately represents entities with larger populations.

The IPUMS also disseminates ACS microdata comprised of a sample of data records at the person- and housing-unit level (U.S. Census Bureau 2009a). In order to protect confidentiality, the microdata are a sample of the ACS; the full ACS sample includes about 2.5 percent of the population for a given year, and the IPUMS sample includes about 1 percent of the population. Other measures to protect confidentiality include the removal of individual identifiers, such as names and addresses, the top-coding of certain open-ended questions that could lead to the identification of individuals, such as age and income, and the switching of a

small number of records with similar records from a neighboring area. One final measure to protect confidentiality is the limiting of identification of microdata to fairly large geographic areas, the smallest of which is the Public Use Microdata Area (PUMA). PUMAs are aggregations of census tracts or counties that contain a population of at least 100,000 people. Using the ACS microdata provides the possibility of using individual-level variables, but the geographic point of reference changes from the relatively small census tract to the much larger PUMA.

Due to the ability to fix individual- and household-level data in space, albeit at a coarse geographical level, the use of PUMAs to represent spatial location is fairly common practice (Allen and Turner 1996; Beckman and Goulias 2008; Blumenberg and Shiki 2007; Liu 2009; Liu and Painter 2012; Painter, Liu, and Zhuang 2007; Sultana 2005; Wyly 1996). Arguing that PUMAs have significance beyond that of convenience, Wang (2006) argues that census tracts and blocks are also relatively arbitrary divisions and that ethnic communities can spread across different scales of residential areas. She proceeds to demonstrate that the spatial ethnic concentrations at the PUMA level reveal the main ethnically concentrated areas at the census tract level for the San Francisco Bay Area. I also follow these scholars in using PUMAs while acknowledging that smaller geographic areas would be more ideal if available. PUMA-level indicators may understate the effect of ethnic concentration on travel behavior, since ethnic concentration at the PUMA level is likely to be lower than that of the tracts in which Latino immigrants live (Wong 1997).

I extracted a sample of residents living in the Atlanta metropolitan area from the ACS 2006-2010 pooled microdata from the IPUMS-USA website (Ruggles et al. 2010). Using the 2006-2010 pooled microdata increases the sample size, but it also adds variability in the sample

across time. During this period, for example, the Great Recession occurred, which may have changed the Latino population in Atlanta. Immigrants who lost their jobs may have returned to their native country, and the proportion of Latinos working in certain industries—such as construction—may have changed during these years. This change over time is not captured in the analysis; instead, the analysis presents an average picture of Latino immigrants and their transportation patterns across time.

I also limited my subsample to employed Latino immigrants working outside the home. Multiple individuals in this sample reside in the same household because the ACS sampling frame includes all individuals within sampled household. One option would be to limit the sample to the household head in order to include household-level variables in the model, but this would omit more than half of the sample. Furthermore, the household heads may differ from the other working members of the household in terms of employment location and access to transportation that would affect the results. As a consequence, I sparingly include household-level controls in the models in order to minimize the correlation of errors resulting from household clusters in the sample.

The question identifying Latinos on the ACS changed slightly during the period of the study. The 2006 and 2007 questionnaires asked, “Is this person Spanish/Hispanic/Latino?” and answers included, “No, not Spanish/Hispanic/Latino,” “Yes, Mexican, Mexican Am., Chicano,” “Yes, Puerto Rican,” “Yes, Cuban,” and “Yes, other Spanish/Hispanic/Latino,” and if the answer was “Other Spanish/Hispanic/Latino,” then the respondent is asked to “*Print group.*” From 2008-2010, the ACS questionnaire asks, “Is Person X of Hispanic, Latino, or Spanish origin?” The answers available that follow include “No, not of Hispanic, Latino, or Spanish origin,” “Yes, Mexican, Mexican Am., Chicano,” “Yes, Puerto Rican,” “Yes, Cuban,” and “Yes, another

Hispanic, Latino, or Spanish origin -- *Print origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*” The result of this change may be a slight increase in the numbers of respondents answering the question in the affirmative, but I do not anticipate this change to affect the overall transportation patterns. However, in this way, the questionnaire creates the panethnic group of “Latino” to refer to those from Spanish-speaking countries in Mexico, Central America, South America and the Spanish-speaking Caribbean.

In using the panethnic label of “Latino,” the results will be discussed carefully with respect to the great internal diversity of national origin included within the label. Indeed, some scholars argue that groups included in the “Latino” category share very little, as the individuals differ in historical experience, socioeconomic status and identity, and that the label therefore has little validity (Calderon 1992; Umana-Taylor and Fine 2001). Scholars further argue that the use of the panethnic label “Latino” masks systemic sub-category variation, resulting in the obliteration of real and important experiences from research findings (DiPietro and Bursik 2012). Real differences exist in patterns between immigrants of different Latin American countries of origin, such as in health outcomes (Zsembik and Fennell 2005), college aspirations (Bohon, Johnson, and Gorman 2006), educational attainment (Stamps and Bohon 2006), occupational attainment (Bohon 2005) and aggressive behavior among youth (Zsembik and Fennell 2005).

Other scholars argue that the national identity and panethnic markers are nested or overlapping identities, with the panethnic identity developing in the United States due to a predominantly – though not exclusively—common Spanish language and Catholic religion, as well as a political response to the American racial categorization system (Itzigsohn and Dore-Cabral 2000; Ricourt and Danta 2003). Empirical studies find support for a panethnic group identity. For example, studies have revealed higher instances of marriage between members of a

panethnic group than outside the larger group (Rosenfeld 2001), and ethnic residential segregation occurs along ethnic lines within larger panethnic residential areas (Kim and White 2010; Okamoto 2003). The use of the panethnic *Latino* marker thus has validity in some contexts, although it must be used with the recognition of internal ethnic boundaries.

Following Umana-Taylor and Fine (2001), who warn about the dangers of using a panethnic label but also caution against excluding individuals from Latin American countries from research due to small numbers in order to achieve a homogenous group, I use the panethnic group of *Latino* but I also recognize that differences in findings may occur between Latino immigrants from the top sending countries. I therefore provide results of the analysis based only on a subsample of Mexicans, who comprise the largest proportion of Latinos, in Appendix A. Because the research questions are concerned with the effects of transportation limitations on the adaptation of immigrants, the sample is also limited to the foreign-born. This limitation retained more than three-quarters of the sample of Latino workers, reducing it by 22.53 percent. I also removed foreign-born Latinos who are naturalized US citizens. Of the remaining subsample, 53 respondents reported not having a vehicle available in the household, yet they commute alone to work. This discrepancy may be due to inter-household sharing of vehicles, but it also may result from error introduced when the data was processed due to imputation of missing responses, so these respondents were removed from the subsample. Unfortunately, the data do not provide information regarding immigrant legal status. Given that Georgia has stringent licensing regulations, the inability to demonstrate legal presence in the United States affects the ability of Latinos without authorization to legally drive alone to work (Bohon, Stamps, and Atilas 2008; Georgia Department of Driver Services 2012). The final sample includes 5,750 Latino immigrants living in Atlanta working outside the home.

Dependent Variable: Commute time

In order to investigate the effects of ethnic residential concentration on commute time, the dependent variable for this section is the commute time for individual Latino immigrant workers, measured in minutes. The question asked on the ACS questionnaire (2006-2010) is: “How many minutes did this person usually take to get from home to work LAST WEEK?” This answer in minutes forms the continuous variable of commute time, and it predominantly measures morning commutes because most, but not all, workers travel to work in the morning. It is an imperfect measure because, as discussed above, other factors affect commute time in addition to geographic distance, such as commute mode, traffic congestion, reliability of transit, and the travel speed (Ihlanfeldt and Sjoquist 1998). However, information regarding work locations are suppressed in the public use files in order to maintain confidentiality, and therefore researchers fairly commonly rely on commute time as a proxy for distance to work (see, for example, Gabriel and Rosenthal 1996; McLafferty and Preston 1996; Taylor and Ong 1995), and control for other factors where possible.

Independent Variables

To test the effects of segregation, the first variable of interest is the residential concentration of immigrants, measured by the averaged *RCQs* of the tracts within each PUMA. In order to calculate the averaged *RCQs* of each tract, I first extracted race and ethnicity information for the census tracts in Atlanta from the ACS 2006-2010 pooled data. I proceeded to calculate the *RCQ* for each tract, using the same approach as above for Question 1, Part 2. For the purposes of identifying immigrant neighborhood concentration, the native-born second generation forms an important part of the context, so “Latinos” for this calculation includes all Latinos, whether native or foreign born. Next, in order to aggregate the tract-level ethnic

concentration information to the PUMA level, I used the spatial join feature of ArcGIS to identify which census tracts were in each PUMA, and I reviewed each tract to ensure that its boundaries were completely enclosed within that of a PUMA so that no tract would be associated with two PUMAs. I then proceeded to average the *RCQ*s of the census tracts in each PUMA to create the value for the PUMA *RCQ*. A *RCQ* of 1 means that the percentage of Latinos in the PUMA matches its percentage for Atlanta overall, which was 9.8 percent of the population in Atlanta according to the pooled 2006-2010 data. If the percentage of Latinos in a PUMA is less than that for Atlanta overall, then $RCQ < 1$, and if the percentage of Latinos in a PUMA is greater than that for Atlanta overall, then $RCQ > 1$. I use the *RCQ* value as a continuous measure to represent the ethnic concentration. The individuals included in this sample live in one of 32 PUMAS, so there are 32 unique values for *RCQ* on a continuous scale.

To test the effect of financial resources on the spatial relationship between the place of employment and the place of residence using individual-level data, the second variable of interest is personal income. I took the natural log of personal income as a linear transformation in order to adjust for the right-skewed distribution of income, and this improved the linear fit of the model. The natural log of personal income is used in order to minimize the correlated errors that are introduced to the model when variables of higher levels of aggregation are added. For this reason, neither household income nor poverty level, which is calculated for families, is included. Other scholars find a positive relationship between personal income and commute time as an indicator of the trade-off of neighborhood amenities for commute time (Gabriel and Rosenthal 1996; McLafferty and Preston 1992; Taylor and Ong 1995).

Vehicle availability and mode of commute are two transportation-related predictors of commute time. The Census questionnaire asks, “How many automobiles, vans, and trucks of

one-ton capacity or less are kept at home for use by members of this household?” The answer provides the numbers of vehicles that is considered to be available to household members. This means that if someone borrows a vehicle from a neighbor, it would not be included as a vehicle available to the household because it is not kept at the home of the borrower. I use this information to calculate the ratio of the number of vehicles available in the household to the number of driving-age individuals (over 15 years old) living in the household. I will refer to this group as *adults* in the household, since this is the population of people in each household who would potentially drive the available cars to work although many of these individuals may not actually drive. I calculated the vehicles-per-adult ratio by dividing the number of vehicles available to members of the household, which ranges from none to six or more, by the number of adults in a household and top-coded the number at 3. Pucher and Renne (2003) used a similar methodology to calculate vehicle availability, only with the adult cutoff at the age of 18. No vehicles available to members of a household signifies that all members of the household must figure out an alternative to commuting other than driving alone – unless they borrow a car from another household. Lovejoy and Handy (2008) have found that the practice of sharing cars and borrowing cars is a mobility strategy used by Latinos immigrants out of necessity. As the ratio of vehicles to drivers increases, the transportation resources in the household increases; one car belonging to a household of five offers some mobility but still quite limited for most of the household members; two cars available for a household of three adults offers a higher level of mobility but cars still are shared (albeit possibly unequally shared) resources. When each adult has at least one car, the individuals are likely to enjoy independent mobility, although still constrained by the costs of driving and maintaining a vehicle.

For commute mode, I combine two variables provided by the IPUMS. The first variable includes twelve methods of transportation, including private motorized vehicle (auto/truck/van), motorcycle, bus or trolley bus, streetcar or trolley car, subway or elevated, railroad, taxicab, ferryboat, bicycle, walked, other, and worked at home. The second variable reports whether the respondent drives to work with another worker. From these variables, I created five modes of commute: (1) travelling in a private motorized vehicle alone; (2) carpooling to work; (3) taking public transit including bus or trolley bus, streetcar or trolley car, subway or elevated, and railroad; (4) walking or biking; and (5) other, which includes going by motorcycle, taxicabs, and non-specified means. Individuals working at home are not included in the sample.

Controlling for mode of commute accounts for some of the variability in the speed of travel. Taylor and Ong (1995) warn that difference in commute times among members of minority groups may be largely due to differences in the speed of the mode of commute. They include a measure for commute distance as well as commute time, and they found that the commute distance for blacks was shorter than for whites and yet the commute time was longer across 10 metropolitan areas in 1977-78 and 1985. Most of the studies of commute time only control for public transit (McLafferty and Preston 1992), or for public transit and carpooling (Liu 2009; Preston, McLafferty, and Liu 1998; Taylor and Ong 1995). I also include walking/biking due to the importance of alternative modes of transportation for low-income individuals (Murakami and Young 1997) and for Latinos (Federal Highway Administration 2006; Pucher et al. 2011).

One important control for socioeconomic status other than income is education. The IPUMS provides eleven levels of education for the pooled data, from no schooling up through 5+ years of college. I recoded these into five categories: less than high school, some high school,

high school diploma or GED, some college, and bachelor's degree or more. Some scholars use years of education instead of categories (Preston, McLafferty, and Liu 1998; Taylor and Ong 1995), and some use this categorical approach (Gabriel and Rosenthal 1996; Ihlanfeldt and Sjoquist 1989). I followed the scholars using the latter approach because there are educational benchmarks that have a distinct impact on an individual's chances in the labor market. For example, those with a high school diploma are more likely to be employed and receive a steady income than those who do not finish high school (Rumberger 1987; Tyler and Lofstrom 2009) – and therefore perhaps more likely to have a car. Scholars find that parallel to income levels, those with a higher education tend to experience a longer commute (Gabriel and Rosenthal 1996; Preston, McLafferty, and Liu 1998; Taylor and Ong 1995), although this association is not consistently significant for immigrants due to low overall educational attainment and the difficulties of having American employers recognize foreign qualifications and experience (Preston, McLafferty, and Liu 1998).

Demographic controls include age, gender, presence of children and race. The age of the respondent is included as a continuous variable, as reported directly by the respondent. Individuals tend to travel more for all trip purposes as they age, until retirement (Santos et al. 2011), and research findings have confirmed the positive effect of age on commute time (Preston, McLafferty, and Liu 1998; Taylor and Ong 1995).

A dichotomous control for gender is included, with women coded as “0.” Scholars consistently find that women tend to commute shorter distances than men (Crane 2007; Plaut 2006; Santos et al. 2011). One reason for women working closer to home is the need to balance household responsibilities, such as grocery shopping and child care with work (Johnstonanumonwo 1992). Another reason that women work closer to home is labor market

segmentation. The female-dominated and minority sectors of the economy tend to pay less and therefore make a poorer trade-off for a long commute (McLafferty and Preston 1991; Wyly 1996). A third and related reason is that low-income women, and especially low-income mothers, tend to change jobs more frequently and use more localized strategies in finding employment (Chapple 2001a; Lein et al. 2005).

Whether the immigrant has a child under the age of sixteen in the household is also included as a dichotomous control. The IPUMS provides a variable that reports the youngest age of a respondent's own child, and I created a dichotomous variable for those who have a child under the age of sixteen. The additional responsibility of children may affect decisions regarding housing and employment changes, as found by Ihlanfeldt and Sjoquist (1989) for blacks, and therefore affect commute time for men as well as women, as found for Latinos (Preston, McLafferty, and Liu 1998). The presence of children in the household is usually included in models of commute time but is not always a significant factor (Gabriel and Rosenthal 1996; Liu 2009).

The model also contains a dichotomous control for whether the respondent self-identifies as white. I created a dichotomous variable for those who reported their race to be white from the IPUMS general categories of race. Whites consistently report higher levels of mobility on all levels, including the highest rates of driving alone, the most trips per day, and travelling the most distance and spending the most time travelling each day (Giuliano 2003; Tal and Handy 2005). Whites are also the most likely to move in the case of employment relocation (Ihlanfeldt and Sjoquist 1989), and benefit from structural conditions in the housing market that perpetuate segregation (Massey and Denton 1993; Rothwell and Massey 2009; Squires and Kubrin 2005), therefore enjoying a wider set of opportunities to trade off neighborhood amenities for a longer

commute time (Ihlanfeldt and Sjoquist 1998). Although there is more fluidity in the racial categories within the Latino groups than in the American conception of race, social distance remains between white Latinos more directly descended from the Spanish colonizers and those with more indigenous or African roots (Morales 1987; Roy Simon 1972). Identification as white is also associated with distance from the immigrant experience and represents a measure of success and social inclusion, given the importance of whiteness in the US social construction of race (Tafoya 2004). The consequences appear in social inequalities, such as higher levels of education and income for white Latinos (Tafoya 2004) and residential segregation between Latinos identifying as white, Spanish, and black, albeit to a lower degree than between whites and racial minorities (Denton and Massey 1989).

The immigration-related measure included is the number of years in the United States. The IPUMS provides the number of years the immigrant has been in the United States, calculated from the reported date of arrival. Immigrants have different travel patterns from natives, and the difference is particularly strong for recent immigrants and fades over time. The number of trips and miles driven increases with the time in the United States, with recent immigrants travelling the least and native-born individuals travelling the most (Federal Highway Administration 2006; Tal and Handy 2010). Access to high-speed transportation is also lower for recent immigrants and increases with time in the United States. The ratio of vehicles per household and correspondingly, the practice of making trips by driving alone, increases with time in the United States (Federal Highway Administration 2006; Tal and Handy 2010). These patterns approach but do not reach the levels of vehicle ownership and the tendency of native born to drive alone. Some scholars have dubbed this converging trend as “transportation assimilation” (Blumenberg and Shiki 2007; Blumenberg and Smart 2010).

Model for Commute Time: Individual-level Data

I build an ordinary least squares regression model to test for segregation effects on the commute time to work. The model is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_nX_n + e$$

where

Y = Commute time,

X_1 = Residential concentration quotient,

X_2 = Natural log of personal income,

X_3 = Car per adult ratio,

X_4 = Drives alone to work,

X_5 = Travels to work by public transit,

X_6 = Walks or bikes to work

X_7 = Commutes to work by another mode

X_8 = No high school

X_9 = Some high school

X_{10} = Some college

X_{11} = Bachelor's degree or more

X_n = A vector of aggregate-level demographic characteristics, and

e = sampling error

The reference category for commute mode is carpooling, and the reference category for education level is high school graduate. The vector of demographic variables includes age in

years, gender (male = 1), presence of children (child/ren present = 1), race (white = 1), and the number of years in the United States. The second model is identical except for the addition of *RCQ* as a measure of segregation.

The modes of commute are included here as a control for the speed of travel, to improve the association of commute time with distance to work. The reference category for commute mode is carpooling. The vector of demographic characteristics includes age, gender, presence of children, race, and the number of years in the United States.

As with the aggregate data, I ran regression diagnostic tests to check that the data fit the mathematical assumptions that underlie OLS regression. The models passed each of the diagnostic tests except for the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity ($p < .001$). The results of the test indicate that it is prudent to reject the hypothesis that the variance of the residuals is identical, which means the p-values may be inflated. In this case, clustered sampling is probably creating heteroskedasticity. I include all working members of each household; the sampling procedure of the ACS is based on counties; the IPUMS data are representative to the level of the PUMA; and, I used pooled data across five years. In order to adjust for this complex sampling design, I weighted the data using the eighty individual-level replicate weights provided by the ACS, and I use the more conservative successive difference replication method for applying the replicate weights with Fay's adjustment set to .5⁵.

Goal 2: Financial Resources and Ethnic Embeddedness Affecting Commute Mode

Commuting time and distance indicates to some extent the costs of commute and the transportation needs for one type of journey. This second section turns to look at the method of

⁵ I set the survey design in STAT using the following command: `svyset[pweight=perwt], vce(sdr) sdr(REPWTP1-REPWTP80) fay(.5)mse`

travel for the journey to work, with a goal of developing a better understanding of the transportation limitations experienced by Latino immigrants in Atlanta, and how limited financial resources and ethnic embeddedness are related to different transportation strategies. In order to accomplish this, I build multinomial regression models predicting the mode of commute, using carpooling as the reference mode because carpooling is the most commonly used commuting method by those who experience limitations on driving alone. The first model includes factors that are generally expected to affect commute mode, and forms the base model.

In order to determine the effect of embeddedness in the Latino community on commuting patterns, I then build two additional models. The second model adds controls for the various levels of ethnic residential concentration to the base model, since those who live close to others of the same ethnicity or pan-ethnicity may be more inclined to share rides to work. The third model, which is the full model, adds economic sector of employment to the model, broken down into four specific niche sectors. Different employment sectors may lend themselves to particular commute modes, due to their spatial locations and distribution across the metro area, and Latino immigrants may be more likely to commute together if they work in the same location.

Commuting patterns may help reveal the transportation limitations faced by Latino immigrants, and the transportation strategies used instead of driving alone. The sample used in these analyses is the individual-level ACS sample from IPUMS, as described in Question 1, Part 3. The sample is thus comprised of Latino immigrants living in Atlanta, employed outside the home.

Dependent Variable

I use commute mode as a measure of mobility. The composition of this variable is the same as above; I combined the variable provided by IPUMS that reported the mode of commute with the variable that reported whether the driver carpooled with another worker or commuted alone to work. A driver is not considered to be carpooling if transporting non-workers, such as taking a child to daycare. The five modes of commute are: (1) travelling in a private motorized vehicle alone; (2) carpooling to work; (3) taking public transit including bus or trolley bus, streetcar or trolley car, subway or elevated, and railroad; (4) walking or biking; and (5) other, which includes going by motorcycle, taxicabs, and non-specified means.

Using commute mode as an indicator of mobility gives insight into travel abilities and constraints, although there are also limitations to the connection between commute mode and mobility. The first limitation is that place of work is only one of many places people need to travel in their daily lives, and focusing on commuting excludes other purposes of travel. This sole focus on the journey to work trip substantially underrepresents human travel needs.

Chatman and Klein (2009) find that non-work related travel accounts for 71 percent of all household trips for the native-born in the United States and 68 percent of all household trips for the foreign-born.

The second limitation of looking at commute mode as an indicator of mobility is that it excludes the travel patterns of non-working individuals from the analysis. Households share limited transportation in different ways; many workers commute in the family's only car leaving the other members without transportation, but some commute via an alternative mode in order to enable a nonworking household member to transport children and run errands (Lovejoy and

Handy 2008). These dynamics are not included in this analysis; commute mode may thus under-represent or over-represent travel patterns and mobility levels.

A third limitation is that commute mode may not be an indicator of mobility but instead an indicator of preferences. If a respondent carpools or walks rather than drives alone, is this due to choice or because no other options are feasible? The assumption in this study is that choices are constrained, and that people will drive alone to work if they have the ability to do so. Research supports this assumption, finding that immigrants want to be able to own and drive their own car (Bohon, Stamps, and Atilas 2008; Handy et al. 2008). Additionally, research on immigrants using alternative modes of transit concludes that immigrants largely rely on modes other than driving alone due to limitations rather than preference (Lovejoy and Handy 2011; Smart 2010).

Looking at mobility from data on commuting to work provides a conservative account of mobility constraints, or limitations on the ability to drive alone. The ability to travel to and from work is likely to be the first transportation barrier for immigrant households to surmount (Bohon, Stamps, and Atilas 2008; Handy et al. 2008), so looking to understand commuting behavior as an indicator of transportation limitations and strategies understates the impact of barriers to transportation as experienced by the entire immigrant community whose travel needs far exceed the trip to and from work.

Given that the dependent variable, mode of commute, is composed of categories, the best analytical method is the multinomial logistic approach. One of the categories of the dependent variable is used as the reference category; in these models, I use carpooling as the reference category. The analysis allows for the generation of the risk that a particular mode of commute, such as driving alone, taking public transit, or walking, is used instead of the reference category

(carpooling). When variables are added to the model, the coefficients of the variables may be transformed into relative risk ratios (RRRs), which indicate the risk of an outcome (such as taking public transit instead of carpooling) for one group over another (such as men over women). I therefore categorize independent variables that are measured on a continuous scale (such as income) into groups in order to be able to compare outcomes between groups.

Independent Variables

The first model tests the effect of common predictors on the mode of commute for Latino immigrants in Atlanta. The most important of the factors influencing commute mode arguably are personal income, because those with a higher personal income are more able to cover the gasoline and vehicle expenses of driving alone, and vehicle availability, because those without access to a vehicle will not drive alone to work.

I used the continuous measure of income for the sample, as described above in Question 1, Part 3, and divided it into quartiles to better fit the multinomial model. Researchers have found that rates of travelling to work via driving alone increase, and rates of carpooling and using other alternative modes of commute decrease, as income of immigrants increase (Blumenberg and Smart 2010; Handy et al. 2008). The measure of vehicle availability used in this model is a categorical breakdown of the vehicle-per-adult ratio as explained above (Question 1, part 3). The categories include those living in a household without any vehicles available, those living in a household with less than one car per driver, and those living in a household where each driver person has access to at least one personal vehicle, as assumed from the fact that there are at least as many cars as adults in the household. Gabriel and Rosenthal (1996) also use this categorical breakdown of vehicle availability.

In a second model, I add residential concentration of immigrants, measured by the PUMA *RCQ*, as a variable of interest. I took the continuous measure for the PUMA-level *RCQ* as described above (Question 1, Part 3), and I created four levels of neighborhood ethnic concentration. The PUMAs with the most dispersed Latino population have an *RCQ* of less than .70, the next group of PUMAs have an *RCQ* between .70 and 1.0, followed by PUMAs with an *RCQ* between 1.0 and 2.0, and the PUMA group with the most concentrated Latino population have PUMA *RCQ*s greater than 2.0. Scholars take different approaches for determining categorical cutpoints for discussing ethnic residential concentrations in communities. Frequently scholars set a certain value as a threshold, and communities that meet or exceed the threshold are considered to be ethnic neighborhoods. For example, Brown and Chung (2006) consider census tracts in Franklin County, Ohio with an *RCQ* value over 1.2 to contain significant overrepresentation of ethnic groups, and Liu (2009) and Liu and Painter (2012) use an *RCQ* threshold of 1.5 when looking at PUMAs across several metropolitan areas to identify ethnically concentrated neighborhoods. When displaying maps of neighborhoods of tract-level ethnic concentrations in census tracts in Los Angeles, Parks (2004b) uses five categories, ranging from *RCQ* of 0-0.5 to an *RCQ* of 8.0 or greater, and considers an *RCQ* of 3.0 or more as an ethnic neighborhood for a dichotomous measure for a regression model. The measures thus vary according to the size of the geographic unit and the context of the study.

The four-category approach I use provides a categorical view of the ethnic concentration in each PUMAs without setting a single threshold to define an immigrant neighborhood⁶. The first category of residential concentration, in which Latinos are least concentrated, includes

⁶ I also experimented with threshold-based dichotomous variable, as well as neighborhood concentration divided into with three and five categories. The results vary substantially, probably due to the environmental or neighborhood-level variation. Most PUMAs do not have public transportation service, but a sizeable minority do have at least some transit service.

thirteen PUMAS and 17.04 percent of the sample, and the second category also includes PUMAS in which Latinos are under-represented, including seven PUMAs and 16.79 percent of the sample. These two groups include PUMAs throughout the city, in the outer suburbs, inner suburbs and central area of the city. The third category includes eight PUMAs and 33.53 percent of the sample, and represents areas where the Latino population is moderately over-represented. PUMAs in this group mostly lie in the inner-ring suburbs. The final category includes one cluster of four contiguous PUMAs in the inner-suburbs, comprising 32.64 percent of the sampled population.

In a third model, which is the full model, I add five categories to test for the effects of sector of employment. The five categories include the four Mexican industry-occupation niches for Atlanta in 2010, as identified by Maples (2012) following methodology proposed by Wang and Pandit (2007), and a fifth category for those employed in non-niche sectors. The identification of the niche employment sectors takes into account both industry and occupation. The first Mexican niche in Atlanta is comprised of those working in food occupations within the personal service industry. For example, these workers include food preparation and serving workers in restaurants and first-line supervisors. The second niche is comprised of those in the construction occupation within the transformative industry, including workers who hang sheetrock, pave roads, and operate construction equipment. The third niche includes those working in productive services industries with a grounds maintenance occupation, including janitors and landscapers. The fourth niche includes those working in transformative industries with production occupations, such as those manufacturing food or other goods.

I rely on Mexican niches because Mexican workers make up the majority of the sample (59.41 percent), and because these Mexican niche employment sectors also comprise four of the

top five sectors for all non-Mexican Latino immigrant workers. The consequence of using Mexican niches for non-Mexican workers is that lower proportions of Latino workers work in niche industries; 33 percent of non-Mexicans work in Mexican niche sectors compared to 62 percent of all Mexicans. Those from other Latin American countries comprise a small proportion of the overall Latin American immigrant workers, making it unlikely that they have developed niches (Wang and Pandit 2007). The largest Latino immigrant group following Mexicans is Salvadorans, who comprise only 6.89 percent of the sample. I include analyses for Mexicans separately in Appendix B.

Defining ethnic niches based on the cross-categorization of industry and occupation allows for a better understanding of the type of work represented by each niche. Industrial sectors focus on the economic sector and work setting, reflecting the structural features of the local economy, and occupational sectors focus on the type of work and skills needed. The more than 200 industrial sectors identified by the ACS are broken down into six categories, including (1) agricultural operations and resource extraction, (2) the production of goods, (3) the distribution of goods, (4) the provision of services oriented to producers, (5) the provision of services to meet collective needs in society, and (6) the provision of amenities to individuals (see Browning and Singelmann 1978 for a detailed explanation).

Relying solely on industries can obscure the nature of the work and the skill levels required, as a single industry may employ managers, clerical workers, assembly line employees and janitorial staff. For this reason, several scholars advocate for the use of industry and occupation cross-classification systems (Hudson 2002; Maples 2012; Wang and Pandit 2007). Thus, the over 800 occupations identified by the ACS are broken down into twenty-three categories in order to maintain similar characteristics and are cross-categorized with the

industrial categories, creating a total of 138 possible niche categories (Maples 2012; Wang and Pandit 2007). Maples (2012) then identified in which of these sectors Mexican workers (either native born or foreign born⁷) are overrepresented in Atlanta for each year between 2005-2010, using an odds-ratio approach with a threshold of 1.5. An odds ratio of 1.5 means that the odds that Mexican workers are employed in a certain sector is 50 percent greater than the odds for non-Mexicans. From 2006-2010, the same four Mexican niches were identified, and these are the niche sectors that I use in this analysis.

Some studies that look at the location of niche employment in comparison to the locations of the ethnic communities, use a niche versus non-niche dichotomy (Liu 2009; Parks 2004b). I use the niche sectors separately as an indicator of the primary employment experiences of the Latino immigrant workers, because each industry varies in its spatial distribution across the city. Commuting patterns for Latinos are likely to vary across industries, both because industries have varying spatial dispersion across a metropolitan area and because locations of employment are of varying distances from ethnic neighborhoods (Hanson and Pratt 1992; Parks 2004a; Parks 2004b).

The spatial distributions of the four niche employment sectors in Atlanta are likely to form distinct spatial patterns. First, construction work is likely to be quite dispersed across the mostly northern suburban regions experiencing industrial and residential growth. Once one job is finished, construction workers move to a new job site; therefore, the workplace also changes over time. Construction workers thus need to have flexible transportation, either in the form of their own vehicle or a shared vehicle. Second, those working in restaurants would have workplaces dispersed along local business strips. Since restaurants tend to hire few workers for

⁷ A very small proportion of Mexican workers in Atlanta are native-born (7 percent according to the U.S. Census 2010).

each shift in each location, ridesharing is more difficult (Bohon, Stamps, and Atilas 2008). Walking may be an option only for those restaurants located in close proximity to an individual's residential community. Third, those working in production in Atlanta, such as manufacturing auto parts or transportation equipment, are likely to work in a large factory setting. Some companies provide transportation for their workers, which is possible due to the need to transport groups of workers to the same location (Bohon, Stamps, and Atilas 2008). Fourth, the job locations of landscapers and janitors for businesses are probably concentrated in business districts where the companies and factories are located, although each locale would hire a small janitorial staff. Again, it would probably be more difficult to share transportation to these jobs. As mentioned above, public transit in Atlanta is particularly limited, but provides an additional transportation option for those who live and work near a transit stop if the transit timetable meets the needs of the worker's schedule.

All three models include controls for other variables that are likely to impact the choice of commute mode. Residential proximity to work affects mode choice (Blumenberg and Shiki 2007; Ferguson 1997). I control for residential proximity to work with a dichotomous variable for whether a worker works in a different PUMA from the PUMA of residence. To create this variable, I first adjusted the PUMAs of residence to match the workplace PUMAs, because some of the PUMAs are subdivided for residential areas because of sufficient population density. Then I took the difference of the PUMA of residence from the PUMA of work, and if the outcome is "0," then the individual works and lives in the same PUMA. This provides some control for those who commute long distances, but limitations of this control include the variation in the actual geographic area of the PUMAs and the fact that someone may live on the edge of one PUMA and work nearby in another PUMA. Blumenberg and Shiki (2007) found

that closer proximity to work is negatively associated with carpooling for immigrants in California, and Ferguson (1997) found that average trip distance at the metropolitan level is negatively associated with carpools with passengers from different households as well as nonmotorized modes of commute, but average trip distance is positively associated with carpools with passengers within the same household and public transportation.

Level of education is a socioeconomic control, with the education levels divided into five categories, as explained above (Question 1, Part 3). Similar to income, previous researchers have found that driving alone increases and carpooling decreases with higher levels of education (Blumenberg and Shiki 2007; Blumenberg and Smart 2010; Cline, Sparks, and Eschbach 2009).

The immigration-related measures include the number of years in the United States and English language ability. I transformed the variable for the number of years in the United States from a continuous variable, as described Question 1, Part 3, into a categorical variable. The first category includes immigrants who arrived within the past 5 years, and the other categories include immigrants who have been in the United States for 6-10 years, 11-20 years, 21-30 years, and 31 years or more. As with travel time, patterns of travel mode used by immigrants are different than those used by the native born, though the differences in the patterns decrease over time (Federal Highway Administration 2006; Tal and Handy 2010). The patterns of travel mode are most different for the recent immigrants, and the rate of reliance on private vehicles increases the most quickly during the first years. The convergence of travel patterns between immigrants and natives continues over time, but the rate of convergence decreases with longer periods of time in the United States (Chatman and Klein 2009; Federal Highway Administration 2006).

I use a dichotomous variable to control for English ability. The IPUMS provides a variable in five categories, depending on whether the individual speaks only English, or speaks

English very well, well, not well or not at all. I transform this into a dichotomous variable, with those speaking only English or speaking English very well coded as “1” and the others coded as “0.” This approach to English categorization follows the method of the US Census Bureau in identifying linguistically isolated families. By their measure, English ability of less than “very good” indicates difficulties understanding written forms and official information (Siegel, Martin, and Bruno 2001). Better English is associated with an increase of driving alone over alternative methods of transit for Latinos (Liu and Painter 2012), and carpooling is preferred over driving alone and walking among immigrants with poor English, but those with poor English also tend to take public transit over carpooling (Blumenberg and Shiki 2007).

The demographic variables include gender, marital status, presence of children, race and age. I included a dichotomous control for gender, as described in the previous section. Research has found that gender affects commute mode, as Liu and Painter (2012) find that Latina women have a greater risk of taking public transit over driving alone to work than Latino men in a sample of six metropolitan areas, and Blumenberg and Shiki (2007) find foreign-born women are more likely to carpool to work than foreign-born men in California. The gender differences in transportation patterns may vary across immigrant groups and across metropolitan areas due to the different transportation systems available, feelings of public safety, and the geography of residential location compared to the geographic pattern of the jobs available for Latinas compared to Latinos (Handy et al. 2008).

I include a dichotomous control for marital status. The IPUMS provides six codes for marital status, including married and spouse present, married and spouse absent, separated, divorced, widowed, and never married/single. I created a “married” variable to include only those who are married with their spouse present. Those who are married with spouse present are

more likely to carpool than those who are not living with a spouse, as it may be easier to form intra-household carpools (Blumenberg and Shiki 2007; Charles and Kline 2006).

The age of the respondent is included as a continuous variable, as reported directly by the respondent. I then break this into five categories: 16-25 years, 26-35 years, 36-45 years, 46-55 years, and 56 years and older. Blumenberg and Smart (2010) find that, as age increases, the tendency of immigrants to carpool with others outside the house for any trip purpose decreases, as does the tendency to travel via public transit or nonmotorized methods, compared to the likelihood of driving alone. Others also find that the odds of carpooling for the journey to work decrease with age (Cline, Sparks, and Eschbach 2009; Liu and Painter 2012).

The presence of children under the age of sixteen living in the household also changes patterns of commute mode. As in the previous section, I created a dichotomous control for whether the immigrant has a child under the age of sixteen in the household. Those with children prefer to travel alone to work over other modes, possibly due to the need to drop off and pick up children from daycare and school activities en route to and from work (Hanson and Pratt 1992; Preston, McLafferty, and Liu 1998).

The self-identification as white is also associated with distinct patterns of commute modes. As noted above, whites consistently report higher levels of mobility on all levels, including the highest rates of driving alone, the most trips per day, and travelling the most distance and spending the most time travelling each day (Giuliano 2003; Tal and Handy 2005). Reporting a white identity may be an indicator of distance from the immigrant experience (Tafoya 2004) and therefore of following the patterns of life – including the transportation pattern of driving alone – of the native-born population.

Models for Commute Mode

I created three multinomial logistic regression models to analyze commute mode. The first model focuses on differences in transportation modes due to income and vehicle availability, the second model adds levels of ethnic residential concentration to learn how segregation levels affect commuting strategies, and the third model adds niche employment sectors to learn how the specific jobs where Latino immigrants work affect commuting methods. The base model is as follows:

$$S = b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12...19}X_{12...19} + e$$

where

S = Mode of commute,

X_1 = Personal income, quartile 2: \$12,770 - 20,661,

X_2 = Personal income, quartile 3: \$20,661 - 33,100,

X_3 = Personal income, quartile 4: \$33,100 - 618,751,

X_4 = No car available,

X_5 = Less than one car per adult,

X_6 = Works in PUMA of residence,

X_7 = No high school,

X_8 = Some high school,

X_9 = Some college,

X_{10} = Bachelor's degree or more,

X_{11} = Immigration characteristics,

$X_{12...19}$ = Demographic characteristics, and

e = sampling error.

The dependent variable, Y , includes the commuting categories of driving alone, carpooling, taking public transit, walking or biking, and “other.” Using carpooling as the reference point maintains the focus on comparing the relative risk ratios (RRR) of particular modes over carpooling, enabling a comparison between carpooling and the other alternative modes of commute. The usual approach is to compare driving alone and each of the other modes, resulting a description of why individuals have a higher probably of driving alone over taking other modes of commute.

The reference category for income is the lowest income quartile. Individuals living in households with at least one car per adult comprise the reference category for vehicle availability. The education categories include less than high school, some high school, high school diploma, some college, and college diploma, with high school diploma as the reference category. The immigration characteristics include years in the United States (less than 5 years, 5-10 years, 10-20 years, 20-30 years, and 31+ years, with those in the country less than 5 years comprising the reference category), and a dichotomous control for English proficiency (very good or only English = 1). The demographic characteristics include age categories (16-25 years old, 26-35 years old, 36-45 years old, 46-55 years old, and 56+ years old, with the 16 -25 year group as the reference category), gender (male = 1), marital status (married = 1), race (white = 1), and presence of own children in the household (yes = 1).

The second model is identical to the first model but includes the level of immigrant concentration in the PUMA. The reference category for the residential concentration measure is

comprised of the PUMAs with highest levels of Latino neighborhood concentration (RCQ category 4).

The third model adds the categories for the Mexican niche employment sectors. Sector 1 refers to the food occupation in the personal service industry; sector 2 refers to the grounds and maintenance occupations in the production service industries; sector 3 refers to the construction occupations in the transformative industries, and sector 4 refers to the production occupations in the transformative industries. The reference category is comprised of those working outside of the Mexican niche sector.

Goal 3: Transportation Limitations and Limited English Proficiency

The commuting modes used by Latino immigrants reveal which immigrants have a higher risk of experiencing transportation limitations and the mobility strategies adopted and used for the journey to work. This third section turns to investigate whether transportation limitations may impede the adaptation process of Latino immigrants by determining whether a relationship exists between mobility levels and English proficiency. To learn if a relationship exists, I build a binary logit model that focuses on whether household vehicle availability and mode of commute predict whether a Latino immigrant speaks English well or very well. The sample used in this analysis is the individual-level ACS sample from IPUMS, as described in Question 1, Part 3. The sample is thus comprised of Latino immigrants living in Atlanta, employed outside the home.

Dependent Variable

The dependent variable is English proficiency. The primary language question asked by the ACS questionnaire is, “Does this person speak a language other than English at home?” and then, for those who answer yes, the follow-up question asks, “How well does this person speak

English?” The answers are “Very well” “Well,” “Not well,” and “Not at all.” The standard to be considered proficient in English in this study is either only speaking English at home or responding as speaking English “very well,” and those who report speaking English “well,” “not well,” or “not at all” are considered not to be proficient. This delineation is also used by others (van Tubergen and Kalmijn 2009).

As these questions rely on individuals to self-report their level of spoken English, the English language question is vulnerable to a number of influences, as discussed by Siegel, Martin, and Bruno (2001). The first question may have multiple interpretations; some who may speak a different language occasionally may answer the first question “yes,” which may contribute over-reporting the use of second languages. However, since the focus of this current study is on English, those coded as speaking only English from this question is a conservative number.

The second question asks individuals to subjectively self-rate their English language level. No guidelines are offered that clarify what each level of English means. Census instructions ask that one person fill out a Census (or ACS) form for all members of the household. A respondent may judge the English ability of others in the household as compared to his or her own English ability, and individuals may claim any level on the Census form without fear of contradiction. Variation across cultural backgrounds may also generate systematic differences in responses to this question; McArthur (1991) suggests that Latinos over-report their English level ability. A number of studies have analyzed this Census question, and Siegel, Martin, and Bruno (2001) summarize that overall, the studies conclude that the results yield low reliability but high validity and unknown bias. For example, a test conducted by the Department of Education found that people who said they spoke English “very well” had scores

close to the scores of native English speakers, but those who spoke English “well” or worse had significantly higher levels of failure (Kominski 1989). For this reason, the US Census uses the threshold of an individual speaking English “very well” or only English to construct the measure of the household-based linguistic isolation measure, which in turn is used for determining where translations are needed for government documents and communications, such as for voting purposes or in communicating in the case of an emergency (Siegel, Martin, and Bruno 2001). I am interested in the extent to which Latino immigrants can navigate through daily life and take advantage of information and opportunities existing in the wider English-speaking society, so I use the same criteria to measure the English proficiency of the respondents.

Given that the dependent variable, English proficiency, is dichotomous with two possible outcomes (an individual is either proficient in English or not), the best analytical method is the binary logit approach. The analysis allows for the generation of the odds that an individual is proficient in English. When variables are added to the model, the coefficients of the variables are logged odds, and they may be transformed into odds ratios, which provide the chance that a respondent with a particular quality is more likely to be proficient in English than a respondent without a particular quality. For binomial logit models, the independent variables included in the model are categorical.

Independent Variables

In questioning the connection between English language ability, as a measure of immigrant adaptation, and geographic constraints, I look at the commute mode to work and vehicle availability. For the mode of commute, I use the five categories of commute as discussed in Question 1, Part 3. The categories include (1) travelling in a private motorized vehicle alone; (2) carpooling to work; (3) taking public transit including bus or trolley bus, streetcar or trolley

car, subway or elevated, and railroad; (4) walking or biking; and (5) other, which includes commuting by motorcycle, taxicabs, and non-specified means. Lack of ability to drive by private vehicle to work may also be a critical factor preventing Latino immigrants from accessing English classes and other sectors of society where they would be exposed to English (Bohon, Stamps, and Atilas 2008; Lovejoy and Handy 2008). Exposure to the host society is an important determinant of English language ability (Espenshade and Fu 1997; Stevens 1992).

The second variable of interest indicating mobility is vehicle availability. I use the categorical breakdown discussed above (Question 2), so that no vehicles available to members of a household signifies that all members of the household must figure an alternative to commuting other than driving alone. If the ratio of vehicles to drivers is between 0 and 1, it means that the car is likely to be a shared resource among the household members, though perhaps not equally shared. If there is a ratio of at least one vehicle per driver, then the driver presumably has full access to the vehicle, and the use of a mode of commuting other than driving alone is due to preference rather than constraint. Vehicle availability is one factor that determines whether an individual may commute alone to work, but it also impacts non-work travel. Tal and Handy (2010) identify the lack of vehicle availability as one reason that recent immigrants make fewer overall trips on average -- including trips to the grocery store and doctors office -- than the native born population.

In order to account for level of embeddedness in the Latino community, I control for PUMA-level *RCQ* and niche employment. For *RCQ*, I used the four categories as described in Question 2. The PUMAs with the most dispersed Latino population has a PUMA-level *RCQ* of less than .70, the next group of PUMAs have an *RCQ* between .70 and 1.0, followed by PUMAs with an *RCQ* between 1.0 and 2.0, and the PUMA group with the most concentrated Latino

population have PUMA *RCQs* greater than 2.0. Ethnic communities provide safe and supportive places that allow the use of the mother tongue, lessening the need to learn English for everyday living (Hwang and Xi 2008; Lieberman 1961; Portes and Truelove 1987; Stevens 1992). Ethnic communities and limited English language proficiency may be mutually-reinforcing factors, since those who cannot speak English are more likely to live in an ethnic community (Lazear 1999).

In this model, working in an ethnic niche is a dichotomous variable. If an individual works in any of the four Mexican niches identified, as explained above (see Question 2) then the niche variable is coded as “1,” otherwise, it is coded as “0.” I combine the different niche sectors because the linguistically insulating effect should not be different across sectors. Research consistently finds negative association between speaking English and working in ethnic niches (Wang and Pandit 2007; Wright, Ellis, and Parks 2010). Just as ethnic communities insulate immigrants from the need to communicate with the English-speaking society, working in an ethnic niche also insulates immigrants from the need to communicate in English in order to work, thus minimizing the exposure to English (Bailey and Waldinger 1991; Grenier 1984).

I use personal income and education as controls for socioeconomic status. Personal income is divided into quartiles as described above (see Question 2). Income is not generally included as a predictor of English speaking ability (Espenshade and Fu 1997; Stevens 1992), and this may be due to the research that points to the impact of English language ability on an immigrant’s earnings (Borjas 1994). I included income as a predictor of English language ability with the rationale that immigrants with higher incomes are able to pay for private English classes and access other social settings that may have a membership or entrance fee, such as business groups and associations, that low-income immigrants are not able to afford. In addition,

insofar as higher income immigrants may also have a more privileged background prior to emigrating from their country or origin, they may have been more likely to gain some English skills prior to migrating, such as in a private primary or secondary school, when compared to immigrants with lower incomes.

Education is divided into five categories as described above (Question 1, Part 3), which include less than high school, some high school, high school diploma or GED, some college, and bachelor's degree or more. Education is found to be positively correlated with English language ability (Espenshade and Fu 1997; Stevens 1999), but the interpretation differs across scholars. Some argue that the more education, particularly in the United States but to a lesser degree in the sending country, the more exposure immigrants have to the English language (Okamura-Bichard 1985). Low levels of education tend to make second language acquisition more difficult (Portes and Truelove 1987; Prins and Toso 2012), presumably because education assists with the development of study and learning skills. Others argue English proficiency affects the likelihood of immigrants finishing high school (in the United States) and pursuing higher levels of education (White and Kaufman 1997).

The demographic vector includes gender, race, and presence of own children in the household. Women usually report lower levels of English abilities than men (Espenshade and Fu 1997; Grenier 1984). Gender roles influence exposure to the English language society, as women are more likely to take care of the household and children and therefore experience more isolation than men. Presence of school-aged children in the household may expose parents to English-speaking contexts, although indirectly through the children's socialization at school.

Race is not usually included in English language studies. I speculate that race is not typically included because of the difficulty of categorizing the vast heterogeneity of immigrants

into the narrow racial categories used in the United States. However, I include a dichotomous control for white because self-identification as white is an indicator of adjustment to US culture as well as a symbol of privilege (McDermott and Samson 2005; Tafoya 2004). Those who identify as white are not as likely to be culturally – and therefore presumably linguistically – distant from US society.

The immigration-related variables include the length of time in the United States, the age at which the immigrant arrived in the United States, whether or not the immigrant is a naturalized citizen, and whether the immigrant is married to a US-born spouse. I used a categorical variable to measure the number of years in the United States, as described above (Question 2). The categories include immigrants who arrived within the past 5 years, 6-10 years, 11-20 years, 21-30 years, and 31 years or more. Length of time in the United States, a reliable measure of exposure to English, is positively related to English proficiency (Espenshade and Fu 1997; Stevens 1999). Even given the high degree of circular migration of some immigrants, as they enter and leave the country multiple times, Espinosa (1997) found that time in the United States is a significant predictor of English language ability.

Age at immigration is divided into four categories. The first category is comprised of immigrants who arrived in the United States as a very young child, before the age of six. The second category is comprised of immigrants who arrived in the United States at the age of entering elementary and high school, from six to fifteen years old. The third category is comprised of immigrants who arrived in the United States at the age of an older student or young worker, between 16 and 29 years old. The final category is comprised of immigrants who arrived in the United States after turning thirty years old. Research has shown that there is a steady decay, beginning in childhood and reaching into young adulthood, in the probability that

immigrants report high levels of English language proficiency in adulthood (Stevens 1999; van Tubergen and Kalmijn 2009). In addition to reflecting cognitive maturation levels when exposed to the English language, the age at immigration is related to the social institutions in which an immigrant is likely to participate, such as the education system in the United States. This also affects the chances of forming close ties with English speakers and completing a higher level of education, which increases engagement with US society and reinforces processes of learning English (Stevens 1999).

For determining whether each respondent is married to a spouse from the United States, I used a combination of the personal identification number within the household and the spousal lock variable provided by IPUMS to pair each married couple in the sample. I also created a variable for whether each individual was born in the United States. Combining the variable for born in the United States for each couple yields two possible combinations: either both spouses are foreign-born or the spouse of the individual in the subsample (of which all are foreign born) was born in the United States. Living with another person who is fluent in English significantly improves the chances that a non-English speaker learns English (Grenier 1984; Stevens 1999). The creation of this variable assumes that the foreign-born spouses do not speak English fluently, but this may not always be the case. This variable also carries the assumption that those born in the United States speak English fluently, and that English is used in the household. However, this control helps account for those who conduct daily lives more in the context of the English language than another language.

I created a binomial variable to identify those who naturalized from a variable provided by IPUMS that gives information regarding citizenship status. Attachment to the United States implies the intention of staying permanently and therefore the motivation to learn English, and

Espenshade and Fu (1997) found that citizenship is the strongest of attachment measures when investigating English language ability. According to Grenier (1984), there is a higher opportunity cost of failing to learn English if an immigrant has committed to stay in the country.

Model for Language Acquisition

I created one binomial logit model for language acquisition to test whether limited transportation is related to English proficiency. The model includes measures of mobility as well as ethnic community measures and the demographic and migration characteristics that research has shown to affect English language acquisition.

$$L = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11...20}X_{11...20} + b_{21...30}X_{21...30} + e$$

where

L = Speaks English proficiently,

X_1 = No car available,

X_2 = Less than one car per adult,

X_3 = Carpools to work

X_4 = Travels to work by public transit,

X_5 = Walks or bikes to work

X_6 = Commutes to work by another mode

X_7 = Very low residential concentration: $0.19 < RCQ < 0.69$

X_8 = Low residential concentration: $0.69 < RCQ < 1.00$

X_9 = High residential concentration: $1.00 < RCQ < 1.73$

X_{10} = Employed in niche

$X_{11...20}$ = Sociodemographic characteristics

X_{21-30} = Immigration characteristics,

e = sampling error.

In this model, driving alone is the commuting category of reference. Individuals in households with at least one car per adult is the omitted category for vehicle availability. The reference category for residential concentration is comprised of the PUMAs with highest levels of Latino residential concentration, compared to the three other categories of PUMAs with lower levels of ethnic concentration. Working in an ethnic niche is dichotomous (1=works in niche). The reference category for income is the lowest income quartile. Those holding a high school diploma comprise the reference category for education level. The demographic characteristics include gender (male = 1), race (white = 1) and the presence of own children in the household (yes = 1). The immigration related characteristics include whether the individual naturalized (1=yes), the immigration cohort with those in the country less than 5 years comprising the reference category, the age of arrival with those who arrived as a young child as the reference category, and a dichotomous measure for whether the immigrant is married to a spouse from the United States (1=yes)

CHAPTER 4: COMMUTE TIME RESULTS

To examine the effect of residential segregation on the commute length of Latino immigrants in Atlanta, I use three approaches. I first use maps to spatially investigate where Latinos live in Atlanta and whether Latinos tend to live in close proximity to the locations that have experienced the greatest employment growth. I then use small-area aggregate data to determine whether neighborhood ethnic concentration is related to the percent of Latinos that experience short commute times. The final approach uses individual-level data to test whether the PUMA-level of segregation is related to each individual's commute time, controlling for individual characteristics such as personal income and mode of commute.

Maps of Latino Neighborhoods & Employment Growth

The first approach begins with a visual investigation, based on three maps, regarding whether segregated Latinos live in areas that are geographically distant from locations of employment. Specifically, I explore whether there is an initial basis to assume spatial mismatch in Atlanta for Latinos. The necessary conditions for spatial mismatch to exist include the following: (1) minority communities live in segregated neighborhoods; (2) these segregated neighborhoods tend to be in centralized areas distant from locations of employment growth (3) employment growth occurs in suburban areas (Kain 1968; Kasarda 1989; Wilson 1987).

Figure 1 shows the tract-level *RCQ* values for Latinos in Atlanta. The color yellow demonstrates very low levels of Latino residential concentration; some of the tracts with an *RCQ* of zero have no Latinos at all, and some have very few. In contrast, the deep blue marks the tracts that have quite a dense concentration of Latinos. In between these two extremes, the light green shading shows the tracts where the concentration of Latinos is relatively low, and the blue-green and light blue shading show the tracts where the concentration of Latinos is progressively

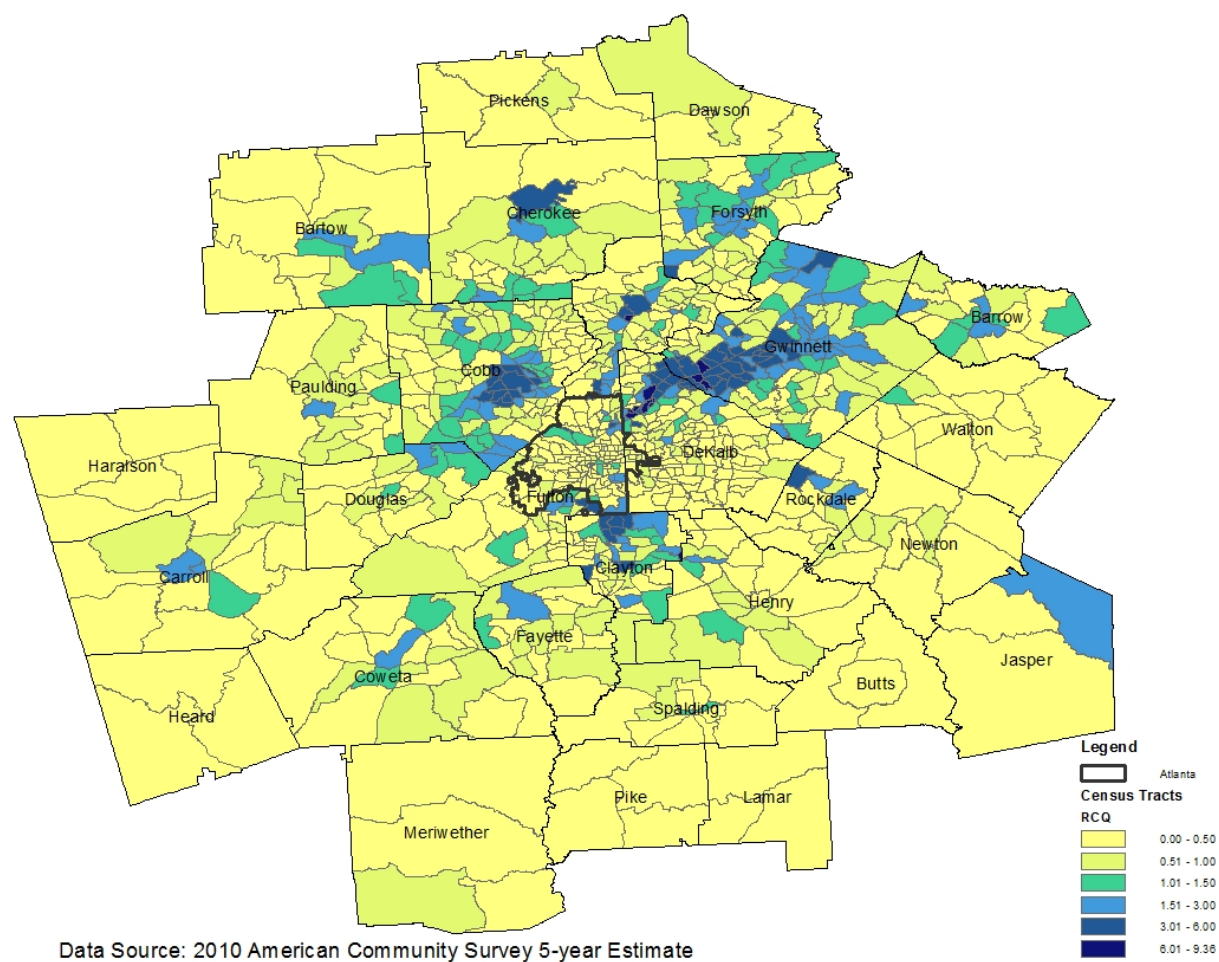


Figure 1: Map of Latino Residential Concentration Quotients for Census Tracts in the Atlanta Area, 2010

higher. The counties are outlined and labeled in black, and the boundary of the central city is outlined in thick black. The small areas of deep blue in a map dominated by yellow and light green shows that Latinos tend to live concentrated in certain locations, although some Latinos live dispersed in other locations.

Atlanta residents typically refer to Gwinnett, Cobb, DeKalb, Fulton and Clayton Counties as the “Atlanta metro,” and these counties are considered to be the heart of metropolitan Atlanta. Thus, it is easy to conceive of Fulton County as the central city, and Gwinnett, Cobb, DeKalb, and Clayton Counties as the inner (or central) suburbs. DeKalb County is somewhat unique in that only a part of the county is in the central city, but most Atlantans think of much of DeKalb County, especially the northern area around Buford Highway, which is paralleled by the Marta subway line, as part of Atlanta city proper.

The largest cluster of tracts with high concentrations of Latinos is in the five-county heart of Atlanta located mostly in Gwinnett County and extends across the north part of DeKalb along Buford Highway. Another sizeable cluster of census tracts with high levels of residential concentration is located in Cobb County. A long, narrow cluster extends from one end of Forsyth County to the other, and smaller clusters are located in a number of additional counties.

The conclusion from the map displayed in Figure 1 is that Latinos in Atlanta tend to live concentrated, clustered in neighborhoods, rather than dispersed among the non-Latino population in Atlanta. Furthermore, the neighborhoods with higher concentrations of Latinos tend to be located in the eastern and northern suburban counties, with slightly more in the inner suburban counties but some tracts with high concentrations of Latinos are also located in the outer suburban counties. Tracts shaded yellow dominate the city center, showing very low concentrations of Latinos in inner-city tracts. This does not mean that fewer Latinos live in the

inner-city tracts shaded yellow; higher numbers of Latinos may live in a given tract, but if there is also a larger overall population, then the level of ethnic concentration in the tract may be lower than the concentration in other tracts—such as tracts shaded blue in Cobb and Clayton Counties—that have with a lower Latino population count but also an even lower overall population. The level of neighborhood concentration is calculated with the *RCQ*, which indicates the proportion of the tract’s population that is Latino *relative* to the proportion of the overall Atlanta population that is Latino.

The map in Figure 2 displays the county-level growth in employment positions between 1990 and 2010. The counties that experienced no growth or a net employment loss are shaded in grey. The counties that experienced employment growth are colored in progressively darker shades of red, with lightest red (or pink) counties adding up to 10,000 positions, the counties colored with a slightly darker shade of red added between 10,001 and 20,000 positions, then the counties colored with yet a darker shade of red added between 20,001 and 50,000 positions, and counties colored the darkest color red added the most employment positions during the decade (over 50,000). The counties that experienced the most growth are Atlanta’s “core” counties: Gwinnett, Fulton, DeKalb and Cobb. (Clayton did not experience the same level of growth.) . One of the central counties, DeKalb County, experienced a net loss in employment positions, along with two additional counties in the south. The map also demonstrates that the counties in the Atlanta metropolitan area tended to experience job growth overall.

The map in Figure 3 displays the county-level growth in the Latino population between 1990 and 2010. All counties experienced positive Latino population growth. The counties are colored in progressively darker shades of blue, with the counties experiencing very small numbers of Latino population growth colored the lightest shade of blue (a growth of up to 1,000

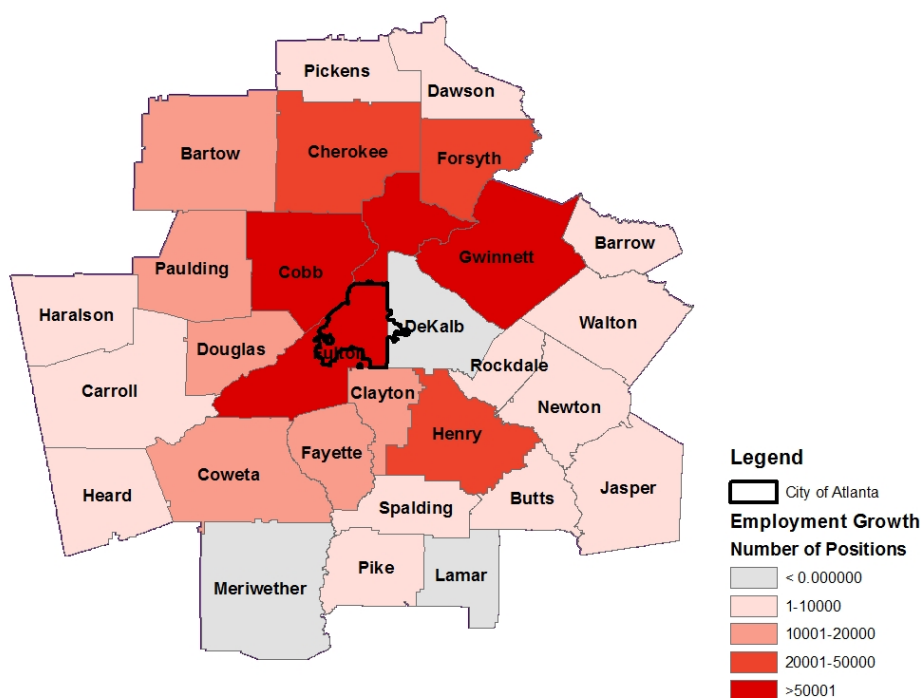


Figure 2: Map of Employment Growth in Counties in the Atlanta Area, 1990-2010

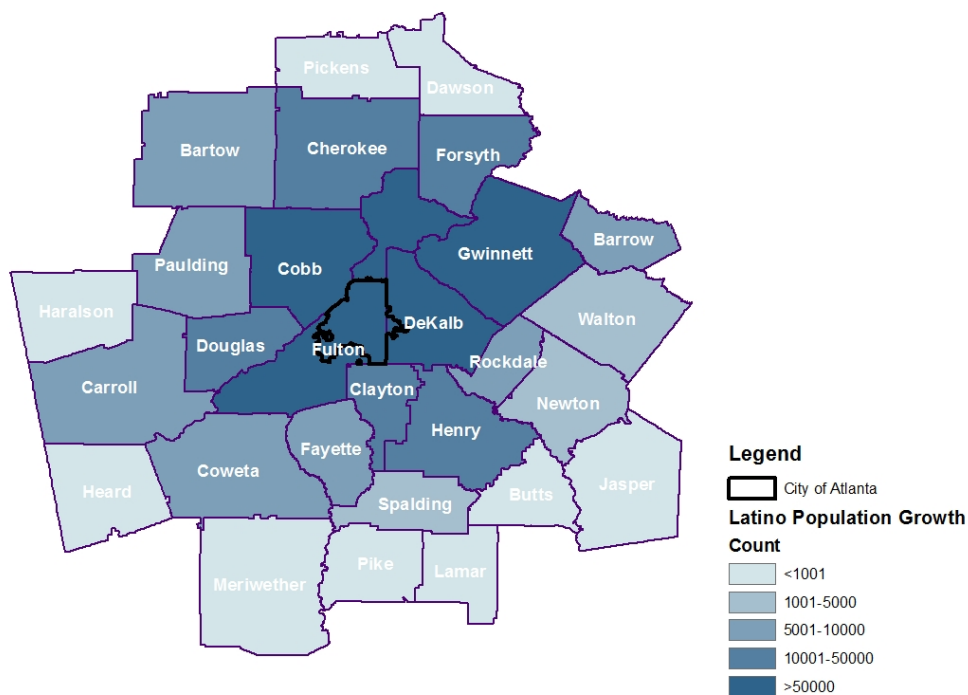


Figure 3: Map of Latino Population Growth in Counties in the Atlanta Area, 1990-2010

Latinos) and counties experiencing the most population growth colored in the darkest blue (a growth of over 50,000 Latinos). This map shows that the counties that experienced the greatest amount of Latino population growth are located in central city and inner suburbs of Atlanta.

When comparing this map with Figure 2, the maps show that the counties of Latino population growth match the locations of employment growth, with the notable exception of DeKalb County that experienced no job growth but a substantial growth in the Latino population. However, it is important to note that the concentration of Latinos in DeKalb County is largely along Buford Highway, which is an area where immigrant businesses began to proliferate rapidly in the nineties (see Figure 4). Thus, although DeKalb County as a whole experienced no job growth, sections of DeKalb County—most notably the immigrant sections—experienced rapid job growth to become “the greatest ethnic-owned business concentration in the southeastern United States” (Walcott 2002: 51), which is obscured in the maps.

To test the strength and significance of the correlation between counties of Latino population growth and counties of employment growth, I calculated the Pearson correlation coefficient. There is a strong positive correlation of .90 between the change in number of employees and the change in the number of Latinos living in the counties in the Atlanta metro area, significant at the $p < .001$ level. Therefore, there is a strong positive relationship between increase in employment and increase in Latino population. As employment increases in each county, then the number of Latino residents in the county also increases, suggesting that there is not a spatial mismatch between Latinos and employment opportunities. What the maps do not tell us is whether the Latinos work in the jobs that are in close proximity to where they live.

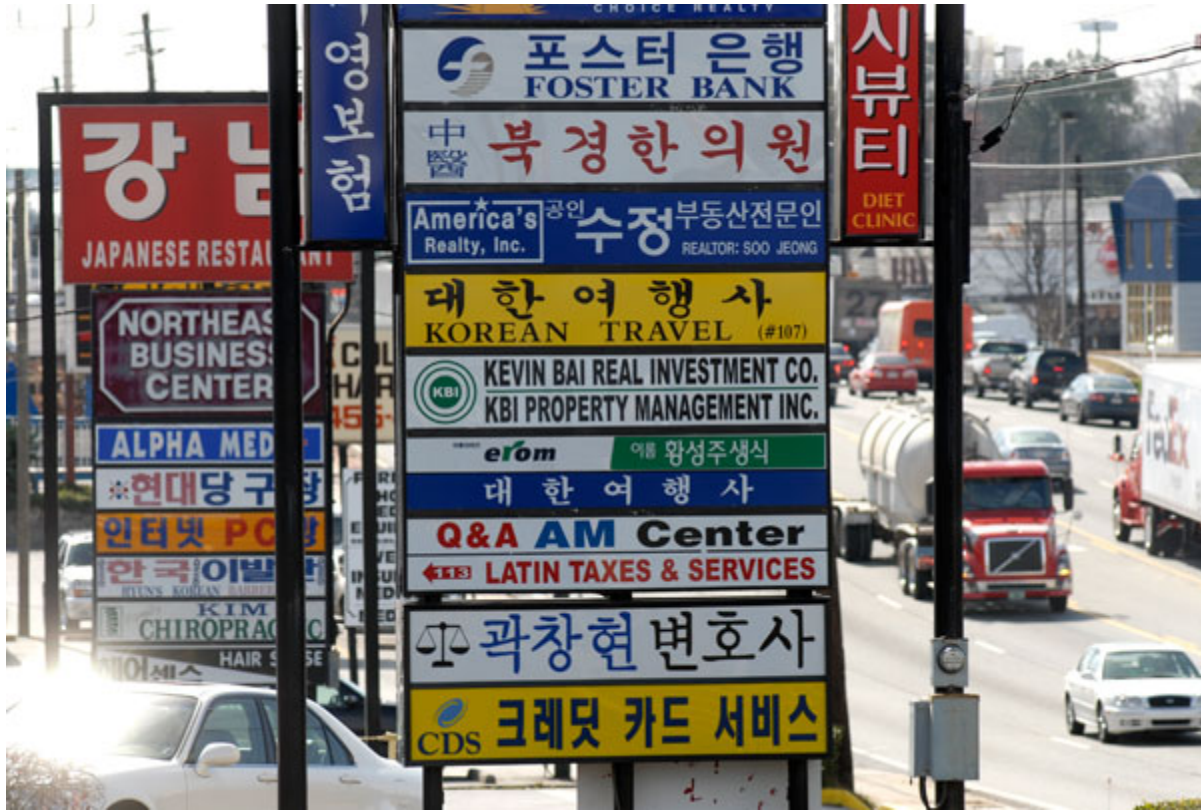


Figure 4: Buford Highway in DeKalb County, Georgia. [photo from Creative Loafing].

Descriptive Statistics of Census Tracts

Table 1 shows descriptive statistics for the sample of 502 census tracts in Atlanta with a minimum population of thirty Latino workers, to determine if a relationship exists between commute time and the residential concentration of Latinos. In looking at the dependent variable, the percent of Latino workers experiencing a short commute time, nearly half of the population of Latino workers, on average, in each tract experience a short commute time (47.26 percent); this is by definition, since “short commute time” was constructed to include those who commute shorter than average. The average tract RCQ is 1.188. This corresponds to Latinos comprising an average of 7.72 percent of the population in the census tracts in this sample, just over what would be considered an even distribution across the tracts ($RCQ = 1$, or 6.54 percent of the population in 2000).

The control variables give an additional insight into the tract-level characteristics of Latinos in this sample. The average Latino household income across census tracts is \$38,284. The average tract-level graduation rate for Latinos over twenty-five years of age is 62.7 percent, and an average of just over half of the Latino workers in each tract drive alone to work (57.4 percent). An average of about three-quarters of all Latinos in each tract are foreign born (76.6 percent), and less than half of all Latinos in each tract, on average, arrived within ten years of the census (42.3 percent). On average, just over half of Latino-headed households in each tract are renter-occupied rather than owner-occupied (51.8 percent), an average of nearly 10 percent of Latino-headed households in each tract have no vehicles available, and an average of nearly two-thirds of Latino-headed households in each tract have at least one child present (62.4 percent). Of Latino workers in each tract, on average, nearly two-thirds are male (65.0 percent). The tract-

Table 1: Characteristics of census tracts with >30 Latino workers in Atlanta, GA

Variables*	Percent	Standard Deviation
% Commuting < 30 minutes	47.260	22.106
Residential concentration quotient (<i>RCQ</i>)	1.188	1.449
Average household income	\$38,284	30,285
% Graduated high school	62.676	24.806
% Drive alone to work	57.352	24.664
% Foreign-born	76.633	21.793
% Arrived 1990-2000	42.306	26.026
% households renter-occupied	51.763	32.97
% households with no vehicles	9.741	14.791
% households with a child present	62.403	12.154
% of workers who are male	64.953	16.342
Average household size	4.194	1.535
% Black	26.207	27.177
n = 502		
*All variables except percent black refer to the Latino population within tracts.		
Sources: U.S. Census 2000 Summary File 3 and Census Transportation Planning Package 2000		

level average Latino household size is 4.2 individuals. The black population in tracts included in this study average 26.2 percent of the total tract population.

Results of Investigating Commute Time with Aggregate Data

Table 2 presents the results from the ordinary least squares regression model predicting the percentage of Latinos in each census tract experiencing a short commute. The results show that as Latino neighborhood concentration increases, the percent of Latino commuters experiencing a short commute time decreases. As the *RCQ* increases by one point, the percent of Latinos in the tract that experience a short commute decreases by 2.455 ($p < .01$). This suggests that ethnic residential concentrations of Latinos are not developing in close proximity to employment. Latinos may be self-segregating into Latino neighborhoods because they may be locating a place to live through social networks, or they may be self-segregating in order to take advantage of the ethnic goods, services, and social networks, they may be experiencing place stratification, with discrimination in the housing market enforcing segregating trends, or they may be experiencing a combination of these factors. In that the Latinos living in the neighborhoods with higher levels of segregation experience longer commutes, the findings are consistent with the spatial mismatch hypothesis. Although Latinos may live near jobs, they may not be working at those particular jobs; the jobs may require certain skills that the nearby Latino population lacks, or Latinos living in the ethnically concentrated neighborhoods may actually be working geographically close by but experience longer commutes due to method and route of commute.

The other three variables that significantly affect the percent of Latinos that experience a short commute are the percent of Latino houses that are renter-occupied, the percent of Latino householders that have their own minor child living with them, and the percent of the tract that is

Table 2: Ordinary least squares results predicting average percent of Latinos who experience a short commute (< 30 min)

Variable	Regression Coefficient	Standard Error
Residential Concentration Quotient	-2.455**	.831
Average Latino household income	-.00007	.00005
Tract-level Percentages of Latinos who:		
Graduated high school	.054	.055
Drive alone to work	.018	.055
Are foreign born	-.028	.029
Arrived 1990-2000	.031	.058
Tract-level Percentages of Latino households that:		
Rent	-.105*	.044
Have no vehicles	.004	.078
Have a child present	-.332***	.087
% Latino workers that are male	-.055	.069
% Black	-.105*	.046
Average Latino household size	.045	.712
Constant	83.064	10.123
R-squared	.116	
F	5.33***	

*** p<.001, ** p<.01, * p<.05

n=502

Data Sources: Census 2000 Summary File 3 and the Census Transportation Planning Package 2000

black. A higher rate of renting among Latinos is associated with longer commutes; for each percentage increase in the number of Latino households that rent, the percent that experience a short commute time decreases by .105 ($p < .5$). This is opposite of what would be expected in the absence of any form of ethnic/racial segregation. In the absence of ethnic/racial segregation, indicators of economic disadvantage—such as renting or low income levels—tend to be positively correlated with short commute times because low income individuals are less likely than those in the middle- and upper-classes to trade off the costs of longer commutes for desirable neighborhood amenities.

A larger percentage of Latino households with children under eighteen years old in a census tract is also associated with smaller percentages of Latinos experiencing a short commute; the percent of Latino households that experience a short commute decreases by .332 percent ($p < .001$) for each percent increase in Latino households that have a child present. It seems that children present do not tend to constrain the commute trips of Latino immigrants, at least as measured here; rather, perhaps commuting parents are also making an extra stop to drop a child off at a daycare or school and therefore adding on to the journey to work, although in Latino households with young children, the mother is likely to stay at home with the child due to a sense of commitment to family over individual needs or desires that is common among Latino parents (Halgunseth, Ispa, and Rudy 2006). Alternatively, parents with young children may be more selective in choosing a neighborhood and may decide to live farther from the location of work in order to provide a better environment (e.g. better schools, nicer parks or safer streets) for their children.

A larger percentage of blacks in a census tract is also associated with a smaller percent of Latinos experiencing a short commute; for each percentage increase in the black population, the

percent of Latinos that experience a short commute time decreases by .105 percent ($p < .05$). This finding is consistent with the spatial mismatch literature. If segregation and discrimination maintain the spatial enclosure of blacks in neighborhoods that are located far from employment opportunities, then Latinos who live in those neighborhoods are also likely to have longer commutes to work.

The variables included in this model explain 11.6 percent of the variability in the percent of Latinos in each tract that experience a commute less than 30 minutes, with an F-statistic of 5.33 ($p < .001$).

Although not definitive, these results support the hypothesis that Latinos living in segregated neighborhoods experience a longer commute (and may live further from employment) than Latinos who live more dispersed through Atlanta, which is consistent with what spatial mismatch would predict. If Latinos are living in close proximity to employment in other places, it may occur for specific employers or industries such as poultry processors, and it may occur more in rural areas that have a single dominant employer.

The results are not definitive because it may be that the Latino neighborhoods with higher ethnic residential concentrations are actually located closer to work, but the residents use carpooling or taking public transit more than the Latinos who live in neighborhoods with lower degrees of ethnic concentration. Carpooling and taking public transit tend to add to commute times, the former due to adding more stops and perhaps adding to the distance travelled, and the latter due to slower velocity and many stops to pick up additional passengers. On the other hand, walking and biking as well as driving alone tend to be associated with shorter commute times, because people who live closer to work would probably be more likely to commute by walking or biking. Controlling for the percent of Latinos who drive alone to work may capture some of

the variability in commute time due to the different velocities of the methods of travel, but the percent who drive alone is insignificant in this model.

A number of additional control variables that generally influence commute time do not significantly affect the percent of Latinos that experience a short commute in this model. Indicators of neighborhood socioeconomic status beyond the percent of Latinos who rent are not significant. These indicators include average Latino household income, percent that graduated from high school, and having no vehicles present. This may reflect contradictory mechanisms at work; lower socioeconomic status may be associated with close proximity to work due to more availability of affordable housing and the motivation to avoid costly commutes, but neighborhoods with minorities of lower socioeconomic status may also be associated with higher degrees of segregation and therefore associated with greater distance from work due to the spatial constraints and limited housing options. Controlling for the mode of commute used by each individual, as well as individual socioeconomic and immigrant characteristics, may greatly improve the model specification and lead to more definitive conclusions.

Descriptive Statistics for Individual Data

Table 3 presents the descriptive characteristics of the individual-level sample of employed Latino immigrants in Atlanta. The Latino immigrant workers in this sample spend an average of 33 minutes commuting to work, which forms the dependent variable. The two primary variables of interest are *RCQ* and income. The average PUMA-level *RCQ* experienced by the individuals in this sample is 1.649, which corresponds to a PUMA in which Latinos comprise 16.16 percent of the population. The average personal income for Latino immigrants in the sample is \$27,927 (not shown in the table), and the mean of the natural log of personal income is 9.872.

Table 3: Descriptive statistics for individual-level sample

	Mean (Standard Deviation)
<i>Dependent Variable</i>	
Commute time, minutes	32.793 (25.740)
<i>Independent Variables</i>	
Average residential concentration quotient	1.649 (0.950)
Natural log of income	9.872 (.972)
Car per adult ratio	0.737 (0.425)
Commute Mode	
Drive alone	0.568
Carpool	0.296
Public transit	0.047
Walk or bike	0.026
Other mode	0.063
Educational Level	
No high school	0.271
Some high school	0.169
High school graduate	0.257
Some college	0.150
Bachelor's degree or more	0.154
Age	35.642 (10.84)
Male	0.682
Has own child present in household	0.399
White	0.505
Number of years in the United States	13.082 (10.249)

N = 5,750

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

Descriptive statistics of the control variables for the sample are also included. The car per adult ratio is 0.737, which roughly corresponds to two cars per three adults. In terms of commute mode, just over half of the Latino immigrant workers (56.8 percent) commute by driving alone to work. The second most common mode of commute is carpooling (29.6 percent). The other commute methods follow distantly, with 4.7 percent using public transportation, 2.6 percent walking or biking, and 6.3 percent commuting using an “other,” unspecified mode. In terms of educational levels, just over a quarter of the Latino immigrant workers had no high school education (27.1 percent), and about a quarter completed high school (25.7 percent). The educational levels of the rest of the Latino immigrants workers are spread fairly evenly across the other three categories, with 16.9 percent completing some high school, 15.0 percent completing some college, and 15.4 percent holding a Bachelor’s degree or more.

As for the demographic characteristics, the average age of the Latino immigrant workers in the sample is about 36 years, more than two-thirds are male (68.2 percent), fewer than half have a child of their own present in the household (39.9 percent), half identify as being white (50.5 percent), and the Latino immigrant workers in the sample have spent an average of thirteen years in the United States.

Results from Investigating Commute Time with Individual-level Data

Table 4 presents the results from the ordinary least squares regression model predicting the time each Latino immigrant spends commuting. Commute time increases as the PUMA-level *RCQ* increases; for each unit increase in the *RCQ*, the time spent on commuting increases an average of 2.467 minutes ($p < .001$). This is interesting because Latinos who live in PUMAs with

Table 4: Ordinary least squares regression results predicting the commute time of Latino immigrants (minutes)

Variable	Regression Coefficient	Standard Error
PUMA averaged level of ethnic residential concentration	2.467***	.494
Natural log of income	1.154*	.506
Car per adult ratio	2.832**	1.068
Commute Mode		
Drive alone	-7.190***	.979
Carpool	--	--
Public transit	10.681***	2.185
Walk or bike	-20.306***	1.977
Other mode	8.625**	2.589
Educational Level		
No high school	.376	1.075
Some high school	-.841	1.027
High school graduate	--	--
Some college	-1.392	1.118
Bachelor's degree or more	-.186	1.174
Age	-.014	.045
Male	6.731***	.649
Has own child present in household	1.841**	.703
White	-.548	.852
Number of years in the United States	.066	.049
Constant	13.253	4.830
R-squared	.087	
F	34.12	

n = 5,750

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

higher levels of ethnic residential concentration make less money and have fewer cars per adult⁸.

The residential concentration result is consistent with the aggregate results, showing that commute time for Latino immigrants who live in more segregated neighborhoods tend to experience longer commutes than those who live in less segregated neighborhoods.

Commute time also increases as income increases; for each percent increase in income, the commute time increases by 1.154 minutes. This finding suggests that lower-income Latino immigrants live closer to work and wealthier Latino immigrants trade longer and more costly commutes for preferred neighborhood characteristics. Commute time is also positively related to the car per adult ratio; for each car per adult increase in the household, the commute time increases by 2.832 minutes ($p < .01$). Increased vehicle availability allows for greater geographic freedom; Latino immigrants may choose where to live somewhat independently of where they work and therefore may choose to live in a nice neighborhood fairly distant from the location of work, or conversely, members of the household may choose to work at a location that they couldn't access with less vehicle availability.

In terms of commute mode, those who walk/bike or drive alone to work spend less time commuting than those who carpool (20.306 minutes less and 7.190 minutes less, respectively, $p < .001$ for both), and those who take public transportation, or use the "other" mode spend more time commuting than those who carpool (10.681 minutes more, $p < .001$, and 8.525 minutes, $p < .01$, respectively).

Two demographic factors significantly affect commute time. Men experience a longer commute than women, spending an average of 6.731 more minutes ($p < .001$) than women spend

⁸ Pearson's correlation coefficient is $-.112$ and $-.124$, respectively, both significant at the $p < .001$ level.

commuting. This may reflect the spatial constraints of women, as they tend to work closer to home in order to manage household and child-rearing responsibilities along with working. Having one's own children in the household is also positively associated with time spent commuting; those with children living in their household experience a commute of 1.841 minutes longer ($p < .01$) than those without children in the household. Again, this may reflect an extra stop on the commute, or a longer route, due to transporting children to school or daycare on the way to work, or it may reflect the willingness of parents to trade off the costs of longer commutes for a better neighborhood environment for their children.

The variables included in this model explain 8.7 percent of the variability in the time that Latino immigrants spend commuting, with an F-statistic of 34.12 ($p < .001$). There is still quite a bit of variability in commute time that is not explained.

Summary

Three approaches were used to determine the effect of residential segregation on the commute length of Latino immigrants in Atlanta. I first explored the residential patterns of Latinos in Atlanta and compared the residential locations with the locations of employment growth. The maps demonstrated that Latinos tend to live in segregated neighborhoods, that the segregation is quite marked in some locations, that the clustered neighborhoods with higher levels of ethnic residential concentration tend to be located in the northern and eastern part of the metro area, and that the counties that experienced more growth in the Latino population also tend to be located in the northern and eastern part of the metro area.

Secondly, I explored patterns in the percent of Latino residents in each census tract who experience a short commute to work. It turns out that higher levels of ethnic residential concentration are associated with fewer Latinos experiencing a short commute time, which is

consistent with the hypothesis that residential segregation creates a spatially constraining effect that results in Latinos living farther from their workplaces than they do in absence of residential segregation. However, other mechanisms may also be at work, including the use of slower commute modes that affects commute time independently of geographic distance.

Third, I used individual-level data, losing the small area specificity of the census tract, but gaining the ability to control for a range of factors that affect the commute time for Latino immigrants. The results were consistent with results from the aggregate analysis, showing that Latino immigrants who live in more highly segregated PUMAs spend more time commuting than Latino immigrants who live non-segregated or less segregated areas.

The information from the maps seems to contradict the results from the regression analyses, the former suggesting that Latinos living in areas with greater numbers of co-ethnics may also live in close proximity to jobs and the latter leading to the opposite conclusion, that Latinos living with greater numbers of co-ethnics actually live farther from jobs. Several explanations may account for this seeming discrepancy. First, the correlation at the county level may not provide a sufficiently fine level of geography to establish close geographic proximity. One may be able to commute for thirty minutes or more and still be in the same county, particularly if the traffic moves slowly, if the journey to work includes multiple stops picking up others in the carpool, or if the journey is on public transit that may include transfers and time spent waiting.

Secondly, the job growth that has occurred in the same counties where Latinos are living may not be the jobs held by the Latinos themselves. The correlation between location of residence of the Latino neighborhoods and location of job growth may instead reflect an indirect relationship, with the non-Latinos moving to Atlanta to take jobs in the counties that experience

high levels of employment growth also supporting a growth in the service sectors of the economy, generating demand for the construction of new homes, landscaping services, and restaurants and retail.

Third, low-skilled service sector jobs may also be more geographically spread out than administrative or high-tech jobs. Latinos, and particularly many Latino immigrants, work in the low-skilled service sector and therefore may have to travel to more dispersed locations than the more highly skilled sectors require. A more thorough analysis would be needed of the types of jobs that were generated in each location to explore this possibility, and how well these matched the types of jobs held by the Latino immigrants living in the same counties.

Overall, the results from these analyses point to several ways that limited mobility may be affecting the lives of US- and foreign -born Latinos. The locations of living and working for some Latinos and Latino immigrants may be in close proximity, particularly for those with low socioeconomic status who do not live in ethnic neighborhoods. Others who live in neighborhoods that are characterized by high numbers of co-ethnics or others who speak the same language may trade off advantages of living in neighborhoods that may have greater degree of social networks and social capital for a longer and more costly commute. However, the options of Latinos and Latino immigrants may also be restricted by external factors. Housing market practices or zoning ordinances – intentionally discriminating or not – may be contributing to the spatial stratification of Latinos, therefore contributing to longer and more costly commutes. Alternatively, Latinos may experience constricted housing and employment options based on mobility considerations, such as ride sharing arrangements that may be dependent on both living and working near the driver and/or riders. An investigation of the mobility patterns

of Latino immigrants may help reveal the extent to which they rely on alternative modes of transportation.

CHAPTER 5: COMMUTE MODE RESULTS

To develop a better understanding of the transportation limitations experienced by Latino immigrants in Atlanta, I construct three models. I build multinomial regression models predicting the mode of commute, using carpooling as the reference mode. The first model includes factors that are generally expected to affect commute mode, and forms the base model. Two of the most important factors that influence the choice of commute mode tend to be financial resources and access to a personal vehicle. Additional factors include the geographic factor of working in the same PUMA of residence and a host of sociodemographic and immigrant-related factors.

To this base model, I add one factor of ethnic embeddedness, namely Latino residential concentration, since those who live close to others of the same ethnicity or who share the same minority language may be more inclined to share rides to work. For the third and final model, I add a second factor of ethnic embeddedness, namely the economic sector of employment, broken down into four Mexican niche sectors and a fifth category for non-niche sectors. I then compare the coefficients across the models and discuss possible mediating and moderating effects between the factors that influence the patterns of commute modes.

Descriptive Statistics

Table 5 presents the characteristics of the sample for the analysis of commute mode. Just over half of the sample of Latino immigrant workers drive alone to work (56.8 percent). The majority of the rest (29.6 percent of the sample) commute by carpooling. Public transit and walking/biking come in distantly behind driving alone and carpooling (4.7 percent, 2.6 percent and 6.3 percent of the sample, respectively).

Table 5: Descriptive Characteristics Relevant to Commute Mode

	Proportion
<i>Dependent Variable</i>	
Commute Mode	
Drive alone	0.568
Carpool	0.296
Bus or rail	0.047
Walk or bike	0.026
Other	0.063
<i>Independent Variables</i>	
Residential Concentration Quotient (RCQ) Categories	
Very low concentration: $0.19 < RCQ < 0.69$	0.170
Low concentration: $0.69 < RCQ < 1.00$	0.168
High concentration: $1.00 < RCQ < 1.73$	0.233
Very high concentration: $1.73 < RCQ < 3.38$	0.429
Niche Employment Sectors, Industry: Occupation	
Personal Service: Food	0.088
Transformative: Construction	0.276
Productive Services: Grounds & Maintenance	0.079
Transformative: Production	0.062
Other (Non-niche sectors)	0.495
Personal Income, Quartiles	
Quartile 1: \$0 -12,770	0.251
Quartile 2: \$12,770 - 20,661	0.251
Quartile 3: \$20,661 - 33,100	0.251
Quartile 4: \$33,100 - 618,751	0.246
Vehicle Availability	
No Car Available	0.068
Less than one car per adult	0.506
At least one car per adult	0.426
Works in PUMA of residence	0.579
Educational Level	
No high school	0.271
Some high school	0.169
High school graduate	0.257
Some college	0.150
Bachelor's degree or more	0.154
Years in the United States	
≤ 5	0.239
6-10	0.285
11-20	0.277
21-30	0.130
31+	0.069

Table 5. (Continued)

	Proportion
Proficient English (speaks very well or only English)	0.311
Age categories, years	
16-25	0.190
26-35	0.356
36-45	0.268
46-55	0.133
56+	0.053
Male	0.682
Married	0.477
White	0.505
Has own child present in household	0.399
n=5750	

Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

The level of Latino residential concentration is divided into four categories. Nearly half of the Latino immigrant workers in the sample live in a PUMAs with the highest *RCQs* (42.9 percent), and nearly a quarter live in PUMAs with relatively high *RCQs* (23.3 percent). The rest of the sample is evenly divided evenly between PUMAs that have relatively low *RCQs* (16.8 percent) and PUMAs in the lowest *RCQ* category (17.0 percent).

About half of the Latino immigrants in Atlanta work in one of four immigrant niches. The top employment sector is construction, which employs 27.6 percent of Latino immigrants in the sample. Latino immigrants working in the other niche sectors are fairly evenly divided between them, with 8.8 percent working in food services, 7.9 percent working in the grounds and maintenance sector, and 6.2 percent working in production occupations, transforming raw materials into useable products. The rest of the sample of Latino immigrants work in a variety of other sectors of the economy.

The personal income variable is divided into quartiles, and half of the sample makes \$20,661 or less. Reflecting a skewed distribution, the top quartile makes anywhere between \$33,100 and \$618,751. Most of the immigrants live in households with fewer than one car per adult; 6.8 percent live in households with no car available and 50.6 percent live in households with at least one vehicle available but less than one car per adult. In spite of the longer commute times reported for those living in neighborhoods with high ethnic concentrations in the previous chapter, 57.9 percent of the immigrants in the sample work in the PUMA where they live, which is indicative of either mode choices that are slow (such as public transit) or the high degree of traffic congestion in Atlanta that extends driving times.

In terms of educational levels, just over a quarter of the Latino immigrant workers had no high school education (27.1 percent), and about a quarter completed high school (25.7 percent).

The educational levels of the rest of the Latino immigrant workers are spread fairly evenly across the other three categories, with 16.9 percent completing some high school but not graduating, 15.0 percent completing some college, and 15.4 percent holding a Bachelor's degree or more.

In terms of the sociodemographic and immigrant characteristics of the sample, about a quarter of the Latino immigrant workers have been in the United States for five years or less (23.9 percent), just over a quarter have been in the United States for six to ten years (28.5 percent) and 11 to 20 years (27.7 percent). A smaller percent has been in the United States for more than twenty years, with 13.0 percent of the immigrants having been in the country for 21-30 years and 6.9 percent for more than 31 years. A minority of the Latino immigrants are proficient in English (31.1 percent). Most of the Latino immigrant workers are younger adults, with the greatest percent falling in the 26-35 year old age group (35.6 percent), and the next greatest percent falling in the 36-45 year old (26.8 percent). The next largest age group is the 16-25 year old group (19 percent), followed by the 46-55 year old group (13.3 percent) and the 56+ year old group (5.3 percent). More than two-thirds of the Latino immigrant workers are male (68.2 percent), just under half are married (47.7 percent), half identify as white (50.5 percent), and a minority have a child of their own present in the household (39.9 percent).

Regression Results

Table 6 presents the results from the first multinomial logistic regression model of commute mode choice. In interpreting the results, relative risk ratios (RRRs) more than 1.0 signify a positive relationship, and RRRs less than 1.0 signify a negative relationship. The results for income and vehicle availability are as expected. Those in the two upper income quartiles have a higher risk of driving alone over carpooling than those in the lowest income category, with those in the third income quartile having 1.382 times the risk of driving alone over

Table 6: Multinomial logistic regression results predicting commute mode of Latino immigrants (ref = carpooling)

	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.142	0.110	0.971	0.192	1.235	0.355	0.764	0.140
Quartile 3: \$20,661 - 33,100	1.382**	0.143	0.758	0.166	1.059	0.314	0.392***	0.096
Quartile 4: \$33,100 - 618,751	1.300*	0.172	0.773	0.240	1.144	0.476	0.486**	0.127
Vehicle Availability								
No Car Available	0***	0.000	8.582***	2.134	6.171***	1.980	3.258**	1.168
Less than one car per adult	0.441***	0.041	1.684*	0.424	1.089	0.332	2.305***	0.539
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.175*	0.094	1.409*	0.230	3.787***	1.425	1.176	0.177
Educational Level								
No high school	0.657***	0.069	1.429	0.346	1.880*	0.587	0.100	0.191
Some high school	0.794	0.096	1.495	0.424	1.616	0.509	0.647	0.163
High school graduate	--		--		--		--	
Some college	1.199	0.134	1.278	0.368	1.151	0.514	1.473	0.334
Bachelor's degree or more	1.273	0.178	1.632	0.509	3.563**	1.484	1.249	0.460
Years in the United States								
<= 5	--		--		--		--	
6-10	1.436**	0.164	0.792	0.165	0.753	0.209	0.752	0.129
11-20	1.826***	0.244	0.722	0.196	0.545	0.226	0.764	0.154
21-30	1.712**	0.278	0.852	0.231	0.922	0.410	0.537	0.218
31+	2.277***	0.525	0.990	0.457	1.141	0.776	0.859	0.531
Speaks English Proficiently	1.346**	0.123	0.747	0.171	0.945	0.272	0.592*	0.122
Age categories, years								
16-25	--		--		--		--	
26-35	1.135	0.119	1.285	0.258	1.025	0.299	1.314	0.196
36-45	1.178	0.126	0.918	0.250	1.119	0.314	1.156	0.210
46-55	1.348	0.217	1.701	0.491	2.385*	0.937	0.697	0.203
56+	1.803*	0.417	2.354*	0.924	2.138	1.295	0.874	0.399

Table 6. (Continued)

	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Male	0.696***	0.067	0.380***	0.052	0.505**	0.102	0.723*	0.110
Married	1.137	0.117	1.051	0.185	0.634	0.186	0.681	0.144
White	1.066	0.098	0.724	0.132	0.922	0.239	0.742	0.123
Has own child present in household	1.188	0.118	0.898	0.173	1.253	0.367	0.802	0.162
Constant	1.652**	0.283	0.125***	0.049	0.023***	0.015	0.298***	0.100

N = 5,750

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

carpooling, and those in the top income quartile having 1.300 times the risk of driving alone over carpooling, than those in the lowest income quartile. Interestingly, income does not affect the decision to take public transit or to walk or bike rather than carpool to work. The non-significance of income with respect to taking public transit may reflect the limited availability of public transit overall in the Atlanta area. The non-significance of income with respect to walking or biking to work may reflect that those who live very near their work locations prefer to walk or bike, regardless of income.

No one in the sample who lives in a household without a vehicle commutes to work by driving alone, since these individuals were removed from the sample with the assumption that the responses were due to error. Those living in households with less than one car per adult, have a lower risk of driving alone over carpooling than those with at least one car per adult in the household ($rrr = .441$; $p < .001$). Those with no vehicles available have higher risks of taking public transit ($rrr = 8.582$; $p < .001$) and of walking or biking ($rrr = 6.171$; $p < .001$) over carpooling to work than those with at least one car per adult. Those with less than one car per adult also have a higher risks of taking public transit over carpooling ($rrr = 1.684$; $p < .05$) than those with at least one car per adult. Those with no vehicles or limited vehicles available thus drive alone less and use public transit or walking or biking more than carpooling as their commute modes than those with a personal vehicle available. Those living in households with limited or no vehicle availability, the use of walking or biking and public transit may severely limit their possible work locations to the locations accessible by foot or near public transit locations. However, they do not face the constraints of a driver's schedule and route that those who carpool must face.

The Latino immigrants who work in their PUMA of residence have a higher risk of using all modes of transportation over carpooling than those who work outside their PUMA of residence. The risk for those who work in their PUMA of residence of driving alone is about 1.175 times higher ($p < .05$) than carpooling, the risk of taking public transit is about 1.409 times higher ($p < .05$) than carpooling, and the risk of walking or biking is about 3.787 times higher ($p < .001$) than carpooling than that of those who work outside their PUMA of residence. Those who travel to a different PUMA to work probably travel longer distances than those who work in their PUMA of residence, and carpooling seems to be the preferred mode, even over driving alone. There is no way to control for within household carpools and carpools between individuals of different households (external carpools) with these data, but Ferguson (1997) found that the likelihood of individuals commuting in external carpools increase with distance travelled, whereas distance is negatively associated with carpooling with others in the same household. This would suggest that much of the carpooling that occurs among the Latino immigrants may be occurring between members of different households. Carpooling may help reduce the cost of gasoline, particularly if the cost is shared, for the long distances covered.

Several educational categories significantly influence commute choice. The risk of driving alone over carpooling to work is lower for those with no high school than for those who graduated from high school ($rrr = .657$; $p < .001$), and the risk of walking or biking over carpooling is higher for both those with no high school ($rrr = 1.880$; $p < .05$) and for those with a bachelor's degree or more ($rrr = 3.563$; $p < .01$), than for those with a high school diploma. This result is interesting; those with a bachelor's degree are probably walking or biking to work due to lifestyle choice, while those with no high school education may be walking to work due to choice, but they are probably more likely to be walking or biking to work due to transport

poverty, or lack of either access to alternative modes of transit or lack of access to better paying jobs that would enable them to cover costs of driving such as gasoline, maintenance, and insurance.

The relationship between years spent in the United States and commute mode shows a fairly progressive increase in risk of driving alone over carpooling across the cohorts, and English language proficiency shows a similar effect. The risk of driving alone over carpooling for those with six to ten years in the United States is 1.436 times that of those with five years or fewer in the United States ($p < .01$); the risk for those with 11-30 years in the United States is 1.826 times that of those with five years or fewer in the United States ($p < .001$); the risk for those with 21-30 years in the United States is 1.712 times that of those with five years or fewer in the United States ($p < .01$), and the risk for those with more than 30 years in the United States is 2.277 ($p < .001$) times that of those with five years or fewer in the United States. More years in the United States, however, does not change the probability that Latino immigrant workers change commute between carpooling and either of the other alternative modes of commute, which may mean that these alternative modes of transport are chosen more by practicality than external factors. The risk of driving alone over carpooling for those who speak English proficiently is 1.346 times that of those who do not speak English proficiently ($p < .01$). These results demonstrate that transportation assimilation does not signify changing to public transit from carpooling as an immigrant learns how to navigate the public transit system better, for example (although this again may be due to the limited nature of public transit in Atlanta); adapting to the car-oriented transportation system in Atlanta means gaining the knowledge and means needed to drive alone to work.

Across most of the categories, age does not significantly affect the mode of commute. The exceptions are several of the older age categories are more likely to take a different mode than carpooling to work. For those 56 or more years old, the risk of driving alone over carpooling to work is 1.803 times ($p < .05$) and the risk of taking public transit is 2.354 times ($p < .05$) that of those 16-25 years old. For those 46-55 years old, the risk of walking or biking over carpooling is 2.385 times ($p < .05$) that of those 16-25 years old. These trends are interesting; the older Latino immigrant workers may be less willing to depend on another (potentially younger) person for the commute, and so they may prefer the independence of other modes of commute. Alternatively, age may be strongly associated with type of job. Younger Latino immigrants may be more likely to work construction or landscaping, which are the types of jobs that tend to hire multiple workers and make carpooling convenient. Older Latino immigrants may work in retail or restaurant work where the smaller number of employees and irregular shifts make carpooling less practical.

Gender has a strong relationship with commute mode; the results show that women do not tend to carpool as much as men. For men, the risk of driving alone over carpooling is 30 percent lower ($p < .001$), the risk of taking public transit over carpooling is 62 percent lower ($p < .001$), and the risk of walking or biking over carpooling is 50 percent lower ($p < .01$) that of women. Carpooling may not work for the types of jobs that low-skilled Latina immigrant women tend to take, such as retail or cleaning houses, compared to the types of jobs that low-skilled Latino immigrant men tend to take, such as construction, landscaping or manufacturing.

The remaining demographic characteristics—namely marital status, identifying as white, and having one's own child living in the same household—do not significantly influence commute mode in this analysis.

Table 7 presents results of a multinomial logistic regression model that includes factors influencing commute mode with the addition of ethnic residential concentration categories. The results are a bit surprising. I expected those who live in less ethnically concentrated neighborhoods to have a higher risk of driving alone over carpooling because higher degrees of ethnic residential concentration may increase the potential of using local social networks to create a ridesharing arrangement. The results, however, are inconsistent across levels of residential concentration categories. The risk of driving alone over carpooling is *lower* for those living in the least ethnically concentrated neighborhoods than for those living in the most ethnically concentrated neighborhoods ($rrr=.743$; $p<.01$). The direction of the relationship changes for those living in neighborhoods with second-lowest levels of ethnic residential concentration, as these Latino immigrants have a *higher* risk of driving alone over carpooling than those living in the most ethnically concentrated neighborhoods ($rrr = 1.406$; $p<.01$). Ethnic residential concentration does not affect the risk of taking public transit over carpooling, and those living in the least ethnically concentrated neighborhoods have a lower risk of walking or biking over carpooling than those living in highly concentrated neighborhoods.

I looked at the bivariate correlation matrix to learn if any factors suggest the reason why Latino immigrants living in the least ethnically concentrated PUMAs have a higher risk of carpooling over driving alone than those living in the most concentrated PUMAs. When looking at bivariate correlations matrix of the variables with the *RCQ* categories (see Appendix C), there is a nine percent significant, positive correlation ($p<.001$) between living in the least ethnically concentrated neighborhoods and having been in the United States for more than thirty years. There are also positive correlations between living in the least ethnically concentrated neighborhoods and falling in the highest income quartile, and living in the least ethnically

Table 7: Multinomial logistic regression results for testing effects of RCQ on the mode of commute of Latino immigrants

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other Mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Residential Concentration Quotient (<i>RCQ</i>)								
Very low concentration: $0.19 < RCQ < 0.69$	0.743**	0.082	1.404	0.389	0.306**	0.118	0.744	0.155
Low concentration: $0.69 < RCQ < 1.00$	1.406**	0.183	1.808	0.574	0.753	0.265	0.337**	0.112
High concentration: $1.00 < RCQ < 1.73$	1.188	0.126	1.121	0.250	0.860	0.270	0.452**	0.122
Very high concentration: $1.73 < RCQ < 3.38$	--		--		--		--	
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.147	0.111	0.949	0.190	1.310	0.378	0.804	0.147
Quartile 3: \$20,661 - 33,100	1.372**	0.146	0.740	0.164	1.084	0.313	0.418**	0.105
Quartile 4: \$33,100 - 618,751	1.300	0.175	0.764	0.235	1.186	0.496	0.506*	0.135
Vehicle Availability								
No Car Available	0***	0.000	8.700***	2.148	5.938***	1.864	3.150**	1.148
Less than one car per adult	0.434***	0.040	1.676**	0.418	1.078	0.329	2.279**	0.543
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.161	0.092	1.360*	0.213	3.897***	1.457	1.236	0.188
Educational Level								
No high school	0.665***	0.069	1.404	0.348	1.894*	0.588	0.965	0.187
Some high school	0.816	0.099	1.440	0.399	1.651	0.518	0.671	0.169
High school graduate	--		--		--		--	
Some college	1.223	0.137	1.290	0.366	1.172	0.521	1.444	0.321
Bachelor's degree or more	1.295	0.184	1.587	0.505	3.760**	1.529	1.233	0.453
Years in the United States								
<= 5	--		--		--		--	
6-10	1.432**	0.167	0.812	0.168	0.745	0.208	0.737	0.129
11-20	1.824***	0.244	0.714	0.193	0.571	0.240	0.764	0.156
21-30	1.736**	0.280	0.863	0.236	0.959	0.428	0.519	0.209
31+	2.46***	0.584	0.874	0.401	1.420	1.003	0.938	0.599

Table 7. (Continued)

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other Mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Speaks English Proficiently	1.320***	0.123	0.704	0.167	0.988	0.271	0.644*	0.132
Age categories, years								
16-25	--		--		--		--	
26-35	1.139	0.121	1.332	0.274	0.986	0.296	1.299	0.194
36-45	1.176	0.126	0.934	0.247	1.077	0.308	1.188	0.213
46-55	1.345	0.212	1.752	0.503	2.247	0.893	0.690	0.200
56+	1.767**	0.410	2.454*	0.972	1.953	1.214	0.966	0.448
Male	0.692***	0.066	0.375***	0.051	0.504***	0.099	0.722*	0.111
Married	1.152	0.120	1.029	0.179	0.650	0.188	0.681	0.141
White	1.042	0.097	0.722	0.130	0.928	0.242	0.773	0.129
Has own child present in household	1.171	0.118	0.892	0.171	1.242	0.361	0.828	0.171
Constant	1.611**	0.286	0.110***	0.043	0.027***	0.018	0.367**	0.126

N = 5,750

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

concentrated neighborhoods and having received a bachelor's degree or higher amount of education. I speculate that these Latino immigrants may commute from suburban areas by carpooling to work downtown.

A second possible reason why Latino immigrants living in the least ethnically concentrated PUMAs have a higher risk of carpooling than expected is the coarse level of geography. Many of the PUMAs with lower levels of Latino residential concentration are also the PUMAs covering the largest amount of geographic space; several PUMAs with the lowest levels of Latino residential concentration levels contain two counties, and one PUMA contains three counties in its boundaries. This general level of geography is likely to mask considerable internal variation in the composition and concentration of the neighborhoods, which may be contributing to the unexpected, inconsistent results.

Table 8 presents results of the third and final multinomial logistic regression model that includes factors influencing commute mode with the addition of sector of employment. The sector of employment impacts the commute mode chosen. Those working in food services have a greater risk of driving alone ($rrr = 1.634$; $p < .01$), taking public transit ($rrr = 3.558$; $p < .001$), or walking or biking ($rrr = 2.795$) over carpooling to work than those working a non-niche employment sector. Those working in the construction sector show the opposite pattern, with a lower risk of driving alone ($rrr = .466$; $p < .001$), taking public transit ($.352$; $p < .001$), or walking or biking ($.375$; $p < .01$) over carpooling than those working in non-niche employment. Those working in grounds and maintenance have a lower risk of walking or biking to work over carpooling ($rrr = .387$) than those working in non-niche employment, but working in grounds and maintenance does not significantly impact the mode of commute otherwise. Working in the production sector does not significantly impact the mode of commute when compared to those

Table 8: Multinomial logistic regression results testing effects of employment sector on the mode of commute of Latino immigrants

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Niche Employment Sectors								
Personal Service: Food	1.634**	0.262	3.558***	0.840	2.795***	0.791	1.321	0.322
Transformative: Construction	0.466***	0.042	0.352***	0.099	0.375**	0.126	0.650*	0.124
Prod. Services: Grounds & Maintenance	0.731	0.120	0.568	0.209	0.387*	0.160	0.898	0.238
Transformative: Production	1.135	0.172	0.756	0.249	0.662	0.367	0.782	0.299
Other (Non-niche sectors)	--		--		--		--	
Residential Concentration Quotient (<i>RCQ</i>)								
Very low concentration: $0.19 < RCQ < 0.69$	0.681**	0.078	1.286	0.357	0.284**	0.108	0.712	0.147
Low concentration: $0.69 < RCQ < 1.00$	1.283	0.168	1.513	0.471	0.655	0.231	0.319**	0.107
High concentration: $1.00 < RCQ < 1.73$	1.131	0.122	1.004	0.235	0.781	0.244	0.436**	0.116
Very high concentration: $1.73 < RCQ < 3.38$	--		--		--		--	
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.130	0.115	0.926	0.194	1.276	0.374	0.802	0.150
Quartile 3: \$20,661 - 33,100	1.373***	0.157	0.748	0.179	1.107	0.330	0.424**	0.106
Quartile 4: \$33,100 - 618,751	1.315*	0.182	0.795	0.247	1.153	0.500	0.514*	0.137
Vehicle Availability								
No Car Available	0***	0.000	8.953***	2.286	6.144***	1.955	3.187**	1.141
Less than one car per adult	0.441***	0.042	1.698*	0.422	1.093	0.333	2.306***	0.552
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.115	0.088	1.307	0.208	3.715***	1.398	1.208	0.186
Educational Level								
No high school	0.697**	0.076	1.550	0.383	2.109*	0.672	0.997	0.194
Some high school	0.829	0.104	1.522	0.411	1.695	0.567	0.681	0.170
High school graduate	--		--		--		--	
Some college	1.147	0.129	1.220	0.343	1.128	0.511	1.389	0.308
Bachelor's degree or more	1.174	0.171	1.483	0.500	3.421**	1.425	1.167	0.436

Table 8. (Continued)

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Years in the United States								
<= 5	--		--		--		--	
6-10	1.389**	0.160	0.714	0.149	0.650	0.191	0.725	0.129
11-20	1.792***	0.248	0.704	0.192	0.556	0.240	0.752	0.155
21-30	1.685**	0.273	0.868	0.241	0.934	0.428	0.506	0.202
31+	2.512***	0.599	0.884	0.401	1.498	1.023	0.923	0.582
Speaks English Proficiently	1.235*	0.115	0.670	0.157	0.925	0.246	0.617*	0.127
Age categories, years								
16-25	--		--		--		--	
26-35	1.157	0.124	1.420	0.292	1.033	0.301	1.302	0.195
36-45	1.188	0.133	1.038	0.284	1.137	0.334	1.191	0.216
46-55	1.291	0.210	1.905*	0.551	2.330*	0.915	0.663	0.198
56+	1.664*	0.391	2.693*	1.074	2.035	1.227	0.925	0.418
Male	0.963	0.097	0.613**	0.099	0.808	0.167	0.874	0.145
Married	1.158	0.121	1.051	0.192	0.645	0.185	0.684	0.142
White	1.022	0.095	0.696	0.132	0.919	0.240	0.762	0.129
Has own child present in household	1.136	0.115	0.805	0.152	1.183	0.337	0.809	0.169
Constant	1.789**	0.322	0.106***	0.042	0.029***	0.020	0.400*	0.150

N = 5,750

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

working in non-niche sectors. These results reveal the high prevalence of carpooling among Latino immigrants working in the construction sector and the low prevalence of carpooling among those working in the food service sector.

The patterns across the modes of commute for the different sectors of employment are probably due in part to the spatial layout of the sectors of employment. The food service positions may be located along business strips, and are probably more likely than construction sites to be located in close enough proximity to locations of residence for the workers to walk or in close enough proximity to public transit stop for workers to commute by public transit. Food service hours also tend to correspond to public transit hours of operation, so taking a bus or subway to work is a possibility for these workers than it might not be for those who have to get to work very early or stay very late. Additionally, the small number of workers needed, and the variety of shifts, may make it difficult for those working in the food service sector to commute by carpooling. On the other hand, the locations of the construction jobs are likely to be dispersed across and beyond the business areas into residential areas and new developments in suburban areas. This dispersion of employment would make it difficult for the construction workers to commute by public transit or by walking or biking. Construction crews may also be comprised of a number of co-ethnic employees working together, and compared to those working in the food service sector, construction workers may be less likely to work different shifts and therefore more likely to have similar daily schedules of arriving to work and departing from work. The necessity of transporting tools also makes travelling by private automobile necessary and by public transit or walking/biking unfeasible. These factors would render carpooling a more workable commute mode for construction workers.

Summary

Three multinomial regression models were built to investigate reasons for patterns in the modes of commute. The first model included factors that are generally expected to affect commute mode. The immigrants with characteristics associated with higher socioeconomic status, such as income, education, and vehicle availability, had higher risks of commuting to work by driving alone over carpooling. Those living in households with limited or no vehicle availability had higher risks of taking public transit and of walking over carpooling than those with a personal vehicle available. Additionally, the immigrants who had adjusted more to living in the United States, such as those who arrived in earlier cohorts and those who speak English proficiently, also had higher risks of commuting to work by driving alone over carpooling.

To this base model, I added categories of segregation levels by dividing the range of ethnic residential concentration levels of the PUMAs into four groups. I expected that those who live in PUMAs where the ethnic residential concentration is lower would be more likely to drive alone to work, and those who live in PUMAs where the ethnic residential concentration is higher would be more likely to carpool. The results are inconsistent. For Latino immigrants living in one of the PUMA groups with low levels of ethnic residential concentration, the results are as expected. However, for Latino immigrants living in the PUMA groups with very low levels of ethnic residential concentration, the results are opposite from the expected results. Those living in neighborhoods with very low levels of ethnic concentration have a higher risk of carpooling than those living in PUMAs characterized by very high levels of ethnic residential concentration. I speculate that either these Latino immigrants may commute from suburban areas by carpooling to work downtown, or that the large geographic size of some of the PUMAs masks significant internal differentiation in the levels of ethnic residential concentration.

To construct the final model, I added economic sectors of employment, measured by four Mexican employment niche sectors and a fifth category for non-niche employment sectors. I found that the sector of employment impacts the commute mode used. The Latino immigrants working in the food services sector tend to use all modes of commuting rather than carpool. Conversely, those working in the construction sector tend to carpool rather than use any other mode of commute. These patterns may reflect the distinct distribution of each of these sectors of employment across space, as well as differences in the structure of the work, which influence which modes of commute are more suitable for each sector.

The overall goal of this chapter was to develop a better understanding of the transportation limitations experienced by Latino immigrants in Atlanta. Driving alone to work reflects the greatest degree of mobility and carpooling arguably reflects the least degree of mobility among the modes of commute included in this analysis. The results show that Latino immigrants who earn higher incomes, who have been in the United States for a longer period of time, and who speak English proficiently also experience higher levels of mobility. Those who work in the food sector also experience higher levels of mobility than Latino immigrants working in non-niche sectors. Conversely, the Latino immigrants who work in the construction sector, who have limited or no vehicles available, and who have low levels of education experience low levels of mobility. Those who experience lower levels of mobility, especially recent immigrants, those with low socioeconomic status, and those working in the construction sector, may also face transportation limitations in areas of life beyond the journey to work.

CHAPTER 6: TRANSPORTATION AND LANGUAGE ABILITY RESULTS

English language proficiency is one of the most important skills immigrants learn as they adapt to US society, and exposure to contexts in which English is the primary language of interaction is one of the central factors that facilitate English language acquisition. Without mobility, immigrants may face restricted opportunities to access English-speaking contexts, and therefore the rate of English language acquisition may be slowed.

To learn whether transportation limitations could be affecting the adaptation process of Latino immigrants as they adjust to the United States, I run a binomial logistic regression model to test whether vehicle availability and commute mode predict English language proficiency of working Latino immigrants in Atlanta, Georgia. Measures for panethnic community embeddedness, including working in an ethnic niche and level of neighborhood segregation, provide additional variables of interest because the residential, work, and transportation aspects of life may each significantly impact the degree of insulation from the mainstream US society, and therefore exposure to the English language. The model includes controls for additional factors that are known to affect the English language proficiency of immigrants.

Descriptive Statistics

Table 9 presents the characteristics of the individual-level sample that are used to learn whether indicators of mobility – modes of commute and vehicle availability – are associated with the likelihood of being proficient in the English language. The sample composition of Latino immigrant workers in Atlanta is the same as the previous analyses that have used the individual-level data, but with a few additions and changes.

The dependent variable is now English proficiency, and of the sample of employed Latino immigrants in Atlanta, 31.1 percent spoke English very well or exclusively. Indicators

Table 9: Descriptive statistics for English proficiency model

Variables	Proportion
<i>Dependent Variable</i>	
Proficient in English (speaks very well or only English)	0.311
<i>Indicators of Mobility</i>	
Vehicle Availability	
No Car Available	0.068
Less than one car per adult	0.506
At least one car per adult	0.426
Commute Mode	
Drive alone	0.568
Carpool	0.296
Bus or rail	0.047
Walk or bike	0.026
Other	0.063
<i>Ethnic Community Measures</i>	
Residential Concentration Quotient (RCQ) Categories	
Very low concentration: $0.19 < RCQ < 0.69$	0.170
Low concentration: $0.69 < RCQ < 1.00$	0.168
High concentration: $1.00 < RCQ < 1.73$	0.233
Very high concentration: $1.73 < RCQ < 3.38$	0.429
Works in Niche Sector	0.505
<i>Socio-demographic Characteristics</i>	
Personal Income, Quartiles	
Quartile 1: \$0 -12,770	0.251
Quartile 2: \$12,770 - 20,661	0.251
Quartile 3: \$20,661 - 33,100	0.251
Quartile 4: \$33,100 - 618,751	0.246
Educational Level	
No high school	0.271
Some high school	0.169
High school graduate	0.257
Some college	0.150
Bachelor's degree or more	0.154
Male	0.682
White	0.505
Has own child present in household	0.399
<i>Immigration Characteristics</i>	
Years in the United States	
≤ 5	0.239
6-10	0.285
11-20	0.277
21-30	0.130
31+	0.069

Table 9. (Continued)

Variables	Proportion
Age of arrival to United States	
Under 6	0.047
Between 6 and 15	0.144
Between 16 and 29	0.600
Over 30	0.209
Naturalized	0.190
Spouse born in United States	0.086
n=5750	

Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

of mobility included are vehicle availability and mode of commute. In terms of vehicle availability, most of the immigrants live in households with fewer than one car per adult; 6.8 percent live in households with no car available and 50.6 percent live in households with a available vehicle but less than one car per adult. In terms of the mode of commute, just over half of the sample of Latino immigrant workers drives alone to work (56.8%); the majority of the rest (29.6%) commute by carpooling. Public transit (4.7%), walking/biking (2.6%) and using an unspecified mode (6.3%) come in distantly behind driving alone and carpooling.

Measures for embeddedness in the ethnic community include Latino neighborhood concentration and working in an ethnic niche. The level of Latino residential concentration is divided into four categories. Nearly half of the Latino immigrant workers in the sample live in a PUMAs with high segregation *RCQs* (42.9%), and nearly a quarter live in PUMAs with fairly high segregation (23.3%). The rest of the sample is evenly divided between PUMAs that have fairly low levels of segregation (16.8%) and PUMAs with low levels of segregation (17.0%). Rather than including the specific niche employment sector, I only control for whether or not the immigrants are working in a niche industry and thus likely to work with others who speak Spanish. Half of the sample (50.5%) works in a niche industry.

The sociodemographic variables include income, level of education, gender, race and presence of children in the household. In terms of income, the personal income variable is divided into quartiles, and half of the sample makes \$20,661 or less. Reflecting a skewed distribution, the top quartile makes anywhere between \$33,100 and \$618,751. In terms of educational levels, just over a quarter of the Latino immigrant workers had no high school education (27.1%), and about a quarter completed high school (25.7%). The educational levels of the rest of the Latino immigrants workers are spread fairly evenly across the other three

categories, with 16.9% completing some high school, 15.0% completing some college, and 15.4% holding a Bachelor's degree or more. More than two-thirds of the Latino immigrant workers are male (68.2%), half identify as white(50.5%), and a minority have a child of their own present in the household (39.9%).

The immigration-related characteristics include number of years in the United States, the age at arrival, an indicator for having become a naturalized citizen, and an indicator for having a US-born spouse. About a quarter of the Latino immigrant workers have been in the United States for five years or fewer (23.9%), just over a quarter have been in the United States for six to ten years (28.5%) and 11 to 20 years (27.7%). A smaller percent have been in the United States for more than twenty years, with 13.0 percent of the immigrants having been in the country for 21-30 years and 6.9 percent for more than 31 years. In terms age at arrival, most of the immigrants arrived between the ages of 16 and 29 (60.0%), and a small minority arrived as very young children (4.7%). The rest of the Latino immigrant workers in the sample arrived when they were older children, between six and fifteen years old (14.4%), or when they were over thirty years old (20.9%). A minority had become naturalized citizens (19%), and a small proportion of the immigrants were married to a US born spouse (8.6%).

Regression Results

Table 10 presents the results of the binomial logistic model that predicts English language proficiency. The overall chi-squared for the model is 100,766.57 ($p < .001$)⁹, which means that the variables combined significantly are significantly better at predicting English language proficiency of the Latino immigrants included in the sample than a model with no variables. Results for the Mexican sample are in Appendix D.

⁹ This is based on running the logistic regression analysis on the sample without the replicate weights.

Table 10: Logistic regression coefficients and odds ratios, predicting English proficiency

	Coefficient	SE	Odds Ratio
<i>Indicators of Mobility</i>			
Vehicle Availability			
No Car Available	-0.975	0.316	0.377**
Less than one car per adult	-0.195	0.090	0.823*
At least one car per adult	--	--	--
Commute Mode			
Drive alone	--	--	--
Carpool	-0.241	0.096	0.786*
Bus or rail	-0.661	0.252	0.516**
Walk or bike	-0.452	0.293	0.636
Other	-0.707	0.214	0.493***
<i>Ethnic Community Measures</i>			
Residential Concentration Quotient (RCQ) Categories			
Very low concentration: $0.19 < RCQ < 0.69$	-0.024	0.123	0.976
Low concentration: $0.69 < RCQ < 1.00$	0.433	0.118	1.543***
High concentration: $1.00 < RCQ < 1.73$	0.131	0.115	1.140
Very high concentration: $1.73 < RCQ < 3.38$	--	--	--
Works in Niche Sector	-0.572	0.088	0.564***
<i>Socio-demographic Characteristics</i>			
Personal Income, Quartiles			
Quartile 1: \$0 -12,770	--	--	--
Quartile 2: \$12,770 - 20,661	-0.120	0.135	0.887
Quartile 3: \$20,661 - 33,100	0.195	0.135	1.215
Quartile 4: \$33,100 - 618,751	0.638	0.149	1.892***
Educational Level			
No high school	-0.842	0.132	0.431***
Some high school	-0.336	0.118	0.714**
High school graduate	--	--	--
Some college	0.497	0.119	1.643***
Bachelor's degree or more	1.165	0.112	3.205***
Male	-0.094	0.085	0.910
White	-0.285	0.095	0.752**
Has own child present in household	-0.132	0.091	0.876
<i>Immigration Characteristics</i>			
Years in the United States			
≤ 5	--	--	--
6-10	0.215	0.161	1.239
11-20	0.536	0.160	1.709**
21-30	0.640	0.170	1.896***
31+	0.939	0.240	2.558***

Table 10. (Continued)

	Coefficient	SE	Odds Ratio
Age of arrival to United States			
Under 6	--	--	--
Between 6 and 15	-0.940	0.177	0.391***
Between 16 and 29	-1.985	0.191	0.137***
Over 30	-2.396	0.237	0.091***
Naturalized	0.555	0.117	1.742***
Spouse born in United States	1.020	0.126	2.772***
Constant	0.820	0.257	2.270**

N = 5,750

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

The results show that the Latino immigrants that have lower levels of mobility, in terms of both vehicle availability and commute mode, also have a lower likelihood of speaking English proficiently than Latino immigrants with higher levels of mobility. Those with no vehicle available have 62.3 percent ($p < .01$) lower odds of speaking English proficiently, and those living in households with less than one car per adult have 17.7 percent ($p < .05$) lower odds of speaking English proficiently than those living in households with at least one car available per adult. In terms of commute mode, those who carpool to work have 21.4 percent ($p < .05$) lower odds of speaking English proficiently and those who take public transportation have 48.4 percent ($p < .01$) lower odds of speaking English proficiently than those who commute by driving alone to work. Walking or biking to work rather than driving alone does not affect the odds of being proficient in English.

The finding that limited transportation and limited English proficiency are related supports the possibility that lack of ability to travel in an automobile-oriented metropolitan area results in impeded English acquisition. As others have established, lack of vehicle availability results in both fewer trips taken overall, and trips of shorter distances. For Latino immigrants, taking fewer trips overall may mean that they cannot travel to the health clinics or their child's school for a parent-teacher conference; this may mean that they cannot travel to take advantage of English classes or other opportunities to build their skills; this may mean that they cannot travel to attend a church service or participate in other social institutions. For Latino immigrants, taking shorter trips may mean working at a local retailer or restaurant (which may have many Spanish-speaking patrons) rather than at a better-paying job further away or shopping at a local convenience store that has limited fresh produce and more expensive staple products. (with perhaps a Spanish-speaking clerk). This analysis cannot establish a causal direction of the

relationship, however, and lack of English proficiency may also affect travel patterns. Given that language is a tool used for communication, and that people acquire a new language when they speak the new language, and that exposure to educational classes, community events, work settings, and stores where English is the dominant language—and where immigrants may develop social ties with native English speakers—is one of the primary influences on an immigrant's acquisition of English, I believe it is reasonable to believe that limited transportation contributes to impeded English language acquisition.

Several measures of panethnic embeddedness significantly and negatively affect the likelihood of speaking English proficiently. Those who live in neighborhoods with low levels of ethnic concentration are 54.3 percent ($p < .001$) more likely to speak English proficiently than those who live in neighborhoods with very high levels of ethnic concentration. Those who work in an ethnic niche are 43.6 percent ($p < .001$) less likely to speak English proficiently than those who do not work in ethnic niches. Similar to the effect of limited transportation in allowing for exposure to English-speaking contexts, if a Latino immigrant lives and works surrounded by other Spanish-speakers, then the potential for learning and practicing English diminishes compared to a Latino immigrant who lives and works in a context surrounded by English speakers.

Many of the sociodemographic characteristics in the model also influence English language proficiency. Latino immigrant workers who fall in the top income quartile have 89.2 percent ($p < .001$) greater odds of speaking English proficiently than those who fall in the lowest income quartile. Given that the top income quartile starts at \$33,100 and goes up, this group includes a wide range of income levels. The Latino immigrants in this group may have the means to pay for private English classes and access other social settings that may have a

membership or entrance fee, and they may also have a more privileged background prior to emigrating from their country or origin and therefore may have been more likely have spoken English prior to migrating. They may have even attended US schools or universities prior to immigration, as was the case for many upper class Cubans, some of whom live in Atlanta (Portes and Stepick 1994). The causality may also flow in the other direction, however, as the lack of English language ability may create limitations on the job market, and English proficiency may reduce or remove the differences between the earnings of foreign-born and US-born individuals with the same education and skill levels (Borjas 1994).

Level of education is consistently related to English proficiency across the categories, with those with lower education having lower odds of speaking English proficiently, and those with higher levels of education having higher odds of speaking English proficiently. Specifically, those with no high school have 56.9 percent ($p < .001$) lower odds of speaking English proficiently than high school graduates, and those with some high school have 28.6 percent ($p < .01$) lower odds of speaking English proficiently than high school graduates. Those with some college have 64.3 percent ($p < .001$) greater odds of speaking English proficiently, and those with a bachelor's degree or higher have 220.5 percent ($p < .001$) greater odds of speaking English proficiently, when compared to high school graduates. This supports the hypothesis that more education increases the likelihood that an immigrant has more exposure to learning the English language, either in the immigrant's country of origin or in the United States. The large jump in the risk of speaking English proficiently among those with a college degree or more probably is because this group includes Latino immigrants who studied at the post-secondary level in the United States (Stevens 1999). Immigrants who study in the United States are exposed to a context in which English is the dominant language, in which immigrants develop

motivation for gaining English skills in order to improve interpersonal interactions and to perform better academically, and in which institutional support for improving English language skills may be provided.

Latino immigrants who identify as white have 75.2 percent greater odds of speaking English proficiently than those who do not claim the racial identification of white. For those with an Anglo phenotype, this finding may reflect the extent of white privilege, perhaps as experienced prior to migration as well as after migration (McDermott and Samson 2005; Telles 1998; Telles and Murguia 1988). For those with a less Anglo phenotype, white identification may also in part indicate a certain level of adjustment to the US culture, accepting the host country's socially constructed racial divisions and identifying with the privileged group.

For this sample of Latino immigrant workers, neither gender nor presence of a child in the household influences the likelihood of speaking English proficiently. However, if a sample were to include all Latino adults rather than the workers, more women would be included who are not in the labor force and who may have child rearing responsibilities. These Latina women may be the ones that experience significant transportation barriers and spatial and social isolation, particularly if household vehicle availability is limited and used by (male) workers for commuting, as other researchers have found (Bohon, Stamps, and Atilas 2008). Some scholars include children in the household with the rationale that non-working Latina mothers may also be more exposed to English through their children's socialization in US schools and other institutions (Stevens 1999), but the socialization of children in a culture and institutions that a non-English speaking parent does not understand may serve to further isolate the parent from her own children (Bohon, MacPherson, and Atilas 2005).

Immigration characteristics influence English language proficiency. The Latino immigrants who have spent more time in the United States, those who arrived at a young age, those who have become naturalized citizens, and those who have a spouse born in the United States are more likely to speak English proficiently. Specifically, compared to those who have spent five years or less in the United States, those who have been in the United States for 11-20 years have 70.9 percent ($p < .01$) greater odds of speaking English proficiently, those who have been in the United States for 21-30 years have 89.6 percent ($p < .001$) greater odds of speaking English proficiently, and those who have been in the United States for 31+ years have 155.8 percent ($p < .001$) greater odds of speaking English proficiently. This lends further support to the hypothesis that length of time in the United States performs as a measure of exposure to English, and therefore is positively related to English proficiency.

Age at immigration also affects English language proficiency. Compared to those who arrived when they were five years old or younger, those who arrived between the ages of six and fifteen have 60.9 percent ($p < .001$) lower odds of speaking English proficiently, those who arrived between the ages of 16 and 29 have 86.3 percent ($p < .001$) lower odds of speaking English proficiently, and those who arrived when they were thirty years old or older have 90.9 percent lower odds of speaking English proficiently. These findings reflect the importance of age-specific cognitive maturation levels, in that the ability to learn a language decreases with age, and the importance of the institutions (especially school) that may assist young immigrants learn the English language and develop social ties with native English speakers.

Those who naturalized have 74.2 percent ($p < .001$) greater odds of speaking English proficiently than those who have not naturalized. Insofar as citizenship measures attachment to the United States, this supports findings of other scholars that immigrants with stronger degrees

of attachment to the United States have more motivation to learn English (Espenshade and Fu 1997; Grenier 1984). It is also worth noting that tests for citizenship are usually in English, so a certain degree of English language competence is necessary to become a citizen, although it is not essential that a person speak English fluently to naturalize.

Having an English-speaking spouse is another measure of both exposure to English and attachment to the United States. Those who have a spouse born in the United States have 177.2 percent ($p < .001$) greater odds of speaking English proficiently than those who are not married to someone who was born in the United States. These immigrants are more likely to speak English daily in the household and therefore experience high levels of exposure and motivation to learn the English language.

Summary

I ran a binomial logistic regression model to test whether indicators of limited mobility are related to the English language proficiency of Latino immigrant workers in Atlanta. The results reveal that mobility levels, measured by vehicle availability and mode of commute, are significantly associated with English language proficiency. This suggests that lack of mobility may be exerting an isolating effect that reduces the exposure of immigrants to contexts in which English is spoken. The combined effect of residential segregation, working in an ethnic niche, and carpooling may contribute to isolation of Latino immigrants from English-speaking society, reducing their access to the opportunities and resources that are available to those who speak English.

As the results demonstrate, measures of limited mobility are associated with English proficiency, but this analysis does not prove the direction of causality. Limited English proficiency may contribute to reduced levels of mobility and access to English-speaking contexts

in multiple ways. Latino immigrants who do not speak English may have more difficulty finding out information needed to use transportation systems, whether learning to drive, reading a street map, or asking for directions. Latino immigrants who do not speak English may also feel more comfortable in an environment that is insulated from the English speaking society, particularly if the immigrant perceives discrimination and fears racial profiling. With language acting as a barrier to information, and with the motivation of feeling safer, those who do not speak English may avoid unfamiliar contexts in which English is the dominant language, and may therefore travel less frequently and seek out few destinations beyond the routes generated by their daily patterns of living and working.

However, the institutional restrictions on movement in requiring proof of legal presence to qualify for a driver's license, the surveillance and profiling experienced by Latinos in the streets, as well as the culture of automobility, are structural factors that contribute to the barriers to movement experienced by Latinos, and this analysis suggests that travel limitations may have serious effects on the lives of immigrants and their ability to successfully adapt to their new environment. Limitations on travel reduce the opportunities to engage in social interactions that may provide practice and motivation for improving one's English skills. This analysis argues for a better recognition of the importance of transportation limitations and their effects on English acquisition.

CHAPTER 7: CONCLUSION

This research investigated how immigrants experience the contradictory processes of mobility and containment in the new Latino destination of Atlanta, Georgia. In a system of automobility, travel by private vehicle is created to be necessary for survival, and alternative mobility options are few. In this political economy of mobility, the mobility regime promotes the perpetuation and expansion of automobility and benefits powerful political and economic agents and institutions, but serves to exclude those who live on the margins. In a context that creates pressures toward forced car ownership, low-income households either spend a significant portion of their income on the expenses of a vehicle or they live with transport poverty, with limited access to the opportunities that are only accessible by car.

As the system of automobility manifests in local forms of streetscapes and highways, suburban sprawl and isolated islands of public transit, social biases and political priorities influence the patterns of which segments of the population benefit and which segments of the population pay the price. In its local manifestation in Atlanta, the mobility regime, operating under a paradigm of suspicion, excludes those who are nonwhite. Public resources are invested in continued development of highways to support automobile travel and to support continued suburban sprawl that benefits those who are able to join the republic of drivers. At the same time, funding is withheld from expanding less expensive travel options of public transportation or pedestrian infrastructure that would increase the mobility options of low-income residents and members of racial and ethnic minorities. Members of racial and ethnic minorities confront the paradigm of suspicion that seeks to constrict their mobility, and fight for alternative mobility options as a civil right.

Immigrants to the United States must adapt to the institutions and learn how to meet basic life needs, and strive to eventually thrive. In the case of transportation within the system of automobility, transportation adaptation refers to purchasing and driving a car, an aspiration many immigrants from Latin America quickly develop. Income barriers to vehicle ownership may decrease with time in the United States, as immigrants improve their economic standing. Barriers in the form of lack of knowledge and familiarity with driving may also decrease with time in the United States, as immigrants learn how to drive.

However, the mobility regime, through public policies and institutional practices, places additional constraints on the ability of immigrants to travel. Most notably, the REAL ID Act of 2005 created more stringent requirements for the issuance of driver's licenses, including applicants providing proof of lawful status. This requirement will render any immigrant without a clear authorized status ineligible for driver's licenses, a group that included about 11.2 million individuals in 2010, of which more than half were from Latin American countries (Passel and Cohn 2011), and these requirements have gone into effect in Georgia.

In addition, many state and local law enforcement agencies, including Georgia and localities within the Atlanta metropolitan area, have entered a Memorandum of Agreement with Immigration and Customs Enforcement (ICE) to enforce federal civil and criminal immigration violations, enabling them to identify and report unauthorized immigrants when enforcing routine traffic laws (Arnold 2002; Security 2009). This has resulted in increased surveillance in the streets, a spike in racial profiling of people who look Latino, and a climate of intimidation and fear in Latino communities (Arnold 2002; Romero 2006).

In completing this study, I investigated the travel patterns of Latino immigrants in Atlanta who experience both pressures to adapt to the transportation system and regulations that exclude

them from the same system. Specifically, I first examined whether the spatial dispersion of employment and ethnic residential concentration exacerbates the transportation costs of commuting to work for Latino immigrants. I then focused on specifying the extent to which Latino immigrants use various transportation strategies for their commute trip to work. In the final section of the research, I turned to ask how transportation limitations may also impede the broader adaptation process of Latino immigrants as they adjust to life in Atlanta.

Summary of Findings

The first two research questions asked whether residentially concentrated Latinos live spatially distant from the locations of job growth and whether the commute time experienced by Latino immigrant workers change significantly as the degree of residential segregation increases. Results revealed that, although Latino immigrants may settle in counties that experience employment expansion, the nearby job opportunities may not provide jobs for the immigrants. The analyses with both aggregate and individual data support the hypothesis that Latino immigrants who live in more segregated neighborhoods experience a longer commute time than immigrants living in more integrated areas. This suggests that factors contributing to the ethnic residential concentration of Latinos also indirectly contribute to longer and more costly commutes for immigrants, and may result in poor economic outcomes for Latino immigrants in terms of lack of opportunities to pursue alternative labor market options. Transportation limitations may be one of the factors that contribute to the residential concentration of immigrants, particularly if immigrants live near one another in order to be able to carpool to work.

The finding that Latinos living in neighborhoods with higher degrees of ethnic concentration tend to experience longer commute times stands in contrast to the finding of

Bohon, Stamps, and Atilas (2008). These scholars learned from focus groups of Latino immigrants that the immigrants may tend to live in close proximity to work places, and that employers frequently provide transportation to enable the immigrants to travel to work. Their conclusion was that Latino immigrants turned to various transportation strategies for the commute to work, but this solution precludes any other destination, and Latino immigrants find themselves stuck in housing locations and employment positions with little opportunities to explore other options. The hypothesis that Latino immigrants may actually live closer to their place of employment may still benefit from further investigation, although it may be more relevant for rural settings in which one major industry dominates.

The next research questions focused on identifying the transportation limitations experienced by Latino immigrants through an investigation of their patterns of commuting to work. The third question asked specifically how income and vehicle availability affect the mode of commute of Latino immigrant workers. Results generally supported the hypothesis that Latino immigrants tend to turn to carpooling rather than driving alone to work when they experience transportation barriers, measured by low incomes and limited vehicle availability. Latino immigrants who experience limited or no vehicle availability also tend to turn to public transit, and those with no vehicle availability tend to turn to walking or biking over carpooling as the transportation mode to work.

The evidence from this analysis supports the hypothesis that immigrants turn to carpooling as a survival strategy that meets life-serving needs rather than out of preference, altruism, or environmental concerns. Other modes of commuting – including walking/biking and taking public transit in addition to driving alone – tend to be used over carpooling when available. Immigrants who live in households with limited vehicle availability, as well as those

who live in households with no vehicle availability, tend to turn to public transit or walking/biking over carpooling when compared to immigrants living in households with at least one vehicle available per adult. Another explanation for these results is that carpooling, like driving alone, may not be an option for those with limited or no vehicles available in the household.

The fourth research question asked how the degree of ethnic embeddedness, measured by ethnic residential concentration and specific niche sector of employment, impact the mode of commute of Latino immigrant workers. The effects of ethnic residential concentration were inconsistent, with Latino residents of PUMAs with very low ethnic residential concentrations carpooling over driving alone in higher percents than Latino residents of the most concentrated PUMAs, but the converse was true of Latino residents of PUMAs with low residential concentrations. This inconsistency may be due to the coarse level of geography at the PUMA level, which may mask significant internal differentiation of Latino ethnic concentration, or it may be due to higher rates of carpooling by Latino immigrants that commute from suburban areas by carpooling to work downtown.

In looking at the other measure of ethnic embeddedness, I found that the sector of employment affects the commute mode used. Latino immigrants working in the food services sector tend to use all modes of commuting rather than carpool. The higher proportion of carpooling over walking or biking is also shared by the immigrants who work in the grounds and maintenance niche, presumably due to the spatial dispersion of the work sites and the lack of viable commuting alternatives to driving to work. Those who work in the construction sector stand in contrast to those working in other employment sectors in displaying a preference for carpooling over all other forms of transportation, even over driving alone.

Taking public transit and walking or biking may not be possible for construction workers who probably must travel long distances to build the expanding urban infrastructure, whose job sites change in location over time, and who may need to travel in a personal vehicle in order to transport machinery or other heavy equipment. At the same time, the long distances to the work sites may also make ride-sharing appealing as a strategy for reducing transportation costs and perhaps for maintaining a work team, members of which may not have a vehicle or license. This circumstance is highlighted in a newspaper story in *The Atlanta Journal-Constitution*. The reporter Feagans (2006) describes a Mexican carpenter who spends two hours each morning picking up his three-person crew and a minivan. Feagans reports: “This car pool isn't about saving gas, Figueroa [the carpenter] says. Without him, his crew couldn't get to work. There are no bus stops or subway stations near their suburban homes. Buying a car is often out of reach, too, particularly for those laborers trying to support families back in Latin America on \$10 an hour.” Transportation is such a need in the construction industry that even those who live in households with one vehicle per worker carpool in greater proportions than they drive alone to their worksite, presumably due to the need of giving rides to others or sharing the cost of commuting.

The fifth and last research question turns to an investigation of the consequences of limited mobility on the lives of Latino immigrants, specifically asking if transportation limitations have an impact on English language proficiency. The findings demonstrate that a positive association exists between transportation limitations and limited English proficiency. Immigrants who live in households with no vehicle available or with limited vehicle availability are less likely to speak English proficiently than Latino immigrants who live in households with at least one vehicle per adult. Similarly, Latino immigrants who commute via carpooling or

public transit are less likely to speak English proficiently than Latino immigrants who commute by driving alone. The precise nature of the relationship and causal mechanisms cannot be concluded from this analysis. Given the language acquisition literature that points to the importance of exposure to English-speaking contexts and social networks, it is not unreasonable to suspect that at least a portion of the lack of English proficiency is caused by limited transportation, and that improved mobility would remove one barrier for immigrants to proactively improve their English skills.

Transportation limitations may add an important aspect of accounting for exposure to the English speaking society. The model controlled for the major structural variables that typically measure exposure, such as length of time in the United States, age at migration, and having an English-speaking spouse. Including access to transportation may present a way to control for other forms of exposure to US society, such as participation beyond the realm of life that can be characterized by *institutional completeness* in which needs can be met by co-ethnics, a realm that may be quite limited in a new Latino destination that has not developed the density and depth of institutional and social support networks extant in traditional destinations (Singer 2004). The numerous small and discrete forms of exposure to, and participation in, US society enabled by mobility may well add up to make a substantial impact on the English language ability of immigrants as well as on other forms of adaptation. Controlling for mobility limitations in effect controls for the many trips *not* taken by low immigrants.

Various scholars point to what these trips not taken may be. A trip not taken may be a trip to inquire about job options at an employment agency or with an employer. It may be a trip to look at houses for sale in order to investigate the possibility of purchasing a home outside of the current neighborhood. A trip not taken may be a trip by a mother with her children to take

advantage of a medical clinic offering free immunization for children entering school, or other doctor visits for preventative care. Trips not taken may include trips to English classes or other classes at a community college or other institution, or trips to provide children with early childhood education opportunities. In not taking these trips, immigrants have less exposure to US society, which may be reflected in poor English skills, but these trips not taken also indicate the truncated ability of immigrants to become full participants in their communities and US society.

Implications

The findings of the research presented above point to the need for a more equitable approach to transportation and urban planning in the United States. Insofar as Latino immigrants experience transportation disadvantage due to unfamiliarity with driving, educational programs could facilitate the process of transportation adaptation. Insofar as society is built around the automobile as the dominant mode of transportation, equity in mobility may be attained either by increasing access to personal vehicles or by changing the way society is built. Insofar as the mobility regime imposes policies that explicitly prevent the movement of certain groups of people, this should be recognized as a violation of civil rights, since daily movement is vital to survival.

The most immediate approach to closing the mobility gap between Latino immigrants and the US born population is to increase the ownership and use of private vehicles within the Latino immigrant population. This could be achieved by facilitating processes of transportation assimilation, with communities actively working to help reduce the situational barriers to driving. For example, in locations with high concentrations of recent immigrants and low levels of vehicle ownership, driver's education programs provided by same-language instructors using official vehicles may help bridge the knowledge and ability gap. Information about how to build

a good credit background and how to research and compare loan options could help empower the immigrants to shop for the best rates. The extent to which dealerships and lenders mark-up financing rates for particular racial/ethnic populations could be investigated and addressed. The effectiveness of these solutions is limited, however, due to the existence of institutional and structural barriers that also serve to reduce the mobility of Latino immigrants.

The longer-term but more comprehensive solution to mobility inequities involves urban planning that incorporates alternative modes of transit into the vision of development. Both reducing the travel distances between the residential locations and needed destinations and increasing the methods that can be used to traverse the distance will reduce the friction of distance for all residents of the communities that take these factors into consideration. Incorporating infrastructure for multiple transportation systems in the existing and future urban areas would help reduce the inequities, but also would solve other problems resulting from the over-use of the automobile and urban sprawl.

Depending on the particular location and community, sidewalks and bike lanes could be installed, crosswalks and stoplights could be added, speed limits for cars could be lowered, all of which would help improve the ability for walkers and bikers to navigate around urban and suburban areas. Allowing the space for slower-moving modes of travel may enable the increased use of new alternatives to driving alone. Such vehicles could include the electric bicycle and scooters, which have been growing in use in Asian and European countries (Fairley 2005; Goodman 2010). These also have the advantage of lower purchase price and insurance rates of cars, which makes them more affordable. Insofar as the cost of auto ownership and driving restricts mobility, less costly forms of personal mobility could be developed and promoted.

The smart growth urban planning strategies provide an alternative vision to urban sprawl. The principles of smart growth, which include “compact, transit accessible, pedestrian-oriented, mixed use development patterns and land reuse” (American Planning Association 2012) highlight the importance of providing infrastructure for multiple transportation options. Public investments in bus, rail, biking and pedestrian infrastructure, as well as greater propinquity between jobs and housing, may help alter the unilateral trend in urban expansion and improve the mobility of the poor, as long as low-income households are not simply displaced and replaced with those who can pay higher taxes. In pursuit of a cultural, structural, and political shift away from automobility, transportation and urban planners should involve the disadvantaged communities in the planning process; otherwise, smart growth policies and blueprints may also perpetuate inequities.

On another structural level, legislation created by the mobility regime that limits the mobility immigrant population should be challenged. Immigrants who know how to drive should be eligible to receive a driver’s license. Not allowing someone the ability to drive for reasons not related to the ability to drive restrictions on multiple areas of the lives of immigrants and their children. Allowing immigrants to have driver’s licenses would also enable them to have access to auto insurance and remove the threat of auto impoundment. Alternatively, comprehensive immigration reform that would recognize and authorize the unauthorized population would make the legal obstacle to driver’s licenses irrelevant. Comprehensive immigration reform would also remove the formal basis for the racial/ethnic profiling of drivers, which makes the public roads a threatening and fearful place, and would remove the threat of deportation for those who are currently unauthorized.

Given that the system of automobility is entrenched in society and that the mobility regime operates beneath a cloak of legitimacy, changes may not come immediately. However, the system of automobility also generates its own points of weaknesses. The wider population experiences many problems created by automobility, including traffic congestion, air pollution, environmental destruction that occurs when the built environment continues to expand.

Automobility is also implicated in additional global problems, such as global warming and geopolitical competition for and disputes over the natural resources needed to provide for the material aspects of the system. These problems display disadvantages and weaknesses of automobility, and provide points for political pressure for investment in alternative systems of transportation.

The oppressive policies and practices of the mobility regime may prove to be the most challenging issue to confront. Although the changing demographic composition of the US population—most specifically the increase in the political power of Latino voters—has placed pressure on politicians for a comprehensive immigration reform, a fundamental change in the rights granted to unauthorized immigrants and in the respect given to all immigrants is not guaranteed. The right to drive a vehicle and the right to move through public space without being targeted for proof of lawful status are only two of the many liberties that a comprehensive immigration reform could either resolve or perpetuate, depending on punitive measures that may be included in the legislation. Furthermore, resolving the mobility restrictions on immigrants imposed by formal legislation would help toward reducing the mobility gap, but issues of equity would remain. Inequities result from the procedural exclusion of the minorities and of the poor from participation in creating policies and making decisions regarding the transportation systems. Until the procedural inequities are also resolved, the many decisions made in many

places may continue to perpetuate the transportation limitations, and perhaps also social isolation, experienced by Latino immigrants.

Future Research

This research adds to a small number of studies that looks at the transportation patterns of Latino immigrants, and an even smaller number of studies that asks what transportation limitations mean for their lives. The paucity of research means that there is both the opportunity and need for many additional investigations. Important areas to pursue include (1) to sift out the variations of travel patterns and implications for the lives of differentiated groups within the Latino immigrant population; (2) to explore variations in place, since the local built context affects what transportation options are available and to whom, and (3) develop more advanced methodologies to improve measurement and clarify relationships between the various factors and housing, transportation and employment, and (4) to continue to extend the questions beyond those of economics to include an investigation of the impacts of transportation limitations on all aspects of social life.

First, the Latino population has many internal differentiations. Transportation patterns may vary across nationality, so using ethnic differentiation rather than panethnic grouping may reveal important differences. Additionally, the unauthorized population experiences specific legal barriers to mobility, and studies that are able to learn more about the challenges faced by the unauthorized immigrants may particularly assist the people that are most directly targeted and restricted by the paradigm of suspicion.

Another area of internal differentiation is along gender lines. The way transportation limitations affect Latino men and Latina women differently warrants further exploration. It is already clear that Latino men and Latina women have different patterns of daily travel, with

women spending less time commuting and using modes of commute over carpooling in greater proportions than men. Latina women may have less access vehicles than a male household member, if the man uses it for commuting to his job, which may pay better. Latina women also may work in service industries, such as retail, hotels and restaurants, which are less likely to provide busses to work than the male-dominated industries. Latina immigrants may also be less likely to coordinate carpools because the restaurants, hotel, or other service industry employers are not as likely to hire a number of employees for the same shift as those in the male-dominated construction or manufacturing industries. Latina immigrants may also be more likely to stay at home to take care of their children, and research has not considered consequences of travel limitations of the Latina immigrant who is not in the labor force.

A second area that needs additional investigation is to explore the variations in transportation patterns and limitations on Latino immigrants in different places. The experiences of mobility of Latino immigrants new immigrant destinations may be considerably different from the experiences of mobility in established destinations because new destinations tend to have less of an urban center and tend to be more suburbanized (Singer 2004). The culture of automobility is also especially entrenched in the US south (Henderson 2011); other locations may have a less unitary approach to transportation planning and urban infrastructure.

A third area that needs attention is to develop more advanced methodologies to improve measurement and clarify relationships between the various factors and housing, transportation and employment. Particularly challenging is how to approach disentangling the multiple and mutually dependent factors that result in spatial and social isolation, such as living in neighborhood with high levels of ethnic concentration, working in an ethnic niche, and transportation.

A fourth area for future research is to ask additional questions about the consequences of transportation limitations. The economic questions are important, but social questions should be included. Scholars that focus on medical care frequently identify transportation as a limitations that prevents disadvantaged individuals, including Latino immigrants, from accessing timely medical care, for example (Cristancho et al. 2008; Flores G 1998). Other public health scholars identify transportation as a barrier to healthy eating, since transportation limitations may prevent the access of grocery stores and fresh produce (Morton and Blanchard 2007; Walker, Keane, and Burke 2010). Still other scholars find that lack of transportation creates a barrier to the enrollment and participation of children of Latino immigrants in early childhood education programs (Karoly and Gonzalez 2011). An investigation of the effects of the transportation barriers on multiple areas of life combined may reveal disturbing social costs of the system of automobility in which we all live.

BIBLIOGRAPHY

- Aldrich, Howard E. and Roger Waldinger. 1990. "Ethnicity and Entrepreneurship." *Annual Review of Sociology* 16:111-135.
- Allen, J. P. and E. Turner. 1995. "Ethnic differentiation by blocks within census tracts." *Urban Geography* 16:344-364.
- . 1996. "Spatial patterns of immigrant assimilation." *Professional Geographer* 48:140-155.
- American Community Survey. 2009a. "Selected Economic Characteristics: 2009 American Community Survey 1-Year Estimates (DP03)." edited by US Census Bureau.
- . 2009b. "Selected Population Profile in the United States: 2009 American Community Survey 1-Year Estimates (S0201)." edited by U. C. Bureau.
- American Planning Association. 2012. "Policy Guide on Smart Growth." Retrieved February 28, 2013 (<https://www.planning.org/policy/guides/adopted/smartgrowth.htm>).
- Andersson, Fredrik, Simon Burgess, and Julia Lane. 2009. "Do as the Neighbors Do: The Impact of Social Networks on Immigrant Employment."
- Arcury, Thomas A., John S. Preisser, Wilbert M. Gesler, and James M. Powers. 2005. "Access to Transportation and Health Care Utilization in a Rural Region." *The Journal of Rural Health* 21:31-38.
- Arnold, Carrie L. 2002. "Racial Profiling in Immigration Enforcement: State and Local Agreements to Enforce Federal Immigration Law." *Arizona Law Review* 49.
- Asamoah, K., M. Rodriguez, V. Gines, R. Varela, K. Domnguez, C. G. Mills, G. Sotomayor, and C. M. Beck-Sague. 2004. "Use of Preventive Health Services by Hispanic/Latino Women in Two Urban Communities: Atlanta, Georgia and Miami, Florida, 2000 and 2001." *Journal of Women's Health* 13.
- Atiles, J. H. and S. A. Bohon. 2002. "The Needs of Georgia's New Latinos: A Policy Agenda for the Decade Ahead. ." Carl Vinson Institute of Government, University of Georgia, Athens, GA.
- Atlanta Regional Commission. 2007. "Atlanta Region Bicycle Transportation and Pedestrian Walkways Plan: Final Report."
- . 2012. "Financing Transportation." Retrieved (<http://www.atlantaregional.com/transportation/financing-transportation>).
- Bailey, T. and R. Waldinger. 1991. "Primary, Secondary, and Enclave Labor-Markets - A Training Systems Approach." *American Sociological Review* 56:432-445.
- Bayor, R. H. 1988. "Roads to Racial Segregation Segregation - Atlanta in the 20th-Century." *Journal of Urban History* 15:3-21.
- Beckman, Jarad and Konstadinos G. Goulias. 2008. "Immigration, residential location, car ownership, and commuting behavior: a multivariate latent class analysis from California." *Transportation* 35:655-671.
- Blumenberg, E. 2004. "En-gendering Effective Planning - Spatial Mismatch, Low-income Women, and Transportation Policy." *Journal of the American Planning Association* 70:269-281.

- Blumenberg, E. and M. Manville. 2004. "Beyond the Spatial Mismatch: Welfare Recipients and Transportation Policy." *Journal of Planning Literature* 19:182-205.
- Blumenberg, Evelyn. 2009. "Moving In and Moving Around: Immigrants, Travel Behavior, and Implications for Transport Policy."
- Blumenberg, Evelyn and Kimiko Shiki. 2007. "Immigrants and Resource Sharing: The Case of Carpooling." *Transportation Research Board 87th Annual Meeting*.
- Blumenberg, Evelyn and Michael Smart. 2010. "Getting by with a little help from my friends...and family: immigrants and carpooling." *Transportation* 37:429-446.
- Bohon, S. A. 2005. "Occupational attainment of Latino immigrants in the United States." *Geographical Review* 95:249-266.
- Bohon, S. A., M. K. Johnson, and B. K. Gorman. 2006. "College aspirations and expectations among Latino adolescents in the United States." *Social Problems* 53:207-225.
- Bohon, Stephanie A., Heather MacPherson, and Jorge H. Atilas. 2005. "Educational Barriers for New Latinos in Georgia " *Journal of Latinos and Education* 4:43-58.
- Bohon, Stephanie A., Katherine Stamps, and Jorge. H. Atilas. 2008. "Transportation and Migrant Adjustment in Georgia." *Population Research and Policy Review* 27:273-291.
- Borjas, George J. 1994. "The Economics of Immigration." *Journal of Economic Literature* 32:1667-1717.
- Breton, Raymond. 1964. "Institutional Completeness of Ethnic Communities and the Personal Relations of Immigrants." *American Journal of Sociology* 70:193-205.
- Brown, L. A. and S. Y. Chung. 2006. "Spatial segregation, segregation indices and the geographical perspective." *Population Space and Place* 12:125-143.
- Browning, Harley L. and Joachim Singelmann. 1978. "The Transformation of the U.S. Labor Force: The Interaction of Industry and Occupation." *Politics & Society* 8:481-509.
- Bullard, R. D. and G. S. Johnson. 1997. *Just Transportation: Dismantling Race and Class Barriers to Mobility*. Gabriola Island, British Columbia, Canada: New Society.
- Cahill, M. 2010. *Transport, Environment and Society*. Maidenhead: Open University Press.
- Cairns, S., J. Greig, and M. Wachs. 2003. *Environmental Justice and Transportation: A Citizen's Handbook*. Berkeley, CA: Institute of Transportation Studies.
- Calderon, J. 1992. "Hispanic and Latino - The Viability of Categories for Panethnic Unity." *Latin American Perspectives* 19:37-44.
- Casas, Jesse, Carlos Arce, and Christopher Frye. 2004. "Latino Immigration and Its Impact on Future Travel Behavior." in *National Household Travel Survey Conference on Understanding Our Nation's Travel*. Washington, DC.
- Cervero, R. and R. Gorham. 1995. "Commuting in Transit Versus Automobile Neighborhoods." *Journal of the American Planning Association* 61:210-225.

- Cervero, Robert. 2002. "Built environments and mode choice: toward a normative framework." *Transportation Research Part D: Transport and Environment* 7:265-284.
- Cervero, Robert, Onesimo Sandoval, and John Landis. 2002. "Transportation as a Stimulus of Welfare-to-Work: Private versus Public Mobility." *Journal of Planning Education and Research* 22:50-63.
- Chan, N. D. and S. A. Shaheen. 2012. "Ridesharing in North America: Past, Present, and Future." *Transport Reviews* 32:93-112.
- Chapple, K. 2001a. "Out of touch, out of bounds: How social networks shape the labor market radii of women on welfare in San Francisco." *Urban Geography* 22:617-640.
- . 2001b. "Time to work: Job search strategies and commute time for women on welfare in San Francisco." *Journal of Urban Affairs* 23:155-173.
- Charles, K. K. and P. Kline. 2006. "Relational Costs and the Production of Social Capital: Evidence from Carpooling." *Economic Journal* 116:581-604.
- Chatman, Daniel G. and Nicholas Klein. 2009. "Immigrants and Travel Demand in the United States: Implications for Transportation Policy and Future Research." *Public Works Management & Policy* 13.
- Chiswick, Barry R. and Paul W. Miller. 2002. "Immigrant Earnings: Language Skills, Linguistic Concentrations and the Business Cycle." *Journal of Population Economics* 15:31-57.
- Clark, W. A. V. and Y. Q. Huang. 2004. "Black and white commuting behavior in a large southern city: Evidence from Atlanta." *Geographical Analysis* 36:54-68.
- Cline, M. E., C. Sparks, and K. Eschbach. 2009. "Understanding Carpool Use by Hispanics in Texas." *Transportation Research Record*:39-46.
- CNN Money. 2011. "Fortune 500: Our Annual Ranking of America's Largest Corporations." Retrieved February 5, 2013 (<http://money.cnn.com/magazines/fortune/fortune500/2011/cities/>).
- Cohen, Mark A. 2012. "Imperfect Competition in Auto Lending: Subjective Markup, Racial Disparity, and Class Action Litigation." *REview of Law & Economics* 8:21-58.
- Crane, R. 2007. "Is there a quiet revolution in women's travel? Revisiting the gender gap in commuting." *Journal of the American Planning Association* 73:298-316.
- Cristancho, Sergio, D. Marcela Garces, Karen E. Peters, and Benjamin C. Mueller. 2008. "Listening to Rural Hispanic Immigrants in the Midwest: A Community-Based Participatory Assessment of Major Barriers to Health Care Access and Use." *Qualitative Health Research* 18:633-646.
- Currie, Graham and Alexa Delbosc. 2001. "Mobility vs. Affordability as Motivations for Car-Ownership Choice in Urban Fringe, Low-Income Australia." in *Auto Motives: Understanding Car Use Behaviours*, edited by K. Lucas, E. Blumenberg, and R. Weinberger. Bingley, UK: Emerald Group Publishing Limited.
- Denton, Nancy A. and Douglas S. Massey. 1989. "Racial Identity Among Caribbean Hispanics: The Effect of Double Minority Status on Residential Segregation." *American Sociological Review* 54:790-808.

- Department of Homeland Security. 2013. "State Driver's License Documentation." Retrieved (<http://www.dhs.gov/state-drivers-license-documentation>).
- Dickins, Ian S. J. 1991. "Park and ride facilities on light rail transit systems." *Transportation* 18:23-36.
- DiPietro, Stephanie M. and Robert J. Bursik, Jr. 2012. "Studies of the New Immigration: The Dangers of Pan-Ethnic Classifications." *Annals of the American Academy of Political and Social Science* 641:247-267.
- Duncan, Otis Dudley and Beverly Duncan. 1955. "A Methodological Analysis of Segregation Indexes." *American Sociological Review* 20:210-217.
- Durlauf, Steven N. 2004. "Neighborhood effects." Pp. 2173-2242 in *Handbook of Regional and Urban Economics*, vol. Volume 4, edited by J. V. Henderson and T. Jacques-François: Elsevier.
- Ellen, I. G., T. Mijanovich, and K. N. Dillman. 2001. "Neighborhood effects on health: Exploring the links and assessing the evidence." *Journal of Urban Affairs* 23:391-408.
- Elliott, James R. and Mario Sims. 2001. "Ghettos and Barrios: The Impact of Neighborhood Poverty and Race on Job Matching among Blacks and Latinos." *Social Problems* 48:341-361.
- Environmental Protection Agency. 2012. "Residential Construction Trends in America's Metropolitan Regions." Washington, DC.
- Espenshade, T. J. and H. S. Fu. 1997. "An analysis of English-language proficiency among US immigrants." *American Sociological Review* 62:288-305.
- Fairley, P. 2005. "China's cyclists take charge: electric bicycles are selling by the millions despite efforts to ban them." *Spectrum, IEEE* 42:54-59.
- Feagans, Brian. 2006. "A Dent in Atlanta's Traffic; Hispanics Share Rides in Big Numbers." in *Atlanta Journal-Constitution*. Atlanta.
- Feagin, Joe R. and Douglas Lee Eckberg. 1980. "Discrimination: Motivation, Action, Effects, and Context." *Annual Review of Sociology* 6:1-20.
- Federal Highway Administration. 2006. "Travel Characteristics of New Immigrants." edited by U.S. Department of Transportation.
- . 2010. "Highway Statistics 2010." Federal Highway Administration,. Retrieved (<http://www.fhwa.dot.gov/policyinformation/statistics/2010/>).
- Ferguson, E. 1997. "The rise and fall of the American carpool: 1970-1990." *Transportation* 24:349-376.
- Fernandez-Kelly, Patricia M. 1995. "Social and Cultural Capital in the Urban Ghetto: Implications for the Economic Sociology of Immigration." in *The Economic Sociology of Immigration: Essays on Networks, Ethnicity, and Entrepreneurship*, edited by A. Portes. New York: Russell Sage Foundation.
- Fernandez, Roberto M. 1994. "Race, Space, and Job Accessibility: Evidence from a Plant Relocation." *Economic Geography* 70:390-416.

- . 2008. "Race, Spatial Mismatch, and Job Accessibility: Evidence from a Plant Relocation." *Social Science Research* 37:853-975.
- Flink, James J. 1972. "Three Stages of American Automobile Consciousness." *American Quarterly* 24:451-473.
- Flores G, Abreu M. Olivar M. Kastner B. 1998. "Access Barriers to Health Care for Latino Children." *Archives of Pediatrics & Adolescent Medicine* 152:1119-1125.
- Fotheringham, A. S. and D. W. S. Wong. 1991. "The Modifiable Areal Unit Problem in Multivariate Statistical Analysis." *Environment and Planning A* 23:1025-1044.
- Frank, Lawrence D. and Gary Pivo. 1994. "Impacts of Mixed Use and Density on Utilization of Three Modes of Travel: Single-Occupant Vehicle, Transit, and Walking." *Transportation Research Record* 1466.
- Frey, William H. 1979. "Central City White Flight: Racial and Nonracial Causes." *American Sociological Review* 44:425-448.
- Gabriel, S. A. and S. S. Rosenthal. 1996. "Commutes, Neighborhood Effects, and Earnings: An Analysis of Racial Discrimination and Compensating Differentials." *Journal of Urban Economics* 40:61-83.
- Garni, Alisa and Arpi Miller. 2008. "Localized Immigration Policy and Migrant Life Experiences: The Case of Mexican Migrants in Southern California." *Journal of Immigrant & Refugee Studies* 6:435-450.
- Georgia Department of Driver Services. 2012. "Information for Non-US Citizens." Retrieved (<http://www.dds.ga.gov/drivers/dldata.aspx?con=1741471757&ty=dl>).
- Giuliano, Genevieve. 2003. "Travel, Location and Race/Ethnicity." *Transportation Research Part A: Policy and Practice* 37:351-372.
- Giuliano, Genevieve and Andrew Gillespie. 1997. "Research Issues Regarding Societal Change and Transport." *Journal of Transport Geography* 5:165-176.
- Glaeser, Edward L., Matthew E. Kahn, and Jordan Rappaport. 2008. "Why do the poor live in cities? The role of public transportation." *Journal of Urban Economics* 63:1-24.
- Goddard, Stephen B. 1997. "The Road to Now." *Annals of the American Academy of Political and Social Science* 553:30-41.
- Goodman, J. David. 2010. "An Electric Boost for Bicyclists." in *The New York Times*. New York: The New York Times Company.
- Grenier, G. 1984. "Shifts to English as Usual By Americans of Spanish Mother Tongue." *Social Science Quarterly* 65:537-550.
- Guest, A. M. and B. A. Lee. 1984. "How Urbanites Define Their Neighborhoods." *Population and Environment* 7:32-56.
- Haeberle, Steven H. 1988. "People or Place: Variations in Community Leaders' Subjective Definitions of Neighborhood." *Urban Affairs Review* 23:616-634.
- Halgunseth, L. C., J. M. Ispa, and D. Rudy. 2006. "Parental Control in Latino Families: An Integrated Review of the Literature." *Child Development* 77:1282-1297.

- Hall, Jane V. 1995. "The Role of Transport Control Measures in Jointly Reducing Congestion and Air Pollution." *Journal of Transport Economics and Policy* 29:93-103.
- Handy, Susan, Evelyn Blumenberg, Moria Donahue, Kristin Lovejoy, Caroline Rodier, Susan Shaheen, Kimiko Shiki, and Lily Song. 2008. "Travel Behavior of Mexican and Other Immigrant Groups in California." *Berkeley Planning Journal* 21.
- Hannam, Kevin, Mimi Sheller, and John Urry. 2006. "Editorial: Mobilities, Immobilities and Moorings." *Mobilities* 1:1-22.
- Hanson, Susan and Geraldine Pratt. 1992. "Dynamic Dependencies: A Geographic Investigation of Local Labor Markets." *Economic Geography* 68:373-405.
- Hanushek, Eric A., John E. Jackson, and John F. Kain. 1974. "Model Specification, Use of Aggregate Data, and the Ecological Correlation Fallacy." *Political Methodology* 1:89-107.
- Happe, Catherine. 2009. "Metro Atlanta Chamber Launches Media Campaign to Mobilize Public on Transportation Funding." Metro Atlanta Chamber of Commerce.
- Hartshorn, T. A. and K. Ihlanfeldt. 2000. "Growth and Change in Metropolitan Atlanta." in *The Atlanta Paradox*, edited by D. L. Sjoquist. New York, NY: Russell Sage Foundation.
- Hassounah, Mazen, Loy-Sai Cheah, and Gerald Steuart. 1993. "Underreporting of Trips in Telephone Interview Travel Surveys." *Transportation Research Record* 1412:90-94.
- Henderson, J. 2004. "The politics of mobility and business elites in Atlanta, Georgia." *Urban Geography* 25:193-216.
- . 2006. "Secessionist automobility: Racism, anti-urbanism, and the politics of automobility in Atlanta, Georgia." *International Journal of Urban and Regional Research* 30:293-307.
- . 2011. "The Politics of Mobility in the South." *Southeastern Geographer* 51.
- Holzer, Harry J. 1991. "The Spatial Mismatch Hypothesis: What Has the Evidence Shown?" *Urban Studies* 28:105-122.
- Hu, P.S. and T. R Reuscher. 2004. "Summary of Travel Trends: 2001 National Household Travel Survey." edited by U. S. D. o. Transportation. Washington, D.C: Federal Highway Administration.
- Hudson, M. 2002. "Modeling the probability of niche employment: Exploring workforce segmentation in Metropolitan Atlanta." *Urban Geography* 23:528-559.
- Hwang, S. S. and J. Xi. 2008. "Structural and individual covariates of English language proficiency." *Social Forces* 86:1079-1104.
- Iceland, J. and M. Scopilliti. 2008. "Immigrant residential segregation in US metropolitan areas, 1990-2000." *Demography* 45:79-94.
- Iceland, John, Daniel H. Weinberg, and Erika Steinmetz. 2002. "Racial and Ethnic Residential Segregation in the United States: 1980-2000." *Series CENSR-3*, edited by U. S. C. Bureau. Washington, DC: U.S. Government Printing Office.
- Ihlanfeldt, K. 2002. "Spatial mismatch in the labor market and racial differences in neighborhood crime." *Economics Letters* 76:73-76.

- Ihlanfeldt, K. and D. L. Sjoquist. 2000. "The Geographic Mismatch Between Jobs and Housing." in *The Atlanta Paradox*, edited by D. L. Sjoquist. New York, NY: Russell Sage Foundation.
- Ihlanfeldt, Keith R. and D. L. Sjoquist. 1998. "The Spatial Mismatch Hypothesis: A Review of Recent Studies and their Implications for Welfare Reform." *Housing Policy Debate* 9:849-892.
- Ihlanfeldt, Keith R. and David L. Sjoquist. 1989. "The impact of job decentralization on the economic welfare of central city blacks." *Journal of Urban Economics* 26:110-130.
- Ishizawa, Hiromi. 2009. "Dynamics of Spanish-Language Neighborhoods in Chicago and Atlanta: 1990-2000." *Population Research and Policy Review* 28:721-746.
- Itzigsohn, Jose and Carlos Dore-Cabral. 2000. "Competing Identities? Race, Ethnicity and Panethnicity among Dominicans in the United States." *Sociological Forum* 15:225-247.
- Jackson, Jerry R. 1979. "Intraurban variation in the price of housing." *Journal of Urban Economics* 6:464-479.
- Jacobson, S. H. and D. M. King. 2009. "Fuel saving and ridesharing in the US: Motivations, limitations, and opportunities." *Transportation Research Part D-Transport and Environment* 14:14-21.
- Jencks, Christopher and Susan E. Mayer. 1990. "Residential Segregation, Job Proximity, and Black Job Opportunities." Pp. 187-222 in *Inner-City Poverty in the United States*, edited by L. E. Lynn Jr. and M. G. H. McGreary. Washington, DC: National Academy Press.
- Johnston, R., M. Poulsen, and J. Forrest. 2003. "And did the walls come tumbling down? Ethnic residential segregation in four US metropolitan areas 1980-2000." *Urban Geography* 24:560-581.
- Johnstonanumonwo, I. 1992. "The Influence of Household Type on Gender Differences in Work Trip Distance." *Professional Geographer* 44:161-169.
- Jones, P. M. 1987. "Mobility and the Individual in Western Industrial Society." in *Transportation Planning in a Changing World*, edited by P. Nijkamp and S. Reichman. Aldershot: Gower.
- Kain, J. F. 1968. "Housing Segregation, Negro Employment, and Metropolitan Decentralization." *Quarterly Journal of Economics* 82:175-197.
- . 1974. "Housing Segregation, Negro Employment, and Metropolitan Development: A Retrospective View." in *Patterns of Racial Discrimination, Vol. II: Employment and Income*, edited by G. M. von Furstenberg. Lexington, MA: D. C. Heath.
- Kain, J. F. . 1992. "The spatial mismatch hypothesis: Three decades later." *Housing Policy Debate* 3:371-460.
- Kandel, W. and E. A. Parrado. 2005. "Restructuring of the US meat processing industry and new Hispanic migrant destinations." *Population and Development Review* 31:447-+.
- Karoly, Lynn A. and Gabriella C Gonzalez. 2011. "Early Care and Education for Children in Immigrant Families." *The Future of Children: Immigrant Children* 21.

- Kasarda, John D. 1989. "Urban Industrial Transition and the Underclass." *Annals of the American Academy of Political and Social Science* 501:26-47.
- Keating, Larry. 2001. *Atlanta: Race, Class, and Urban Expansion*. Philadelphia: Temple University Press.
- Keenan, Teresa A. 2010. "Transportation Use and Options of Midlife and Older Adults." AARP Research & Strategic Analysis, Washington, DC.
- Kim, Ann H. and Michael J. White. 2010. "Panethnicity, Ethnic Diversity, and Residential Segregation." *American Journal of Sociology* 115:1558-1596.
- Kim, Jongsung. 2011. "Education, English language proficiency, and earnings of male immigrants in the US labor market." *Journal of Business & Economics Research* 1.
- Kim, S. H. O., J. Ehrich, and L. Ficorilli. 2012. "Perceptions of settlement well-being, language proficiency, and employment: An investigation of immigrant adult language learners in Australia." *International Journal of Intercultural Relations* 36:41-52.
- Kitamura, Ryuichi, Patricia L. Mokhtarian, and Laura Laidet. 1997. "A micro-analysis of land use and travel in five neighborhoods in the San Francisco Bay Area." *Transportation* 24:125-158.
- Kominski, R. . 1989. "How Good Is 'How Well'? An Examination of the Census English-Speaking Ability Question." in *Annual meeting of the American Statistical Association*.
- Kossoudji, Sherrie A. 1988. "English Language Ability and the Labor Market Opportunities of Hispanic and East Asian Immigrant Men." *Journal of Labor Economics* 6:205-228.
- Lazear, Edward P. 1999. "Culture and Language." *Journal of Political Economy* 107.
- Lee, I-Min and David M. Buchner. 2008. "The Importance of Walking to Public Health." *Medicine & Science in Sports & Exercise* 40:S512-S518.
- Lee, Li Way. 1984. "The Economics of Carpools." *Economic Inquiry* 22:128-135.
- Lein, Laura, Alan F. Benjamin, Monica McManus, and Kevin Roy. 2005. "Economic Roulette: When Is a Job Not a Job?" *Community, Work & Family* 8:359-378.
- Leinberger, Christopher B. and Charles Lockwood 1986. "How business is reshaping America." *Atlantic*, 1986/10//, pp. 43+.
- Lemp, J. D. and K. M. Kockelman. 2008. "Quantifying the external costs of vehicle use: Evidence from America's top-selling light-duty models." *Transportation Research Part D-Transport and Environment* 13:491-504.
- Leventhal, Tama and Jeanne Brooks-Gunn. 2000. "The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes." *Psychological Bulletin* 126:309-337.
- Lichter, D. T., D. Parisi, M. C. Taquino, and S. M. Grice. 2010. "Residential Segregation in New Hispanic Destinations: Cities, Suburbs, and Rural Communities Compared." *Social Science Research* 39:215-230.

- Liebersohn, Stanley. 1961. "The Impact of Residential Segregation on Ethnic Assimilation." *Social Forces* 40:52-57.
- Lippard, Cameron D. 2006. "Building Inequality: A Case Study of White, Black, and Latino Contractors in the Atlanta Construction Industry." Georgia State University, Sociology Dissertations.
- Lipsitz, George. 2007. "The Racialization of Space and the Spatialization of Race." *Landscape Journal* 26:10-23.
- Litman, Todd. 2003. "Measuring Transportation: Traffic, Mobility and Accessibility." *Institute of Transportation Engineers Journal* 73:28-32.
- . 2009. "Transportation Cost and Benefit Analysis: Techniques, Estimates, and Implications." Victoria Transport Policy Institute.
- Liu, C. Y. 2009. "Ethnic Enclave Residence, Employment, and Commuting of Latino Workers." *Journal of Policy Analysis and Management* 28:600-625.
- Liu, C. Y. and G. Painter. 2012. "Travel Behavior among Latino Immigrants: The Role of Ethnic Concentration and Ethnic Employment." *Journal of Planning Education and Research* 32:62-80.
- Logan, J. R. , B. J. Stults, and R. Farley. 2004. "Segregation of Minorities in the Metropolis: Two Decades of Change." *Demography* 41:1-22.
- Lovejoy, K. and S. Handy. 2011. "Social networks as a source of private-vehicle transportation: The practice of getting rides and borrowing vehicles among Mexican immigrants in California." *Transportation Research Part a-Policy and Practice* 45:248-257.
- Lovejoy, Kristin and Susan Handy. 2008. "A Case for Measuring Individuals' Access to Private-vehicle Travel as a Matter of Degrees: Lessons from Focus Groups with Mexican Immigrants in California." *Transportation* 35:601-612.
- Lovejoy, Kristin and Susan L. Handy. 2007. "Transportation Experiences of Mexican Immigrants in California: Results from Focus Group Interviews." Institute of Transportation Studies, University of California, Davis.
- Madden, Janice Fanning. 1985. "Urban wage gradients: Empirical evidence." *Journal of Urban Economics* 18:291-301.
- Maples, James N. 2012. "Changes in US Ethnic Niches, 2005-2010." Knoxville, TN: University of Tennessee.
- Marrow, Helen B. 2005. "New Destinations and Immigrant Incorporation." *Perspectives on Politics* 3:781-799.
- Massey, D. S. and N. A. Denton. 1988. "The Dimensions of Segregation." *Social Forces* 67:281-415.
- Massey, Douglas S. and Nancy A. Denton. 1987. "Trends in the Residential Segregation of Blacks, Hispanics, and Asians: 1970-1980." *American Sociological Review* 52:802-825.
- . 1993. *American Apartheid: Segregation and the Making of the Underclass*: Harvard University Press.

- Massey, Douglas S., Jorge Durand, and Nolan Malone. 2003. *Beyond Smoke and Mirrors: Mexican Immigration in an Era of Economic Integration*. New York: Russell Sage Foundation.
- McCann, Eugene J. 1999. "Race, Protest, and Public Space: Contextualizing Lefebvre in the U.S. City." *Antipode* 31:163-184.
- McDermott, Monica and Frank L. Samson. 2005. "White Racial and Ethnic Identity in the United States." *Annual Review of Sociology* 31:245-261.
- McLafferty, S. and V. Preston. 1991. "Gender, Race, and Commuting Among Service Sector Workers." *Professional Geographer* 43:1-15.
- . 1992. "Spatial Mismatch and Labor Market Segmentation for African-American and Latina Women." *Economic Geography* 68:406-431.
- . 1996. "Spatial mismatch and employment in a decade of restructuring." *Professional Geographer* 48:420-431.
- McManus, Walter, William Gould, and Finis Welch. 1983. "Earnings of Hispanic Men: The Role of English Language Proficiency." *Journal of Labor Economics* 1:101-130.
- Metro Atlanta Chamber of Commerce. 2012. "Metro Atlanta Annual Indicators - 2011."
- Mieszkowski, Peter and Edwin S. Mills. 1993. "The Causes of Metropolitan Suburbanization." *The Journal of Economic Perspectives* 7:135-147.
- Ming, Z. 2006. "Travel choice with no alternative - Can land use reduce automobile dependence?" *Journal of Planning Education and Research* 25:311-326.
- Morales, Julio. 1987. *Puerto Rican Poverty and Migration*. New York: Praeger.
- Moran, C. M., P. J. Hletko, J. R. Reigart, and P. M. Darden. 2002. "Transportation: A barrier to care for rural children?" *Pediatric Research* 51:208A-208A.
- Morton, Lois Wright and Troy C. Blanchard. 2007. "Starved for Access: Life in Rural America's Food Deserts."
- Murakami, Elaine and Jennifer Young. 1997. "Daily Travel by Persons with Low Income." edited by U. D. o. Transportation. Washington, DC: Federal Highway Administration.
- Murray, Alan T., Rex Davis, Robert J. Stimson, and Luis Ferreira. 1998. "Public Transportation Access." *Transportation Research Part D: Transport and Environment* 3:319-328.
- Myers, D. 1997. "Changes Over Time in Transportation Mode for Journey to Work: Effects of Aging and Immigration." in *Decennial Census Data for Transportation Planning*.
- Nawyn, S. J., L. Gjokaj, D. L. Agbenyiga, and B. Grace. 2012. "Linguistic Isolation, Social Capital, and Immigrant Belonging." *Journal of Contemporary Ethnography* 41:255-282.
- O'Kelly, M. E. and W. Lee. 2005. "Disaggregate journey-to-work data: implications for excess commuting and jobs-housing balance." *Environment and Planning A* 37:2233-2252.
- Odem, Mary E. 2009. "Latino Immigrants and the Politics of Space in Atlanta." in *Latino Immigrants and the Transformation fo the U.S. South*, edited by M. E. Odem and E. Lacy. Athens, GA: The University of Georgia Press.

- Okamoto, Dina G. 2003. "Toward a Theory of Panethnicity: Explaining Asian American Collective Action." *American Sociological Review* 68:811-842.
- Okamura-Bichard. 1985. "Mother Tongue Maintenance and Second Language Learning: A case of Japanese Children." *Language Learning* 35:63-89.
- Ong, Paul M. 2002. "Car Ownership and Welfare-to-Work." *Journal of Policy Analysis and Management* 21:239-252.
- Orszag, Peter R. 2009. "OMB Bulletin No 10-02." edited by U.S. Office of Management and Budget. Washington, DC.
- Painter, Gary, Cathy Yang Liu, and Duan Zhuang. 2007. "Immigrants and the Spatial Mismatch Hypothesis: Employment Outcomes among Immigrant Youth in Los Angeles." *Urban Studies* 44:2627-2649.
- Park, Jin Heum. 1999. "The Earnings of Immigrants in the United States: The Effect of English-Speaking Ability." *American Journal of Economics and Sociology* 58:43-56.
- Parks, Virginia. 2004a. "Access to Work: The Effects of Spatial and Social Accessibility on Unemployment for Native-Born Black and Immigrant Women in Los Angeles." *Economic Geography* 80:141-172.
- . 2004b. "The Gendered Connection Between Ethnic Residential and Labor Market Segregation in Los Angeles." *Urban Geography* 25.
- Passel, Jeffrey S. and D'Vera Cohn. 2011. "Unauthorized Immigrant Population: National and State Trends, 2010 " Pew Hispanic Center, Washington, D.C.
- Peponis, J., C. Ross, and M. Rashid. 1997. "The structure of urban space, movement and co-presence: The case of Atlanta." *Geoforum* 28:341-358.
- Plaut, P. O. 2006. "The intra-household choices regarding commuting and housing." *Transportation Research Part a-Policy and Practice* 40:561-571.
- Portes, A. and P. Fernandez-Kelly. 2008. "No Margin for Error: Educational and Occupational Achievement among Disadvantaged Children of Immigrants." *Annals of the American Academy of Political and Social Science* 620:12-36.
- Portes, A., P. Fernandez-Kelly, and W. Haller. 2005. "Segmented assimilation on the ground: The new second generation in early adulthood." *Ethnic and Racial Studies* 28:1000-1040.
- Portes, A. and C. Truelove. 1987. "Making Sense of Diversity - Recent Research on Hispanic Minorities in the United States." *Annual Review of Sociology* 13:359-385.
- Portes, A. and M. Zhou. 1993. "The New 2nd Generation: Segmented Assimilation and its Variants." *Annals of the American Academy of Political and Social Science* 530:74-96.
- Preston, V. and S. McLafferty. 1999. "Spatial Mismatch Research in the 1990s: Progress and Potential." *Papers in Regional Science* 78:387-402.
- Preston, V., S. McLafferty, and X. F. Liu. 1998. "Geographical barriers to employment for American-born and immigrant workers." *Urban Studies* 35:529-545.

- Prins, E. and B. W. Toso. 2012. "Receptivity toward Immigrants in Rural Pennsylvania: Perceptions of Adult English as Second Language Providers." *Rural Sociology* 77:435-461.
- Pucher, J., Ralph Buehler Buehler, Dafna Merom, and Adrian Bauman Bauman. 2011. "Walking and Cycling in the United States, 2001–2009: Evidence From the National Household Travel Surveys." *American Journal of Public Health* Vol 101.
- Pucher, J. and J. L. Renne. 2003. "Socioeconomics of urban travel: Evidence from the 2001 NHTS." *Transportation Quarterly* 57:49-77.
- Puentes, Robert and Ryan Prince. 2003. "Feuling Transportation Finance: A Primer on the Gas Tax." Brookings Institution, Washington, DC.
- Purvis, Chuck. 2003. "Commuting Patterns of Immigrants."
- Rabin, Yale. 1973. "Highways as a Barrier to Equal Access." *Annals of the American Academy of Political and Social Science* 407:63-77.
- Raphael, S. and L. Rice. 2002. "Car Ownership, Employment and Earnings." *Journal of Urban Economics* 52:109-130.
- Reardon, S. F. and D. O'Sullivan. 2004. "Measures of spatial segregation." *Sociological Methodology, Vol 34* 34:121-162.
- Reardon, Sean F., Stephen A. Matthews, David O'Sullivan, Barrett A. Lee, Glenn Firebaugh, Chad R. Farrell, and Kendra Bischoff. 2008. "The Geographic Scale of Metropolitan Racial Segregation." *Demography* 45:489-514.
- Ricourt, Milagros and Ruby Danta Danta. 2003. *Hispanas de Queens: Latino Panethnicity in a New York City Neighborhood*. Ithaca, NY: Cornell University Press.
- Robinson, W. S. 1950. "Ecological Correlations and the Behavior of Individuals." *American Sociological Review* 15:351-357.
- Rogalsky, J. 2010. "Bartering For Basics: Using Ethnography and Travel Diaries to Understand Transportation Constraints and Social Networks Among Working-Poor Women." *Urban Geography* 31:1018-1038.
- Romero, Mary. 2006. "Racial Profiling and Immigration Law Enforcement: Rounding Up of Usual Suspects in the Latino Community." *Critical Sociology* 32:447-473.
- Rosenbaum, James E., Lisa Reynolds, and Stefanie Deluca. 2002. "How Do Places Matter? The Geography of Opportunity, Self-efficacy and a Look Inside the Black Box of Residential Mobility." *Housing Studies* 17:71-82.
- Rosenbloom, Sandra and Agneta Stahl. 2002. "Automobility among the Elderly." *EJTIR* 2:197-213.
- Rosenfeld, Michael J. 2001. "The Salience of Pan-National Hispanic and Asian Identities in U.S. Marriage Markets." *Demography* 38:161-175.
- Ross, Catherine L. Ross, Ph.D. and Anne E. Dunning Dunning. 1997. "Land Use and Transportation Interaction: An Examination of the 1995 NPTS Data." edited by U. S. D. o. Transportation. Washington, DC: Federal Highway Administration.

- Ross, S. L. 1998. "Racial differences in residential and job mobility: Evidence concerning the spatial mismatch hypothesis." *Journal of Urban Economics* 43:112-135.
- Rothwell, Jonathan and Douglas S. Masssey. 2009. "The Effect of Density Zoning on Racial Segregation in U.S. Urban Areas." *Urban Affairs Review* 44:779-806.
- Roy Simon, Bryce-Laporte. 1972. "Black Immigrants: The Experience of Invisibility and Inequality." *Journal of Black Studies* 3:29-56.
- Ruggles, Steven J., Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. 2010. "Integrated Public Use Microdata Series: Version 5.0 [Machine-readable database]." edited by M. P. Center. Minneapolis, MN: Minnesota Population Center
- Rumbaut, R. G. 1994. "The Crucible Within - Ethnic Identity, Self-Esteem, and Segmented Assimilation Among Children of Immigrants." *International Migration Review* 28:748-794.
- Rumberger, Russell. 1987. "High School Dropouts: A Review of Issues and Evidence." *Review of Educational Research* 57.
- Saha S, Komaromy M. Koepsell T. D. Bindman A. B. 1999. "PATient-physician racial concordance and the perceived quality and use of health care." *Archives of Internal Medicine* 159:997-004.
- Sallis, James F., Lawrence D. Frank, Brian E. Saelens, and M. Katherine Kraft. 2004. "Active transportation and physical activity: opportunities for collaboration on transportation and public health research." *Transportation Research Part A: Policy and Practice* 38:249-268.
- Sanchez, T. W. 1999. "The connection between public transit and employment - The cases of Portland and Atlanta." *Journal of the American Planning Association* 65:284-296.
- Sánchez, Thomas W., Rich Stolz, and Jacinta S Ma. 2003. *Moving to Equity: Addressing Inequitable Effects of Transportation Policies on Minorities*. Cambridge, MA: The Civil Rights Project at Harvard University.
- Sang, Sunhee, Morton O'Kelly, and Mei-Po Kwan. 2011. "Examining Commuting Patterns: Results from a Journey-to-work Model Disaggregated by Gender and Occupation." *Urban Studies* 48:891-909.
- Santos, A., N. McGuckin, H.Y. Nakamoto, D. Gray, and S. Liss. 2011. "Summary of Travel Trends: 2009 National Household Travel Survey." US Department of Transportation, Washington, DC.
- Schrank, David, Bill Eisele, and Tim Lomax. 2012. "TTI's 2012 Urban Mobility Report." The Texas A&M University System.
- Schwartz, S. 1994. "The Fallacy of the Ecological Fallacy - The Potential Misuse of A Concept and the Consequences." *American Journal of Public Health* 84:819-824.
- Security, US Department of Homeland. 2009. "Secretary Napolitano Announces New Agreement for State and Local Immigration Enforcement Partnerships & Adds 11 New Agreements." Retrieved March 20, 2013

- (<http://www.dhs.gov/news/2009/07/10/secretary-announces-new-agreement-state-and-local-immigration-enforcement>).
- Seiler, Cotten. 2006. "'So That We as a Race Might Have Something Authentic to Travel By': African American Automobility and Cold-War Liberalism." *American Quarterly* 58:1091-1117.
- . 2007. "The Significance of Race to Transport History." *Journal of Transport History* 28:307-617.
- Shamir, Ronen. 2005. "Without Borders? Notes on Globalization as a Mobility Regime." *Sociological Theory* 23:197-217.
- Sharma, Madhuri. 2011. "A Geographic Perspective on Intra-Urban Racial/Ethnic Diversity, Segregation and Clustering in Knoxville, Tennessee: 1990-2000." *Applied Geography* 32:310-323.
- Sheller, Mimi and John Urry. 2006. "The New Mobilities Paradigm." *Environment and Planning A* 38:207-226.
- Shihadeh, E. S. and R. E. Barranco. 2010. "Latino Immigration, Economic Deprivation, and Violence: Regional Differences in the Effect of Linguistic Isolation." *Homicide Studies* 14:336-355.
- Siegel, Paul, Elizabeth Martin, and Rosalind Bruno. 2001. "Language Use and Linguistic Isolation: Historical Data and Methodological Issues." in *FCSM Statistical Policy Seminar*. Bethesda, MD: US Census Bureau.
- Singer, Audrey. 2004. *The Rise of New Immigrant Gateways*. Washington, DC: Brookings Institution.
- Sjoquist, D. L. 2000. "The Atlanta Paradox." New York: Russell Sage Foundation.
- Smart, Michael. 2010. "US Immigrants and Bicycling: Two-wheeled in Autopia." *Transport Policy* 17:153-159.
- Smith, B. E. and J. Winders. 2008. "'We're here to stay': economic restructuring, Latino migration and place-making in the US South." *Transactions of the Institute of British Geographers* 33:60-72.
- So, K. S., P. F. Orazem, and D. M. Otto. 2001. "The effects of housing prices, wages, and commuting time on joint residential and job location choices." *American Journal of Agricultural Economics* 83:1036-1048.
- Squires, Gregory D. and Charis E. Kubrin. 2005. "Privileged Places: Race, Uneven Development and the Geography of Opportunity in Urban America." *Urban Studies* 42:47-68.
- Stamps, Katherine and Stephanie A. Bohon. 2006. "Educational attainment in new and established Latino metropolitan destinations." *Social Science Quarterly* 87:1225-1240.
- Stepick, A. and C. D. Stepick. 2010. "The complexities and confusions of segmented assimilation." *Ethnic and Racial Studies* 33:1149-1167.
- Steven Ruggles, J. Trent Alexander, Katie Genadek, Ronald Goeken, Matthew B. Schroeder, and Matthew Sobek. 2010. "Integrated Public Use Microdata Series: Version 5.0 [Machine-

- readable database] ", edited by M. P. Center. Minneapolis, MN: Minnesota Population Center.
- Stevens, G. 1992. "The Social and Demographic Context of Language Use in the United States." *American Sociological Review* 57:171-185.
- . 1999. "Age at immigration and second language proficiency among foreign-born adults." *Language in Society* 28:555-578.
- Stoll, M. A., H. J. Holzer, and K. R. Ihlanfeldt. 2000. "Within cities and suburbs: Racial residential concentration and the spatial distribution of employment opportunities across sub-metropolitan areas." *Journal of Policy Analysis and Management* 19:207-231.
- Stoll, Michael A. 1998. "When Jobs Move, Do Black and Latino Men Lose? The Effect of Growth in Job Decentralisation on Young Men's Jobless Incidence and Duration." *Urban Studies* 35:2221-2239.
- Stoll, Michael A. and Harry J. Holzer. 1999. "Within Cities and Suburbs: Racial Concentration and the Spatial Distribution of Employment Opportunities across Submetropolitan Areas." Institute for Research on Poverty.
- Sultana, S. 2005. "Racial variations in males' commuting times in Atlanta: What does the evidence suggest?" *Professional Geographer* 57:66-82.
- Surface Transportation Policy Project. 2003. "Transportation Costs and the American Dream: Why a Lack of Transportation Choices Strains the Family Budget and Hinders Home Ownership."
- Suro, Roberto and Audrey Singer. 2002. *Latino Growth in Metropolitan America: Changing Patterns, New Locations*. Washington, DC: Brookings Institution.
- Tafoya, Sonya. 2004. "Shades of Belonging." Pew Hispanic Center, Washington, DC.
- Tal, Gil and Susan Handy. 2010. "Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey." *Transport Policy* 17:85-93.
- Tal, Gil and Susan L. Handy. 2005. "The Travel Behavior of Immigrants and Race/Ethnicity Groups: An Analysis of the 2001 National Household Transportation Survey." Davis, CA: Institute of Transportation Studies, UC Davis.
- Taylor, Brian D. and Paul M. Ong. 1995. "Spatial Mismatch or Automobile Mismatch? An Examination of Race, Residence and Commuting in US Metropolitan Areas." *Urban Studies* 32:1453-1473.
- Teal, Roger F. 1987. "Carpooling: Who, how and why." *Transportation Research Part A: General* 21:203-214.
- Telles, Edward. 1998. "Does it matter who answers the race question? Racial classification and income inequality in Brazil." *Demography* 35.
- Telles, Edward E. and Edward Murguia. 1988. "Phenotypic Discrimination and Income Difference Among Mexican Americans." Mexican American Studies & Research Center.
- Thacker, Andrew. 2006. "Traffic, Gender, Modernism." in *Against Automobility: Social Scientific Analyses of a Global Phenomenon*, edited by S. Bohm, C. Jones, C. Land, and M. Paterson. Malden, MA: Blackwell Publishing Ltd.

- Tharpe, Jim. 2007. "Atlanta airport still the "busiest:" Hartsfield-Jackson nips Chicago's O'hare for second year in a row." in *The Atlanta Journal-Constitution*.
- Tyler, John H. and Magnus Lofstrom. 2009. "Finishing High School: Alternative: Pathways and Dropout Recovery." *The Future of Children* 19.
- U. S. Census Bureau. 2012. "2010 Topologically Integrated Geographic Encoding and Referencing (TIGER)/Line Shapefiles [machine readable data files]." Washington, DC. Retrieved May 7, 2012 (<http://www2.census.gov/geo/tiger/TIGER2010/TRACT/>).
- U.S. Census Bureau. 1980. "1980 Census of Population." vol. 1, edited by U.S. Department of Commerce: Bureau of the Census. Washington, DC.
- . 1993. "1990 Census of Population: Social and Economic Characteristics - Georgia." U.S. Government Printing Office., Washington, DC
- . 2000. "2000 Census of Population, Summary File 1." U.S. Department of Commerce: Bureau of the Census., Washington, DC. Retrieved April 12, 2012 (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).
- . 2009a. "A Compass for Understanding and Using American Community Survey Data: What PUMS Data Users Need to Know." Washington, DC: US Government Printing Office.
- . 2009b. "Design and Methodology: American Community Survey." Washington, DC: US Government Printing Office.
- . 2010. "2010 Census of Population, Summary File 1." Washington, DC. Retrieved April 12, 2012 (<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>).
- Umana-Taylor, A. J. and M. A. Fine. 2001. "Methodological implications of grouping Latino adolescents into one collective ethnic group." *Hispanic Journal of Behavioral Sciences* 23:347-362.
- United States Census Bureau. 2000a. "Census Tracts and Block Numbering Areas." Retrieved January 14, 2013 (http://www.census.gov/geo/www/cen_tract.html).
- . 2000b. "Geographic Areas Reference Manual ": Geography Division.
- Urry, John. 2006. "Inhabiting the Car." in *Against Automobility: Social Scientific Analyses of a Global Phenomenon*, edited by S. Bohm, C. Jones, C. Land, and M. Paterson. Malden, MA: Blackwell Publishing Ltd.
- Valenzuela Jr., Abel , Lisa Schweitzer, and Adrielle Robles. 2005. "Camionetas: Informal Travel Among Immigrants." *Transportation Research Part A* 39:895-911.
- van Tubergen, F. and M. Kalmijn. 2009. "A Dynamic Approach to the Determinants of Immigrants' Language Proficiency: The United States, 1980-2000." *International Migration Review* 43:519-543.
- Volti, R. 1996. "A century of automobility." *Technology and Culture* 37:663-685.
- Wagmiller, R. L. 2007. "Race and the spatial segregation of jobless men in urban America." *Demography* 44:539-562.
- Walcott, Susan M. 2002. "Overlapping Ethnicities and Negotiated Space: Atlanta's Buford Highway." *Journal of Cultural Geography* 20:51-75. . 2002. "'Overlapping Ethnicities

- and Negotiated Space: Atlanta's Buford Highway." *Journal of Cultural Geography* 20:51-75.
- Waldinger, Roger. 1994. "The Making of an Immigrant Niche." *International Migration Review* 28:3-30.
- Walker, Renee E., Christopher R. Keane, and Jessica G. Burke. 2010. "Disparities and access to healthy food in the United States: A review of food deserts literature." *Health & Place* 16:876-884.
- Walsh, M. 2008. "Gendering mobility: Women, work and automobility in the United States." *History* 93:376-395.
- Wang, Q. 2006. "Linking Home to Work: Ethnic Labor Market Concentration in the San Francisco Consolidated Metropolitan Area." *Urban Geography* 27:72-92.
- Wang, Qingfang. 2010. "How Does Geography Matter in the Ethnic Labor Market Segmentation Process? A Case Study of Chinese Immigrants in the San Francisco CMSA." *Annals of the Association of American Geographers* 100:182-201.
- Wang, Qingfang and Kavita Pandit. 2007. "Measuring Ethnic Labour Market Concentration and Segmentation." *Journal of Ethnic and Migration Studies* 33:1227-1252.
- Wang, Qingfang and Susan Walcott. 2010. "A Spatial Analysis of Ethnic Self-Employment in Metropolitan Atlanta." *Southeastern Geographer* 50:323-345.
- Waters, M. C., V. C. Tran, P. Kasinitz, and J. H. Mollenkopf. 2010. "Segmented assimilation revisited: types of acculturation and socioeconomic mobility in young adulthood." *Ethnic and Racial Studies* 33:1168-1193.
- Weisberg, Cook &. 1982. *Residuals and Influence in Regression*. New York: Chapman and Hall.
- White, Michael J. and Gayle Kaufman. 1997. "Language Usage, Social Capital, and School Completion among Immigrants and Native-born Ethnic Groups." *Social Science Quarterly* 78:385-98.
- Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. Chicago: University of Chicago Press.
- . 1996. *When Work Disappears: The World of the New Urban Poor*. New York: Knopf.
- Wong, D. W. S. 1993. "Spatial Indexes of Segregation." *Urban Studies* 30:559-572.
- . 1997. "Spatial dependency of segregation indices." *Canadian Geographer-Geographe Canadien* 41:128-136.
- . 2008. "A local multidimensional approach to evaluate changes in segregation." *Urban Geography* 29:455-472.
- World Bank. 2008. "Data Table: Motor vehicles (per 1,000 people)." *World Development Indicators*.
- Wright, Richard, Mark Ellis, and Virginia Parks. 2010. "Immigrant Niches and the Intrametropolitan Spatial Division of Labour." *Journal of Ethnic and Migration Studies* 36:1033-1059.

- Wyly, E. K. 1996. "Race, gender, and spatial segmentation in the twin cities." *Professional Geographer* 48:431-444.
- Zsembik, B. A. and D. Fennell. 2005. "Ethnic variation in health and the determinants of health among Latinos." *Social Science & Medicine* 61:53-63.

APPENDICES

Appendix A

Table 11: Ordinary least squares regression coefficients for factors predicting the commute time in minutes of Mexican immigrants in Atlanta, GA

	Regression Coefficient	Standard Error
PUMA averaged level of ethnic residential concentration	3.903***	.619
Natural log of income	.803	.742
Car per adult ratio	2.843	1.204
Commute Mode		
Drive alone	-7.789***	1.204
Carpool	--	--
Public transit	9.518***	2.643
Walk or bike	-19.342***	2.617
Other mode	7.366**	3.050
Educational Level		
No high school	.139	1.526
Some high school	-.581	1.342
High school graduate	--	--
Some college	-2.548	1.446
Bachelor's degree or more	-1.664	2.657
Age	-.005	.058
Male	9.420***	.971
Has own child present in household	1.909*	.932
White	-.263	1.107
Number of years in the United States	.025	.750
Constant	12.692	6.902
R-squared	.1023	
F	26.26***	

N = 3,265

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

Appendix B

Table 12: Multinomial logistic regression results predicting commute mode of Mexican immigrants (ref = carpooling)

	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.196	0.159	1.106	0.268	1.700	0.663	0.681	0.136
Quartile 3: \$20,661 - 33,100	1.305	0.183	0.772	0.245	1.367	0.588	0.332**	0.112
Quartile 4: \$33,100 - 618,751	1.328	0.250	0.499	0.269	2.620	1.607	0.388*	0.151
Vehicle Availability								
No Car Available	0.000***	0.000	17.654***	7.921	11.395***	5.228	4.069***	1.605
Less than one car per adult	0.457***	0.056	3.345**	1.434	2.100	0.907	2.933***	0.861
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.213	0.134	1.916**	0.396	4.296*	2.821	1.115	0.211
Educational Level								
No high school	0.623***	0.083	1.660	0.448	1.512	0.576	0.867	0.208
Some high school	0.742*	0.106	1.456	0.514	1.395	0.522	0.473***	0.117
High school graduate	--		--		--		--	
Some college	1.088	0.181	1.076	0.584	0.727	0.392	1.364	0.397
Bachelor's degree or more	1.268	0.300	1.116	0.810	1.490	1.119	1.544	0.821
Years in the United States								
<= 5	--		--		--		--	
6-10	1.472*	0.223	0.770	0.186	0.878	0.326	0.696	0.151
11-20	1.829**	0.323	0.614	0.192	0.517	0.293	0.718	0.204
21-30	1.788**	0.393	0.975	0.393	0.994	0.954	0.305*	0.150
31+	1.776	0.630	0.501	0.360	0.297	0.329	0.418	0.550
Speaks English Proficiently	1.355*	0.177	0.637	0.243	0.864	0.411	0.495*	0.144

Table 12 (Continued)

<u>Mode of Commute</u> (carpooling is reference)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Age categories, years								
16-25	--		--		--		--	
26-35	1.131	0.139	1.465	0.338	1.389	0.572	1.098	0.214
36-45	1.183	0.153	1.051	0.337	0.691	0.338	0.862	0.197
46-55	1.340	0.285	2.165	0.935	1.640	0.949	0.540	0.234
56+	3.462**	1.347	5.093**	2.875	7.728**	5.485	2.211	1.223
Male	0.669**	0.083	0.338***	0.066	0.266***	0.075	0.677	0.140
Married	1.260	0.159	1.376	0.364	0.566	0.231	0.862	0.208
White	1.129	0.119	0.575*	0.147	0.660	0.253	0.922	0.198
Has own child present in household	1.133	0.154	0.860	0.261	1.277	0.485	0.788	0.220
Constant	1.432	0.340	0.052***	0.030	0.023***	0.015	0.298***	0.100

N = 3,265

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

Table 13: Multinomial logistic regression results testing for RCQ effects on commute mode of Mexican immigrants

Mode of Commute (carpooling is reference mode)	Drives Alone		Public Transit		Walks or Bikes		Other Mode	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Residential Concentration Quotient (RCQ)								
Very low concentration: $0.19 < RCQ < 0.69$	0.795	0.108	1.135	0.472	0.213*	0.160	0.962	0.245
Low concentration: $0.69 < RCQ < 1.00$	1.508*	0.256	2.244**	0.863	0.548	0.288	0.244**	0.127
High concentration: $1.00 < RCQ < 1.73$	1.319*	0.173	1.094	0.239	1.038	0.401	0.520*	0.171
Very high concentration: $1.73 < RCQ < 3.38$	--		--		--		--	
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.194	0.163	1.090	0.266	1.813	0.744	0.695	0.145
Quartile 3: \$20,661 - 33,100	1.280	0.185	0.740	0.239	1.400	0.612	0.361**	0.122
Quartile 4: \$33,100 - 618,751	1.276	0.249	0.493	0.264	2.651	1.681	0.436*	0.175
Vehicle Availability								
No Car Available	0.000***	0.000	17.096***	7.654	10.987***	4.985	3.978**	1.655
Less than one car per adult	0.446***	0.054	3.189**	1.376	2.100	0.900	2.956***	0.892
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.196	0.131	1.797	0.372	4.669*	2.986	1.197	0.228
Educational Level								
No high school	0.635**	0.087	1.672	0.475	1.537	0.584	0.869	0.209
Some high school	0.763	0.111	1.404	0.489	1.378	0.521	0.503**	0.124
High school graduate	--		--		--		--	
Some college	1.098	0.183	1.131	0.600	0.714	0.376	1.382	0.401
Bachelor's degree or more	1.256	0.307	1.255	0.882	1.368	1.010	1.497	0.812
Years in the United States								
≤ 5	--		--		--		--	
6-10	1.492	0.233*	0.823	0.199	0.827	0.316	0.672	0.151
11-20	1.838	0.327**	0.648	0.197	0.555	0.320	0.690	0.202
21-30	1.872	0.411**	1.093	0.448	0.973	0.935	0.263**	0.128
31+	1.838	0.665	0.425	0.325	0.428*	0.481	0.414	0.583

Table 13. (Continued)

Mode of Commute (carpooling is reference mode)	Drives Alone		Public Transit		Walks or Bikes		Other Mode	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Speaks English Proficiently	1.309	0.174*	0.577	0.237	0.880	0.413	0.565*	0.160
Age categories, years								
16-25	--		--		--		--	
26-35	1.124	0.139	1.518	0.367	1.263	0.547	1.095	0.220
36-45	1.184	0.155	1.008	0.305	0.662	0.323	0.913	0.205
46-55	1.342	0.282	2.114	0.941	1.556	0.910	0.549	0.240
56+	3.300	1.277**	5.346**	3.068	6.120	4.596	2.708	1.564
Male	0.672	0.083	0.338***	0.065	0.266***	0.078	0.678	0.140
Married	1.275	0.163	1.383	0.371	0.584	0.236	0.844	0.193
White	1.103	0.121	0.589*	0.149	0.653	0.255	0.946	0.202
Has own child present in household	1.117	0.155	0.843	0.261	1.249	0.469	0.810	0.228
Constant	1.343	0.324	0.045	0.027	0.021	0.021	0.342	0.151

N = 3,265

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

Table 14: Multinomial logistic regression results testing for effects of niche employment sectors on mode of commute of Mexican immigrants

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Niche Employment Sectors								
Personal Service: Food	1.751**	0.357	4.112***	1.244	2.896**	1.103	1.582	0.460
Transformative: Construction	0.520***	0.065	0.433*	0.151	0.431	0.189	0.773	0.183
Prod. Services: Grounds & Maintenance	0.861	0.202	0.512	0.252	0.063**	0.056	1.281	0.396
Transformative: Production	1.364	0.262	1.019	0.436	1.034	0.702	1.099	0.476
Other (Non-niche sectors)	--		--		--		--	
Residential Concentration Quotient (<i>RCQ</i>)								
Very low concentration: $0.19 < RCQ < 0.69$	0.728*	0.103	1.047	0.446	0.178*	0.140	0.930	0.235
Low concentration: $0.69 < RCQ < 1.00$	1.372	0.240	1.845	0.687	0.467	0.247	0.229**	0.121
High concentration: $1.00 < RCQ < 1.73$	1.254	0.163	0.951	0.225	0.979	0.404	0.498	0.158
Very high concentration: $1.73 < RCQ < 3.38$	--		--		--		--	
Personal Income, Quartiles								
Quartile 1: \$0 -12,770	--		--		--		--	
Quartile 2: \$12,770 - 20,661	1.163	0.167	1.033	0.260	1.711	0.720	0.695	0.146
Quartile 3: \$20,661 - 33,100	1.295	0.202	0.730	0.252	1.370	0.587	0.373**	0.123
Quartile 4: \$33,100 - 618,751	1.370	0.274	0.562	0.304	2.665	1.753	0.473	0.186
Vehicle Availability								
No Car Available	0.000***	0.000	18.186***	8.388	13.100***	6.398	4.009**	1.621
Less than one car per adult	0.453***	0.057	3.241**	1.403	2.182	0.956	3.004***	0.924
At least one car per adult	--		--		--		--	
Works in PUMA of residence	1.140	0.127	1.721*	0.378	4.365*	2.805	1.168	0.227
Educational Level								
No high school	0.672**	0.093	1.867*	0.525	1.706	0.674	0.911	0.221
Some high school	0.774	0.112	1.466	0.486	1.505	0.575	0.506**	0.121
High school graduate	--		--		--		--	
Some college	1.054	0.171	1.101	0.582	0.690	0.375	1.339	0.384
Bachelor's degree or more	1.244	0.312	1.216	0.930	1.222	0.945	1.592	0.874

Table 14. (Continued)

<u>Mode of Commute</u> (carpooling is reference mode)	<u>Drives Alone</u>		<u>Public Transit</u>		<u>Walks or Bikes</u>		<u>Other mode</u>	
	RRR	SE	RRR	SE	RRR	SE	RRR	SE
Years in the United States								
<= 5	--		--		--		--	
6-10	1.427*	0.228	0.704	0.167	0.702	0.283	0.652	0.147
11-20	1.828**	0.334	0.621	0.191	0.541	0.326	0.677	0.199
21-30	1.816**	0.396	1.087	0.454	0.858	0.875	0.252**	0.125
31+	1.912	0.689	0.466	0.363	0.728	0.762	0.382	0.535
Speaks English Proficiently	1.210	0.154	0.563	0.222	0.839	0.377	0.551	0.156
Age categories, years								
16-25	--		--		--		--	
26-35	1.139	0.143	1.627*	0.385	1.322	0.568	1.087	0.219
36-45	1.189	0.159	1.151	0.352	0.677	0.327	0.907	0.207
46-55	1.250	0.268	2.390*	1.049	1.639	0.980	0.502	0.227
56+	3.119**	1.223	6.201**	3.733	7.800**	5.804	2.513	1.467
Male	0.930	0.114	0.529**	0.122	0.412**	0.105	0.799	0.169
Married	1.302*	0.167	1.407	0.399	0.576	0.229	0.856	0.198
White	1.068	0.116	0.566*	0.150	0.664	0.262	0.921	0.199
Has own child present in household	1.089	0.155	0.762	0.233	1.261	0.491	0.791	0.224
Constant	1.376	0.327	0.040***	0.025	0.021***	0.022	0.323*	0.152

N = 3,265

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

Appendix C

Table 15: Correlation Matrix

	Drive alone	Carpool	Bus/ rail	Walk/ bike	Other	Very low RCQ	Low RCQ	High RCQ	Very high RCQ	Food Serv.	Grounds & Maint.	Const'n	Prod'n	Non- niche
Drive alone	1.000													
Carpool	-0.744 0.000	1.000												
Bus or rail	-0.254 0.000	-0.144 0.000	1.000											
Walk or bike	-0.187 0.000	-0.106 0.000	-0.036 0.006	1.000										
Other	-0.298 0.000	-0.169 0.000	-0.058 0.000	-0.042 0.001	1.000									
Very low RCQ	-0.002 0.898	0.010 0.438	0.018 0.176	-0.036 0.006	-0.008 0.561	1.000								
Low RCQ	0.085 0.000	-0.049 0.000	0.006 0.633	-0.012 0.374	-0.079 0.000	-0.204 0.000	1.000							
High RCQ	0.058 0.000	-0.027 0.045	-0.023 0.084	0.003 0.802	-0.050 0.000	-0.250 0.000	0.248 0.000	1.000						
Very high RCQ	-0.113 0.000	0.052 0.000	0.001 0.932	0.034 0.011	0.108 0.000	-0.393 0.000	0.389 0.000	-0.478 0.000	1.000					
Food Services	-0.010 0.431	-0.076 0.000	0.132 0.000	0.069 0.000	0.003 0.834	-0.033 0.014	0.017 0.194	0.021 0.109	-0.006 0.633	1.000				
Grounds & Maint.	-0.072 0.000	0.058 0.000	0.008 0.523	-0.007 0.587	0.035 0.008	-0.026 0.046	0.030 0.025	0.013 0.343	0.032 0.016	-0.091 0.000	1.000			
Construction	-0.222 0.000	0.233 0.000	-0.052 0.000	-0.027 0.039	0.079 0.000	-0.073 0.000	0.071 0.000	-0.025 0.059	0.131 0.000	-0.192 0.000	-0.181 0.000	1.000		
Production	0.031 0.020	-0.022 0.103	-0.009 0.485	-0.015 0.264	-0.005 0.720	0.016 0.236	0.027 0.039	-0.024 0.067	-0.012 0.375	-0.080 0.000	-0.075 0.000	-0.159 0.000	1.000	
Non-niche	0.229 0.000	-0.186 0.000	-0.028 0.032	-0.004 0.768	-0.089 0.000	0.090 0.000	0.057 0.000	0.015 0.248	-0.125 0.000	-0.307 0.000	-0.290 0.000	-0.612 0.000	-0.255 0.000	1.000

Table 15. (Continued)

	Drive alone	Carpool	Bus/ rail	Walk/ bike	Other	Very low RCQ	Low RCQ	High RCQ	Very high RCQ	Food Serv.	Grounds & Maint.	Const'n	Prod'n	Non- niche
No car	-0.310 0.000	0.070 0.000	0.280 0.000	0.213 0.000	0.117 0.000	-0.027 0.041	0.023 0.077	-0.044 0.001	0.076 0.000	0.043 0.001	0.075 0.000	0.060 0.000	-0.018 0.173	-0.110 0.000
< one car/adult	-0.180 0.000	0.154 0.000	-0.013 0.312	-0.029 0.026	0.108 0.000	-0.057 0.000	0.034 0.011	0.004 0.752	0.065 0.000	0.063 0.000	0.028 0.037	0.124 0.000	0.021 0.116	-0.171 0.000
One car +	0.340 0.000	-0.192 0.000	-0.129 0.000	-0.079 0.000	-0.169 0.000	0.072 0.000	0.046 0.001	0.018 0.164	-0.105 0.000	-0.086 0.000	-0.066 0.000	-0.156 0.000	-0.012 0.370	0.229 0.000
Works in home PUMA	-0.039 0.004	-0.018 0.184	0.025 0.056	0.095 0.000	0.028 0.036	-0.019 0.158	0.040 0.002	-0.009 0.507	-0.009 0.503	0.072 0.000	0.038 0.004	-0.030 0.022	-0.001 0.923	-0.034 0.011
Very low income	-0.161 0.000	0.057 0.000	0.073 0.000	0.032 0.017	0.136 0.000	-0.046 0.000	0.029 0.030	-0.028 0.031	0.081 0.000	0.111 0.000	0.085 0.000	0.002 0.911	-0.028 0.035	-0.096 0.000
Low income	-0.094 0.000	0.057 0.000	0.029 0.027	0.019 0.148	0.047 0.000	-0.013 0.321	0.020 0.132	0.005 0.706	0.021 0.117	0.046 0.001	0.045 0.001	0.062 0.000	0.045 0.001	-0.127 0.000
Med. Income	0.065 0.000	-0.004 0.751	-0.041 0.002	-0.009 0.507	-0.083 0.000	-0.013 0.314	0.013 0.342	0.025 0.061	-0.002 0.907	-0.025 0.057	-0.023 0.087	0.037 0.005	0.050 0.000	-0.031 0.018
High income	0.191 0.000	-0.111 0.000	-0.061 0.000	-0.042 0.001	-0.100 0.000	0.073 0.000	0.062 0.000	-0.001 0.926	-0.101 0.000	-0.133 0.000	-0.107 0.000	-0.101 0.000	-0.068 0.000	0.256 0.000
No high school	-0.206 0.000	0.112 0.000	0.082 0.000	0.053 0.000	0.104 0.000	-0.045 0.001	0.033 0.013	-0.058 0.000	0.108 0.000	0.005 0.705	0.084 0.000	0.171 0.000	0.043 0.001	-0.222 0.000
Some high school	-0.050 0.000	0.059 0.000	0.012 0.357	0.008 0.533	-0.026 0.051	0.010 0.435	0.019 0.154	0.003 0.836	0.004 0.759	0.049 0.000	0.016 0.227	0.075 0.000	0.019 0.159	-0.113 0.000
High school graduate	0.034 0.011	0.000 0.997	-0.047 0.000	-0.033 0.012	-0.006 0.664	-0.026 0.047	0.023 0.077	0.034 0.011	0.009 0.510	0.050 0.000	0.008 0.547	0.033 0.012	0.005 0.680	-0.065 0.000
Some college	0.107 0.000	-0.084 0.000	-0.024 0.072	-0.032 0.017	-0.019 0.149	0.019 0.161	0.023 0.084	0.009 0.521	-0.039 0.004	-0.028 0.031	-0.036 0.006	-0.123 0.000	-0.017 0.195	0.154 0.000
Bachelor's deg.+	0.159 0.000	-0.117 0.000	-0.033 0.013	-0.003 0.835	-0.075 0.000	0.058 0.000	0.065 0.000	0.019 0.142	-0.110 0.000	-0.090 0.000	-0.094 0.000	-0.207 0.000	-0.062 0.000	0.317 0.000

Table 15. (Continued)

	No car	< one car/adult	One car +	Wks home PUMA	Very low income	Low income	Medium income	High income	No high school	Some high school	High school graduate	Some college	Bachelor's degree ormore
No car	1.000												
< one car/adult	-0.273 0.000	1.000											
One car +	-0.233 0.000	-0.872 0.000	1.000										
Works in home PUMA	0.052 0.000	0.050 0.000	-0.077 0.000	1.000									
Very low income	0.103 0.000	0.115 0.000	-0.169 0.000	0.061 0.000	1.000								
Low income	0.046 0.001	0.093 0.000	-0.117 0.000	0.077 0.000	-0.336 0.000	1.000							
Med. Income	-0.045 0.001	-0.014 0.286	0.037 0.005	-0.009 0.501	-0.336 0.000	-0.336 0.000	1.000						
High income	-0.104 0.000	-0.195 0.000	0.251 0.000	-0.130 0.000	-0.331 0.000	-0.331 0.000	-0.331 0.000	1.000					
No high school	0.173 0.000	0.095 0.000	-0.184 0.000	0.030 0.021	0.092 0.000	0.119 0.000	-0.045 0.001	-0.168 0.000	1.000				
Some high school	0.015 0.269	0.049 0.000	-0.056 0.000	0.011 0.403	0.020 0.132	0.044 0.001	0.036 0.007	-0.100 0.000	-0.275 0.000	1.000			
High school graduate	-0.080 0.000	0.065 0.000	-0.025 0.056	0.016 0.219	0.023 0.088	0.008 0.539	0.059 0.000	-0.091 0.000	-0.358 0.000	-0.265 0.000	1.000		
Some college	-0.061 0.000	-0.085 0.000	0.117 0.000	-0.003 0.826	-0.034 0.009	-0.062 0.000	0.002 0.900	0.096 0.000	-0.256 0.000	-0.189 0.000	-0.247 0.000	1.000	
Bachelor's deg. +	-0.071 0.000	-0.162 0.000	0.200 0.000	-0.066 0.000	-0.127 0.000	-0.140 0.000	-0.056 0.000	0.326 0.000	-0.260 0.000	-0.192 0.000	-0.251 0.000	-0.179 0.000	1.000

Table 15. (Continued)

	Drive alone	Carpool	Bus/ rail	Walk/ bike	Other	Very low RCQ	Low RCQ	High RCQ	Very high RCQ	Food Serv.	Grounds & Maint.	Const'n	Prod'n	Non- niche
<=5 yrs. in US	-0.222 <i>0.000</i>	0.104 <i>0.000</i>	0.084 <i>0.000</i>	0.070 <i>0.000</i>	0.139 <i>0.000</i>	-0.033 <i>0.012</i>	0.040 <i>0.002</i>	-0.004 <i>0.789</i>	0.059 <i>0.000</i>	0.025 <i>0.057</i>	0.034 <i>0.010</i>	0.120 <i>0.000</i>	0.001 <i>0.942</i>	-0.141 <i>0.000</i>
6-10 yrs. In US	-0.040 <i>0.003</i>	0.039 <i>0.003</i>	0.008 <i>0.541</i>	-0.008 <i>0.529</i>	0.007 <i>0.600</i>	-0.047 <i>0.000</i>	0.010 <i>0.447</i>	-0.020 <i>0.137</i>	0.060 <i>0.000</i>	0.092 <i>0.000</i>	0.014 <i>0.291</i>	0.057 <i>0.000</i>	0.005 <i>0.684</i>	-0.113 <i>0.000</i>
11-20 yrs. in US	0.091 <i>0.000</i>	-0.034 <i>0.009</i>	-0.049 <i>0.000</i>	-0.040 <i>0.003</i>	-0.052 <i>0.000</i>	0.005 <i>0.725</i>	0.014 <i>0.282</i>	0.017 <i>0.191</i>	-0.029 <i>0.028</i>	-0.020 <i>0.127</i>	0.002 <i>0.894</i>	-0.039 <i>0.003</i>	-0.002 <i>0.912</i>	0.046 <i>0.001</i>
21-30 yrs. in US	0.122 <i>0.000</i>	-0.071 <i>0.000</i>	-0.039 <i>0.003</i>	-0.017 <i>0.188</i>	-0.071 <i>0.000</i>	0.032 <i>0.017</i>	0.029 <i>0.029</i>	0.017 <i>0.189</i>	-0.061 <i>0.000</i>	-0.090 <i>0.000</i>	-0.034 <i>0.009</i>	-0.092 <i>0.000</i>	0.002 <i>0.912</i>	0.151 <i>0.000</i>
31+ yrs. in US	0.122 <i>0.000</i>	-0.088 <i>0.000</i>	-0.018 <i>0.167</i>	-0.010 <i>0.449</i>	-0.060 <i>0.000</i>	0.090 <i>0.000</i>	0.022 <i>0.090</i>	-0.013 <i>0.341</i>	-0.074 <i>0.000</i>	-0.051 <i>0.000</i>	-0.039 <i>0.003</i>	-0.113 <i>0.000</i>	-0.011 <i>0.424</i>	0.156 <i>0.000</i>
Proficient English	0.230 <i>0.000</i>	-0.144 <i>0.000</i>	-0.067 <i>0.000</i>	-0.034 <i>0.010</i>	-0.116 <i>0.000</i>	0.064 <i>0.000</i>	0.095 <i>0.000</i>	0.021 <i>0.108</i>	-0.138 <i>0.000</i>	-0.082 <i>0.000</i>	-0.097 <i>0.000</i>	-0.225 <i>0.000</i>	-0.063 <i>0.000</i>	0.330 <i>0.000</i>
Child present	0.157 <i>0.000</i>	-0.071 <i>0.000</i>	-0.063 <i>0.000</i>	-0.039 <i>0.003</i>	-0.106 <i>0.000</i>	0.018 <i>0.181</i>	0.044 <i>0.001</i>	0.036 <i>0.006</i>	-0.078 <i>0.000</i>	0.011 <i>0.405</i>	-0.015 <i>0.260</i>	-0.076 <i>0.000</i>	-0.005 <i>0.692</i>	0.072 <i>0.000</i>
16-25 yrs old	-0.149 <i>0.000</i>	0.100 <i>0.000</i>	0.027 <i>0.041</i>	0.019 <i>0.160</i>	0.080 <i>0.000</i>	-0.030 <i>0.023</i>	0.035 <i>0.008</i>	-0.002 <i>0.877</i>	0.051 <i>0.000</i>	0.080 <i>0.000</i>	0.003 <i>0.840</i>	0.106 <i>0.000</i>	-0.013 <i>0.335</i>	-0.135 <i>0.000</i>
26-35 yrs old	-0.038 <i>0.004</i>	0.022 <i>0.094</i>	0.016 <i>0.226</i>	-0.009 <i>0.486</i>	0.028 <i>0.037</i>	0.003 <i>0.810</i>	0.022 <i>0.099</i>	-0.002 <i>0.906</i>	0.015 <i>0.245</i>	0.045 <i>0.001</i>	0.003 <i>0.802</i>	0.076 <i>0.000</i>	-0.024 <i>0.067</i>	-0.084 <i>0.000</i>
36-45 yrs old	0.065 <i>0.000</i>	-0.028 <i>0.032</i>	-0.036 <i>0.007</i>	-0.015 <i>0.266</i>	-0.038 <i>0.004</i>	-0.007 <i>0.599</i>	0.033 <i>0.012</i>	0.007 <i>0.579</i>	-0.026 <i>0.050</i>	-0.054 <i>0.000</i>	-0.007 <i>0.606</i>	-0.027 <i>0.042</i>	0.018 <i>0.162</i>	0.050 <i>0.000</i>
46-55 yrs old	0.099 <i>0.000</i>	-0.066 <i>0.000</i>	-0.019 <i>0.154</i>	0.001 <i>0.961</i>	-0.062 <i>0.000</i>	0.024 <i>0.066</i>	0.016 <i>0.221</i>	0.007 <i>0.584</i>	-0.037 <i>0.005</i>	-0.060 <i>0.000</i>	0.003 <i>0.809</i>	-0.131 <i>0.000</i>	0.014 <i>0.291</i>	0.142 <i>0.000</i>
56+ yrs old	0.064 <i>0.000</i>	-0.067 <i>0.000</i>	0.017 <i>0.188</i>	0.015 <i>0.252</i>	-0.030 <i>0.025</i>	0.023 <i>0.085</i>	0.018 <i>0.165</i>	-0.019 <i>0.161</i>	-0.015 <i>0.246</i>	-0.038 <i>0.004</i>	-0.003 <i>0.813</i>	-0.098 <i>0.000</i>	0.016 <i>0.217</i>	0.102 <i>0.000</i>
Male	-0.107 <i>0.000</i>	0.118 <i>0.000</i>	-0.031 <i>0.019</i>	-0.013 <i>0.313</i>	0.032 <i>0.016</i>	-0.034 <i>0.009</i>	0.020 <i>0.122</i>	-0.004 <i>0.777</i>	0.045 <i>0.001</i>	-0.079 <i>0.000</i>	0.029 <i>0.026</i>	0.397 <i>0.000</i>	-0.023 <i>0.087</i>	-0.315 <i>0.000</i>
Married	0.193 <i>0.000</i>	-0.088 <i>0.000</i>	-0.062 <i>0.000</i>	-0.070 <i>0.000</i>	-0.128 <i>0.000</i>	0.051 <i>0.000</i>	0.060 <i>0.000</i>	0.003 <i>0.826</i>	-0.087 <i>0.000</i>	-0.060 <i>0.000</i>	-0.050 <i>0.000</i>	-0.106 <i>0.000</i>	-0.002 <i>0.881</i>	0.156 <i>0.000</i>
White	0.045 <i>0.001</i>	-0.015 <i>0.253</i>	-0.026 <i>0.048</i>	-0.003 <i>0.839</i>	-0.038 <i>0.004</i>	-0.001 <i>0.957</i>	0.054 <i>0.000</i>	0.045 <i>0.001</i>	-0.078 <i>0.000</i>	-0.003 <i>0.819</i>	-0.015 <i>0.273</i>	-0.049 <i>0.000</i>	-0.006 <i>0.643</i>	0.056 <i>0.000</i>

Table 15. (Continued)

	No car	< one car/adult	One car +	Wks home PUMA	Very low income	Low income	Medium income	High income	No high school	Some high school	High school graduate	Some college	Bachelor's degree ormore
<=5 yrs. in US	0.156 <i>0.000</i>	0.126 <i>0.000</i>	-0.207 <i>0.000</i>	0.068 <i>0.000</i>	0.178 <i>0.000</i>	0.062 <i>0.000</i>	-0.062 <i>0.000</i>	-0.179 <i>0.000</i>	0.082 <i>0.000</i>	0.011 <i>0.391</i>	-0.009 <i>0.504</i>	-0.050 <i>0.000</i>	-0.053 <i>0.000</i>
6-10 yrs. In US	0.007 <i>0.587</i>	0.045 <i>0.001</i>	-0.049 <i>0.000</i>	0.027 <i>0.042</i>	0.010 <i>0.446</i>	0.076 <i>0.000</i>	-0.003 <i>0.805</i>	-0.084 <i>0.000</i>	0.017 <i>0.188</i>	0.029 <i>0.028</i>	0.010 <i>0.442</i>	-0.051 <i>0.000</i>	-0.014 <i>0.305</i>
11-20 yrs. in US	-0.068 <i>0.000</i>	-0.048 <i>0.000</i>	0.084 <i>0.000</i>	-0.040 <i>0.002</i>	-0.043 <i>0.001</i>	-0.026 <i>0.046</i>	0.059 <i>0.000</i>	0.010 <i>0.430</i>	-0.016 <i>0.231</i>	0.033 <i>0.013</i>	0.033 <i>0.013</i>	-0.024 <i>0.075</i>	-0.031 <i>0.018</i>
21-30 yrs. in US	-0.082 <i>0.000</i>	-0.081 <i>0.000</i>	0.124 <i>0.000</i>	-0.029 <i>0.030</i>	-0.108 <i>0.000</i>	-0.081 <i>0.000</i>	0.009 <i>0.504</i>	0.181 <i>0.000</i>	-0.044 <i>0.001</i>	-0.044 <i>0.001</i>	-0.027 <i>0.042</i>	0.082 <i>0.000</i>	0.052 <i>0.000</i>
31+ yrs. in US	-0.046 <i>0.000</i>	-0.099 <i>0.000</i>	0.124 <i>0.000</i>	-0.054 <i>0.000</i>	-0.098 <i>0.000</i>	-0.087 <i>0.000</i>	-0.005 <i>0.712</i>	0.191 <i>0.000</i>	-0.083 <i>0.000</i>	-0.070 <i>0.000</i>	-0.026 <i>0.054</i>	0.108 <i>0.000</i>	0.098 <i>0.000</i>
Proficient English	-0.135 <i>0.000</i>	-0.185 <i>0.000</i>	0.255 <i>0.000</i>	-0.070 <i>0.000</i>	-0.131 <i>0.000</i>	-0.153 <i>0.000</i>	-0.042 <i>0.002</i>	0.328 <i>0.000</i>	-0.283 <i>0.000</i>	-0.114 <i>0.000</i>	-0.030 <i>0.023</i>	0.183 <i>0.000</i>	0.322 <i>0.000</i>
Child present	-0.113 <i>0.000</i>	-0.114 <i>0.000</i>	0.173 <i>0.000</i>	-0.035 <i>0.008</i>	-0.097 <i>0.000</i>	-0.059 <i>0.000</i>	0.044 <i>0.001</i>	0.113 <i>0.000</i>	-0.055 <i>0.000</i>	0.007 <i>0.621</i>	-0.010 <i>0.431</i>	0.007 <i>0.587</i>	0.066 <i>0.000</i>
16-25 yrs old	0.064 <i>0.000</i>	0.146 <i>0.000</i>	-0.180 <i>0.000</i>	0.050 <i>0.000</i>	0.176 <i>0.000</i>	0.068 <i>0.000</i>	-0.050 <i>0.000</i>	-0.194 <i>0.000</i>	0.011 <i>0.408</i>	0.096 <i>0.000</i>	0.049 <i>0.000</i>	-0.022 <i>0.094</i>	-0.150 <i>0.000</i>
26-35 yrs old	0.010 <i>0.452</i>	-0.027 <i>0.041</i>	0.022 <i>0.092</i>	0.021 <i>0.113</i>	0.012 <i>0.358</i>	0.021 <i>0.115</i>	0.026 <i>0.046</i>	-0.060 <i>0.000</i>	0.030 <i>0.024</i>	0.015 <i>0.266</i>	0.040 <i>0.002</i>	-0.043 <i>0.001</i>	-0.058 <i>0.000</i>
36-45 yrs old	-0.018 <i>0.163</i>	-0.046 <i>0.001</i>	0.056 <i>0.000</i>	-0.033 <i>0.014</i>	-0.089 <i>0.000</i>	-0.036 <i>0.007</i>	0.020 <i>0.123</i>	0.105 <i>0.000</i>	-0.015 <i>0.254</i>	-0.020 <i>0.122</i>	-0.038 <i>0.004</i>	0.004 <i>0.786</i>	0.082 <i>0.000</i>
46-55 yrs old	-0.065 <i>0.000</i>	-0.029 <i>0.027</i>	0.063 <i>0.000</i>	-0.027 <i>0.043</i>	-0.065 <i>0.000</i>	-0.048 <i>0.000</i>	-0.001 <i>0.920</i>	0.116 <i>0.000</i>	-0.030 <i>0.024</i>	-0.080 <i>0.000</i>	-0.046 <i>0.001</i>	0.061 <i>0.000</i>	0.114 <i>0.000</i>
56+ yrs old	0.001 <i>0.952</i>	-0.063 <i>0.000</i>	0.063 <i>0.000</i>	-0.028 <i>0.035</i>	-0.059 <i>0.000</i>	-0.019 <i>0.149</i>	-0.007 <i>0.616</i>	0.085 <i>0.000</i>	-0.008 <i>0.548</i>	-0.038 <i>0.004</i>	-0.027 <i>0.039</i>	0.031 <i>0.018</i>	0.052 <i>0.000</i>
Male	0.054 <i>0.000</i>	0.085 <i>0.000</i>	-0.113 <i>0.000</i>	-0.050 <i>0.000</i>	-0.149 <i>0.000</i>	0.047 <i>0.000</i>	0.062 <i>0.000</i>	0.040 <i>0.003</i>	0.128 <i>0.000</i>	0.037 <i>0.005</i>	0.023 <i>0.077</i>	-0.100 <i>0.000</i>	-0.125 <i>0.000</i>
Married	-0.153 <i>0.000</i>	-0.102 <i>0.000</i>	0.181 <i>0.000</i>	-0.047 <i>0.000</i>	-0.157 <i>0.000</i>	-0.082 <i>0.000</i>	0.031 <i>0.021</i>	0.209 <i>0.000</i>	-0.098 <i>0.000</i>	-0.050 <i>0.000</i>	-0.017 <i>0.187</i>	0.044 <i>0.001</i>	0.150 <i>0.000</i>
White	-0.020 <i>0.131</i>	-0.007 <i>0.574</i>	0.018 <i>0.181</i>	-0.002 <i>0.905</i>	-0.034 <i>0.011</i>	0.004 <i>0.786</i>	0.005 <i>0.717</i>	0.026 <i>0.053</i>	-0.042 <i>0.002</i>	-0.008 <i>0.539</i>	-0.001 <i>0.967</i>	-0.003 <i>0.842</i>	0.063 <i>0.000</i>

Table 15. (Continued)

	<=5 yrs. in US	6-10 yrs. In US	11-20 yrs. in US	21-30 yrs. in US	31+ yrs. in US	Proficient English	Child present	16-25 yrs old	26-35 yrs old	36-45 yrs old	46-55 yrs old	56+ yrs old	Male	Married	White
<=5 yrs. in US	1.000														
6-10 yrs. In US	-0.354 0.000	1.000													
11-20 yrs. in US	-0.347 0.000	-0.391 0.000	1.000												
21-30 yrs. in US	-0.217 0.000	-0.244 0.000	-0.239 0.000	1.000											
31+ yrs. in US	-0.153 0.000	-0.172 0.000	-0.169 0.000	-0.105 0.000	1.000										
Proficient English	-0.201 0.000	-0.121 0.000	0.047 0.000	0.179 0.000	0.234 0.000	1.000									
Child present	-0.235 0.000	0.009 0.499	0.179 0.000	0.077 0.000	-0.039 0.003	0.055 0.000	1.000								
16-25 yrs old	0.294 0.000	0.031 0.019	-0.117 0.000	-0.160 0.000	-0.132 0.000	-0.046 0.001	-0.227 0.000	1.000							
26-35 yrs old	0.040 0.002	0.132 0.000	0.044 0.001	-0.144 0.000	-0.188 0.000	-0.068 0.000	0.077 0.000	-0.360 0.000	1.000						
36-45 yrs old	-0.140 0.000	-0.062 0.000	0.118 0.000	0.119 0.000	-0.021 0.109	0.034 0.010	0.218 0.000	-0.293 0.000	-0.450 0.000	1.000					
46-55 yrs old	-0.149 0.000	-0.084 0.000	-0.049 0.000	0.201 0.000	0.218 0.000	0.067 0.000	-0.033 0.014	-0.190 0.000	-0.291 0.000	-0.237 0.000	1.000				
56+ yrs old	-0.100 0.000	-0.087 0.000	-0.048 0.000	0.047 0.000	0.345 0.000	0.057 0.000	-0.149 0.000	-0.115 0.000	-0.176 0.000	-0.143 0.000	-0.093 0.000	1.000			
Male	0.108 0.000	0.033 0.012	-0.053 0.000	-0.050 0.000	-0.080 0.000	-0.139 0.000	-0.076 0.000	0.071 0.000	0.056 0.000	-0.020 0.135	-0.109 0.000	0.040 0.002	1.000		
Married	-0.241 0.000	-0.019 0.140	0.089 0.000	0.130 0.000	0.111 0.000	0.128 0.000	0.544 0.000	-0.299 0.000	-0.005 0.684	0.149 0.000	0.123 0.000	0.055 0.000	0.061 0.000	1.000	
White	-0.003 0.819	-0.014 0.280	-0.022 0.096	-0.004 0.776	0.074 0.000	0.008 0.558	-0.009 0.478	-0.033 0.012	-0.050 0.000	0.004 0.766	0.062 0.000	0.064 0.000	0.036 0.007	0.038 0.004	1.000

Appendix D

Table 16: Binary logit results predicting English Proficiency, Mexican sample

	Coefficient	SE	Odds Ratio
<i>Indicators of Mobility</i>			
Vehicle Availability			
No Car Available	-1.467	0.660	0.231*
Less than one car per adult	-0.023	0.129	0.977
At least one car per adult	--	--	--
Commute Mode			
Drive alone	--	--	--
Carpool	-0.251	0.138	0.778
Bus or rail	-0.876	0.375	0.417*
Walk or bike	-0.819	0.512	0.441
Other	-0.856	0.292	0.425**
<i>Ethnic Community Measures</i>			
Residential Concentration Quotient (RCQ) Categories			
Very low concentration: $0.19 < RCQ < 0.69$	-0.270	0.202	0.764
Low concentration: $0.69 < RCQ < 1.00$	0.428	0.150	1.534**
High concentration: $1.00 < RCQ < 1.73$	0.072	0.171	1.074
Very high concentration: $1.73 < RCQ < 3.38$	--	--	--
Works in Niche Sector	-0.570	0.129	0.565***
<i>Socio-demographic Characteristics</i>			
Personal Income, Quartiles			
Quartile 1: \$0 -12,770	--	--	--
Quartile 2: \$12,770 - 20,661	-0.124	0.167	0.883
Quartile 3: \$20,661 - 33,100	0.283	0.169	1.327
Quartile 4: \$33,100 - 618,751	0.304	0.206	1.356
Educational Level			
No high school	-0.720	0.171	0.487***
Some high school	-0.257	0.164	0.774
High school graduate	--	--	--
Some college	0.291	0.181	1.338
Bachelor's degree or more	1.250	0.211	3.489***
Male	-0.016	0.132	0.985
White	-0.364	0.143	0.695*
Has own child present in household	-0.054	0.138	0.947

Table 16. (Continued)

	Coefficient	SE	Odds Ratio
<i>Immigration Characteristics</i>			
Years in the United States			
<= 5	--	--	--
6-10	0.152	0.221	1.164
11-20	0.583	0.240	1.791*
21-30	0.332	0.285	1.394
31+	0.311	0.402	1.364
Age of arrival to United States			
Under 6	--	--	--
Between 6 and 15	-1.340	0.276	0.262***
Between 16 and 29	-2.311	0.291	0.099***
Over 30	-2.632	0.364	0.072***
Naturalized	0.681	0.183	1.977***
Spouse born in United States	1.003	0.184	2.727***
Constant	0.926	0.370	2.524*

N = 3,265

*** p<.001, ** p<.01, * p<.05

Data Source: American Community Survey pooled 2006-2010 sample from the Integrated Public Use Microdata Series

VITA

Sarah Hendricks grew up in Blacksburg, Virginia, home of Virginia Tech. She received her BA in Sociology from Princeton University in 2000, and then spent two years working with community organizers to build the Albany Park Neighborhood Council in Chicago, Illinois. She returned to southwestern Virginia to serve two years with Americorps Vista before embarking on graduate studies in 2006 with the University of Tennessee. As a graduate student, she proudly served as Graduate Research Associate and Webmaster for the Society for the Society of Social Problems from 2007-2011. She received her MA in Sociology from the University of Tennessee in 2008 and continued with doctoral studies, to be completed in May 2013.